BUDAPESTI CORVINUS UNIVERSITY

# EXPLORING THE POTENTIAL AND IMPACT OF GAMIFICATION IN BUSINESS HIGHER EDUCATION

PHD THESIS

Supervisor: Dr. Ágnes Wimmer, professor

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Budapest, 2025

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# Table of contents

# Table of charts

# Table of figures

*To Doma, Lili, Réka and Pepe,* ***who taught me to play and make jokes****.*

*To Mom and Dad* ***who taught me to work hard****.*

*To Andrea Balázsné Mócsai* ***who taught me to teach.***

*To Dr. Ágnes Wimmer,* ***who taught me research.***

*Thank you!*

*Motto: Ludus in fabula.*

*Pun. It's base is the latin proverb "Lupus in Fabula" meaning: the wolf in the story, referring to the surprising twist in the story that leaves one speechless* (Kőrizs, 2015). *„Ludus" on the other hand is "play" in latin. „Ludus in fabula" therefore refers to the importance of play in the story, that leaves one speechless.*

*The author's own pun.*

# 1. Introduction

What are games? Why do we play?

Play has an important role in our culture. Play is a purposeless, free, literally unproductive activity (Hamayon, 2016). The individual is free to exist independently of social norms (Deterding, 2015a), yet this "purposelessness" itself is a social norm and purpose, as parents, teachers, and researchers all recognize the importance of play, and Deterding argues that play is a form of escape in a hectic world. Homo Sapiens (the wise man) or Homo Faber (the creative builder) is also Homo Ludens (the playful man) (Gillin & Huizinga, 1951). Play is usually associated with social experiences, enjoyment, imagination, discovery and development. The last two phenomena are also specific to learning. However, learning in the school system is based on explicitly defined rules and objectives, so it is not clear at first sight how learning and play can be linked. The aforementioned benefits and experiences of games and play are the result of the specificity of games, the game elements, because they can - through various hormonal effects such as dopamine or endorphin secretion - lead to psychological effects and altered motivation (Luria et al., 2021; Marczewski, 2015). Can this magic be used to achieve a better learning experience and thus more effective learning? Is it really possible to make education more exciting by enriching it with 'empowering agents' borrowed from games, by adding game elements, that is, by gamification ?

My curiosity to make education more playful stems from my interest in education and, at the same time, my love of games. As a father I take every opportunity with my children, among friends and colleagues to find and exploit the parallels between perceived reality and games. For me, I am motivated by the connection and interaction I have with others through play, by mentoring, by tapping into the synergies in the community, and by serving a loftier purpose. These motivating factors drive me and are certainly related to my love of education as well.

Since 2006 I have been an external lecturer and since 2019, I have been a PhD student at the Corvinus University of Budapest. I have always looked for a way out of the frontal teaching. Before the Bologna system, I was involved in the design of a management and methodology diploma course using complex case studies. Later I developped a management simulation game. Simulation education models, also known as serious games (Deterding, 2016) present the context of management in a complex way. They perform their educational task through several iterations in a safe environment, through experimentation, in effect mirroring real-world

practices. However, it is considered to be very dependent from an infrastructure and funding point of view, as the simulations require a computer and a license fee for their use. So, instead of serious games, I looked for a more universal methodology that could be used in live education, which I found in education enriched with gameful elements.

In my research, I explore the potential and the impact of gamified education in the context of higher business education. Gamified education can enhance the learning experience and strengthen the affective (emotional) side of learning. This is based on the motivational driving forces that are triggered by the components of gamification and the resulting sustained attention and learner engagement. The need to enhance the learning experience is justified by the challenges facing business higher education: the changing business environment, the need to renew economic thinking, the impact of digitalisation and the new learning and content consumption patterns of the younger generations. Overall, universities are having to prepare students for ever more complex tasks, while keeping students' attention and thus teaching-learning more time- and energy-intensive than before. Gamification is part of the evolution of educational methodologies and gamification tools can support educators in adapting the way they teach to the content consumption habits of new generations.

In my research, I explore the motivational theories associated with gamification and identify the main components of gamification. I will also provide insights into the didactic dimension of gamified education in the detail necessary to study gamification. The first objective of the research is to explore the specific relationships underlying the different aspects of motivation-playfulness pedagogy, to understand better the mechanisms by which the playful elements operate. This may help those who are starting to gamify their courses either from a pedagogical, motivational, or direct gamification perspective. Building on these, the second aim of this dissertation is to provide an explicitly detailed and structured summary of the design steps for the gamification of a classroom course. I will outline the challenges of design and implementation and the responses to them. The third aim of the dissertation is to explore the factors that influence the student experience. Based on this, it will be possible to investigate the motivational impact of gamification in the experimental part of the research on gamified courses, which is the central issue of the dissertation.

### *Structure of the dissertation*

Following the Introduction, the **second chapter of** the thesis **presents the background of the research**. In the first half of the chapter, I used the ecosystem model of education as an

overarching theory to illustrate why the gamification of education is now worth addressing. **The rationale for gamification is underpinned by** trends in business higher education: changing economic models, labor market expectations, and generational characteristics of students. All point in the direction of enhancing the learning experience and strengthening motivation. After reviewing the international, labor market, and societal influences, I briefly refer to the strategy of the Corvinus University of Budapest, where gamification also has its place.

The second chapter continues with **a presentation of** the **literature.** Since gamification aims to influence behavior and enhance engagement, I will **first** provide an overview of **the motivational theories** most commonly cited in the gamification literature. To design, implement, and analyze the impact of gamification, it is essential to understand the underlying motivational processes and to find the most appropriate motivational theory to fit the topic. In the literature chapter, **the discussion of motivation is followed by a review of the literature on gamification**: the most common definitions, basic elements, and frameworks are presented, followed by a list of areas of gamification in business and society. It is worth pointing out that elements of gamification are present in the majority of mobile phone applications, thus underlining the relevance of the topic. Still, it is also worth considering the extent to which users are aware of these processes that influence motivation. I will highlight, in particular, the area of gamification in education and **then briefly review the concept of gamification from a didactic perspective.** I will present the parallel between classroom interventions to support education and gamification; here, I will approach gamification from a pedagogical perspective. In my view, gamification techniques can be seen as pedagogical interventions to support education. At the end of the chapter, **I will summarise the theories I have collected on pedagogical interventions, motivational theories, and gamification in a system and give an example of how to** achieve **the interplay between the three dimensions.**

**The third chapter of** my dissertation contains a detailed presentation of the **research design and methodology. I outline the research objectives and the research questions. Firstly, I aim to verify the motivational effect of gamification, and secondly, I seek to answer the question: do students consciously understand and perceive these influencing mechanisms?** After all, these influencing techniques can be found around every corner, both in virtual space and the physical world, and it may be important to prepare our students for this. **After formulating a theoretical model** delimited by questions and objectives, the methodology will be presented in detail: **semi-structured interviews and thematic analysis.** This section will

then conclude with **a look at the paradigms**. The last part of the third chapter describes in detail the steps of the experiment design in my research and the concrete implementation. The reason for this level of detail is that the gamification of the course is context-dependent in a crucial way, making the results of my research difficult to generalize. However, a detailed tracing of the design and implementation steps may help to make these approaches and studies useful in other contexts. In particular, I will compare the **gamification of live seminar classes and online training**. The significance of this is that most of the articles on gamification present research on online training or the analysis of some software or platform linked to live training. The main reason for this, in my opinion, is that gamification of online courses or live courses supported by software is more straightforward and the back-testing is significantly easier than in the case of live classroom training. This **provides an important aspect of my dissertation: gamification and impact evaluation of live seminar class.**

**In the fourth chapter, I present the results of my research**. I will discuss the effectiveness of the methodology and then **present** the **themes and codes** formulated in the thematic analysis**, together with the** relevant **quotations**. I use the quotes to present the students' views on learning experiences and their reflections on motivation and then compare them with the quotes in the context of gamification. Based on the conclusions drawn from the interviews, I will answer the question of whether gamification really had a motivational effect in the experiment. I also show findings on whether the students in the experiment encountered similar influencing playful elements as in most of their mobile phone apps. At the end of the chapter, I summarize the limitations of the research, address the ethical issues of the research, and formulate my position on validating my research.

**I will conclude** the dissertation **with a summary in chapter five**. Here, I will summarise the key points of the research and the results, highlight the lessons learned, and suggest further research directions.

Several supplementary materials can be found in the **appendix to my dissertation**. I present the complete **list of nearly 100 game elements** found in my research**, which** is currently the most comprehensive and detailed table available in the literature. Second, **I situate gamification in the force field of behavioral science and economics.** This is part of my academic pathfinding and helps inform the interested reader about the scientific embeddedness of gamification. The appendices contain additional information on the design and implementation of the research and experiment, in particular **illustrations of** the physical

implementations of gamification, i.e., the personalized **gamified feedback sheets**. To illustrate the developmental stages of these feedback sheets, I have included several versions in the appendices. **As an illustration, I present the questions asked during the interviews in the appendix and** a detailed table of codes and themes generated during the thematic analysis. Finally, I will guide the reader to the **online shared database containing the interviews, transcripts, and coding work database recorded** during my research, using the link at the end of the annex. The dissertation concludes with a bibliography.

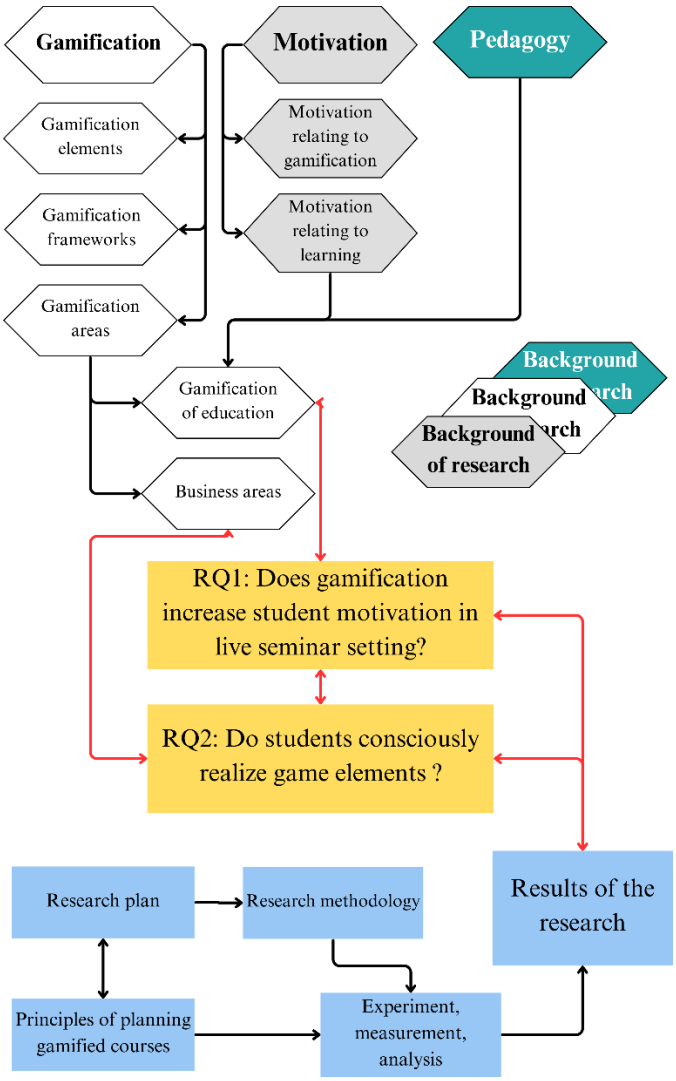
The structure of the dissertation is summarized on 1. Figure (page 16.). It is intended to provide a visual way to facilitate navigation between the dissertation sections.

*Acknowledgments*

It is a cliché among PhD students that the PhD is a lonely road[1]. The many solitary hours are more necessary for immersion. The dissertation could not have been written in a vacuum without a complex constellation of support, advice, and collaboration. I have received invaluable help and flexibility as an educator and researcher. I am grateful to my supervisor, Dr. Ágnes Wimmer, for her guidance and friendship. I thank my department heads, Dr. Zita Zoltayné Dr. Paprika, and Dr. Judit Gáspár, and my institute directors, Dr. Erzsébet Czakó and Dr. Dávid Losonci, for the freedom and flexibility to teach and experiment. Dr. Éva Bodnár, Dr. Magdolna Daruka, and Dr. Olga Csillik gave me crucial advice and feedback during the drafting phase of the dissertation. Furthermore, the shaping of my research approach was an essential factor that helped me to find my way to my own paradigms. I relied mainly on the DIS:CO course led by Dr. Dóra Horváth, Dr. Attila Cosovan, and Dr. Ariel Mitev. I can thank them all by giving the same support to those who come after me.

[1] The loneliness of the PhD researcher (Cantor, 2020)

*1. Figure: Structure of the dissertation*




Research background:
chapter 2, page 16.

Motivation: chapter 2.2.1, page 30.

Gamification:
-elements: chapter 2.2.2.2, page 50.

-frameworks:
chapter 2.2.2.3, page 61.
-areas: chapter 2.2.2.4, page 68.
-education:
chapter 2.2.3, page 76.

Pedagogy: chapter 2.2.3.1, page 81.

Pedagogy+motivation+gamification:
chapter 2.3, page 86.

Research objectives:
chapter 3.1, page 91.

Research methods
chapter 3.3, page 96.

Planninr principles for gamified education
chapter 3.5, page 106.
The experiment:
chapter 3.6, page 109.

Results of the research:
chapter 4, page 133

Source: the author's own work with Canva.com software

# 2. Research background

*"That's what games are, in the end. Teachers. Fun is just another word for learning."*

Raph Koster American writer, game designer, entrepreneur

At the beginning of the chapter, I will use the ecosystem model of education to show why it is worthwhile to address this topic in the context of education and how gamification fits into the world of education, whether at the institutional level or in the educational paradigm. This will be followed by a literature review on motivational theories and then on the theories and practical uses of gamification that underpin the empirical part. Findings on gamification in education

follow this, and finally, building on this, the final section of the chapter will formulate the relationship between motivational theories, pedagogical interventions, and playful elements.

## 2.1. Gamification of business higher education in the education ecosystem

Gamification refers to the use of elements borrowed from games. It is described in the literature as a tool, a method, a comprehensive framework or even an approach that motivates through the experience of experiences and their influence. The literature suggests that their use can lead to a more enjoyable learning experience. The literature (Bai et al., 2020a, Llorens-Largo & Molina-Carmona, 2020, Sailer et al. 2017a) reports predominantly positive motivational effects. At the same time, the vast majority of literature on the study of gamification in education focuses on gamification through some online platform or computer application, mainly because this allows for significantly easier observation, data collection, and analysis[2]. In contrast, my research was conducted in a live seminar teaching environment under the conditions (schedule, assessment, and grading) as prescribed by Corvinus University of Budapest. Thus, the process of designing, implementing, and evaluating the gamification of the course had to be quite flexible and adaptable.

In business higher education, institutions aim to prepare students for the challenges of business and society. As many business processes[3], computer programs, or mobile applications today apply gamification elements, it is important to familiarise students with these "motivational" elements, their effects, and their potential applications[4]. This is why limiting the study to higher education in business is appropriate, as the center of education of business-related motivation. Just as in the process of higher education in science and engineering, field work, laboratory or workshop work, which serve to put theory into practice or for demonstration purposes, plays an important role, so in business higher education, given that it is about understanding the functioning of systems (companies, organizations) operated by people with limited resources. The educational solutions are, by analogy, case studies, project work and simulations, and, in my opinion, also work experience. All these are typically group tasks requiring competition or even collaboration. In this way, in addition to learning from the task at hand, students acquire

[2] For further justification, see later chapter 3.5 from page 102.
[3] Their classification and a summary can be found in chapter 2.2.2.4, page 68.
[4] The business-economic impact of gamification is estimated at USD 70 billion by 2030 (Dhapte, 2024), which is significant reason alone to explore its potential role for education.

communication, cooperation, and possibly leadership skills, ethical considerations, and the basics of social responsibility. To do this, instructors need two types of knowledge: concrete professional knowledge on the one hand and pedagogical knowledge to transfer knowledge simply through analogies and abstractions on the other (Shulman, 2013). Experienced teachers know that one explanation is not an explanation, and therefore the pedagogical toolbox must be colorful in keeping with the complexity of the subject matter. In business higher education, therefore, the essence of these methods is to help the student fit in, there and then, with the assigned task context. They need to see themselves, their role, and the impact of their behavior and choices in that context. While science and engineering experiments are typically well described by physical and chemical formulae and the outcome is predictable - in laboratory conditions, the solution of case studies, simulations, and all group work always has the imprint of the individual: their motivation, their personality, their group dynamics and even the influence of the instructor's attitude. Human behavior can, of course, also be predicted, but in my opinion, with much greater error than the silver mirror experiment in a chemistry class, and the latter can be repeated countless times with little resource input, which is not the case for a project. Project work and simulations are usually collaborative tasks. This is linked to the motivational factors associated with community or even rapid feedback[5]. The aim is for students and participants to be immersed in the activity, to experience it, to receive immediate feedback and thus to develop. This is what gives gamification of education its beauty, its relevance and the complexity of the subject.

Why is this even necessary? Firstly, as the use of tools has evolved throughout human history, there is a constant need to develop methods of knowledge transfer, so teachers have adopted a range of methods from basic visual aids (Vörös, 2011) to project work involved in teaching and other areas of life. With gamification, it can be noted that many of the essential basic elements that fall under the heading of gamification are not new today, and have long been used in other guises, whether in education or other fields. For example, narrative in gamification refers to a story or plot that gives context and purpose to participants and helps them to find meaning in the completion of tasks. So they are not simply completing a series of tasks but are 'living a story' or becoming part of an 'adventure.' However, an early example of the use of narrative is the 1906 Swedish environmental education material based on the well-known Swedish cartoon The Adventures of Nils Holgerson, penned by the Nobel Prize winner for Literature Selma

[5] I explain it in more detail in chapter 2.2.1, from page 30.

Lagerlöf (Rahn, 1986). I use the ecosystem model to show the factors that make gamification an important phenomenon and why it has just emerged as a possible response to the challenges of higher education.

An ecosystem is a complex system made up of many units whose components are interconnected, working together towards a common goal and, at the same time, competing with each other, which can be a necessary condition for the system's development. For an education ecosystem to function effectively, there needs to be mutual trust between its components and generally accepted norms. Learner-centered thinking is of paramount importance, with an emphasis on autonomy and customized processes to meet individual needs rather than on strong student control. In the educational ecosystem, university research is increasingly multidisciplinary, with closer links to the rest of the ecosystem and even with growing international educational research implications. An effective educator in such a system is "*responsive to change, flexible, able to respond to changing student needs, and with a broad repertoire*" (Csillik, 2022, p. 57).

The ecosystem comprises several closely interrelated levels (Niemi, 2021)**. The macro level** includes different levels of education (such as secondary and higher education) as well as national strategies for curricula or assessment systems. It also includes support for lifelong learning and, in my view, should also include policies for life-wide learning. **At the meso-level**, institutions (schools, universities) are embedded in their specific infrastructures, cultures, and management characteristics. At this level, we find essential links in the form of cooperation between educational institutions and certain economic actors: this enables the development of innovative teaching and working methods and the flow of information on labor market supply and demand. This allows educational institutions to better understand the evolution of labor market needs. The **micro level** refers to individuals, students, and teachers who have unique stories, experiences, and particular characteristics, including their own innate genetic and neurological traits. I structured the ecosystem analysis based on the work of Csillik (2022).

### 2.1.1. The importance of the macro level of the education ecosystem

This level in the ecosystem determines the large-scale social, economic, and political factors that influence education at the national or even international level. These factors include social and economic phenomena, cultural aspects, policy, and academic thinking.

*Changes in economic models*

Economic education is a reflection of business. The dynamic changes in the global economy that the education is about: the emergence of new business models, the emergence of sharing business models (e.g. Uber, Airbnb), the boom of start-ups, the development of online commerce, the large amount of data collected by digital platforms and the resulting ability to segment markets and influence them with pinpoint accuracy. To understand and analyse new economic models, it is necessary to rethink and develop long-used methods. An example is Porter's 5 forces model (Porter, 2006) , which is used to assess the success of firms competing within an industry. We may feel the need to extend it to be well suited to the specificities of e-commerce, the social economy, or clustering in complex innovation and manufacturing-services hubs (Hámori, 2023). In addition, slowing economic growth, ageing societies, repeated transformation and localisation of supply chains, increasingly stringent data protection regulations and geopolitical divisions (World Economic Forum: Future of Jobs Report 2023, 2023) require increasingly agile adaptability. Business higher education can no longer teach standard solution schemes for solving predictable problems (Kai-Holger, 2016). The increasing complexity of economic and business models also places greater responsibility on business higher education institutions. Not only more complex facts, formulas and contexts, but also additional societal phenomena pose more and more complex training challenges.

*Trends in higher education*

Scientific disciplines are becoming isolated through specialisation (Illés, 2019), but as scientific tasks become more complex, more complex methods are needed to map and process them. Thus, in an interdisciplinary way, researchers can also draw on other disciplines (Lukovics & Zuti, 2018). Lucas et al. (2017) add that the volatility of markets makes it necessary to use increasingly complex quantitative tools. In the future, many other phenomena will permeate the field of education, calling for further innovation in methodology and content. These include artificial intelligence, robotics, sustainability and globalisation. Their specificities need to be

reflected in education: in hybrid forms of education, personalised processes, game-based learning and immersive experiences[6] (Ciolacu et al., 2017). According to publications by the World Economic Forum, the OECD and many other experts, "the criteria for *an innovative* pedagogy" (Lannert, 2023, p. 9):

- motivates students in a playful way, encouraging active participation and reflection, and through social interaction, providing a truly good learning experience
- embodied in practical, experience-based forms of training
- use modern infocommunication platforms in a way that students can learn to use them in a meaningful way

**Understanding** and constructing **more complex subject knowledge requires a higher level of student engagement**, which is **the clear aim of gamified education**. As is a good learning experience, playfulness and the use of info-communication platforms.

### *Labour market expectations*

In fact, changes in the economic environment and trends in higher education mean that universities have to prepare students to deal with increasingly complex problems, where it is harder to keep their attention and thus learning (knowledge construction) requires more time and energy. While facts and observable data and routine tasks are generally easy to learn (Pitt & Britzman, 2003), understanding abstract constructs and complex structures is more difficult. From a different perspective, linear topics or material that is easy to represent visually is probably easier to teach than interdisciplinary contexts or knowledge that can be linked to value judgements and individual experience. Alongside subject-matter and technical knowledge, universities have an essential role to play in equipping prospective employees with the skills to adapt to the ever-changing demands of the labour market. Potentially in collaboration with their colleagues on the other side of the world. To illustrate this, the World Economic Forum's list of key work skills projected for 2015, 2020 and 2025 is presented in 1. Table. I draw particular attention to the dynamics of change. From 2015 to 2020, 2 new skills have been added to the top 10, the others have basically just changed swapped places. However, by 2025, 6 completely and 3 partially new skills have been added, and the items remaining in the list of the previous top 10 skills have lost their importance. In my opinion, the experts have not really been able to

[6] For example 3D printing or virtual reality.

draw up a list of ten for 2025, since - I think just to include the ability - they have put, for example, analytical thinking and innovation, two quite distinct skills, in the same category.

*1. Table: Top employee skills*

| | Top employee skills | | |
|---|---|---|---|
| # | 2015 | 2020 | 2025 |
| 1. | Complex Problem Solving | = Complex Problem Solving | Analytical Thiking and Innovation |
| 2. | Coordintating with Others | ↑ Critical Thinking | Active Learning and learning Strategies |
| 3. | People Management | ↑ Creativity | ↓ Complex Problem Solving |
| 4. | Critical Thinking | ↓ People Management | ↓ Critical Thinking and Analysis |
| 5. | Negotiation | ↓ Coordintating with Others | ↓ Creativity, Originality, Initiative |
| 6. | Quality Control | Emotional Intelligence | ↓ Leadership and social influence |
| 7. | Service Orientation | ↑ Judgement and Drcision Maknig | Technology use, monitoring and control |
| 8. | Judgement and Drcision Maknig | ↓ Service Orientation | Technology Design and Programming |
| 9. | Active Listening | ↓ Negotiation | Resilience, Stress Tolerance and Flexibility |
| 10. | Creativity | Cognitive Flexibility | Reasoning, Problem-Solving and Ideation |
| | Legend: | ↓ Skill lost importance<br>↑ Skill gained importance<br>New, or partially new skill | |

Source: Grey (2016) and Whiting (2020) edited by the author.

It is important to highlight that among the key capabilities for 2025, there is a place for "technology design", also known as UX/UI (User Experience-User Interface) design: a modern approach to process design that relies on a motivational background similar to gamification. Its main goals (Kaasinen et al., 2015) are to provide a good user experience, to create an easy and intuitive user interface, and to create visually appealing and understandable interfaces. To achieve this, it uses the results of user research. **This makes it very similar to gamification, as gamification is based on understanding user behaviour and motivation and aims to motivate and engage users as much as possible in the target activity.**

### *Thinking about learning*

The perception of teaching and knowledge affects the institution operating in the ecosystem at the mesoscale and also affects the teachers and students who teach and learn there. After all, the

certification of diplomas, the pathways to them, the accreditation of institutions are all linked to the way we think about the creation of knowledge. Moreover, the macro-level phenomena mentioned earlier, such as changes in technology or the transformation of economic models, can also give new direction to ideas about knowledge and its construction. Two phenomena should be included in this category. First, the role of the **learner-centred learning process** is crucial. The emphasis is on the active, autonomous (self-regulated) learning activity of the learner. At the same time, knowledge is created by the instructor by taking into account the learner's characteristics and individual needs through tasks that can be linked to real-life situations (Katona et al., 2020). In other words, the learner is actively involved in the construction of knowledge (Bovill & Bulley, 2011). Thus, the learner is not passive, the teacher as an advisor or facilitator supports the learner in constructing knowledge in the most effective way in the light of his/her own individual needs. On the other hand, the role and impact of individual characteristics is also reflected. The impact of the individual and the subjective approach. In other words, *instead of concepts based on* "*normative, absolute truths, a plurality of perceptions of reality and values is brought to the* fore" (Feketéné, 2002, p. 29) . "*Every statement is the statement of an observer*" (Feketéné, 2002, p.23). Adult learners (university students) have to interpret their own personal challenges (information dumping, tensions in the world and in their human relationships, environmental pollution, etc.) and find solutions to them. Moreover, the complexity of reality is not linear (easy to understand), but a network of relations and interconnections. Thus, the concrete subject knowledge taught in frontal education is less useful, the solution tailored to the individual, personalised and fitting into his/her own patterns may lead to results (Feketéné, 2002).

In my opinion, the constructivist phenomenon discussed in the ecosystem analysis is one of the most interesting perspectives from which to look at gamification. At first sight, there is a fundamental similarity, as **personalisation in the interest of the individual**, in my opinion, is **one of the most powerful game mechanics**. Some authors have therefore perhaps more than necessary conflated these two different phenomena. For example, on the topic of constructivist gamified education, Machmud et al.(2023), Szirtes (2022) and Ng et al. (2023). **It is important to note, however, that gamification is merely the application of operational mechanics borrowed from games and that there is no theoretical model of gamification as a means-method of constructing knowledge**. By using gamification, we can also provide students with the opportunity to make choices, to define their own learning path and thus to construct their own knowledge. However, this choice of path is essentially only behavioural, not an internal

psychological change, and can therefore be more abstractly related to the so-called behaviourist theory of learning: learning is a change in behaviour, which takes the form of responses to external stimuli. From a gamification perspective, knowledge construction is seen from an external perspective (Bíró, 2014)**. So, gamification has an overlapping goal with the constructivist paradigm (personalisation), but the way to get there is to control, to guide, to reveal possibilities, rather than to develop self-regulated learning**. Adding elements of games to traditional learning environments is a way of harnessing imagination and can increase engagement: through personalisation, designing reward systems (Kapp, 2012). The same is approached from just the other side by Seraji et al. (2023), who assess the so-called serious games[7] associated with gamification by comparing their mechanical elements with some of the features of constructivist learning theory (interactions, problem solving, active learning and discovery).

Finally, in relation to the constructivist approach, I would like to mention that this is reflected in the research paradigm of my dissertation[8]: the basic laws of reality are given, but its interpretation and evaluation is subjective, dependent on the individual, thus the researcher (the teacher in constructivist learning theory) influences the course and outcome of the experiment (learning).

### *Generational traits*

An important factor in the learning process is the preparation, concentration and learning characteristics of students at university. Here I highlight the topic of the so-called Generation Z (born between 1995 and 2009) based on the literature. Although researchers are not unanimous in the generational debate, educators should be prepared for the fact that the behavioural patterns of the younger generations are different, and that they need to be approached and motivated in a different way than their predecessors (Shatto & Erwin, 2016; Tari, 2015). From the perspective of educational innovation, they are characterised by "*dependence on rapidly evolving digital tools, adaptive use of newer and newer digital solutions, holistic and visual approach, results orientation, creativity, interest-driven, self-confidence, need for freedom of expression, preference for practice- and activity-oriented experiential, group learning,*

[7] Learning games, which I describe in more detail in chapter 2.2.2.1, page 45.

[8] The links to the paradigms are set out in chapter 3.4, from page 100.

*multitasking, need for continuous feedback and peer opinions, importance of trust*[9] " (Csillik et al., 2022, p. 209). They have grown up in a world where internet use is commonplace. This has fundamentally transformed human relationships and communication. The new communication relations are characterised by multidirectional, parallel messaging, short, concise messages, the predominance of visual content, the use of English expressions and abbreviations, and the visual expression of emotions and moods. Technology adaptation (digital platforms, big data analytics, Internet of Things, artificial intelligence, etc.) fits with the constructivist approach: versatility and accessibility are the hallmarks of technology in learning. What can be transformed from learning interest (which means knowledge possession) to knowledge construction, from externally directed learning to self-regulated learning (Machmud et al., 2023).

Changing content consumption habits and labour market challenges require educators to exploit the potential of inormation-communication tools and modern methods of learning[10] ( Csillik et al., 2022)**. The use of gamification elements** (e.g. freedom of choice, competition, reward, development, etc.) is also **appropriate in education** because of the role of games in the lives of the new generations of learners.

### 2.1.2. The characteristics of the meso level of the ecosystem

**The meso level** is the transition between the micro and macro levels, and includes the institutions and organisations that directly influence educational processes. In the case of my dissertation, it is the organisation of Corvinus University of Budapest, its overall and educational strategy and the decisions derived from it, which map the responses to changes from the macro level to the level of education being delivered. Among the sources specific to the meso-level, I have chosen the comprehensive strategy and the educational strategy of Corvinus University, because I consider them to be sufficiently comprehensive and not unnecessarily detailed to justify the existence of the gamification theme.

The overall strategy document *(Corvinus Renewal Agenda 2030*, 2020) sets out the university's mission and the goals needed to achieve it. "*Corvinus University of Budapest educates the responsible economic and social elite of Hungary and Central Europe in the twenty-first century.*" Among the goals is a first-class student experience (customer experience): "*Corvinus*

[9] The use of digital platforms, visual approaches, freedom of expression, feedback and trust are recurring phenomena in the empirical part of my dissertation, in chapter 4.4 from page 139.
[10] Project work, case studies, blended learning.

*must provide its customers with a service that is always outstanding professionally, always predictable and reliable, and always engaging, humane and supportive in its communication*." (*Corvinus Renewal Agenda 2030*, 2020, p. 8). It also puts some organisational changes at the service of its strategic goals, highlighting in particular the importance of the "*student journey*" and "*student onboarding*" *(Corvinus Renewal Programme 2030*, 2020, p.10). As a general goal of university education, it emphasises *the need to* "*always strive for the best in the work at the university; the student/partner first, the University second, the individual* interest *third*" *(Corvinus Renewal Agenda 2030*, 2020, p. 11). It identifies mutual respect as the basis of university community life, and the common goal of serving the well-being of society as a whole.

The mission statement underlying the education strategy is to "*be able to identify opportunities and challenges along environmental, technological and societal transformations, and to put their knowledge at the service of sustainable social and economic development*" and "*our graduates are ready to make a lasting positive impact on their professional field and society as a whole*" *(Education Strategy 2024-2027.*, 2022, p. 3) in a way that enables them to adapt to economic and technological change. To do this, the organisation will create the necessary resources in the form of, for example, infrastructure, internal training, conference participation, "*using state-of-the-art teaching methods and tools; providing an in-depth theoretical and methodological foundation; integrating real, practical challenges and transversal*[11] *competences into the curriculum*" and "*not as a single subject but* infused *into the curriculum*" *(Education Strategy 2024-2027*, 2022, p. 5).

At the macro level of the education ecosystem, we have seen that more complex economic models, higher education trends, labour market changes or generational specificities make the way we teach increasingly important, alongside, perhaps even above, content. A summary of the meso level can also be related to the philosophy of gamification in several ways. Mutually agreed values are in themselves **community-builders**, signifying **belonging to a community status,** and can be an important part of an onboarding process for a new entrant. All of these can be (also) found in the gamification toolkit. Performance as a result of the work and the ways in which it is displayed (league tables, performance indicators, praise, etc.) are elements of paramount importance to the player. Joint efforts point the way towards a **clearly defined**, **meaningful goal**; both are (also) a key motivational element behind gamification. All of these

[11] Transversal competences (also known as transferable competences) are competences that will be essential requirements for the student's future jobs, regardless of the job or profession (Lannert, 2023).

help to enhance the student experience, which is the purpose of gamification of education: they mark the foundations of active and interactive education, enabling individual learning pathways, building on state-of-the-art technologies and platforms. As well as the efforts associated with gamification. I would particularly highlight the approach set out in the Education Strategy, which often **favours the development of subject matter** not directly in the form of curricula, but **by 'infusing' subjects.** This was my secondary aim with the gamified educational research and experiment: in addition to creating a unique motivational experience **to introduce** students to the **role of** gamification **in the economy and the world of work.** In other words, I did not develop a "gamification" subject[12] , but **integrated the elements in** question **into a feedback mechanism for** a course, similar to the functioning of many processes and platforms found in business. Although the knowledge of a methodology is not a "competence" in the strict sense of the word, **the methods of gamification are independent of the professional field** (the target stream to be influenced)**, and** therefore **their application is** as much **a transversal-transferable knowledge as the competences mentioned** above. In further chapters of this dissertation, I will write more about the elements of gamification (chapter 2.2.2.2) the motivational background (chapter 2.2.1) and the myriad of gamification applications in the business world (chapter 2.2.2.4).

The importance of gamification in education lies in the fact that it can provide instructors with motivational power, help students' engagement in learning, increase student motivation, and thus, according to many authors, lead to better learning outcomes (Anderman & Gray, 2015; Bai et al, 2020a; Chapman & Rich, 2018; Kenéz, 2016; Marinho et al., 2019; Oliveira et al., 2020). The importance of this approach is reflected in the widespread use of gamification approaches in academic and business education. Some related examples are: the University of Waterloo in Canada, the University of Brighton in the UK and the University of Liège in Belgium offer courses in gamification, and more complex master's courses in gamification are offered by, for example, the Spanish IEB and Barcelona University, Michigan State University in the US, the Swedish Skövde College and the Australian University of Technology (Baikins, 2020). Among the online platforms selling open courses, the well-known Udemy *(Udemy Gamification Courses*, 2023) and Coursera *(Coursera Gamification Courses*, 2023) offer 264 and 28 gamification training courses respectively[13] . In these courses, participants can gain

[12] I will mention this separately in the final part of the dissertation.

[13] The importance of the latter is illustrated by some statistics on the businesses in question. According to Udemy's investor page *(Investor Overview Udemy* |, 2023) offers more than 200,000 courses in 75 languages to its 64

insights into motivational theories and all the gamification mechanics that can be used to influence the perception and motivation of participants in the gamification process.

In chapter 2.2.2.4, I will show how these playful elements have been used in a wide range of business and social contexts for years. This is how participants in gamified courses can get closer to a modern methodology of influence that is almost pervasive in business and society. Therefore, one of the aims of my dissertation is to bring this modern approach to gamification closer to the students through a gamified course, in addition to its motivational effect. Therefore, I will investigate whether students will notice parallels between the elements of the gamified course and the influencing (gamified) solution used in most applications of the mobile phone in their pocket[14]. Emphasizing the importance of gamification - from a philosophical point of view - Roth (2017) argues that the spread of gamification in social life is such that it is not possible to draw a sharp line between lived world ("realities") and games: it is mostly a "*new level of reflexivity of communication design and a new self-image of society*" (Roth, 2017, p. 1). With this, I would like to emphasize that by experiencing gamified interventions that challenge students in different ways, a gamified methodology of motivation can be understood, which students can apply in the future as workers, teachers, parents or leaders in their own profession, with experience behind them, even if they have not explicitly learned gamification, but have only encountered this methodology of motivation  part of an experienced pedagogical methodology.

### 2.1.3. Linking the micro level of the ecosystem to the disserrtation

The micro-level of the educational ecosystem is the teaching-learning arena, focusing on the interaction between learner and teacher. It includes all elements that affect the learning process (OECD, 2017). Furthermore, the set of interactions between them: assessment, feedback, motivational elements. More broadly, it also includes the educational environment, the physical tools used in learning and teaching, and therefore, in my opinion, a significant part of the direct factors that are relevant to the construction of knowledge.

million users, and Coursera boasts 129 million subscribers *(Coursera, Inc. - Coursera Reports Second Quarter 2023 Financial Results*, 2023).

[14] The research aims and research questions are explained in the chapter 3.1, from page 91.

In my dissertation, I explore this level of the ecosystem: is gamification really useful in live seminar classes? Does it really enhance student experience and motivation? Education is both a science and an art; the sharing of subject knowledge and its distribution in the squeeze of mass education and the 'average' in the old-fashioned classroom environment. (Lovat et al., 2003). In traditional education, the teacher held the knowledge, showing the way to the students in a formal and frontal way, forcing them into a truly passive 'listening' role. Today, the literature (Bodnár & Sass, 2020, pp. 7-8) distinguishes between four roles. On the one hand, it is necessary for **the teacher** to be **diagnostic**: he or she must be able to assess the students' abilities. In the role of **mentor**, he/she should be patient, develop a direct relationship with the students and support their learning with his/her experience and advice. In the course of teaching, **the teacher** must **become a trainer** who not only teaches, but also understands the behaviour of students and their groups, provides guidance and sets an example through his or her own behaviour. Finally, **the teacher is** also **a leader.** In this way, he or she motivates and inspires the students, bringing together all the learning activities in a complex system. What do students think about this? According to them, a good teacher is open, prepared, helpful and above all interesting (Csillik, 2018). And teaching is achieved through the presence of the teacher, "*in the learning community of teacher and students*" (Bodnár & Sass, 2022, from 05:20).

The teacher's task is to help the learner to form, develop and change his or her own conceptions of the science in question. In this respect, the literature (Badia & Iglesias, 2019) distinguishes between **instructivist** and constructivist approaches. According to the instructivist orientation, through the transmission of knowledge material and concepts, students thus internalise a copy of external reality. I would add that this certainly refers to the reality as perceived by the students. According to the **constructivist** approach, the instructor creates a powerful learning context that facilitates the active development of the students' knowledge base, often complemented by experimental-practical interventions. The acquisition of the factual material on which the lessons are based is essential for effective knowledge construction, and an instructivist approach is therefore necessary in this respect. The material learned is better deepened through affective experiences (Józsa & Fejes, 2011), so it is worth considering and, whenever possible, using lighter ways of doing so, such as gamification, thus moving closer to a constructivist approach to teaching. Gamification has a specific place in activities where community, communication skills, contact, possibly task subdivision (projects), competition, problem solving are important. And the use of these skills is clearly typical of business and

management education, and **therefore a meaningful and useful research topic in this context is the study of gamification.**

## 2.2. Literature review: motivational theories, gamification and pedagogy

The use of gamification aims to increase participant engagement or motivation. The phenomena related to my dissertation are therefore clustered around motivation, learning and gamification. Therefore, I will begin with a literature review of motivational concepts and motivational theories. I will then examine the definitions, building blocks, more complex frameworks and applications of gamification, followed by a brief discussion of pedagogical interventions, showing the place of gamification in the pedagogical literature. I conclude the literature section by exploring the links between motivation, gamification and pedagogical interventions.

### 2.2.1. The role of motivation and influencing motivation in learning

A brief overview of motivational theories is essential because of the motivational effects of gamification. Individuals are motivated to persevere in activities that lead to goals (Anderman & Gray, 2015). The reinforcement of motivation to learn is clearly reflected in learning outcomes (Fejes, 2015). The mechanism of action of gamification works by capturing the attention of the participant in the gamified process (education, shopping, etc.) and reinforcing his/her motivation. There are many motivational theories in the psychological literature, but due to the focus of my dissertation, I will specifically discuss theories related to gamification and learning.

Several overlapping concepts of motivation and motivated learning can be found in the literature: attention, engagement, presence, cognitive absorption, flow, involvement, immersion, attitude. In my dissertation, I focus on the constructs of motivation and engagement[15] . The definition of the difference between engagement and motivation is not consistent in the literature. One perspective is that motivation refers to intention and engagement refers to action (Lee et al., 2019). Researchers agree that both motivation and

[15] For more on the unexplained concepts, see Bouvier et al. (2014), Brown (2016), Curran (2013), Józsa and Fejes, (2011).

engagement are influenced by context, that personal responses differ from individual to individual, and that both constructs are strongly related to learning outcomes (Christenson et al., 2012). The authors add that for work and research on classroom support interventions, it is unnecessary to distinguish between the two concepts (Christenson et al., 2012, p. 41). **Accordingly, in my dissertation I consider the concepts of motivation and engagement as equivalent.**

The concepts of motivation and engagement are typically associated in the literature with the learning experience. This is perceived by learners as being enhanced by good feedback, interesting learning material, a supportive community, autonomy and a sense of achievement. Molnár (2002, p.63) stresses the importance of this: „*we need to help our* learners *to make learning an experience, a need or even a flow (...) for them".* Lo et al. (2022) used a literature review and modern quantitative research methodology (structural equation modelling, SEM) to demonstrate that good learning experiences, whether pedagogically or performance-based, had a significant positive impact on motivation to learn. In fact, good teacher-student interactions, supportive and collegial atmosphere were found to be explicitly conducive to student motivation. **In my thesis, I will either discuss the influence of learning experience or the influence of motivation-engagement, depending on the context. Although these are psychologically distinct phenomena, the distinction is not the focus of my dissertation.**

Motivation is seen in the literature as an intrinsic process that energises the individual, drives them towards a pattern of behaviour and helps to maintain it (Dostert & Müller, 2021). Behind this simple definition, however, the reader can discover nearly 30 theories that only partially overlap (Singh & Drew, 2023). An easy-to-understand and visually clear comparison of the more familiar theories is presented in the work of Dostert and Müller cited above. According to the authors, an individual is either "pushed" into action by an internal motive or "pulled" into it by an external goal or incentive. The authors add that the motive is an internal inclination that drives the individual towards a desired goal. The goal is a mental representation of the desired outcome that the individual wishes to achieve. Factors influencing motivation (Dostert & Müller, 2021 p. 470) include the individual's goals, emotional state, belief in his or her own abilities, and expectations of the environment (supportive or hindering). Accordingly, it is expected that any intervention aimed at changing behaviour will have a different impact on the individual. In addition to these, there are a number of different constructs (game experience, development, social connectedness, etc.) associated with play alone, to which individuals are expected to differ in their sensitivity. In summary, **the motivational effects associated with**

**games and play are difficult to capture because of the diversity of constructs that vary widely in terms of individual preferences, feelings, environmental conditions and, finally, content and presentation of the** participating **stakeholders.** In relation to the research design, I will specifically address this challenge and the response to it[16].

In my dissertation, I present the most frequently cited theories in the literature on gamification. Given the fact that gamification is an activity aimed at influencing the motivation of the person involved, the elements and frameworks of gamification presented in the subsequent chapters of the literature can be logically more easily grasped and then placed together with motivations in a coherent system of thought in a later chapter[17].

The literature search on motivation theories was conducted using Publish or Perish 8.9.45 software, using the search terms "gamification AND (or",") motivation AND theory" in Google Scholar, Scopus and Cross Ref databases. I organized the results in an Excel spreadsheet, sorted them in descending order by number of references, reviewed 74 most cited literatures after filtering out overlaps, and adjusted this list with relevant literatures I read during my studies. This was necessary because using keyword search alone, the search engines did not return, for example, B.J. Fogg's model, which is specifically designed to describe and model the influence of behaviour, only the author did not call it motivational theory, but Fogg's behavioural model. Further research work has shown that the names some theories are not consistent in the literature, e.g. goal theory, orientation theory, achievement goal construct all refer to the goal orientation theory presented at the end of this chapter. The 74 most frequently cited articles were processed using the saturation principle: the articles at the end of the relevance ranking did not present any new theories, so I did not continue the research. The results of the related literature search are considered in the light of the theories that were mentioned in at least five percent of the articles. In the table summarising the theories, I present a data series showing the importance of a motivational theory in terms of the percentage of articles in which the theory was the only theory mentioned. I have supplemented the results with the goal orientation theory and BJ. Fogg's theory, based on my own research decisions. The former is explicitly related to learning and is thus inextricably linked to the topic of my dissertation. The latter model is a kind of transition between theoretical and practical approaches, generally focusing on the

[16] I summarise it in chapter 3.
[17] Chapter 2.3 from page 86.

behavioural aspects of interventions, and I considered it sufficiently important to present a more complete picture of the topic of gamification-motivation influence in the dissertation.

Finally, in order to discuss motivational theories, I think it is necessary to clarify the concept of the "game element", which discussed in more detail later. Gamification can be used to influence the motivation of the participant in the process. In gamification, this can be achieved through the use of game elements. Game elements, also known as mechanics, are thus tricks learnt from games, such as various forms of immediate feedback on performance: the use of progress indicators, rankings, badges and trophies. In this way, the participant can immediately see his or her progress in a clear and comprehensible way.

*2. Table: Motivational theories in the literature*

| Name of theory | Reference to literarue | What % of articles mention? | What % of articles mention exlusively? |
|---|---|---|---|
| Self determination theory | (Deci & Ryan, 1985) | 78% | 45% |
| Flow theory | (Csikszentmihalyi, 2008) | 22% | 3% |
| Goal settig theory | (Locke et al., 1991) | 15% | 3% |
| Skinner's theory | (Richter et al., 2015) | 9% | 0% |
| Expectation theory | (Anderman & Gray, 2015) | 8% | 1% |
| Social comparison theory | (Festinger, 1954) | 7% | 1% |
| Social cognitive theory | (Bandura, 1999) | 8% | 0% |
| Fogg's behavioral model | (Fogg, 2009) | based on my own decision | |
| Goal orientation theory | (Fejes, 2015) | | |

*Source*: *the author's own work*

A brief presentation of the motivational theories is given - in the order of their relevance. **The order of presentation is irregular, starting from the less frequent theory to the theory of self-determination.** The reason for this is that self-determination theory is considered by many authors to be a comprehensive theory, and therefore in some respects it can be seen as a summary of the other theories. I will then present Fogg's model, which I have chosen to include

here, followed by Flow theory, which is like it, and finally goal orientation theory, which is related to motivation to learn.

### *Less common motivational theories associated with gamification*

Albert Bandura based his **social cognitive theory** on the so-called phenomenon of mutual determination, which refers to the interactions between individuals and between individuals and their environment (Bandura, 1999). The individual is not just a passive observer, a sufferer of the influence of the environment on him, but the individual and his environment interact: „*In this model of reciprocal causality, internal personal factors in the form of cognitive, affective and biological events; behavioral patterns; and environmental events all operate as interacting determinants that influence one another bidirectionally"* (Bandura, 1999, p. 6). The author points out that the degree and quality of the interactions between the former are not set in stone, but take on value depending on the situation, circumstances, opportunities and social context (Bandura, 2000).

Two comments on the interconnection with the environment should be underlined. On the one hand, the individual's self-efficacy beliefs, whether pessimistic or optimistic, can facilitate or hinder both the individual's own performance and his or her interaction with the environment (Bandura, 2000, p. 10). On the other hand, individuals internalize through their learning activities by observing the environment (other learners) and using what they learn from it (Anderman and Gray, 2015, p. 932). The latter is intrinsically linked to social experiences and the online content consumption habits of the young generations (blogs, media channels, YouTube, Facebook, Twitter, etc.).

Closely related to community is **the theory of social comparison**, according to which individuals judge themselves and their abilities by comparing themselves with other individuals. It is through constant social comparison that people come to know themselves and their own opinions better. The comparison can be made to individuals who are 'stronger' than oneself or 'weaker' than oneself. In the first case, the need to catch up can act as a motivating force, and in the second case, it can increase self-confidence (Festinger, 1954). In all these ways, the individual reduces uncertainty about himself, his place in the world, his "worth". In conclusion, the theory emphasises the importance of community interactions.

According to **Victor Vroom's expectancy-value theory** (Anderman and Gray, 2015; Gopalan et al., 2020; McCelland, 1985), an individual performs an action because he or she believes it

will bring him or her closer to a desired goal. The beliefs that influence behaviour are (1) the task is performed to achieve an outcome, (2) it is to be decided whether the action will bring the outcome, and (3) what the value of the outcome achieved is to the individual. What is needed is the individual's value judgments about (a) the importance - according to his or her perception or belief - of the task to be accomplished, (b) the value or excitement of completing the task, (c) the extent to which the activity brings him or her closer to his or her goal, and finally (d) the resource (cost) that he or she has to sacrifice to complete the task (Anderman and Gray, 2015). If the value of the desired goal is significant to him, his motivation is also enhanced.

B. F. **Skinner**, in the context of his study of learning and motivation, formulated **his reinforcement theory**, one of the earliest theorems of motivation theory describing human behaviour: an individual's behaviour depends on its consequences (Gordan, 2014). With negative feedback, the probability of repetition decreases. The author found that continuous positive feedback is effective in the development of appropriate behavioural patterns, but that their maintenance is better supported by non-continuous (intermittent) positive feedback (Richter et al., 2015). According to Skinner, motivation is thus crucially influenced by external factors.

**Locke and Latham** found in their research that goals have a strong influence on individual performance and motivation. In their **goal setting theory**, they identified principles that describe the relationship between goals and performance (Locke et al., 1991). First, goals that are specific and not too easy to achieve are motivating ('effective goals'), in which case the individual understands what needs to be done and considers them achievable. The person needs continuous feedback to estimate the distance to the goal. Reinforcing feedback strengthens motivation and negative feedback encourages the individual to correct the action. The authors also conceptualised intrinsic motivation as the ability to set and achieve goals that are more likely to be achieved. The context in which goals are set also plays a role in the level of motivation, with a supportive management or friendly workplace culture helping to develop effective goals.

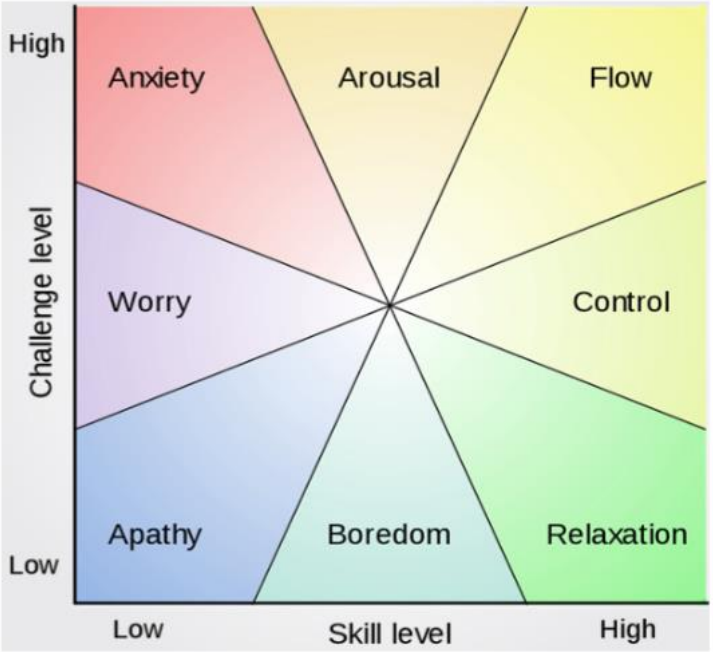
### *Flow Theory*

Mihály Csíkszentmihályi's theory of **Flow** is related to the field of positive psychology. The author coined the concept in 1975 (Csikszentmihalyi, 2008). This state requires that the activity in question is challenging to the individual's abilities: neither too easy, and therefore boring, nor too difficult, which can cause anxiety (see Figure 2.).

To achieve a flow experience, several conditions are needed to help keep the individual in flow during the activity (Marinho et al., 2019, pp. 44): "*clear goals, immediate feedback, balance between challenge and skill, merge of action and awareness, concentration on the task, sense of control, loss of self-consciousness, sense of changed, autotelic*[18] *experience"*.

The importance of feedback and clear and achievable goals is clearly reflected in Locke and Latham's theory. And the balance between capabilities and challenges also plays a role in Fogg's behavioural model, which will be discussed in the next chapter.

*2. Figure: Mapping of feelings in Flow-theory*




Source: Buzady & Almeida (2019, p. 5) edited by the author

A flow experience describes a state of being that involves strong motivation and immersion in the activity. It is an effective state for task solving, work, or learning (Wimmer et al., 2022). The approach and tools of gamification have drivers that can satisfy the conditions of the flow experience in part or in whole (e.g. clear goals, feedback, personalization through challenge and skill balance and equally the experience of free choice and authority). A similar but more

[18] having a purpose in itself

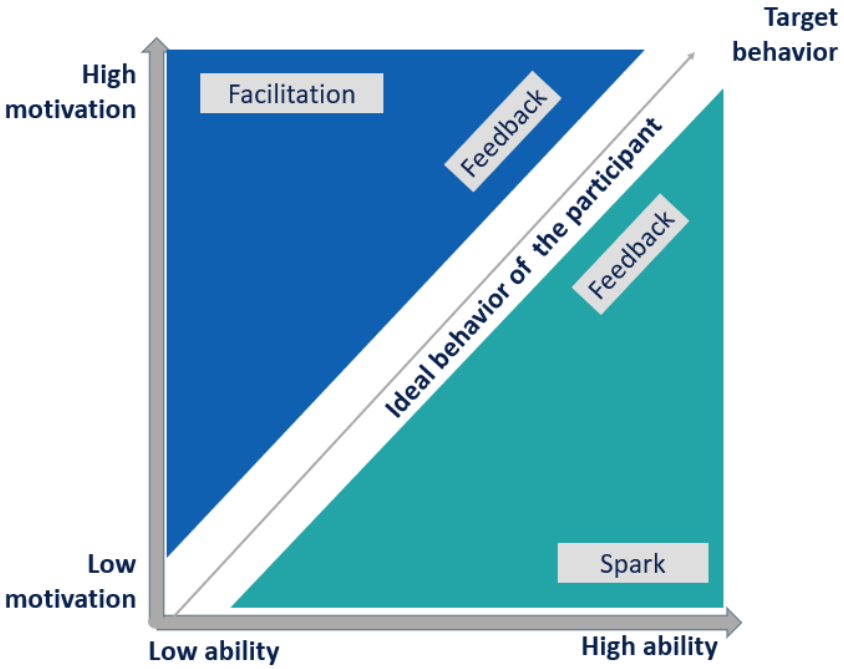
pragmatic approach to the theory is described in Fogg's model in the next section, which brings the thesis closer to behavioural science by introducing an external stimulus (trigger).

### *Fogg's behavioural model*

I think it is necessary to present **the behavioural model of** Stanford researcher **Brian Jeffrey Fogg** because it takes a more practical approach to the motivation of action than the motivational theories discussed so far. In this way, it provides a good link between motivational theories and the more pragmatic (interventions, gamification) parts of the dissertation. In fact, it is not a theory of motivation, but a description of how behaviour is influenced and the background to it. Fogg studied mechanisms - mainly programs and applications - that can change the behaviour of users through some persuasive method or social influence. According to the author, in this framework, motivation can be traced back to three types of incentives - necessary but not sufficient - each with a positive and a negative aspect. These are the pleasure-pain scale, the hope-fear scale and the community acceptance-rejection scale.

According to Fogg, motivation alone is not enough to influence behaviour: the participant must be able to act and some kind of trigger is essential. This is the essential point which, in my opinion, allows Fogg's model to complement the motivational theories approach by applying conscious and pragmatic behaviour influence. A non-zero-sum combination of motivation and ability is essential for action: the two can trade-off within certain limits. Low-motivated but well-skilled people may be willing to take simpler steps. The reverse is also possible: in the absence of skills, an actor with the right motivation may pull out all the stops to achieve his goal. The author sums up: highly motivated people will take exceptionally difficult actions. The trigger can be any phenomenon that the actor notices, that links the phenomenon to the behaviour he is aiming at, and that he is motivated and able to perform the action. A person with strong skills who is not motivated can be "ignited" by a **spark.** A motivated but weak actor needs **a facilitator.** And an actor who is on the right track needs **feedback** to continue on the right track. The model is illustrated in Figure 3.

*3. Figure: Fogg's behavioral model*




*Source: Fogg (2009, p. 5) edited by the author*

Putting the model into an educational context: timing is a function of the timetable. The teacher's involvement and the subject constraints can be understood as triggers. In an educational context, I summarise possible interventions, triggers, signals and feedback at the end of this chapter[19]. Finally, I think it is important to note that the idea of the spark is at the heart of the topic of behaviour design and behaviour change. Modern software design principles (UX - UI, User Experience - User Interface design) are looking for the spark that can nudge the individual involved in the process to act, to buy. This is the intervention of modern software developers.

### *Self-determination theory*

The theory of self-determination (Czakó, 2017; Deci et al., 2001; Deci and Ryan, 1985), coined by Edward L. Deci and Richard M. Ryan, suggests that an individual is willing to engage in an activity because the activity is enjoyable, attractive, or perhaps consistent with his or her self-concept (integrity), or because the individual identifies with the value of the action (outcome). According to the overarching theory covering the theory of self-determination, by default, all human beings automatically strive to improve, to overcome challenges and to get new

[19] The interventions are presented in chapter 2.3 starting at page 86.

experiences. However, development does not take place in a closed space; it requires a myriad of supportive environments. Learners learn with different motivations and achieve different results. According to the theory, the degree to which an action is genuine, intrinsically motivated, is crucial, and so it distinguishes between so-called autonomous (=self-determined) reasons and directed, controlled reasons. The so-called "intrinsic" motivation is an autonomous drive, when the action is carried out for its own sake, for its pleasure value. In contrast, extrinsic motivation is a kind of drive for benefits (Di Domenico et al., 2024). Approaching from the direction of control, actions driven by external regulation are typically performed by the learner for rewards or to avoid punishment, because of something/someone external to the learner. This is followed by inward regulation: the learner exercises self-control, internalising the external motive, for example, learning to get a better grade than others. The autonomy category is when he or she identifies with the goal, for example, learning because learning is important in life. This is called identification-based regulation. A stronger internal drive than this may be learning because of one's own need for literacy, with complete inner peace and alignment. Finally, intrinsic and autonomous drive to learn is due to someone who simply loves to learn. The distinction between intrinsic and extrinsic motivation can therefore in itself be misleading as to the orientation and energy of human behaviour. Autonomous motivation can be derived from interest, internalisation of experience and the values of the individual. Controlled motivation, on the other hand, is generated in the individual by feelings aroused by others (pride, shame, etc.) or by external incentives (gifts, prizes, etc.). Autonomous motivation is considered by the authors to be a higher quality motivation due to its intrinsic source (Anderman and Gray, 2015). Indeed, according to Deci and Ryan (Deci & Ryan, 1985) autonomy, or responsible choice, is the embodiment of self-determination in relation to personality, i.e. if given a choice, the individual will behave in a self-identical way. At the root of this is the basic psychological need for competence and self-determination. If external motivational factors (e.g., rewards, feedback, deadlines) are involved in the relationship, their impact depends on how they influence the learner's perception of his or her own competence and self-determination. 'Motivational' factors that reduce an individual's perception of his/her competence to make decisions, for example, by creating more of an external constraint, are likely to reduce intrinsic motivation, and vice versa.

At the end of the chapter, I will detail the most commonly used theory to characterise motivation to learn, goal orientation theory, which argues that learners invest energy in learning because of their perception of their own competence. On the one hand, to acquire knowledge or to avoid

discomfort due to not acquiring it (this is the so-called acquisition goal orientation). On the other hand, to achieve a better outcome or to avoid a worse outcome compared to peers (relational goal orientation). Drawing on self-determination theory, the learning drivers from autonomous motivation can be related to the acquisition goal orientation (Guay, 2022)**. Striving to achieve autonomous goals can not only lead to better cognitive and behavioural outcomes, but also to stronger affective experiences.**

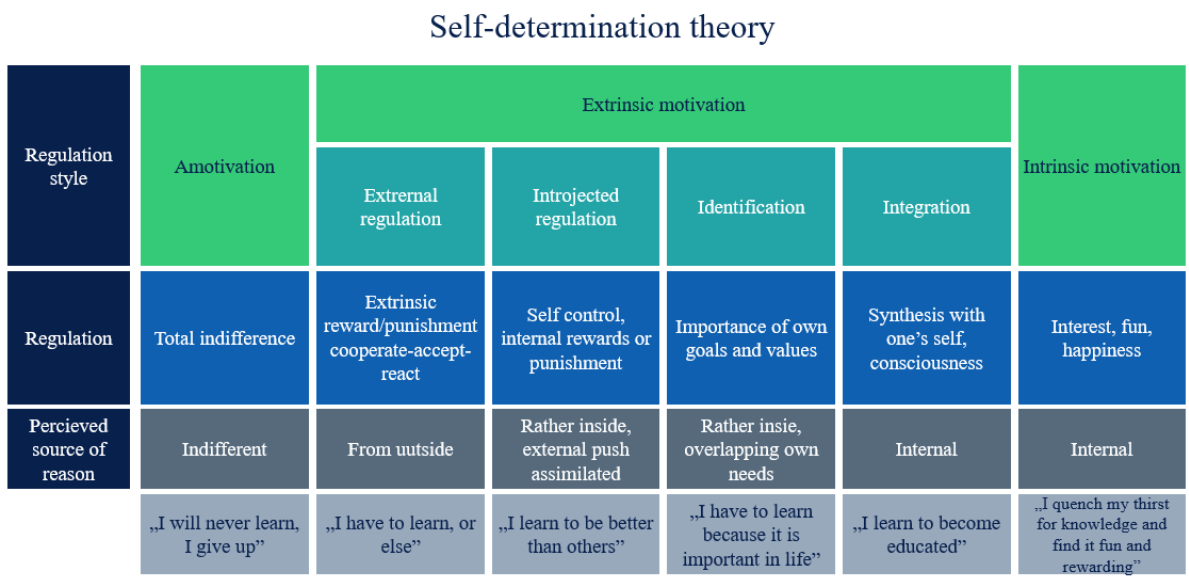
In order to better map autonomous and controlled regulation and related goals, Ryan and Deci (2000) added psychological needs to self-determination theory. Psychological needs are states result in well-being when satisfied, but in tension and ill-being when not. Basic psychological needs are the needs for **competence**, **autonomy** and **relatedness**, which are fundamentally present regardless of age, gender, culture or social status (Deci et al, 2013). The need for **competence** leads students to develop their skills through challenges that go beyond their abilities, enabling them to interact effectively with the environment (Guay, 2022), i.e. to navigate the world more successfully. The need for **autonomy** is related to the experience of making their own choices and decisions: students can make decisions in a way that is coherent with their own values. The authors note that autonomy is not the same as independence: individuals who enjoy autonomy may equally be in a dependent relationship. Finally, **connection with community** is essential for secure emotional ties and for experiencing belonging to a community. Psychological needs are not independent of each other: the need for competence or autonomy cannot be fully met in a vacuum, it requires a community, a context.

Autonomous motivation can be enhanced through interventions that address an individual's autonomy, abilities, and needs related to their community attachment (Yu and Levesque-Bristol, 2020). Autonomy-supportive behaviour is a form of behaviour in which the perspectives of others are taken into account, providing opportunities to act according to one's own principles (Cullen & Oppenheimer, 2024). Individuals experience autonomy through their freedom to make decisions about their own lives, learning, prioritising tasks and how to solve problems. Lack of this can lead to frustration and internal self-contradiction (cognitive dissonance). An individual's experience of his/her abilities is theorised to relate to his/her perceived useful role in interacting with the environment. Failure to do so can mean failure, low belief in one's abilities. Meeting a community need means building meaningful relationships and caring, and the lack of these can lead to feelings of exclusion and loneliness.

From an educational intervention perspective (such as **gamification**), self-determination theory suggests that a student **whose need for autonomy and social interaction is met** and who **is challenged according to his/her abilities will have a stronger self-motivation**. In terms of the elements of gamification, this theory can be paired with any game element that has an effect on autonomy in some kind of relationship with the community or in autonomy in one's own tasks. This is where the different theories of motivation can be seen to be interrelated, since the theory can be linked to flow and to BJ Fogg's behavioural model.

Finally, I present a visual summary of the theory on Figure 4.

*4. Figure: Self-determination theory in detail*

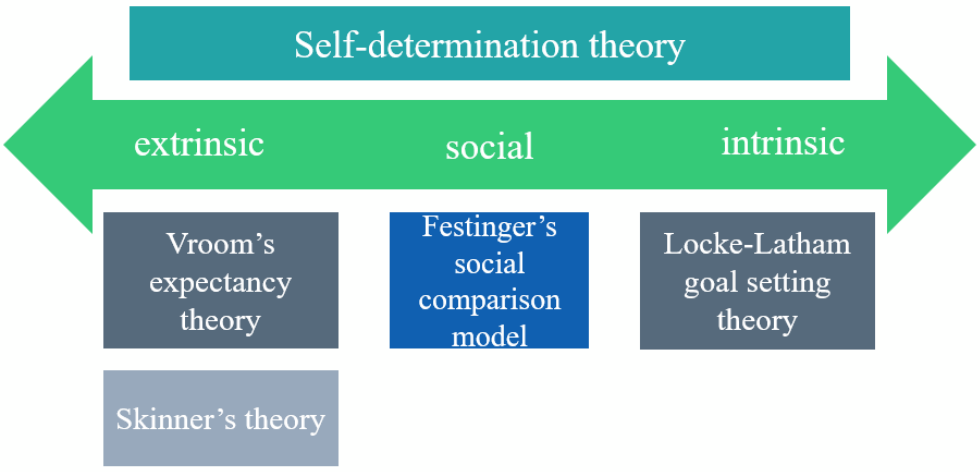



Source: Topîrceanu (2017, p. 43) and Bajor at al. (2019)

I have already mentioned the similarities between the motivational theories, and the self-determination theory is also considered in the literature to be a generous and comprehensive theory. I present a representation of this in 5. Figure. which brings together the theories cited in the literature[20] into a logical system.

[20] The version of the diagram in the original work also presents other motivational theories not discussed in the dissertation.

*5. Figure: The comprehensive self-determination theory*




Source: Richter et al. (2015 p. 24) edited by the author

*The goal orientation theory*

Goal theory (orientation theory) is the dominant theory used to study the learning environment and motivational characteristics of students (Fejes, 2015). For more information on the two strands of this approach - mastery orientation and relational goal orientation - see (Bong, 2001; Csapó and Németh, 2012; Fejes, 2015; Jámbori et al., 2019; Nagy et al., 2019). It lists motivational orientations to avoid them alongside two orientations. Driven by the relational motivation (performance goal), learners strive to show their abilities, what they have learned and that they are smarter or more hardworking than other learners. A learner motivated in a relational but opposite way to the previous one, i.e. learning with a relational but performance avoidance goal orientation (performance avoidance goal orientation), does so in order to prove that he or she is no less clever or hardworking than others. The mastery goal learner seeks to increase his/her own knowledge, while the mastery-avoidance goal learner seeks to avoid his/her own lack of understanding.

However, in addition to the 2 main types of learning motivation, goal orientation theory emphasises **the importance of context**. The motivational climate created by the instructor also greatly influences the individual's motivation to learn, which may thus differ in different contexts. (Anderman & Gray, 2015) adds that the perceived learning (classroom) community atmosphere and the perceived motivational climate are interrelated, and that the mutual respect and professional, emotional support created by the instructor also reinforce the development of

an adaptive goal structure[21]. However, from the teachers' perspective, questions arise about how to get students to pay attention or to do a task in class.

In my dissertation, I present the relevance of goal orientation theory in relation to the educational interventions (gamification) discussed later. This is because the theoretical framework for classroom interventions was developed with reference to goal orientation theory. At the same time, classroom interventions can be mapped to the building blocks of gamification (or a grouping of them), so that goal-orientation theory indirectly contributes to the justification of gamification pedagogy.

Anderman and Gray (2015) specifically address the design of the learning environment for motivation. From an educational design perspective, the relationship between environment, behaviour and personality traits should be taken into account. This is of particular importance when designing an educational environment in an online space, where the environment and interaction is virtual. Finally, the author refers to the individual's perception of his or her own efficacy, mentioned earlier: the best-known way of enhancing perceived self-efficacy is to set smaller, rather more interrelated goals, which have a positive impact on self-esteem through the experience of success. When discussing the tools of gamification, I will discuss the relevant parallel separately.

I will build on the motivational theories discussed here several times later in the research. By understanding the basic motivational drivers, it is possible to better understand the mechanisms of the game elements, to compare the game elements more easily, and to design the game process more effectively. On the other hand, this helps to identify the factors that influence the learner experience in research.

In the previous chapters, I have provided an insight into the motivational theories related to learning. In the following chapters, after a literature analysis of gamification, I will briefly discuss pedagogical interventions, and I will also present the interventions in a new guise, as gamification elements. Finally, I show that they can be understood, designed and implemented in a coherent and cohesive structure.

[21] For more on the affective (emotional) aspects of learning, see Delamarter and Wiederholt (2020) and Józsa and Fejes (2011).

### 2.2.2. Theoretical overview of gamification

I will start with a high-level review of the Hungarian literature on gamification. This will be followed by a systematization of the theoretical background on games and play, and after I will present the interpretation of gamification and its various definitions. I will then introduce some gamification elements, which will also play a role in the empirical part of the dissertation. I will then examine the frameworks of gamification and illustrate their practical application through some examples. While the approach and methods of gamification lead to stronger engagement and motivation, effective gamification of educational processes requires a clear understanding of what exactly the instructor wants to influence through the intervention and how this stimulation should be implemented. Therefore, it is crucial to understand the elements of gamification and the frameworks that give them a logical structure.

In the Hungarian academic community, few doctoral theses deal with gamification. In 2016, Árpád Rab (Rab, 2016) examined the structure and characteristics of digital culture and the place of gamification in it. Richárd Fromann's 2016 dissertation (Fromann, 2016) analysed the spread of a gameful worldview and its impact on society, and identified types of players based on the study of online gaming communities. Balázs Barna (Barna, 2020) observed the impact of playful and gamified training on the basis of their specificities embedded in corporate processes on the one hand, and on the other hand he explored the gamification potential of the Moodle system. Tamás Kovács (Kovács, 2021) investigated the acceptance of gamification among trainers and students. Rihárd Péter Szabó (Péter-Szabó, 2023) drew conclusions on gamification based on the experience of developing and operating a specific historical educational software. These doctoral theses investigate the social and cultural effects of gamification or analyse the applicability of specific software solutions.

In terms of academic journals, the reader can find the concept of gamification in the Új Pedagógia and Educatio journals (e.g. Rigóczki, 2016). Because of its aforementioned importance for business and education, there are also nearly twenty articles related to gamification in Vezetéstudomány (Budapest Management Review). Some of these articles only mention gamification (Nagy V., 2016), more often topics related to work and workplaces are presented (Barna & Fodor, 2018; Tóth, 2022; Tóth & Mitev, 2022) and several authors have published articles on the relationship between gamification and training (Hartyándi, 2022; Tarpataki & Mikáczó, 2022). In book format, the translation of some foreign books (e.g.

Zichermann & Linder, 2013) and Ádám Pusztai's comprehensive and practically applicable publication Gyakorlati játékosítás (Gamification in Practice) are worth mentioning.

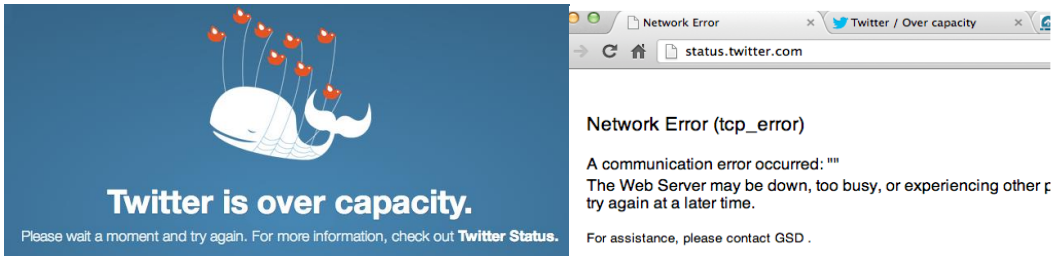
In my dissertation, I deal with "game" only as a phenomenon underlying gamification. There are some additional concepts associated with the word „game" which are not discussed in my dissertation. On the one hand, game ("games people play") is also a hidden series of communicative steps towards a foreseeable goal (Berne, 1973), a concept that is basically related to the field of transactional analysis in psychology, and belongs to another discipline. Game theory, on the other hand, is a branch of mathematics (Kopányi, 1993), which investigates possible outcomes and optimal tactics in multi-actor decision situations, and is thus also distant from the field of gamification.

#### 2.2.2.1. Definition and structure of gamification

To understand the definition of gamification, I think it is necessary to clarify some concepts that overlap or complement gamification. In the Hungarian version of my dissertation, I use English terms in some places to define the concept, because, for example, the Hungarian language has only one word for game, while in English "game" and "play", although related words, as will be seen shortly, have different meanings. I will start the overview with the terms play, playfulness, game, gamefulness, serious game. These are necessary because, in my experience, it helps to be clear about what is NOT gamification when defining gamification.

In play (Deterding, 2019), individuals freely engage in pleasurable activities of their own free will, using their abilities, in appropriate behaviours and ways, within norms of mutual care, trust and safety. Thus, the concept of play is free, self-indulgent fun, when the act is performed for its own sake by the individual, without goals. Salovaara and Statler (2019, p. 1) describe play as an intentionality or activity that is associated with positive experiences such as flow or timelessness. Caillois and Barash (2001, p. 4), on the other hand, conceptualize play as a free activity that is outside the normal course of life and is not serious. Related to the latter, playfulness is the tendency to (re)evaluate situations in order to entertain oneself and one's environment (Proyer, 2012). An example of playful design is the playful presentation of some (online) information to which the provider does not expect a response. This is illustrated on 6. Figure: the user is obviously amused by the Twitter server's message about congestion (left image), but it does not contain any more meaningful information than the image on the right.

*6. Figure: Example of playful and functional design*




Source: https://crunchify.com/twitter-down-today-for-me-twitter-is-over-capacity/; accessed: 2021.03.31. 11:05 (both images)

A game (Goethe, 2019) creates an environment in which participants can learn about themselves, interact with others and develop and practice social skills. Caillois and Barash (2001, p. 12) highlight the commonly agreed rules and the time limit of the game, which usually has a fixed beginning and end. Compared to play, it is therefore a more controlled action, within a framework of rules, in order to achieve a goal.

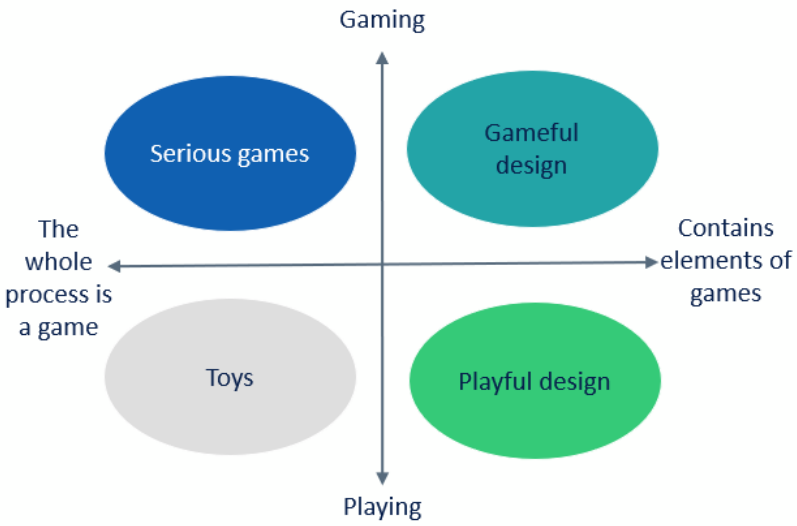
In my dissertation I define game as an activity with a specific goal, with the proviso that the goal can be the experience of play in itself, and that chance can also play a role in the rules. Similar to the analogy of *play* and *playfulness*, the concept of *gamefulness* is formulated as follows Walz and Deterding (2014, p. 413): on the one hand, it refers to personality traits, virtues and abilities that gamers exhibit: motivation, persistence in achieving goals, creativity, curiosity, and the will to improve. It has traces of playfulness but is distinguished from it by its goal orientation. The next concept related to games, which is also part of the broader context of gamification, is the serious game. According to Deterding et al. (2011), games are serious games that are designed for more than mere entertainment. In Makewa and Ngussa's (2020) formulation, serious games allow for the presentation of new situations, thus helping to discuss problem solving, practice and develop skills. Roth (2017) argues that serious games are effective teaching methods (e.g. business simulations). In addition to the concepts of game, gamefulness, we can also find in the literature the term gameful design, which according to Deterding is nothing else but gamification (Deterding, 2015a).

The most common definitions of gamification found in the literature are according to Huotari and Hamari (2017), gamification is ultimately a tool for increasing operational efficiency: it makes a service (process) more efficient by creating game-like experiences, thereby increasing the value creation and added value (turnover) of users. Kapp (2012, 2013) associates with

elements borrowed from games, game mechanics, game aesthetics and playful thinking that engage people and motivate them to act. Zichermann and Linder (2013) have a similar formulation: gamification is the use of a game design approach and game mechanics to engage participants in solving tasks, challenges and problems. Werbach and Hunter (2012) formulation (using game design methods and game elements outside of play) is similar to Deterding et al.'s (2011) approach: using game design elements in a non-game setting. In my thesis and research, I use as a working definition Pusztai's (2018, p. 74) definition of ***gamification*** as "***a strategy in which game design elements are used in non-game environments to change users' behaviour in a positive direction***"[22]. Games and similar activities are structured "*to make optimal experience eaiser to achoeve, and (...) even routine activities can be transformed into personally meaningful games that provide optimal experiences*" (Deterding, 2015b, p. 3). In my dissertation, the aim is to influence motivation to learn, and this does not raise ethical issues beyond those discussed in the last chapter, which is only related to data handling.

To understand the former, see 7. Figure.

*7. Figure: Gamification and game/play logic*




Source: Deterding et al. (2011, p. 11)

Alternatives to the Hungarian term "gamification" can be found in Németh (2015).

[22] In the Appendix 6.4 . starting from page 205. I specifically discuss the place of gamification in the business and economics disciplines.

Stakeholders associated with the use of gamification can be "participants" with different roles depending on the context. Some authors use the term "stakeholder" narrowly, in terms of the customer-consumer strata (Seiffert-Brockmann et al., 2018), as the aim of gamified processes is to influence "consumer" engagement or motivation towards the "provider's" product or service. However, gamification itself takes considerable effort, time and energy, and therefore, for example, in education, where the aim of the processes is to influence student motivation, the gamification perspective may also involve instructors, administrators or creators of the gamified process within the institution[23]. Therefore, I think that the concept of stakeholders in gamification should be understood in a general way, as a set of external and internal stakeholders (Chikán, 2017). Based on my own teaching and working experience and building on articles by, for example, Marcucci et al. (2018), Richards et al. (2014) and Souza et al. (2020), the stakeholders of gamified processes can be approached as follows. On the one hand, the organisations whose operations and services are gamified and whose main objective is thus to influence the motivation and behaviour of their consumers (target group). Not incidentally, with the help of an appropriate IT infrastructure, they can collect data on the behaviour of their target group, which can be used to develop further influencing tactics (Paharia, 2013; Toda et al., 2019). Secondly, the professionals responsible for developing gamified versions of processes can expect creative challenge, professional development and recognition, and the outcome of their work is a more enjoyable process, such as the learning process in a work or educational context for employees, or the purchasing process in a business context. They are familiar with the theoretical and methodological rules of gamification, they know the basic building blocks (mechanics) and the frameworks that unify them. Thirdly, from the side of the staff implementing the gamified process (trainers and administrators in an educational context, marketing experts in a business context), they will encounter higher engagement, attention or user experience and, using the aforementioned additional data, they can intervene in the process by providing feedback or changing the difficulty of the process, if necessary. Finally, the participants targeted by the gamified process - be they winners or victims, I leave this to the reader of this thesis - are users, consumers, listeners; all those whose behaviour and engagement the aforementioned organisations want to change. In a game context, they would be called "players". Depending on the process being gamified, there may be external (e.g. consumers)

[23] An example of this is the Moodle system at the Corvinus University of Budapest (Tarpataki & Mikáczó, 2022), which required the input of many university colleagues to invent, develop, operate, integrate into the curriculum and use in teaching.

and internal (e.g. employees) stakeholders. Robson identifies an additional stakeholder: the observer (Robson et al., 2015). The observer is a passive participant in the gamified process but can contribute to enhancing (or degrading) the experience by his, or her presence. The author suggests that the role of observer is taken by the manager or teacher of the participant in the player process, if they do not play an active role.

Using elements borrowed from gamification games in a non-game environment. In the previous paragraphs I have given an overview of the concept of games. For a better understanding, I will take a look at the characteristics of games. Stenros (2016) in his literature summary on („The game definitioin game") offers a review of the concepts needed to define a game, the logical framework of the game elements referred to in the topic of gamification (3. Table).

These logical frameworks are rather abstract and general descriptions, and consequently there is no uniform formulation of the elements of games and their classification in the literature (Huotari & Hamari, 2012). Moreover, none of the basic elements classified as game elements are exclusive to game processes: they can be found in games and in processes that are not otherwise game processes (Deterding, Dixon, et al., 2011), are not explicitly labelled gameful (or playful). Moreover, the labels of several game elements that presumably have the same content are not uniform, e.g. the terms "marketplace", "economy", "virtual economy", "virtual goods" and "virtual currency" are used to describe the game element that offers the possibility to collect points and "buy them off" or „trade them" in a gamified process. Of course, the concrete manifestation of these may indeed differ (e.g. virtual pennies or points can be collected), but the essence of the player element is the same: for extra effort in the process, some kind of points can be collected, which can be "redeemed" or "cashed in" later according to predefined rules. The term "game element" is not universally accepted by itself, Marczewski calls these game elements or mechanics, Yu-kai calls it game technique, and finally Hamari et al. (2014) and other authors refer to the same phenomena as motivational affordance.

*3. Table: Spacific features of games*

| | |
|---|---|
| **Rules** | The rules adopted by the players delimit and create the game, and some researchers even argue that the game itself is the rule (Stenros, 2016, p. 501). In some cases, the decision or choice is also a rule[24]. |
| **Function, purpose** | Stenros distinguishes between entertainment, educational, experimental, research and operational games, which have different purposes[25]. |
| **Instrument, activity** | The experience of game/play can be through activity alone (speech, movement) or through the use of a tool or technology for play. |
| **Separated - linked** | It refers to the connection of games to the real world. If, for example, we consider the risk-free environment of playful learning, in which the player can make mistakes without punishment, then the game is sharply separated from the real world. |
| **The role of the player** | The player, actor, decision-maker is a "structural element" in the rules of the game. The player's place, team/site, identity can be defined. |
| **Product (or lack thereof)** | Some authors argue that the game is by definition unproductive. At the same time, it is questionable whether the experience of the game or the determination of the identity of the winner/loser can be considered productive. |
| **Competition, conflict** | Achieving a goal within the rules of the game is the point of the game. Competition, conflict between players or between players and the rules (the game itself, resources, time, etc.) can also occur. |
| **Objective, final criteria** | Does the game have a specific end point, is there a way to win or lose? Is it enough to strive towards the goal without reaching it? [26] |

Source: Stenros (2016, pp. 507-511)

[24] I note that the researchers of the concept of games also make a special mention of the phenomenon of cheating (which is also a "game" in my opinion).

[25] For more information on other types of games, see Deterding et al. (2011); Henricks (2015); Salen and Zimmerman (2004); Sutton and Smith (1997) and for specific applications, see chapter 2.2.2.4 on page 68.

[26] I would add the example of the computer games Tetris and Pinball. There is no way to win in these, only to delay losing the game, as the game gives the player random tracks for as long as the player is playing, the temporary gain (the track cleared of dice) lasts only until new dice appear the next second.

### 2.2.2.2. Building blocks of gamification: the game elements

With regard to the building blocks of gamification, after defining the types of building blocks, it is useful to identify their types and then to examine their intended use. The game elements are a key part of my dissertation, so it is key to define them precisely. Therefore, I will present some approaches below, on which I will build my own definition. I will then provide a more detailed description of the game elements used in my research: as their design and practical application are an integral part of the empirical part of the dissertation, it seemed appropriate to present these game elements in principle. At the end of this sub-chapter, I will discuss the relationship between play elements and motivation, which is necessary to understand in order to achieve the desired effect by using play elements.

Marczewski (2014) distinguishes between game elements:

- **playful** mechanics, which he sees as the activities that can be carried out within the framework of the game process
- **schedules**, which describe the time or performance logic (how many points are needed for the next level)
- **dynamics**, which is the interaction between the participant and the rules (mechanics)
- **feedback**, which gives the participant feedback such as leaderboards, badges, messages
- **tokens** (tokens), which are virtual collectible points
- **interactions**, which are the concrete embodiment of the participant and the process (e.g. a mouse click in a game), and finally
- **aesthetics**, which collects the emotional reactions experienced by the participant.

Robson et al. (2015) examine the impact of game elements in three categories:

- The first category includes **setup mechanics**, which are used to define the "rules of the game" for a particular gamified process. In an educational context, for example, this might be the definition of whether a participant cooperates or competes, works alone or in a group, and who are the members of the group (or the opposing group). Obviously, this can have an impact on the overall experience of the gamified process.
- The **rule mechanics** define the purpose and constraints of the gamified process. Some rules are based on deterministic logic, always working in the same way: for example, if the points collected can be traded, then this is true for the whole process (note that this is only true if no additional game element, such as a time window, is used to change

this). Other rules have ambiguous outputs, such as cases involving luck or social interaction. One of the most common rule mechanics is the time window, time pressure or time limit.

- The **progression mechanics** work as the player progresses, allowing for immediate feedback. The authors add that rewarded actions are more likely to be repeated. Feedback can be provided by accumulating points, moving forward between levels, progress indicators, or rewards realised in real space. And progress indicators that are visible to the audience (other participants) can also reinforce the community status of the participants.

Deterding et al. (2011) also recognized that the definition of game elements can be approached at multiple levels of abstraction, and therefore, in their view, the definition of a game element should be a cross-cutting statement that summarizes all of these. They formulate the following levels of approach:

- **Game** interface design level that aims to capture the user experience through interaction, such as badges, leaderboards.
- The next level is the level of **game and mechanics design**, including time pressure, process rounds/iterations, or limited resources.
- It places **game design principles**, **game models** and **game design** methods at a higher level of abstraction. The latter are phenomena outside the narrow subject of gamification, game style, the theoretical model of the game (i.e. not the gamified process). All these are referred to by the authors as game design elements.

In terms of the definition of game elements, my own research definition used in this dissertation is in some ways more general and in other ways narrower than those mentioned so far. On the one hand, **I do not distinguish between which stakeholders of the game element are "actively" or "passively" connected to the game element**. For example, the participant presented with a decision situation (authority related game elements) is an active stakeholder in the decision, whereas the designer or operator of the process (the instructor in the context of my dissertation) is passive, seeing the decision facilitated by the game element as an outcome. However, the ranking or trophies presented to the participating student have nothing to do with the participating student, yet they help to increase motivation. **Thus, for the purpose of this dissertation, any elementary part is a game element that creates a graphical, verbal, or written interaction between the participants with the purpose of enhancing the motivation**

**of the participating stakeholder.** In other words, the Marczewski or Deterding elements, mechanics, techniques, tokens, etc. already mentioned in this chapter are all considered game elements in this dissertation and in my own thought map for gamification. There is also an important practical reason for my approach. The playful mechanics had to be implemented using scissors, glue, Excel and PowerPoint, from this point of view it makes absolutely no difference whether the token or time pressure belongs to the design level of a game interface or game mechanics according to an author. The only important thing was the effect they wanted to achieve by introducing the mechanics.

This part of the literature search was carried out using Publish or Perish 8.9.45 software, using the search terms **gamification** AND (or","**)** (**mechanics** OR **elements**) in Google Scholar, Scopus and Cross Ref. I organized the results in an Excel spreadsheet, sorted them in descending order by number of references, reviewed 40 most cited articles after filtering out overlaps, and supplemented this list with additional literatures I had read during my studies that I considered relevant. The articles I read at the end of the relevant list no longer listed any new items, so I did not continue the research following the principle of saturation.

One of the challenges of the literature search for game elements was to identify the differences in the naming and content of each element. Some authors generously use game elements such as deadline and time pressure, time constraint or time restriction as synonyms, but these do not mean the same thing. The psychological impact of an end-of-semester deadline for an assignment is not the same as the time pressure of a 45-minute final examination. The effect of time pressure is more strongly linked to individual perception, while the deadline is more objective, refers to a predetermined date and is independent of individual perception. The former is therefore linked to the individual's perception of (little) time, while the latter is an externally imposed time constraint. Related to the same theme, the time window (appointment dynamics game element) is a third approach, with the slight difference that it has a start and a finish "deadline" between which the task can be solved for the participant. Comparing game elements in this depth requires a separate study, preferably including the changing influence of the context (e.g. online or offline processes).

Another challenge is the use of different names for game elements with similar or presumably identical content. Some examples are:

- Game elements: motivational affordance (Hamari et al., 2014), game technique (Deterding et al., 2011) or game mechanics (Marczewski, 2017; Robson et al., 2015)

- Challenges: special tasks, are usually called challenges, but Zichermann and Cunningham (2011) has a quest, Huang and Soman, (2013) has a mission
- Simóes et al. (2013) use the word trophy instead of badge, and the word gift instead of the generic reward; Nah et al. (2014) found the word prize suitable for the same purpose
- Groh (2012) replaces the term time pressure seen elsewhere with time constraint, Huang and Soman (2013) uses the term time restriction
- The narrative element in Groh's quoted work is called "fantasy", elsewhere it is story, theme
- The game element of social engagement is used by Lister et al. (2014) as social pressure, with, in my opinion, a slightly different meaning
- The possibility to experiment, try and fail is called Dicheva et al. (2023) freedom to fail, while the same is seen in Simóes et al. (2013) and Nah et al. (2014) as repeated experimentation and replay
- Some further examples without details: the virtual economy (marketplace = economy = virtual goods = virtual currency), performance graph = progress bar, reputation (recognition = reputation), badge (trophy ribbon = medal = badge).

Out of the nearly 100 game elements collected during the literature search, 11 game elements were used in my own research, which are presented in detail in the Annex. Besides a short description of the game element, I show some sources where this element is mentioned. The importance and relevance of the game element is shown by the hit rate (percentage of sources in which it was found). I will refer to specific game elements implemented in experiments conducted in the empirical part of the dissertation, which may help to compare the theoretical background and practical application of the game element. I have included the full list in bulleted form only in the appendix[27]. To make a detailed and explained list of all game elements is indicated as a further research direction at the end of the dissertation. My two most extensive sources are Marczewski's (2017) website with 52 game elements and Yu-kai's (2017) book with 76 game elements. In my dissertation I list and systematize the basic game elements with a thoroughness and detail not found elsewhere in the literature

[27]Annex 6.1, page 198.

*4. Table: Explanation of the chosen game elements*

| **Game mechanics** | **Short explanation** | **Specific example in the experiment** | **Literature reference** | **Mechanics frequency** |
|---|---|---|---|---|
| Onboarding (process / rule clarifying) | Aims to introduce participants to the basic rules and functions of the process. It helps them to understand the objectives to be achieved, the tools to be used, so that they can start "playing the game" with confidence. | 116.p. | (Domínguez et al., 2013; Zichermann & Cunningham, 2011) | 15% |
| Narrative | It creates a link between the participants and the process through a story ("tale"). | 121.p. | (Plass et al., 2015; Sailer et al., 2013) | 33% |
| Unpredictability (surprise, astonishment) | Uncertain, random or startling events can surprise the participants with unexpected twists and turns, enhancing the experience and sustaining enthusiasm. | 119.p. | (Yu-Kai, 2017) | in this form only Yu-Kai quoted |
| Badges | The badge can be a reward for reaching various performance-related milestones and collecting points. It comes with an attractive visual display, recognition from yourself and the community. | 127.p. | (Deterding, Sicart, et al., 2011; Hamari et al., 2014; Simões et al., 2013) | 83% |

| | | | | |
|---|---|---|---|---|
| Levels (rank) | It is used to measure the progress of the participant: they can progress through different levels as they complete more tasks or gain experience. It provides a continuous challenge and makes progress visible. | 119.p. | (Deterding, Dixon, et al., 2011; Domínguez et al., 2013; Hamari et al., 2014) | 73% |
| Leaderboard (ranking) | It shows a ranking based on the performance of the participants. It encourages competition, participants can compare their results. | 119.p. | (Hamari et al., 2014; Silva et al., 2020; Zichermann & Cunningham, 2011) | 75% |
| Voting | It gives them the opportunity to express their opinions and make decisions during the game. The aim is to involve participants in the decision-making process | 129.p. | (Dichev & Dicheva, 2017; García et al., 2017) | 8% |
| Autonomy | It gives them the opportunity to choose their actions and decisions. It aims to give participants a sense of control over their gaming experience, which increases their engagement and personal experience | 129.p. | (Dichev & Dicheva, 2017) | 3% |
| Virtual economy (virtual market) | They can redeem their performance points for a real or theoretical gift or service. | 129.p. | (Deterding, Dixon, et al., 2011; Tondello et al., 2016; Zichermann & Cunningham, 2011) | 18% |

| | | | | |
|---|---|---|---|---|
| Customization, personalization | Some aspect of the target process (tool, information, etc.) is personalised by the "game master" or participants. It makes the process more personal, so they can become more emotionally attached to it. | 128.p. | (Dicheva et al., 2023; Zichermann & Cunningham, 2011) | 25% |
| Feedback | It provides continuous information on the participant's performance so they can understand whether they are doing well or badly. It helps you to improve. | 128.p. | (Deterding, Dixon, et al., 2011; Hamari et al., 2014; Sailer et al., 2017a) | 30% |

Source: the author's own work

A list of game elements, or even a more detailed description of them, is not yet enough to ensure that the instructor can use them to achieve the exact purpose. My research concerns live contact teaching, the gamification of which is quite labour intensive for the instructor. Designing and operating a "personalized" system, matching mechanics with the factual information and many other tasks[28] need to be solved. To make this complex logic really work, a deeper understanding of the context of gamification is needed, both in terms of the combined purpose of the game elements and their motivational impact. The gamification frameworks provide support for understanding the purpose of the game elements. Further literature can provide insights into the motivational links. Therefore, the relationship between motivation and game elements, followed by the frameworks, is the subject of the next two chapters.

### *Motivational impact of game elements*

The use of game elements, whether in educational or other processes, is not new, an early example of which I have already mentioned: the 1906 environmental studies curriculum on which the cartoon „The Adventures of Nils Holgerson" was based (Rahn, 1986). More direct elements of playfulness can be found in the Boy Scouts of America, where badges were awarded to the scouts as early as 1911 (Deterding, 2012). Indeed, it was taken for granted that the motivational effects associated with progress and the associated recognition. More recent examples of these are (Robson et al., 2015), through the Samsung Nation and Pepsi Soundoff online loyalty programmes: badges are used to build strong relationships between brands and customers, and the eco-driving style of Nissan Leaf car drivers is rewarded by collecting points and sharing them on social media. Deterding points out in his cited work that such gamified methods generally do not sufficiently assess how much the personality traits of users and the context may influence the impact of game elements, as not everyone feels the need to proclaim their status, and some even feel bothered by it. There is no complete consensus in either the academic or the practitioner-business domain on when which building block(s) should be used (Sailer et al., 2017b), so the practical implementation of gamification is sometimes arbitrary and subjective. Nevertheless, I consider it important to summarise what is known from the

[28] This will be explained in more detail during the discussion of the design and implementation of the experiment. See chapter 3.6 on page 109.

literature. In this section, I summarise some typical approaches to the specific motivational impact of gamification elements.

Game elements can have intrinsic and extrinsic motivational effects and aim to strengthen the motivation and commitment of the participants in the process (Muntean, 2011, p. 326). Intrinsic motivation is, for example, the participant's own choice to perform or not perform the action: altruism, cooperation, or even aggression. The category of extrinsic motivation is when the participant acts under external influence (by the designer or operator of the gamified process) or for an external reward. A related game element can be a point, a badge, missions or levels.

Badges, leaderboards and progress indicators act as a motivation associated with the need for achievement, reinforcing the participant's belief that the task in question was worthwhile (Sailer et al., 2017b). Avatar, narrative and group activities can motivate due to a sense of community belonging. Freedom of choice and meaningful task performance can be associated with motivations related to autonomy. I explore the links to the motivational theories discussed earlier in the following paragraphs.

In the context of social cognitive theory, elements of gamification explicitly facilitate the observation of the process, the participants and their outcomes, especially the positive feedback elements of the game that are built into the process, such as appropriate or effective behaviour. Belief in the participant's own abilities can be reinforced by immediate gamified feedback that clearly shows the participant's progress and performance.

Regarding expectancy theory, I highlight that a feature of gamified processes is the rapid and valuable and fair feedback that indicates the participant's progress, which contributes to the goal becoming more achievable according to the individual's perception. The setting of clear goals is also a feature of gamification, but I emphasise that in gamification the focus is on the process: the goal is for the participant to complete the task with enjoyment. In expectancy theory, the focus is on the outcome, the achievement of the goal, which is obviously achieved by completing the process, yet the two approaches are subtly different. Examples of specific game elements that can be linked to the expectancy theory include: mechanics associated with all feedback (see previous paragraph), and the setting of understandable, achievable and meaningful goals.

The most common elements of peer comparison theory are leaderboards, benchmarks, badges, group tasks, group competitions, in other words, any mechanics that allow performance to be compared within or between communities.

Self-determination theory is the motivational theory most often cited in my research on gamification. In it, it is meaningful for the individual to make a perceptual decision about their own actions. This free choice can be linked to game elements and any mechanics where the participant determines direction, quality, action, etc. Similarly, the participant's belief in his or her own abilities and the challenges ahead is an important part of the theory; gamification is characterised by the increasing difficulty of the challenges, and this is linked to the theory in this way. Many of the game elements of gamification apply to social interaction, and finally, participants may experience intrinsic and extrinsic motivation in relation to the process made more enjoyable by gamification, as well as virtual rewards (points, badges, virtual goodies).

In goal orientation theory, the participant's perception of the individual's developmental goals has a motivational effect on the individual's behaviour. Whether the learner is driven by mastery or relational motivation, the drive for both progress and disclosure of results requires the formulation of a well-defined and achievable goal. Points, league tables and other feedback mechanisms that reflect progress towards goals are also useful in this case. Given that goal orientation theory is linked to pedagogical interventions in the literature and that, as discussed earlier, much of the toolkit of gamification can be mirrored in interventions, virtually all elements of gamification can be linked to goal orientation theory.

Fogg's behavioural model is very similar to Flow Theory, as Fogg also emphasises the importance of the matching of ability and challenge, which is a basic thesis of the flow state. **The spark** that **spurs** the participant to action and the more prominent presence of supportive **facilitation** distinguish the two theories. In my view, the embodiment of the **spark** is individual preference dependent, and I make no attempt to define it and link it to gamification. **Facilitation** appears in community-related game elements, such as mentoring in Octalysis, or the philanthropic player role seen in HEXAD. I will discuss these in more detail in the next chapter.

**The Flow** theory can be associated with clearly formulated goals, game elements that can be used to provide feedback on all performance (badges, leaderboards, performance indicators, etc.). The sense of control associated with flow is typically reflected in game elements that can be linked to decisions, personalisation. Finally, the higher purpose of value creation activity

may be reflected in community elements or narratives, which may represent a sense of belonging to an elite community or a narrative embodying a lofty purpose.

#### 2.2.2.3. Gamification frameworks

I will start the literature review on frameworks also by defining the phenomenon. In this case, however, the methodology of the literature research followed a different structure and the reason for this can be found in the definition. In this subsection, therefore, a brief review of the approaches found in the literature is followed by an explanation of my own definition. I will then analyse in more detail three frameworks I have chosen. My main justification for the selection is based on my own professional experience and the aim of the dissertation. During the literature search, I collected a number of frameworks, but most of them are too specific to a particular professional field, programme or product. And many of the frameworks are logics that present some kind of software development related framework, process description. In this dissertation, however, I was looking for a sufficiently general framework that could be related to gamification in education, preferably overarching theory and practice as well.

The increased use of gamification has been accompanied by the need to group the game elements and to put them into an operational system. Knowing the principles of ordering facilitates a deeper understanding of the elements, because they follow one another in a meaningful system. In their summary work, Mora et al. (2015) refer to game elements as atomic parts, ingredients, constituents. The game elements can be grouped into a framework, an overall operational logic, based on their functional principle, design, applicability and purpose. The author adds that most frameworks are based on the so-called human-focused design, whereby the focus of the design is on the human being and not on function. Most frameworks also draw on psychology for motivation.

I encountered similar challenges in my research of literature on frameworks as I did with game elements. Even the meaning of the word framework is not uniform. In software design, a framework is a general logic on/into which a specific program is coded (Team, 2021). In social science, a framework is a comprehensive structure that encapsulates a research or theory (Gerring, 1999), theoretical guidance and also helps to summarize experiences and lessons learned about a phenomenon. The literature review by Mora et al. (2015) analyses 19 gamification frameworks and based on this, has developed grouping and evaluation criteria, such as the comprehensiveness of gamification frameworks or their business/academic

application areas. However, in this article and also in other authors' work (e.g. Suh & Wagner, 2017) the interpretation of frameworks is looser, even some successive steps of a process development are interpreted as frameworks, e.g. the so-called 6D "framework", which is associated with the authors of the MDA logic (discussed later in this chapter), is described by its own authors as nothing more than a checklist to be ticked off[29] (Werbach & Hunter, 2015). Other authors (Yildirim, 2017) use the term gamification-associated framework for the self-determination motivation theory discussed earlier. **In my view, a framework** serves **to contextualize the theoretical assumptions it contains** and, as such a logic, it must necessarily **provide a link between the theoretical and practical aspects.** I will therefore present three models of gamification structures from the literature in more detail. Firstly, the MDA model (Hunicke et al., 2004), one of the first and most cited frameworks for gamification. Secondly, the HEXAD/RAMP (Tondello et al., 2019) model and finally Octalysis (Yu-Kai, 2017) framework, which incorporate concrete game elements into a logical system and also specifically discuss their applications. MDA's framework presents the main components of gamification in a hierarchical way, with a simple visual representation, and in my opinion, an overview of MDA can help the reader in warming up to understand the more complex frameworks that follow. The content available online respective the HEXAD/RAMP models contains a wealth of game mechanics (game elements) and can be related to the author's player personality test to determine player types. Lastly, I will present Yu-Kai Chow's Octalysis system, which can be easily compared with the motivational theories and interventions that form the psychological basis of gamification. Further frameworks and typologies of gamification are addressed by, among others, Hunicke et al. (2004), Kapp (2012, 2013), Klock et al. (2020), Robson et al. (2015), and Ruiz-Carrasco et al. (2017). However, these frameworks either deal with too narrow a topic, or with the analysis of a specific player platform, or with explicitly commercial aspects, so that the aforementioned frameworks are the most appropriate for the purposes of my research.

### *Mechanics, dynamics and aesthetics (MDA) framework*

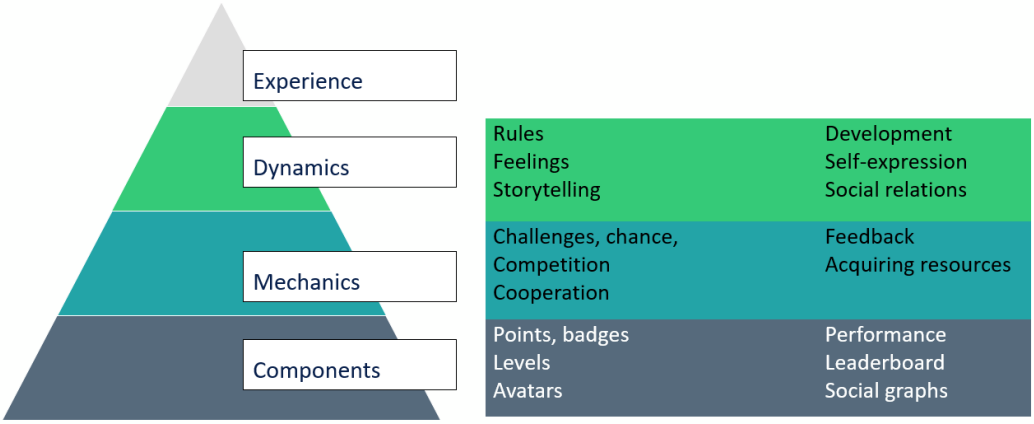
With gamification gaining ground in business and academia, there was a need for a general design principle derived from game design to implement gamified processes (Mora et al., 2015),

[29] Define business objectives, Delineate behaviors, Describe your players, Device activity loops, Don't forget the fun factor, and finally Deploy the appropriate tools.

which led to the formulation of the MDA system in 2004 (Hunicke et al., 2004)**. It sought to bridge the gap between game design and game research**.

MDA is an acronym made up of mechanics, dynamics and aesthetics. It classifies game elements into these three categories, each with the goal of achieving a game experience through different incentive methods (see 8. Figure) Werbach és Hunter (2012, pp. 78-82).

*8. Figure: The MDA framework*




Source: Werbach & Hunter(2012, pp. 78-82)

**Game dynamics** are at the highest level of abstraction in the framework: rules (constraints), elements that facilitate emotions (curiosity, competition, frustration), narrative, opportunity for development, community and relationships (status, altruism). **Mechanisms** are basic processes that are concretely performed or (exploited) by the participant and through which the dynamics are experienced. The author lists ten mechanisms:

- Challenges (requires effort to solve)
- The role of luck/random chance
- Competition
- Cooperation
- Feedback
- Acquisition/gathering of livestock/value
- Gifts (for performance)
- Transactions / market (possibility to swap)
- Circles (sequential process divided into circles/steps)
- Winning conditions (known and achievable targets)

**Game elements are** the most tangible building blocks of the gamified process. Each game element is linked to a higher-level mechanic or dynamic. Werbach and Hunter (2012, pp. 78- 82) consider the following game elements to be the most important:

- Results (in relation to the objectives set)
- Avatars (visual representations of the player)
- Highlights (visual representations of results)
- Defeat your main opponent (exceptionally difficult challenges)
- Collections (livestock, badges)
- Battle (usually a short-term challenge)
- Unlocking content (depending on achieving goals, challenges)
- Gift giving (possibility to give gifts to other participants)
- Leaderboards (visual display of progress and results)
- Experience levels (to show progress)
- Points (to show progress in the process)
- Missions (separate challenges with a known objective and reward)
- Community network (in relation to other participants in the process)
- Teams, clans
- Virtual

According to the author, the essence of gamification of a process is to bring the three levels of building blocks into harmony with each other. Its application is illustrated in the Appendix[30].

### *The RAMP framework and the HEXAD typology*

Andrzey Marczewski**'s RAMP** model (Tondello et al., 2019) approaches the structure of gamification **from the motivational aspect that** affects **the user**. The model is an extended version of self-determination theory. According to self-determination theory, an individual is willing to engage in an activity because the activity is enjoyable, attractive, possibly consistent with his or her image of self (integrity), or the individual identifies with the value of the action (outcome) (Deci & Ryan, 1985) . The acronym RAMP is composed of **r**elatedness, **a**utonomy, **m**astery and **p**urpose. Relatedness embodies the desire to belong to a community, to cooperate with other people. Autonomy means the individual's autonomy to make decisions for oneself,

[30] Appendix 6.2 from page 202.

independence. Excellence means immersion in, and achievement of excellence in, an activity. This requires that challenges are neither too hard nor too easy (like Flow Theory and BJ Fogg's behavioral model). Finally, goal motivation represents the larger, possibly loftier meaning associated with the activity (Pusztai, 2018, pp. 23-26).

Marczewski's methodology goes beyond these motivational drivers. The author has created a validated test based on personality types (so-called HEXAD), which categorizes the tested individual into so-called player types (Tondello et al., 2019). First, I will highlight that from a motivational point of view, contextual elements play a decisive role, among which personality plays a prominent role. From this point of view, Marczewski uses the HEXAD test to identify the type of player involved in the gamified process. In addition to these, the author lists on his own website 52 player elements that can be used to gamify processes, while at the same time assigning these elements to the individual HEXAD player types. In this way, it is technically and psychologically possible to personalize part or all of the gamified process, which can have a significantly stronger incentive effect on the participants. The game elements are available at https://www.gamified.uk/user-types/gamification-mechanics-elements/ (downloaded 16/03/2021 21:01). The related HEXAD player types are defined by Marczewski as follows (https://www.gamified.uk/user-types/, retrieved 16.03.2021. 21:00) and (Pusztai, 2018, pp. 110-112) :

- The **free spirits** player type is **independent** (see autonomy in RAMP), autonomous, likes to decide on his own activities, to personalize his own work method, office, avatar, to create. They like to share their results and ideas. They need feedback. Related game elements include discovery, surprises, and personalization.
- **Achiever** players strive **for excellence** (see mastery in RAMP). They aim to develop their skills and attributes to the maximum. In competitions, their aim is to enhance their own performance, not to compete. Related game elements: challenges, certificates of achievement, levels, opportunity for progress and feedback.
- For **socializer players, bonding** (relatedness in RAMP) is important. They strive to connect with others, work together, and communicate. The most stimulating game elements for them are groups/clans, social network, showing status, and competition.
- For **philanthropist** players, **helping others**, service, a lofty purpose (purpose in RAMP) is essential. Among the game elements, they are most motivated by living a sublime purpose, helping others, giving to others, sharing knowledge/information.

- Within the basic logic of RAMP, you can find "**player**" type players anywhere. They can represent any of the previous behaviors, with the significant difference that they **expect something in return** for every action they take. They are most motivated by rewards, experience points, leaderboards, virtual values.
- Outside the logic of RAMP are individuals with an **analytical/disruptive** (disruptor) mindset. They are motivated by change and want to influence the process in which they are involved. The game elements that can be associated with them are likely to be of limited use in an educational context, however, the author suggests that innovation platforms, voting, developer tools, and anonymity may be incentives for the analytical type.

Marczewski has created a practical framework with the HEXAD game type test and the 52 game elements listed and categorized. It should be noted here, however, that neither the author quoted nor any of the other frameworks have given a fully specific description of the game elements in question. I see the reason for this in the fact that, like all interventions, gamification is entirely context dependent. That is, in an educational context, it is up to the teacher to consider, devise and implement the gamification of the course or lesson in question, depending on the specificities of the subject / lesson / course / task. As with MDA, I put forward a possible practical implementation in the Annex[31].

### *The Octalysis framework*

In the following I will briefly introduce the **Octalysis** gamification framework. Like RAMP, this framework is based on motivational drivers but distinguishes **8 drivers** instead of four. At first glance, this may seem like an unnecessary extension of the model, but in my opinion, it is necessary to create more nuanced categories, because - from an educational point of view - relevant motivational drivers can be more precisely placed.

Octalysis distinguishes eight motivational drivers, to which - similar to Marczewski's model - game elements are assigned (Yu-Kai, 2017) :

**#1** **Epic meaning:** a deep motivation where the participant feels part of something greater than him/herself; the author identifies such motivation with service such as writing free Wikipedia articles or contributing to a group victory in group work

[31] Annex 6.2, page 202.

**#2** **Accomplishment:** participants develop their skills thanks to this motivating factor, which helps them overcome the challenges they face

**#3** **Empowerment and feedback**: this allows the participant to experience creativity and the joy of creation, and to see the results of their creativity (feedback)

**#4** **Ownership (and responsibility)**: the desire to possess and acquire can drive participants, whether real or virtual. This includes the possibility of control over a process

**#5** **Social influence**: this includes peerhood, feedback received through company, mentoring, acceptance and competition as a motivating factor

**#6** **Scarcity:** participants want something that is not (yet) theirs.

**#7** **Unpredictability**: driven by general curiosity about the unknown ("what next?")

**#8** **Avoidance**: this motivational force refers to the avoidance of negative outcomes, such as the loss of the result of efforts made so far or the loss of access to some prospective prize

The motivational drivers listed by Octalysis can be mapped to the RAMP system and include some of the drivers described later in the interventions and motivational theories. Note that the 8 sections of Octalysis contain a total of 76 game elements, nearly comparable to the 52 game elements of RAMP/HEXAD. These two frameworks list the most game elements in the literature. For an illustration of the use of Octalysis, see the Annex[32].

For a graphical representation of Octalysis, see 9. Figure. The author presents an analysis of the Facebook platform using the graph, which gives a good overview of the essence of the Octalysis. The blue area outside the octagon in the middle of the graph shows the weight of that dimension. The strength of the platform is the community (social influence), the feedback from others (creation, feedback), the posts and reactions perceived as random by others (unpredictability), and the connections, likes, photos and disposition over them (ownership) accumulated over time under one's profile. The higher level of avoidance illustrates the habitual use of the platform: the user is already afraid of missing out.[33]

[32] Annex 6.2, page 202.

[33] This so-called FOMO (Fear of missing out) phenomenon can be found in the game item list in Annex 6.1, page 198.

*9. Figure: Illustration of Octalysis using Facebook*


Source: *Yu-kai (2021)*

In the previous pages, I have presented the elements of gamification and the frameworks that give them a logical structure. The purpose of using game mechanics is to enhance the motivation of the participants in the process, regardless of the target area. In the next chapter I will describe the typical application areas of gamification.

## 2.2.2.4. Areas of application of gamification

Compared to the leisurely pursuit of playful activities, which have their place and time, the social acceptance of processes played in a non-game environment (at work or in learning, or in public) is not clearly positive. At the same time, however, the acceptance of changes in values, narratives or mental models is inherent to the process of community building or even change management (Deterding, 2014). Thus, it is the task of the designers and implementers of gamified interventions to create an atmosphere of autonomy, acceptance and support for their own methods, even in the obligatory work environment (Reeve, 2006). Game mechanics can be found in research on gamified processes in dozens of professional fields. The most typical applications are presented in this chapter.

The related literature search was carried out using Publish or Perish 8.9.45 software, Google Scholar, and Scopus using the search terms "**gamification** AND (or",") **application fields".** The results were sorted into an Excel spreadsheet, sorted in descending order by number of references, and after filtering out overlaps, 75 most cited literature were reviewed. In the dissertation, I only present those areas that appeared in at least five percent of the articles. The search results are presented in 5. Table. The application areas are presented in proportion to their relevance and in reverse order of their frequency of occurrence, with the gamification of education being presented in a separate subsection due to its importance. I have merged the topics of marketing, communication and commerce because, although the articles used different terminology, their content was clearly about promoting business and sales.

### *Software design*

In contrast to manufacturing and industrial processes, one of the most significant characteristics of software design and development efficiency is the human factor and the associated motivational drivers. The most tedious process of coding software should therefore be broken down into shorter projects and challenges that require individual or team capacity and skills, which is similar to games, for example: meeting goals by acquiring and using skills and working together. The reward or punishment is analogous to the success or failure of a development project (García et al., 2017). And teamwork can be packaged into collaborative "mission" type challenges, ranking and progress indicators can be formed, making development work more enjoyable by using playful elements. In addition to software design (Alhammad & Moreno, 2020), gamified motivational elements are also used in related quality assurance (Say et al., 2023), programming and testing.

### *Community economy: the division of labor, financing and the gamification of social decisions*

The achievements of information technology and telecommunications have given rise to new social phenomena that require a fundamentally new approach to their business analysis. The institutions of crowdsourcing (such as Wikipedia, Tripadvisor, or Waze), crowdfunding (such as Kickstarter), or sharing economy (such as AirBnB or Uber) go beyond neoclassical economics in that they pursue not only the business interests of the participants, but also other non-monetary, but more sublime motivational needs. Such as being part of something big and important, being involved in its birth and operation (Morschheuser et al., 2019). The author notes that non-monetary motivational phenomena are inherent to gamified systems as already mentioned, while the question is usually whether to build a cooperative or competitive gamified

structure. In this way, resource allocation at the community level is based on other objective functions, so that masses of participants contribute to make a service work and thus benefit others the value created is not only monetary but also comes along intangible values such as belief, justice, or performance (Roth et al., 2015).

The gamification of online tools for social decision-making and civic engagement (chat rooms, forums, community platforms) is also a well-known practice: it helps to maintain activity, build community and achieve activity goals. These platforms are characterized by the efficient allocation of limited resources and the management of conflicts of interest to keep the community alive, despite internal and external barriers (Hassan, 2017; Santos et al., 2021). Democratic governance is about involving citizens in decisions and the planning that precedes them. However, the transaction costs of coordinating this are high due to the multiplicity of citizens, NGOs and other stakeholders. According to deliberation theory, the more effective way is therefore to properly inform citizens through social dialogue, who will find their own way to political activism. Gamified platforms help people to learn about the issue at stake, to exchange ideas on it at community level and then to participate in the decision-making mechanism in the system, equipped with the appropriate knowledge (Chambers, 2003). This form of decision-making gives a new impetus to social life, which is referred to in literature as smart community (Romano et al., 2022).

*5. Table: Application areas of gamification*

| Areas of application | What percentage of articles mention it? | What percentage of articles mention it exclusively? |
|---|---|---|
| Education, learning | 19% | 5% |
| Health, wellness | 12% | 1% |
| Business, trade | 10% | 0% |
| Sustainability | 7% | 1% |
| Work, efficiency, collaboration | 6% | 0% |
| Marketing, communication | 6% | 0% |
| Community economy | 5% | 1% |
| Software design, programming | 5% | 0% |

Source: author's own work

### *Gamification in business*

Gamification can be used in business to enhance internal workflows and employee motivation, but it can also be used to make these events more exciting and memorable. Gamified workflows can also be used for self-reflection, tracking their own progress and development, and self-motivation (Gerdenitsch et al., 2020). All of these have a positive impact on employees' experience and performance. The literature has analyzed the role of gamification in many corporate functions. In the following paragraphs, I will present some of its applications.

Playful elements are used in many areas of human resource management. A common recruitment task is the gamification of the administrative tasks required of candidates (uploading CVs, etc.) (Allal-Chérif et al, 2021). This is where candidates first get an idea of the firm's culture, a crucial activity in developing an initial perception of the firm's brand: candidates perceive firms using gamified recruitment tools as innovative, technologically advanced, supportive of continuous learning, creative, fun workplaces and performance-oriented firms (Varghese & Deepa, 2023). The same can be said about onboarding processes, where new colleagues are familiarized with the methods and organizational characteristics of

the new workplace. It is also common practice to gamify internal training, facilitated by interactivity and rewarding progress with virtual badges and trophies. An important area is performance appraisal, which can support the assessment of employee performance with instant real-time and visually easy-to-understand data (Thomas et al., 2022), and some authors (Bizzi, 2023) report measurable performance gains because of gamified performance management.

Innovation can also be a gamified corporate function. The innovation process is typically non-algorithmic, with multiple levels of the organization working out a response to the challenges of a complex economic environment. Sometimes, the innovation process is open (Gimenez-Fernandez et al., 2021), geographically distributed and across distributed teams. In such cases, organizational friction and the different goals of people working in different organizational units (Patrício et al., 2021) explicitly complicate the innovation process. Gamified mechanics can contribute to the development of well-communicated common goals, and the increased work experience and playfulness of cooperation can have a markedly beneficial effect on collaboration (Patricio et al., 2022). For participants, novel processes that seem easy can be more enjoyable and reduce stress. A less institutionalized form of innovation can also be an open suggestion forum or brainstorming championship for some processes. Gamification of these typically involves publishing new solutions and rewarding the brainstormers.

Project management is like the innovation process in that it involves teamwork across embedded departments. Similar organizational friction can occur in this case. In literature, the most common is the gamification of project tasks for software development. In software development projects, tasks of goal setting and resource planning are typically gamified (Machuca-Villegas & Gasca-Hurtado, 2019), usually with point accumulation, reward and ranking mechanics. These provide an obvious visibility of individual performance, encouraging developers to compete and rewards to perform better.

### *Gamification of commercial activity in business*

In recent years, gamification has become increasingly popular in business, commerce and marketing as companies have discovered that gamification can help them strengthen brand loyalty, increase engagement and boost sales. In commerce, gamification is primarily focused on increasing customer engagement (Rahmadhan et al., 2023). Typically, customer performance-based gamification mechanics are emerging in online commerce: customers can earn points or rewards for purchasing certain products, which can later be redeemed for discounts or other benefits. In addition, gamification elements such as challenges or quizzes are

often introduced to encourage customers to make further purchases, and the potential of online communities and social media is exploited (Milanesi et al., 2022). In marketing, gamification is often used to increase brand awareness and consumer engagement. Contests or challenges are launched on social media where participants can be awarded prizes for following a brand or sharing a certain content. In addition, gamification can help to involve consumers in decisions about the brand, for example when designing new products or creating campaigns. The success of gamification in business, commerce and marketing depends on several factors. First, it is important that the gamification elements are genuinely interesting and engaging for the target audience (Singh et al., 2021).

Related examples:

- InsideSales.com[34] . This sales process support platform enriches the sales process with playful mechanics: gifts, trophies and competition mechanics are available, based on commercial data (data generated using the CRM module)
- Nike+[35] : Nike has changed the way we think about running with data collection mechanisms built into shoes. Runners can measure, share their own performance, set goals for themselves.
- M&M's candy pretzel search game[36] . The company's visibility and the average time spent on their website was significantly increased by a game to find a hidden pretzel in a picture of M&M's candies.
- Starbucks adds collectible stars to customers' purchases[37] . Based on the number of stars, customers can enjoy various benefits under the company's loyalty program, such as badges, trophies, discounted and free products.
- eBay has introduced a bidding system where participants must compete against time and other bidders[38] . The influence of the information that the participant can see how much higher the best bid is compared to his or her own before the time runs out is not negligible.

[34] https://www.insidesales.com/7-sales-gamification-secrets/ downloaded: 30.11.2024.

[35] https://en.wikipedia.org/wiki/Nike%2BiPod; retrieved 30.11.2024. The product has not been in production for years and has no up-to-date website.

[36] http://www.digitaltrainingacademy.com/casestudies/2015/06/gamification_case_study_mms_eye_spy_pretzel.php; downloaded 30.11.2024.

[37] https://www.starbucks.hu/en/rewards; downloaded 30.11.2024.

[38] https://www.ebay.co.uk/help/buying/bidding/bidding?id=4003; downloaded 30.11.2024.

- In addition to the above, countless other examples can be found in a simple "best gamification examples in marketing (etc.)" Google search.

### *Making work and collaboration more effective through gamification*

In my dissertation, I have repeatedly pointed out that gamification can influence the effectiveness of participant's activities by influencing motivation, facilitating the development of common goals and reduce the impact of organizational friction. There are also many examples in the literature and in business of gamification of tools specifically designed to promote work efficiency or collaboration.

When introducing collaboration tools to improve work efficiency (virtually any new process or tool), management must overcome individual and organizational friction and resistance. Collaboration tools typically do not contain gamified elements but can be linked to such applications through a wide range of connectivity options (Dalponte Ayastuy et al., 2021). Organizational acceptance of new programs can be facilitated by the addition of gamified additional programs (plug-ins). The cited article describes several collaboration solutions (Microsoft Yammer, Salesforce, Sharepoint, Jive, Slack) and their plugins that are well known in multinational enterprise environments. For example, when using Microsoft's enterprise collaboration and work organization application Yammer, users can collect activity points, see their own performance in leaderboards and thus get to know their collaborators better.

### *Gamification relating to sustainability*

Since the 1990s, there has been an exponential increase in research on sustainability and well-being. The United Nations calls for the use of the principle of "more with less" and sustainable production and consumption of shared economic goods (Mandujano et al., 2021) with the aim of fundamentally changing consumption and production.

However, information alone does not induce lasting change in individual behavior; long-term change requires environmental education that clearly identifies the barriers to individual and social well-being. This can be done by making science terminology accessible and interesting to technicians (Frías-Jamilena et al., 2022). A great way to do this is through mobile phone and computer applications (Johnson et al., 2017). The initial eco-friendly technologies were mostly focused on raising awareness about sustainability, with the so-called Persuasive Sustainability Systems (PSS) gamifying the process by setting and measuring back targets at individual and community level to create long-lasting change. Sustainability-related gamification efforts

typically address three areas. Firstly, they aim to reduce energy consumption in the home and thereby reduce the carbon footprint of households. They usually assess a family's energy consumption in a way that is easy to understand visually (e.g. rising sea levels threaten islanders). On the other hand, there are apps that encourage eco-friendly transport, such as the Ubigreen[39] app, which warns of the carbon emissions of the mode of transport chosen by the traveler, or the Toyota Prius car fuel gauge[40] , which invites drivers to a community competition to see who can go the furthest on a gallon of fuel. The sophistication of this latter gamification technique is noteworthy: results are presented as modified by driving style, wind conditions or even driving behind a truck , so the app shows average consumption rankings in a fair competition (Huber & Hilty, 2015). Finally, the gamified way of influencing behavior has also been incorporated into the methodology of public authorities and legislative bodies, predominantly by framing community decisions. The German Ministry for Economic Development's Building Ideas Glocally initiative supports projects formulated and implemented through community participation. It aims, among other things, to make sustainable everyday life accessible and affordable for all, promotes decentralized, locally delegated decision-making and favors community decision-making (Mandujano et al., 2021). The business aspects of community decision-making and implementation are discussed in the following subsection. To conclude, a good playful example is the Waste Game[41] which uses gamified training and information sharing to raise awareness on the importance of consumption and waste management.

### *Promoting healthy lifestyles through gamified processes*

Inequalities in the affordability and accessibility of health services and the rising costs of health maintenance and treatment have led to a growing interest in gamification of digital health products. Accelerometers, sensors and GPS built into smartphones have made continuous health services accessible. Examples include Behavior Change Support Systems (hBCSSs), which help to create healthier lifestyles through a gamification-enhanced user experience: influencing user perception and immersion leads to more regular use. It is important to note that gamified apps are generally easy to navigate and understand, significantly facilitating the use and experience of older generations (Sardi et al., 2017). The importance of this issue is reflected in

[39] https://www.ubigreen.com/en/ (downloaded 2024.12.31. 19:00)
[40] https://www.torquenews.com/8113/do-toyota-prius-owners-obsess-too-much-over-fuel-economy (downloaded 2024.12.31. 19:05)
[41] https://thewastegame.iua.ie/ (downloaded 2024.12.31. 19:09)

the World Health Organization's creation of a dedicated department[42] that researches the benefits of using mobile devices for medical and social health (Souza-Júnior et al., 2016).

The literature specifically highlights applications related to the maintenance and improvement of mental health, as experts point out that psychological treatments are very poorly accessible, either because of their cost or their availability. Some services can be extended through the uptake of mobile phones, and gamification is also important here because of the potential to increase the frequency of use. Successes have been achieved with mobile phone-based attention-bias-modification training (ABMT) applications to improve the perception and assessment of hazards in the user's immediate environment, and the resolution of some anxiety conditions has also been successfully achieved using gamified applications Cheng et al. (2019), and an in-depth list and summary is provided by Sardi et al. (2017).

The most common lifestyle applications are used to encourage, measure, provide feedback, analyze and plan physical activity, sport and fitness. They can also be used for smoking cessation, reducing alcohol consumption, or to encourage a healthier lifestyle in the case of diabetes, for example. Here again, the use of playful mechanics reinforces the motivation to use. This is achieved either through arousing emotions (joy, curiosity) or through the interesting presentation of factual data (distance run, calories burned) (Alahäivälä & Oinas-Kukkonen, 2016).

### 2.2.3. Gamification of education

Most of the literature on gamified processes is concerned with education and learning. Perhaps one reason for this is that game and play itself involves the development of skills in a microenvironment in which skills can be safely practiced (Koivisto & Hamari, 2019). Two important questions need to be asked about the gamification of education. First, we need to see exactly which aspect of education can be supported by gamification. This is the subject of this subsection. Secondly, it needs to be clarified how compatible is this with a pedagogical perspective on education? I will clarify this in the next sub-chapter.

Economic and social development requires increasingly complex knowledge from those leaving education and training institutions: in addition to professional competences, soft skills (e.g. communication, teamwork, flexibility) need to be integrated into the curriculum (Csillik

[42] https://www.who.int/observatories/global-observatory-for-ehealth

& Daruka, 2020) and the learning to use some new technologies has also become a focus. Effective training involves a modular, flexible, competency-based, deliberately designed learning path (Daruka, 2018). Learners can choose their own learning style and pace, and education becomes personalised (Almeida & Simoes, 2019, Demartini & Benussi, 2017). Effective learning (Molnár, 2002) is increasingly associated in the literature with the development of learning capacity, which points to the concept of **self-regulated learning**: "*a complex self-development of thinking, emotional, volitional and actional capacities, which in all cases systematically directs learning skills towards the achievement of one's own goals"* (Molnár, 2002, p.64.). In practice, this means self-regulation of the learning process, dynamic goal-setting, adaptation, feedback, conscious management of learning resources, and, when necessary, sharing of attention (Péter, 2011). Goal setting, self-regulation of the process and feedback are essential elements of gamified processes and pedagogical support interventions in general.

This transformation can therefore be facilitated using game elements. For example, by allowing multiple ways of solving a task, providing immediate and understandable feedback on the activity, offering optional challenges of different difficulty levels, allowing (and accepting) the possibility of making mistakes, providing a clear context, and promoting competition and collaboration (Simőes et al., 2013). Therefore, a thorough knowledge of game elements and motivational theories is necessary to design the process.

Gamified education can be found in primary schools, secondary schools, fields of higher education (Dichev & Dicheva, 2017, Kalogiannakis et al., 2021), as well as in training courses, corporate and other training courses (Kalogiannakis et al., 2022). By discipline, the literature mentions, for example, mathematics, literature, biology, chemistry, astronomy, geography, language teaching, and business (Kalogiannakis et al., 2021, Subhash & Cudney, 2018).

In the context of education, the following activities can be gamified according to Kenéz (2016) and Kiryakova et al. (2014):

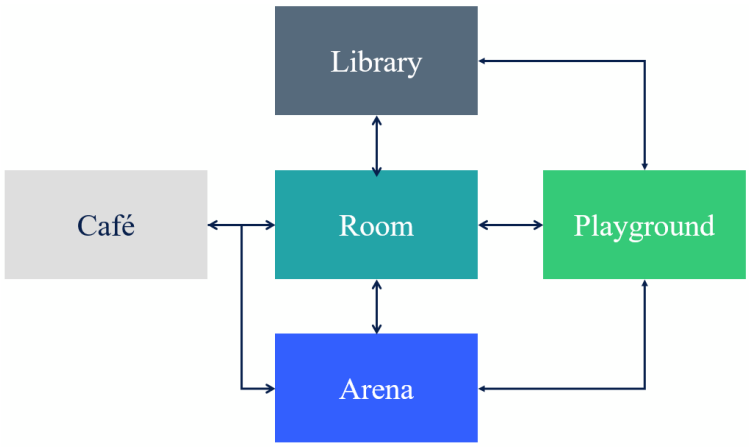
- **The course and dynamics of the classes** can be gamified by (a) spontaneous questions, quick tests on what has been learned (preferably with visual feedback), (b) voting on the course of the lesson, its thematic branching choices (using Mentimeter or other online tools), (c) group work, group competition, (d) based on class activity the allocation of tokens, or points, and (e) the possibility of using or trading of these points, and finally (f) ranking.
- **Evaluation and grading** can be made more playful with **continuous, immediate personalized** feedback.

- **Individual work**, **gamification of assignments** depending on the specificities of the course. For larger assignments, it may be possible to break the assignment into parts and provide continuous feedback to the student. A freely chosen task can also be a motivating force. All this allows for individual, personalized feedback, which also increases student engagement.
- **Gradually increasing difficulty:** by increasing complexity, students can make use of what they have previously learned.
- **A non-linear learning pathway:** the student can develop his/her own learning strategy and satisfy his/her need for autonomy in relation to his/her own choices.
- The **whole course** process can be gamified. You can have a narrative-wrapped arc, or the features of individual, or group work discussed above can contribute to the dynamics of the course.
- **Social influence** and work on the course can also be included in this approach. Group formation and group work are specific to several motivational theories and gamification frameworks.
- **Visual representation of progress**: using league tables, badges and progress indicators.

An essential philosophical element of gamification is to make the gamified process ("target process") as easy as possible for the participant to navigate to avoid unnecessary anxiety. This is related to the UX/UI design mentioned next to BJ Fogg's motivation theory. UX/UI design a profession concerned with providing good user experience. It is important to add that it is not about simpler challenges but about making it easy for the individual to see what the next step is (however difficult it may be)[43]. To illustrate the process for clarity, I mention Thiagarajan's (Thiagarajan, 2015) four-door model (10. Figure) which illustrates the role of platforms/infrastructure in a gamified environment. The **room is** the central part of the learning activity, from where all functions can be accessed. Considering the communication space of generations Z and Y, this could be a common Facebook group, but MS Teams also offers the possibility to live such a central, collaborative experience. **The library** function can be fulfilled by the Moodle/MS Teams page of the seminar group. This is where all class material is uploaded and where students can upload their class and homework assignments. The **Playground** is a place for practice and preparation. Students can test their knowledge here. The main tools for this can be the practice tests uploaded to Moodle. **The Arena** is used for examinations. This may involve writing small final exams, other forms of assessment (Teams, Moodle). Perhaps the most exciting is the **Café**, a social "chat" space. This is where communication between students and teachers takes place. Interactive interface. A Facebook group or Ms Teams could be suitable for this purpose.

[43] Of course, the exception to this is when the task is to find out exactly what the next step is.

*10. Figure: Thiagarajan's 4 door model*

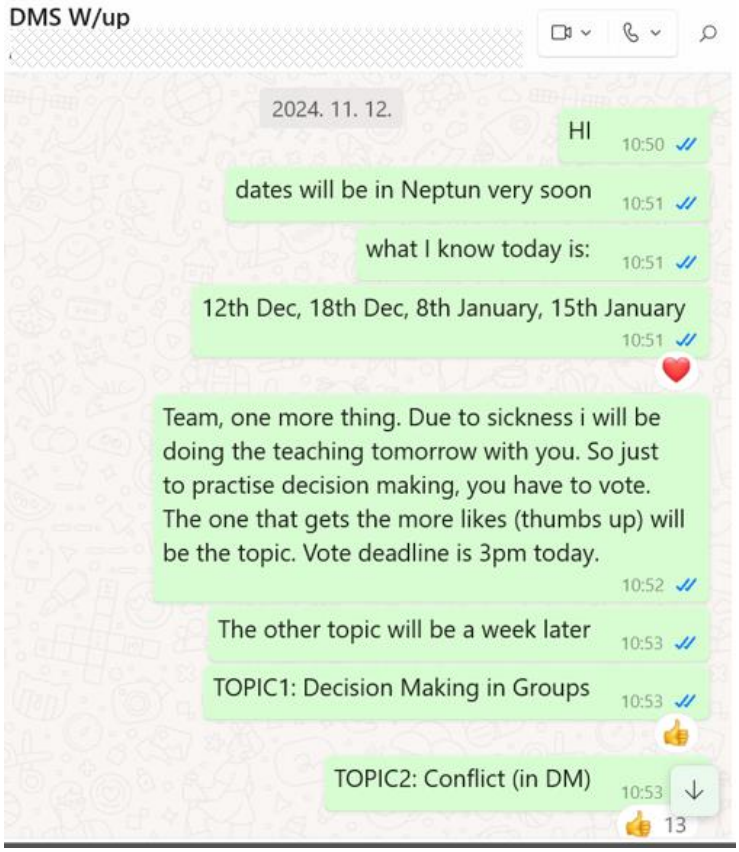



Source: Thiagarajan (2015).

For an example of young generations adapting their communication habits and the "cafeteria", see 11. Figure. The chat room was created by one of my seminar groups for teacher, demonstrators and students on Whatsapp[44,45]. It reflects generational characteristics: instantaneous information transfer and immediate reactions. It is not considered an official channel, but with careful communication respective risk can be mitigated. Student activity can also be easily boosted with such platforms. In this specific case, due to substitutions, I held several seminars for a seminar group, and I had the freedom to decide which part of the material to choose. This opportunity to exercise autonomy was passed on to the students. In the chat room I asked them to vote whether I wanted the “group decisions” or the “conflict” topic first. **The possibility of choosing on this informal platform is a good example of an ad-hoc application of gamification mechanics.**

[44] https://web.whatsapp.com/
[45] origin of the chat room name: DMS W/Up = Decison Making Skills Whatsapp

*11. Figure: WhatsApp group and the autonomy exercised there*




Source: author's own screenshot.

The challenges of designing gamified processes are highlighted in a summary by Mora et al. (2015). Based on their research, they conclude that game design for motivational influence is too complex a challenge to be constrained within formal definitions and frameworks. Instead, he suggests a flexible, even agile, process for design rather than a fixed schema. Rab (2016) adds that it is extremely difficult to strike a balance between playful and non- playful elements when implementing gamification integrated into education.

In the next chapter, I will review the didactic aspects related to gamification and provide further definitions of gamification. I will then consolidate the motivational theories, game elements and gamification frameworks and pedagogical dimension presented earlier.

### 2.2.3.1. The relationship between gamification and pedagogy

Gamification of teaching is used to enhance student motivation using game elements. Instructional interventions that support students' motivation to learn (Carnell et al., 2005; Fejes, 2015; Lüftenegger et al., 2014) are at the forefront of pedagogical research. Instructional support interventions are instructional efforts to influence student behavior and enhance student motivation. In my dissertation, I argue that gamification tools can be considered as such educational interventions, and accordingly, the literature and motivational theories provide scientific explanations for the potential of gamification to sustain and enhance student motivation and attention.

Hulleman et al. (2010) and Lazowski and Hulleman (2016) report several experiments in which interventions[46] in laboratory settings have been used to influence students' perceived values (task or activity) and thus student motivation. The authors emphasize that, although there are substantial theoretical differences on different expectations and perceived values, as a general principle it can be accepted that students who believe they can do or see meaning in the activity are more motivated. The relationship between interventions and motivation is made more tangible by the introducing the concept of interest by Hulleman et al. (2010). If an external trigger[47] arouses the learner's interest, the individual may perceive the targeted activity as valuable and therefore become more motivated, as discussed earlier.

The categorization of classroom interventions is discussed in Fejes (2015), Kaplan and Maehr (2007), Lüftenegger et al. (2014). They provide a detailed analysis of the interventions and the framework developed to examine the impact of classroom context, based on the following dimensions (Ames, 1992). First, the fine-tuning of the task (Task) assigned during instruction, changing the difficulty of the task, changing the parts of the task. Second dimension is the findings on control (Authority): are students given the right to shape the rules, deadlines, etc.? Recognition is the third pillar of the interventions. Group tasks to support the social experience (Grouping), the characteristics of group training are the next dimension. Evaluation is an

[46] Educational interventions and educational support interventions are somewhat different concepts. An intervention is an activity that is carried out for a specific purpose and in all cases with a measurement of the outcome. In this interpretation, gamification is not an intervention because the gamified process does not in itself involve the measurement of its own outcome. My dissertation is a special case, because here the very purpose of the research is to measure and analyze the gamified process. For a good overview of interventions, see Kis and Fejes (2023).

[47] The trigger phenomenon is explained in more detail in the discussion of Fogg's model in chapter 2.2.1, page 30.

indispensable part of any training process, so the methods of evaluation and their link to the task are the next pillar (Evaluation). Finally, the time limit for the completion of the tasks (Time) is the last category of interventions. The initials of the dimensions form the acronym TARGET. The relationships are summarized in table 6. based on Fejes (2009, 2015), Kaplan and Maehr (2007).

*6. table: System of classroom interventions*

| Dimensions of context | Definition | Interventions to support the learning (mastery) objective | Interventions supporting the comparative objective |
|---|---|---|---|
| Task (Task) | What is the task?<br>What is the expected output?<br>Can the learner influence it?<br>What is its perceived usefulness? | The individual is given a meaningful and challenging task that is flexible in some respects. The task can vary from individual to individual and can be tailored to the individual. | Easy (routine) or difficult (but well-structured) tasks.<br>All students are given the same challenge. It's all about assessment. |
| Authority, governance | How much say do they have in the rules and deadlines? Who is involved in making rules and decisions? | The learner is involved in setting the framework for the task and has a say in how (or when) the task is done. | It carries out the task according to predefined rules, with predefined decision alternatives, and cannot make its own decisions. |
| Recognition | How do participants behave, how is behavior recognized? | Accepted behavior, for example:<br>Extra effort, risk taking, creativity, sharing ideas, learning from mistakes. Recognition is private and open. | Recognized behaviors for example:<br>Achieving good results with little effort, flawless work, following the rules. Achievement is openly recognized. |
| Group work | What are the methods of group formation? What are the norms within the group? | Grouping:<br>Circle of interest, different personalities to learn from, encouraging inter- and intra-group interactions | Grouping:<br>Based on ability or performance. Little communication within the group, groups compete with each other |
| Evaluation | How is the evaluation carried out? How is the assessment and the task related? | Development, creativity and mastery are valued. Personal (not public) evaluation. | Completing the task and comparing it to others is the essence of assessment. |
| Time | Time management, its flexibility. What is the time limit for sending messages. | Flexible timetable, pick your own pace, it's all about progress/learning | Inelastic time frame, performance expected under time pressure. Schedule before understanding |

Source: The author's own summary based on Fejes (2015, pp. 56-57) and Kaplan & Maehr, (2007, p. 159)

The authors stress that, in addition to interventions, teacher behavior also influences student motivation. On first reading, the classroom interventions show strong similarities with the motivational theories and playful elements examined in earlier chapters of this dissertation:

- In its interpretation, the task can be compared to clearly formulated goals, which is a central phenomenon of Flow Theory, and is also reflected in the game elements of Octalysis, for example (epic meaning).
- Regarding authority, we can refer to autonomy either from self-determination theory or from the RAMP framework, but also to the motivational driver of ownership/responsibility seen in the Octalysis.
- At the heart of almost all motivational theories and frameworks there is the need for social connection and recognition, which is also found in the model above.
- Group work is a form of community connectedness, also found in self-determination theory, in the RAMP framework (relatedness) and Octalysis (social influence).
- Feedback on performance is also reflected in Flow Theory, the developmental psychological claim of self-determination theory, and is one of the most common gamification mechanics.
- Statements about time are better known as a pedagogical tool, but there are also several time-related mechanics (time window, time pressure) among the game elements. Among the frameworks, one motivational driver in the Octalysis refers to the same (scarcity).

Thus, gamification tools can also be considered as educational interventions. In educational theory journals, gamification is already discussed separately from educational theory (Bíró, 2014). It may seem justified at first glance, as gamification is generally labelled in literature as a new possibility for using information and communication tools, and educational theories date back much earlier. In my view, gamification permeates these theories rather horizontally and this can be shown by the following brief overview (Blummer-Jenei, 2018). Constructivism is an active learning theory that looks at the construction of knowledge in individuals through experimentation and (group) information sharing, here the teacher supports learning as a facilitator. Cognitivism theory focuses on the internal processes of learning, resulting in the ability to apply the material learned; purposeful, targeted instruction with visuals, graphics and, where possible, immediate corrective feedback. Behaviorism focuses on response and behavior to stimuli, but in this case the learner is more passive, repetitive, rote, following predetermined

and known steps, and the learning organization provides positive and negative feedback. These theories of teaching and learning follow significantly different instructional philosophies, but all of them include key words that are clearly basic mechanisms in gamification, such as immediate feedback, group information sharing, facilitator instructor, predictable steps (note that the opposite of this is also a gamification technique: unpredictability). Finally, I would like to point out that most of the gamification techniques mentioned above are only new in appearance, precisely because of the info communication possibilities mentioned above. Feedback, league tables, badges - these are the most frequently mentioned gamification techniques - were in the pedagogical repertoire before the appearance of gamification, so part of the criticism of gamification may be that it does not offer anything new. I can respond to this point with an analogy: black and white, then color, and later modern LED and plasma televisions can deliver the same program, their main functionality is the same, yet the experience is different. Similarly, gamification in education can provide an old-new experience.

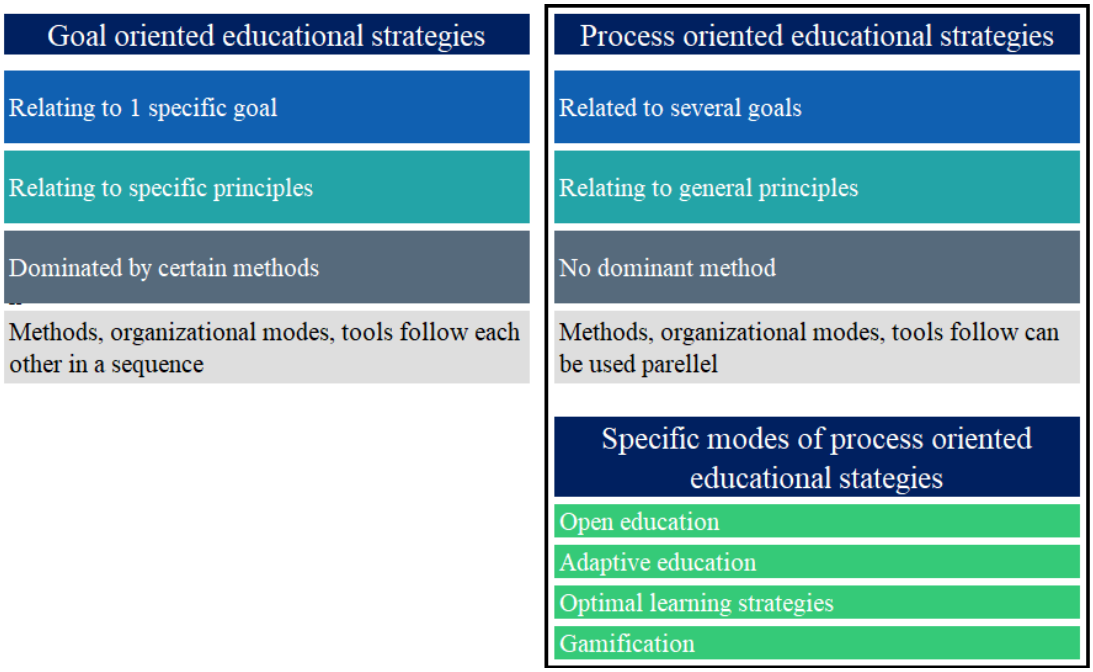
In this subsection, I have compared the categories of game elements with the categories of pedagogical classroom interventions. However, overall, where does gamification fit in the didactic system of thought?

#### 2.2.3.2. Gamification as an educational strategy

It is also important to define the place of gamification from the point of view of didactics. According to Falus and Szűcs (2021), a set of methods, tools and procedures used in education to achieve a specific goal *can be considered as an educational strategy.* The authors present a few examples and categories, all of which are characterized by (1) planning the strategy, (2) implementing a specific activity and through this (3) restructuring the information (i.e. knowledge construction), and finally (4) some kind of feedback or evaluation. In other words, **regulation** towards a **goal** by means of the tools formulated in the strategy in each learning **context**. Instructional strategies are divided into two main groups, goal-oriented and control-theoretical instructional strategies. In a goal-oriented approach, the focus is on the goal and the content it conveys. In the case of regulation-theoretical strategies, specific regulation tools and procedures are implemented in the educational process, usually not linked to a single goal (Falus & Szűcs, 2022)**. Regulation-theoretical strategies include** open and adaptive instruction, optimal learning strategies and **gamification**. Open instruction mainly provides a platform for self-regulated learning, while adaptive instruction emphasizes teaching procedures

adapted to the individual abilities of learners. This can be linked to the optimal learning strategy, which relates learning outcomes that are significantly better than expected to opportunities (time and circumstances) adapted to individual abilities. These are summarized in 12. Figure.

*12. Figure: Gamification within didactics*




Source: The author's own synthesis based on Falus & Szűcs (2022, p. 400, and p. 498)

Using gamification, mechanics borrowed from games are incorporated into the teaching process. In this case, regulation is achieved using game mechanics[48] such as point scoring, knowledge leveling or narrative. One of the key areas of application of gamification is assessment and feedback. On the one hand, points and associated experience/knowledge levels can be highly motivating for learners. They have the advantage of focusing on continuous improvement and accumulation of points in relation to the points accumulated, as opposed to, for example, a final grade derived from the grade point average (Fromann & Damsa, 2016). This is explicitly supported by the visual, graphical representation that is otherwise typical of gamification.

[48] More on this in chapter 2.2.2.2, page 51.

## 2.3. Gamification, motivation and education in uniform structure

The preceding chapters of the dissertation were about motivation, gamification and its applications, especially in education. In none of these areas the reader can find a single definition, a consensus in the literature on the characteristics of the phenomena, and the context of learning and teaching is also multifaceted. Why am I looking for a coherent structure for so many blurred boundaries, some of which overlap? The word uniform structure may not be the most apt, but - borrowing the term from legal jargon - my aim is to find a broad common domain of interpretation of the motivational theories most often associated with gamification, as my research suggests, or as I have determined by expert judgement to be otherwise significant, in a way that can be integrated into education, i.e. that can be matched with interventions that support education. I will place the game mechanics used in my own research into this logic. Based on this line of thought, the reader can approach the gamification element of choice→← motivation→← education-supporting intervention combination from the side of the game element or intervention type, or perhaps the motivating driver. What is the sense, the real benefit, of this structuring? Why is it important to categorise a particular gamification element in so many ways? **Why is it good to understand its relationship with related motivational theories and to find its place, if any, in the framework?** I believe that this is precisely why it is important for the participant in the gamified process to have a customisable solution: the more detailed the options for setting and fine-tuning are, the more the process can be tailored to the context, which increases the efficiency and the experience aspect of the activity. However, I must stress that this also makes the system more cumbersome. A rudimentary car racing simulator game on a computer can be controlled with a simple mouse and keyboard, but more complex games are multi-screen and use realistic controls and real steering wheels and pedals. The latter is considerably more complicated, but I would prefer to give a real car to someone who has successfully played the latter. **To sum up, a more detailed formulation of the possibilities, effects and benefits may make it difficult to apply a single model in practice, but it does allow us to tailor the methods of gamification more to the students, the curriculum and the course, here and now in an educational context.**

6. Table shows the pillars of my dissertation. On the one hand, the broader motivational theories (self-determination and, due to its educational aspect, goal orientation theory), the frameworks of gamification and the intersection of these interventions, which are **both educational interventions from a pedagogical point of view and game elements from a gamification**

**point of view**. In the table, I have mapped the types of interventions (Task, Authority, Recognition, Grouping, Evaluation, Time) to the logically related parts of the motivational theories. In the same way, I have also sought to locate the interventions within the elements of the gamification framework. I have also assigned to the intersection points some possible game elements, which can be placed in the course either according to their content or according to the related HEXAD player types. Before reviewing the table, 2 factors are important to emphasize. Firstly, all interventions are entirely context and course dependent, so the result can take many different forms like a game board. Secondly, the impact of the interventions also depends on the personality of the target student. For example, the time pressure game element, which is a separate intervention category in the TARGET system, can affect learners with a tendency to all four types of motivation in terms of learning (goal orientation) motivation. Students with mastery orientation may be motivated to acquire knowledge more quickly. The mastery-oriented achievement-avoidant student is motivated to avoid less effective learning. The performance-oriented individual is motivated by "showing off" his or her own abilities, while the performance-avoidant person seeks to avoid the appearance of being incompetent in the eyes of his or her peers. One possible way of applying the table is to follow the badge game element through the frameworks, motivational theories and intervention logic:

- **RAMP framework and badges**: if badges convey some value, they can reinforce goal-oriented behaviour (Goal) and encourage higher performance (Excellence).
- **HEXAD player types and badges**: badges are rewards for achievement, so they are perhaps most easily associated with the "Player" type of "something for something", and (Marczewski, 2017) also classifies badges under this type.
- **MDA design system and badges**: here badges are among the most atomic components, as are levels, rankings, etc[49].
- **Octalysis and badges:** in Octalysis, badges can either reflect "Progress and Achievement" or, if badges can be collected, they can be related to the "Ownership" driver.
- **Self-determination theory and badges**: the badge is used to recognise the learner's performance, so it is most typically a response to a psychological need for competence. Note that if it could be published, it could also be linked to "Attachment".

[49] More details can be found in chapter 2.2.2.3, from page 61.

- **Goal orientation theory and badges**: if the badges reward an individual's learning outcomes, then the mastery goal can be reinforced, if they are for comparison with others, then the benchmark goal is associated with the badge.
- **Interventions and badges:** fall under the category of recognition and evaluation interventions. In the former case, it is a recognition of performance, in the latter a more formal way of doing so.

Any of the game elements can be placed in this table, given the theoretical background of motivation and pedagogical interventions, as in the examples listed. To summarize, for gamification of a course or a component of a course, the instructor can use the motivational theories, the pedagogical interventions, the playful frameworks of the motivational theories further thought for gamification, the type of students' playful, or the playful elements as a starting point. Whichever direction you take when designing a gamified course, the table will help you to create a complex, coherent gamification process.

*6. Table: Gamification, motivation and pedagogy in one logical frame*

| | | Game mechanics used in the experiment-->> | Badges | Leaderboard | Levels | Virtual market | Autonomy | Personalization | Feedback | Voting | Onboarding | Narrative | Unpredicability, suprise |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frameworks | RAMP | Relatedness | | √ | | √ | | | | | | | |
| | | Autonomy | | | | √ | √ | √ | | | √ | | |
| | | Mastery | √ | √ | √ | | | | | | | | |
| | | Purpose | √ | | √ | | | | | √ | √ | √ | √ |
| | HEXAD | Socializer | | | | | | | | | | | |
| | | Free spirit | | | | | √ | √ | | | | | |
| | | Achiever | | | √ | | | | | | | | |
| | | Player | √ | √ | | | | | | | | | |
| | | Philantropist | | | | | | | | | | | |
| | | Disruptor | | | | | | | | √ | | | |
| | | General game mechanics | | | | | | | √ | | √ | √ | √ |
| | MDA | Mechanism | | | | | √ | √ | | √ | √ | | |
| | | Dynamics | | | | √ | | | √ | | | √ | |
| | | Game element/component | √ | √ | √ | | | | | | | | √ |
| | Octalysis | Epic meaning | | | | | | | | | √ | √ | |
| | | Accomplishment | √ | √ | √ | | | | | | | | |
| | | Empowerment (creativity , feedback) | | | | | √ | | √ | | | | |
| | | Ownership | √ | | | √ | | √ | | | | | |
| | | Social influence | | √ | | | | | | √ | | | |
| | | Scarcity | | √ | | | | | | | | | |
| | | Unpredictability | | | | | | | | | | | √ |
| | | Avoidance | | | | | | | | | | | |
| Self-determination theory | Pszichológiai igények | Autonomy | | | | √ | √ | √ | | √ | √ | | √ |
| | | Competence | √ | √ | √ | | | | √ | | √ | | √ |
| | | Relatedness | | √ | | √ | | | | | √ | √ | |
| Goal Orientation Theory | Mastery | Mastery+ | √ | | √ | √ | √ | | √ | √ | √ | √ | |
| | | Mastery (avoidance) | | | √ | | | | √ | √ | | | √ |
| | Comparative | Comparison+ | √ | √ | | √ | | √ | | √ | | | |
| | | Comparison (avoidance) | | √ | | | | | | √ | √ | | |
| Pedagogical supporting interventions (TARGET) | Task | | | | √ | | √ | √ | √ | | √ | √ | √ |
| | Authority | | | | | √ | √ | √ | | √ | √ | | √ |
| | Recognition | | √ | | | | | | | | | | |
| | Grouping | | | √ | | √ | | | | √ | | | |
| | Evaluation | | √ | √ | √ | | | | √ | | | | √ |
| | Time | | | | | | | | | | | | |

Source: the author's own work

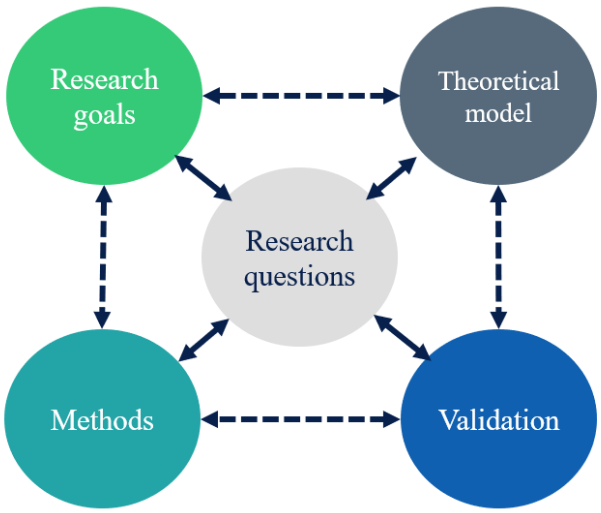
# 3. Research design, objectives and methodology

The peculiarities of scientific observation of the world, in a surprisingly modern way by today's standards, were formulated by the 13th century English philosopher Roger Bacon as follows (Marczyk et al., 2005). According to Bacon, science is a privileged way of acquiring knowledge with properties that distinguish it sharply from all other ways of acquiring knowledge. Scientific knowledge acquisition is based on evidence (empirical) and observations, driven by questions and hypotheses, drawing conclusions from experiments through analysis and formulating propositions in such a way that repetition of the process should lead to the same result. The research design of my dissertation touches on all these eternal principles.

In my research, I will build on the theoretical background of motivational theories, pedagogical interventions and gamification elements to develop gamification elements for a live seminar course and then measure its impact on the student experience and motivation.

I built the conceptual model of the research design based on Maxwell (2009). Maxwell formulated it in relation to qualitative research. A research design consists of five parts: (1) defining the research objectives, (2) outlining the theoretical model, (3) formulating the research questions, (4) developing the methodology, and (5) testing validity (13. Figure).

*13. Figure: Research model*




Source: Maxwell (2009, p. 217)

It is necessary to add to the Maxwell research design model that although the parts are inextricably linked and the figure only shows the research questions as central, the picture is more nuanced. On the one hand, the elements are different in terms of timing. The formulation

of the objectives, based on literature research, foreshadows the specificities of the theoretical model, in this case the hypothesised link with the motivational effect of gamification. This can be followed by a list of research questions derived from the objectives. The theoretical model, the questions and the educational-research context may determine the methodology. Finally, research and analysis are followed by validation of the methodology and results.

## 3.1. Objectives of the research and the research questions

The mission or "epic meaning" for me, using the concept of gamification, is to show how and how effectively live seminar classes can be made more motivating by using gamification elements. To this end, I have formulated several interrelated and interdependent objectives and research questions. The objectives are:

1. Objective **First, the unification of the theories related to gamification** and the mapping of the connections and similarities between them. This can help to map the instructor's options and support him in gamifying the course. I have pointed out that many universities abroad teach gamification methodology in full master's courses, and I therefore believe that there is a case for developing such a "recipe". **This should be done with a level of detail and thoroughness which, according to my research, is not yet to be found in the literature**. Achieving Objective 1 will contribute significantly to a deeper understanding of the playful elements. This will allow the design process, identified as the next objective, and its implementation to be more effective.
2. Objective **Examining the gamification possibilities of a live seminar course. Formulating a structured design process,** selecting the gamification elements and adapting them to the specificities of the course, with particular attention to the need to ensure that the effects of the intervention can be measured ex post. Definition and selection of the technical conditions for the subsequent implementation. To **examine the didactic and practical/technical aspects of gamification and to design and implement the experiment accordingly**.
3. Objective Explore **what students think are the factors that influence their learning experience**. This is a prerequisite for examining and measuring the impact

of gamification. Research objective 3 is to map the student learning experience. The gamification experiment was designed to influence these experiences, so research objective 3 provides benchmarks for measuring motivation.

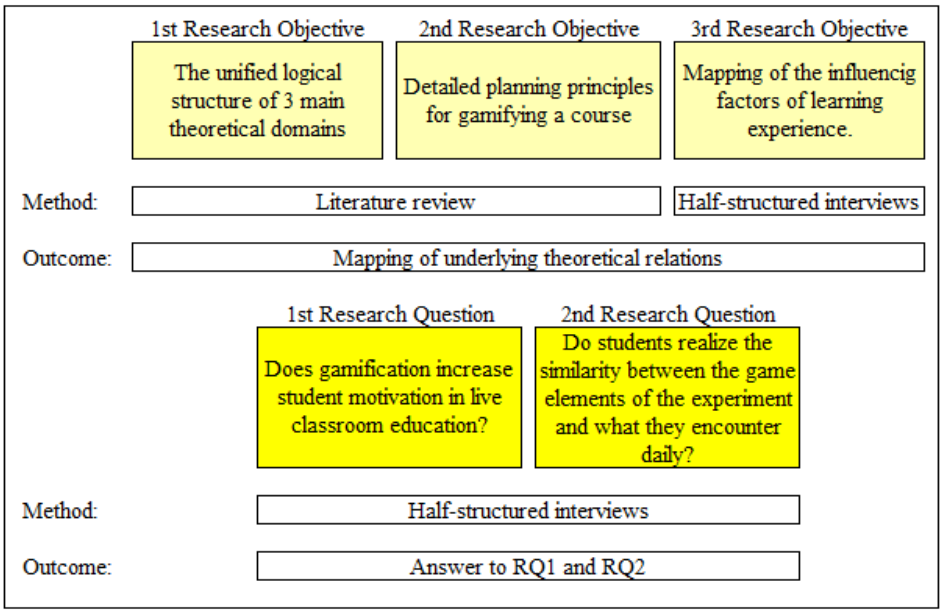
Achieving the **first three** research **objectives** is a prerequisite for answering the two subsequent research questions. The bridging logic between theories is embodied in a summary table. Formalising the design and implementation process of gamification involves defining and explaining the design steps. These two objectives are fulfilled through the processing of the literature section of the dissertation. The third objective, exploring students' learning experiences, is achieved through the analysis of the interviews detailed in this chapter. **All of these are also the results of the research, in time preceding and laying the foundations for the empirical research**, which aimed to answer the following questions.

The first research question is whether a well-designed gamification process in a live seminar class environment really increases student engagement and motivation. To do this, I investigated what and how the students in the experiment believe it influences their own learning experience (research objective 3). The second research question is: do students consciously recognise the motivational-influencing aspiration of gamification elements and discover its relevance for their future business life? To put it more formally:

- **Research question 1 (RQ1): Can gamification in a live seminar class environment increase student engagement and motivation?**
- **Research question 2 (RQ2): After participating in a gamified course, do students recognise the gamification elements and relate them to the gamification in practice?**

The research objectives and research questions are summarised in 14. Figure.

*14. Figure: Research objectives and research questions*




Source: the auhor's own work

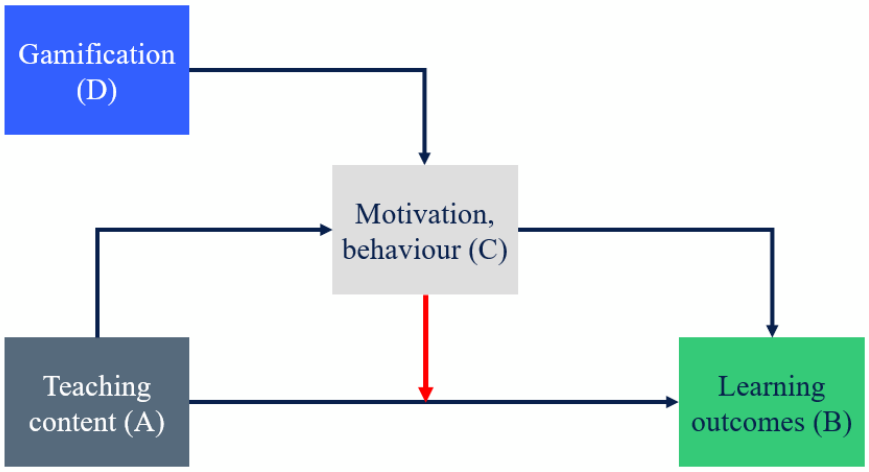
By formulating the links between motivational theories, gamification mechanics and frameworks systematically identified in the literature review, **I have in fact already achieved the first objective**. The didactical and gamification feasibility of course is formulated **as the second goal,** and its framework of conditions will be achieved on the basis of **further literature research in** the next chapter. The exploration of the learning experiences - **as the third objective** - is composed through **qualitative means**, via semi-structured interviews within the empirical part. **The first research** question is to assess the motivational impact of gamification. Also through the analysis of **semi-structured interviews** I will provide the answer. This will link the experimental part of the empirical part (gamification design-development-measurement) with the literature chapters on motivation in classroom teaching. Finally, I bridge the gap between the gamification course and the business areas of gamification by answering the **second research question.** In doing so, I seek to justify the students' insights into the methods of influencing the gamified course and similar methods seen in the business world. The related empirical part is **also related to the analysis of the semi-structured interviews**.

## 3.2. Theoretical model in relation to the research questions

Teaching activities, student behaviour and motivation influence learning outcomes. Baptista and Oliveira (2017), Landers (2014), Landers et al. (2017, 2018) have also based their empirical

studies on these assumptions. Landers (2014) adds that this really shows that gamification should not replace but complement and improve basic educational processes. A more formal definition of the theoretical model is presented by Landers (2014). In theoretical models, dependent and independent variables, mediator and moderator quality relationships are distinguished. The independent variables are external conditions, and the dependent variables are the variables that are to be influenced in the experiment. The mediator relationship between variables represents the effect of the dependent variable on the independent variable, explaining the relationship, i.e. why the effect is occurring. A moderator shows nature, direction and influence of the relationship between two variables. Landers formulated the theory model for game theory of education, that is, the relationships between observable dependent and independent variables. This is summarised in 15. Figure and further findings can be followed in the figure.

*15. Figure: Theoretical model of gamified education*




Source: Landers (2014)

According to Landers (2014), the way and content of education affects learners' motivation and behaviour and also learning outcomes: better learning materials typically contribute to better learning outcomes. The impact of educational content and method on learners' motivation depends on context. The author notes that gamification-supported instruction will not be more effective if the foundations (teaching materials) are inadequate. The relationship between motivation and learner behaviour is also clear in relation to learning outcomes: for the same learning content and instructor, we can find a wide range of learning outcomes. The author stresses that gamification is only effective in an educational setting if it promotes behaviours

that are otherwise related to learning outcomes. The moderating effect mechanism due to gamification is as follows: gamification elements can make the processing of the learning material more interesting and exciting, but this requires - as I have written earlier - that the learning material is otherwise usable. The moderator effect can be seen in the sense that we would not achieve learning outcomes without an appropriate independent variable (instruction), but we can expect higher motivation levels and consequently better learning outcomes because of the moderator variable. In summary, gamification is a direct mediator process on motivation, i.e. it explains (mediates) the change in motivation. Motivation thus moderates (strengthens or weakens) process.

Landers (2014) highlights that gamification can affect learning outcomes in such a way that gamification (as a causal construct) affects motivation, which can then influence learning outcomes. In the empirical research of Baptista and Oliveira (2017), García-Jurado et al. (2019), Herzig (2012), Raman (2020) and Suh et al. (2017), the use of gamification has been shown to influence the user's flow experience (flow), perceived ease of use and perceived usefulness of the gamified process in a positive direction and, overall, to influence user behaviour in the desired positive direction. Under the topic of motivational theories, I noted that perceived usefulness plays a role in, for example, motivation to learn. Thus, although these articles did not all examine gamification in an educational context, the aim was equally to increase motivation. Silic and Lowry (2020), approaching the process from the perspective of design research, derive higher levels of engagement and immersion from the experiential nature of the process (which they refer to as gamification) and from this they derive a positive effect on behaviour.

Regarding the conceptual model of the research, I note that contextual elements[50] can also have moderating effects on the variables. I considered contextual items and personality characteristics as independent variables. Context may include innumerable variables that influence the learning experience. The examples below are my own educator's opinion, without scientific research:

- elements relating to the instructor
    - personality, mood, teaching style, language and presentation skills, length of the lesson, technology and teaching aids used

[50] Weather, seminar time (hour or day of the semester), room size, lighting, temperature, etc.

- elements relating to the student
    - personality, mood, prior knowledge, cultural background, learning style, student expectations, health, language skills and prior knowledge, relationships with other students, behaviour of other students, group work, student workload (other courses, personal life), distractions (mobile phone, etc.)
- elements relating to the classroom
    - size, ventilation, temperature, lighting, room layout, outdoor weather,
- other conditions
    - the time (morning, after lunch, etc.) etc.

The analysis of the impact of some elements of context is not the focus of my dissertation, however, the student interviews related to the third research objective confirm the influential impact of context[51].

## 3.3. Methodological overview

In the empirical part of my research, I explored the factors influencing students' learning experiences and the impact of gamified elements on the formulated learning experience. The exploratory nature itself pointed towards a qualitative methodology. It is important to emphasise that motivation is a very complex phenomenon, and its perceptions are highly context-dependent, and therefore I used semi-structured interviews to collect data. For data analysis, I used thematic analysis. The live seminar class experiment provided an opportunity for this. Similar thematic analysis has been used to investigate the motivational impact of gamification, for example by Thomas et al. (2023). In this chapter, I will review the steps and characteristics of the qualitative research methodology, including thematic analysis. Based on my knowledge of methodology, I situate this research into the paradigm space and then detail the design steps of gamified education. Building on the design logic, in the next chapter I show in detail the implementation steps of the concrete experiments and then put forward the results of the research.

The gamification of the courses has been done through several iterations, with the game elements being constantly improved. A total of 165 students from two Business Economics, two Decision Theory and two Decision Making Skills courses participated in the gamified lessons

[51] I describe this in more detail in the chapter disussing the results.

in Hungarian and English. Students were exposed to five development versions of gamification, with a total of 11 game elements. A total of 51 interviews were recorded in one Business Economics and two Decision Making Skills courses.

### *The qualitative methodology*

Qualitative research aims to gain a deeper understanding of human experiences, attitudes and interactions. In complex and dynamic areas such as the impact of educational gamification, it is crucial that the interviewer and the respondent understand the same thing and in the same way about the phenomenon under study. Qualitative tools can also consider the natural context and the subjectivity of the participants. The purpose of qualitative research is to explore their experiences (Moser & Korstjens, 2017).

For data collection, the sample was given: students participating in the gamified seminars. Data collection was done in two versions. In the first version, I collected data through voluntary interviews, and in the second version, through mandatory interviews. During the interviews, I measured the factors influencing the students' learning experiences and examined their impressions of gamification. I did this in such a way that the questions were as non-implicit as possible. I used the works of Aldemir et al. (2018 ), Paris et al. (2004 ) and Torrado Cespón and Díaz Lage (2022) as inspiration for the questions, and adapted their questions for the experiment[52]. In the interviews, due to their semi-structured nature, I did not ask all the questions in all cases, and in the first version of the research (2021 Business Economics course, interviews marked 21_VG) I focused more on learning experiences, while in the second phase (2023 Decision Making Skills course, interviews marked 23_DMS) I focused more on gamification experiences. The main reason for this was that, due to the changes in education mentioned earlier, by 2023 the gamified feedback sheet used in the experiment had reached a level of development that allowed me to build better-quality research on it.

### *Semi-structured interviews and their analysis*

According to Horváth and Mitev (2015), the aim of qualitative research is to analyse the observed phenomenon in a given context with as much detail as possible, in order to draw detailed and meaningful conclusions. The qualitative interviews were conducted in two versions. In the first version, at the beginning of the research, I wanted to get to know the

[52] The interview questions are presented in the Annex 6.9 on page 227.

learning experience and its influencing factors. A smaller proportion of the questions were about perceptions of gamification. These gave me a much broader picture of what influences the learning experience and what motivates students. The second version of the interviews, on the other hand, focused on the gamification elements.

The advantages and disadvantages of interview research are well illustrated in Koul et al. (2016). Interviews are a rich source of information, the interviewer can create an exciting atmosphere with the interviewees, to clarify any misunderstandings immediately. Interviewing is also a discourse, an opportunity to brainstorm in both directions. The personal interview provides a link between the interviewer and the interviewee, allowing the interviewer to get closer to the character of the respondent and to judge the sincerity of the interviewee more easily. Finally, the authors add that interview research is the closest to the work of a teacher. However, it is a costly and very time-consuming way of collecting information, and the interviewer's personality, perception and the circumstances of the interview can distort the answers. It takes practice and expertise in the subject to obtain and interpret the right answers.

While initially reading through the interview transcripts, I drew several conclusions about the design of the interviews, this also shaped the characteristics of the interviews in the second version. The reflection on motivation and learning experiences is a very complex phenomenon, for example, the students did not understand the same factors influencing the learning experience as I, as a researcher, would have expected the answers to be. Therefore, in the interviews of the second version, in many cases, the asking of questions was preceded by a definition or explanation of the question. This had to be done in a way that would influence the respondents' opinion as little as possible, but it was important that the respondents understood what I was looking for an answer to.

The interview, the audio recording and the transcript of the interview and its anonymous use in my research were agreed to by the students, and some of these acknowledgements can be heard on the audio recordings. The interviews were recorded on MS TEAMS platform. The transcripts in Hungarian were created manually[53]. The English interviews were transcribed using youtube.com and later, the new related feature of MS TEAMS. The interview materials have been put into a consistent and clear format for efficient use. I translated the quotes from the English interviews into Hungarian for the purpose of the dissertation. When preparing the

[53] For this (also) I am eternally grateful to my Mother, Dr. Márta Illés.

transcripts, I tried to use verbatim transcriptions, but in some cases, this was not practical. Occasionally, I transcribed words and sentences with minor changes in a way that did not substantially alter the text.

I have made the audio files of the interviews, the transcripts of the interviews and the coding database available to the reader as discussed in the Annex[54]. The students cannot be identified from either the interviews or the audio materials. For this reason, any names mentioned in the audio materials have been deleted from the audio and the transcripts.

### *Thematic analysis methodology*

The analysis of the interviews was carried out using a **thematic analysis** method using NVIVO 14 software. For a good overview of thematic analysis, see Kiger and Varpio (2020), and for useful, practical tips, see Castleberry and Nolen (2018) for a literature analysis. On thematic coding and the use of NVIVO, I drew inspiration from Dr. Jarek Kriukow's podcasts (Kriukow,2023b, 2023a, 2023c)The working mechanism of the methodology is summarized in 7. Table.

*7. Table: Thematic analysis process*

| The analytical step | Explanation |
|---|---|
| 1 - detailed study of the interviews | Reading the transcripts, even several times, to give the researcher an overall picture of the content of the texts, which is necessary to carry out the second step more efficiently |
| 2 - Defining codes and matching to text | Capturing phenomena found while reading texts as a code and recording the relationship between the text reference and the code. It is essential to maintain the references, which will support the results later. When reading a text, a new code should be assigned to new important phenomena or a previous code to a recurring phenomenon. |
| 3 - Rethinking codes | In the coding process, it may be necessary to rename codes or to merge or eliminate certain codes. Careful reading of the transcripts can lead to a better understanding of the phenomena and the relationships between them, and the researcher can formulate more logical codes after reading several passages. |
| 4 - Search for themes | After the codes have been grouped, the logical connections and themes that link them across the research are identified. In practice, these are codes formulated in a more abstract way, from which the results of the research are built. |
| 5 - Review and refine themes | Understand and describe topics and codes and the links between them. Capturing the specific cartography of the themes, their contribution to the story. |

[54]Annex 6.10, page 228.

| | |
|---|---|
| 6 - Documenting the analysis | Formulate the answers to the research objectives and questions, describe the story arc, list the codes associated with the themes and the quotations on which they are based. |

Source: own translation, summary and editing based on Kiger & Varpio (2020) and Castleberry & Nolen (2018)

The principle of the methodology is therefore that by repeatedly reading and comparing text passages, the researcher collects the phenomena (codes) discovered in the content across all interviews. The codes are then grouped into a logical and hierarchical system, and on the basis of these, categories describing the essential messages of the research are formulated, which the methodology calls themes. These reflect the explanatory nature of qualitative research. Also, the mechanism of the game elements is perceived and appreciated by the students through the learning context and their own personality traits, and accordingly, the observation and understanding of the phenomenon is the most complex part of the research work. Coding, thinking through codes, and defining themes is entirely subjective, there are no set rules for this that it must be done in order to answer the research objectives and questions, in accordance with the research paradigm.

## 3.4. The place of the research in the paradigm space

Social science research is characterised by positivist, pragmatist and constructivist paradigms[55]. The positivist paradigm (Denzin & Lincoln, 2005) is based on the philosophical movement of the same name, according to which the researcher is surrounded by objective reality, quantifiable cause and effect and uses surveys and standardised tests to investigate the impact of interventions and formulate generalisable rules. Understandable, measurable reality suggests an objective ontology, and the empirical research approach also defines the epistemological aspect: truth is absolute. Its methodology is typically quantitative. The constructivist paradigm is the opposite philosophy to positivism. Here (Guyon et al., 2018), reality is constructed by us through interactions and experiences. It takes its ontology from relativism: reality is subjective, there is no single objective reality. Corresponding to this is the epistemological side: knowledge is situational, influenced by individuals, communities, context. Qualitative methods dominate in this paradigm Between these two extremes lies the so-called pragmatic paradigm. Its

[55] The literature deals with a number of other paradigms, such as interpretivist, postmodern, etc. For the purpose of this dissertation, pragmatism is situated between positivism and constructivism, and therefore I will only deal with these three paradigms.

emergence is due to the need to formulate a more flexible and 'comfortable' paradigm for research using mixed methods (both qualitative and quantitative). Especially in the case of interdisciplinary research involving several researchers, where each researcher tries to find his or her own voice. The pragmatist paradigm argues that although reality is constructed, it is not completely constructed, there is an essentially stable reality base (Kriukow, 2024). The pragmatist paradigm does not conduct research from a philosophical point of view, but always uses the method that is necessary and works to answer the question at hand (Brierley, 2017), hence the name. Its ontology is essentially "pluralistic", reality can be approached from multiple perspectives. According to its epistemological aspect, there is no one best way to construct knowledge, it always depends on the situation. Methodologically, both qualitative and quantitative tools are used by pragmatist researchers. Brierley emphasises that while in purely qualitative and quantitative research the relationship between theory and data is based on induction or deduction, in the pragmatist paradigm the researcher can switch back and forth between the two.

In my opinion, the study of motivation and commitment cannot be taken out of its own context, yet some general, individual-independent directions can be discerned in the literature. For this reason, I classify my own research within the pragmatic paradigm. "*The reality of the organization is unique, it is examined in its uniqueness*" and "*how the subjective interpretations and interactions of organizational actors create a "shared reality" that exists for them "there and then"* (Gelei, 2006, pp. 9-10). This is also supported by the fact that much of the data collected in my research is based on interviews and that the students themselves participated in the experience and shaping of the classroom reality that influenced their perception of it.

I briefly discuss the rationale for using the Maxwell research design model. Maxwell's research model is fundamentally concerned with qualitative research, as Maxwell emphasises the reflexive (Maxwell, 2009) nature of qualitative research through the back-and-forth, interconnecting elements of the model that permeate the entire research. The methodology of my dissertation includes qualitative elements. The theoretical part of my research was largely in place at the beginning of the research; however, the practical implementation has undergone several changes during these 4 years. I knew what I was looking for, but the way in which I measured and collected data was fundamentally changed by the coronavirus, the shift to online education, the return to classroom teaching, the transformation of Budapest Corvius University, the change in the subjects taught and the seminar language, the in the undergraduate and postgraduate education. Therefore, the data collection methods of the empirical part were

implemented in a variety of ways, and this reflection, emphasized by Maxwell, was thus fully experienced in the field of qualitative data collection. The advantage of this was a broader understanding of research methodologies, but on the other hand it became more difficult to make conclusions about the generalisability of the results[56].

At the end of the chapter on paradigms, I would like to draw attention to an interesting dichotomy. Among the research paradigms, I have chosen to focus on the positivist and constructivist tendencies because of the specificity of my research philosophy. The constructivist extreme represents a completely subjective, individual-dependent view of reality, in comparison to which I believe that the basic assumptions of reality are constant and that their perception varies from individual to individual. At the same time, as an educator, I believe in the constructivist educational paradigm because I (also) believe that significantly better learning outcomes can be achieved if students construct knowledge at their own pace and according to their individual characteristics. I have thought a lot about how to resolve this dichotomy. In the end, I came to the conclusion that (a) as a researcher, I take a pragmatic approach and use what works, adapting to the challenges, and that as a teacher, (b) I try to use more subjective elements in the **way** I teach. At the same time, **what** I teach (c) does have fixed and irrefutable principles that are, in my opinion, eternal regardless of subject: in economics, the time value of money is a real construct, inflation affects everyone in the same way, in society, in real life, or there is no escape from the Ten Commandments or just civil law. Finally, the duality of the constructivist educator and the pragmatic researcher is also reflected in the fact that I wanted to actively influence the perception, experience and motivation of the students through the experiment of gamification, that is, to change the subjective reality they had previously perceived.

## 3.5. Experiment design

I begin this chapter with a theoretical overview of the design of gamification processes. It is necessary to consider the design from a didactical and gamification perspective, and finally the technological implementation issues need to be addressed. However, as regards the technical aspects of the gamified course, I have relied entirely on my own experience as an educator and financial analyst. Many articles mention target software or developed applications, but for me the focus was on an easy-to-implement, time-only technology, without any need for funding or special equipment. Finally, measurement was an essential aspect: gamification had to be added

[56] The generalisability of the results and validation are discussed in more detail in the chapter on research results.

to the courses in such a way that its impact could be measured in some way. The principles associated with the design and delivery of gamified education are identified by specific coding (e.g. "[principle d2]"), which simplifies references to them in the following. The principles are summarised in a table after a discussion of the relevant literature.

*The challenges of gamification of live seminar class versus online platforms, or classes*

In my dissertation, I am specifically investigating the possibilities and impact of gamification of live seminar setting, partly because this is how I like to teach[57] . At the same time, **the vast majority of articles** on gamification **are about the functioning of some online platform or online process**. It is important to recognise that **there are important practical reasons for** this. In relation to the ecosystem model, I have looked at what technological and social influences are pointing in the same direction as gamification. Digital technology, online learning platforms (whether Moodle or other e-learning platforms), due to their virtual nature and the automation available, **make the mechanics of gamification** much **simpler**: instantaneous automatic scoring, feedback, levels, badges, ranking, etc. Moreover, these systems **are scalable**, they can deliver this gamified experience to thousands of participants, **instantly**. And on the operational side, **they register** considerable amount of **data that** is essential to further refine the system and personalise the user experience. Online platforms **can provide a** high degree of **interactivity**, high quality **visuals** and thus **a stronger experience and engagement**. In contrast, in the empirical part of my dissertation, the creation of feedback with gamification took 6-8 man-hours per case: revising papers, sorting data, ranking and tiering, creating design, producing and printing personalised feedback, and sending it out via email, or handing out in person. This is an immediate event and experience in a well-functioning e-learning system (e.g. displaying a badge in Duolingo). All this is illustrated in 8. Table, which shows the functioning of a training platform for ERP, the behaviour expected of the learner and the results collected. For example, as soon as a user shares his experience with others, he can immediately see the associated score and his ranking in the leaderboard. In a live seminar class without target software, this requires first the scores, and in addition all the scores, to be ranked so that each student can only see his/her own score and his/her own position in the ranking.

[57] On the other hand, I'm lucky that I also teach in this way.

*8. Table: Gamification and measurement of online platforms, software*

| **Expected behaviour** | **Metrics used for analysis** |
|---|---|
| Create an account on the gamification platform | Number of users created in the system |
| Take a diagnostic test before starting the training material | Score on the diagnostic test |
| Create a user in the ERP software | User ID in the ERP software |
| Learn the main concepts of ERP modules | Scores for each ERP module quiz |
| Learn about progress in the training system | Total points in the training |
| Solve the tasks proposed for each ERP module | Screenshots of solutions to the recommended exercises |
| Complete optional activities to reinforce concepts | Number of optional activities completed |
| Connect with other users in the training system | Number of comments published |
| Share your results with other users | Ranking in the league table |
| Enjoy the training system | Results of the satisfaction survey |
| Successfully complete the training process | Score on the final test |
| Log in to the ERP system daily | Number of users logged in per day |
| Use the ERP system for daily activities | Total queries sent during the day |

Source: Alcivar & Abad (2016, p. 113)

Live seminar classes and "offline" gamification is significantly more labour intensive, although it does not require any investment in the associated target software. Given the extra work and inherently more difficult implementation, it is understandable why the vast majority of gamification studies are specifically related to the use of some kind of software.

According to a comprehensive literature search on the design of gamification systems (Bouzidi et al., 2019), the vast majority of articles on gamification note the use of some form of technology, with only one article explicitly stating that the use of technology for gamification is not mandatory but recommended. In my research, I used a lot of IT tools[58], and I also used interactive elements (QR codes) in the personal feedback form[59], which was created as a concrete implementation of gamification. These elements made the experience more

[58] These are listed under the paragraph "context and technology" on page 110 .
[59] The feedback form is presented starting at page 113 .

interactive, but the vast majority of the gamification elements used in my research, the related feedback, data collection and its analysis were practically manual: Completed in Excel, printed out, handed in person and then emailed.

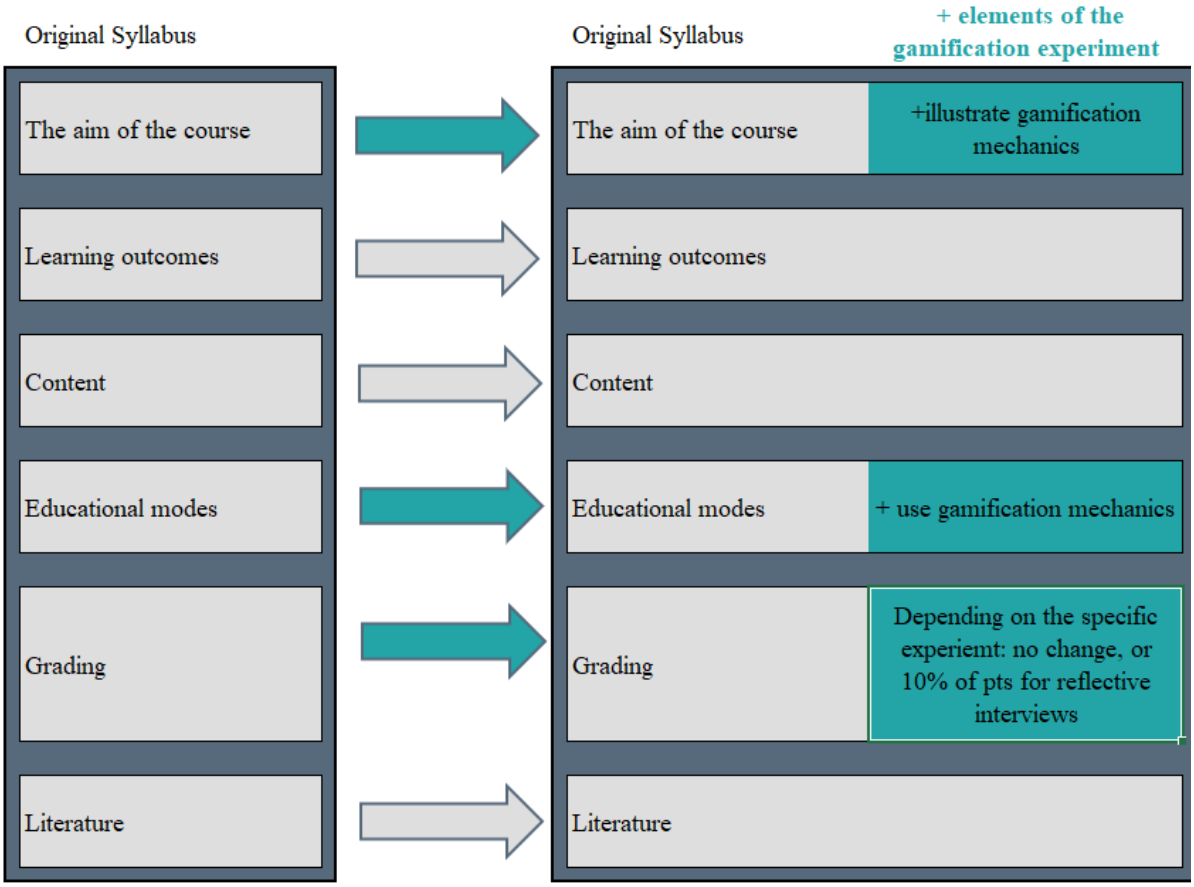
*Didactic aspects of experiment design*

The didactically authoritative source is the didactic handbook by Falus and Szűcs (2022), which discusses the relationship of gamification to pedagogy in only two pages. First, the authors suggest that positive feedback should dominate, and negative feedback should be avoided by the instructor [principle d1]. This is also in line with research on self-determination theory, which suggests that negative feedback (Ryan & Deci, 2000) can reduce intrinsic motivation. Secondly, with regard to assessment, it is important to reduce the stress factor as much as possible [principle d2]. Thirdly, instead of a one-off end-of-year assessment, continuous feedback is preferable [principle d3], so that the student can see progress for him/herself. Fourthly, the diversity of learners should be taken into account [principle d4], allowing for personalised learning and knowledge construction. Finally, the instructor should seek to measure back what has been learned [principle d5]. In addition to the principles, the authors highlight three additional aspects that give games attractive, engaging (immergent) qualities. Firstly, it is important that the difficulty of the tasks to be performed is balanced with the learner's abilities [principle d6], which can be paralleled, for example, with the Flow Theory. It is worthwhile to set a number of smaller objectives [principle d7], which are individually achievable, assessable, for which the instructor can give feedback, and which together give the overall goal of the course ("epic meaning"). Finally, positive feedback [principle d8] should be given for the achieved objectives immediately after completion. The latter can also be linked to the Flow Theory.

In the following, I will describe in detail the specific classroom experiments, which were mechanically implemented as a gamified feedback mechanism, strictly within the general framework of the respective subjects. **That is, in my experiments, the curriculum, the mode of instruction, the mode of rating and grading (at least a decisive part of it) were external conditions**. On the one hand, this is important because, from a didactic point of view, the subject data sheets and conditions adopted by Corvinus University determined the framework of the experiment, and therefore in my dissertation **I** only **deal with didactic issues in the sense of gamification**. The specificities of the curriculum have to be taken into account when judging

the experiment and assessing its generalisability. The logic of the experiment is illustrated in 16. Figure.

*16. Figure: Relation between the course and the gamification experiment*




Source: the author's own work

## *Designing the experiment in terms of gamification of processes*

According to a comprehensive literature review on the design of gamification systems (Bouzidi et al., 2019), 80% of the literature on gamification does not specifically describe the implementation steps of gamification. A negligible proportion of them prefer to use known gamification platforms, which is also a loophole, they do not need to explain the design of the processes, as they work from "ready made material". Therefore, in addition to the few good quality articles on gamified instruction design, I have also used a general (non-educational) work on gamified process design for this subsection. A number of aspects of gamification-enriched educational process design are listed in the literature. According to Alcivar and Abad (2016), the basic ("business") goals of the gamified system should be defined [principle g1], and then the playful mechanics [principle g2] that will influence the behaviour of the

participants towards the desired goal should be identified. The user persona [g3] should be defined, which will help to select the appropriate mechanics, taking into account the specificities of the users (demographics, age, experience, background, etc.). The authors also mention the levelling characteristic of games [principle g4], i.e. the possibility for the participant to choose between easy, medium and difficult challenges. For the specific development of the system, the logic of the MDA presented previously[60] was used. For the implementation of , the authors used the SAP-based target software related to the project. Slightly different from the design flow in the article by Baldeón et al. (2018). Definition of objectives [g1] and related measurable variables and metrics [g5 principle], profiling of participating learners [g3], definition of items [g2]. All this is followed by implementation, then measurement [g6 principle] and feedback of results In this case, KAHOOT platform was used to implement gamification. An engineering approach to gamified process design is described in[61] by Morschheuser et al. (2018). Considering only gamification, the goal of the process [g1] and the context (related processes, technology definition, etc.) [g8 principle] are described first, followed by the creation of the persona [g3]. After the selection of player mechanics [g2], the implementation comes next in sequence. More detailed guidance is provided by Urgo et al. (2022). The definition of goals [g1] and selection of mechanics [g2] is followed by the precise definition of explicitly focused learning outcomes. I prefer to refer to the latter as a didactic goal [principle d9]. The importance of a visually pleasing design [g9 principle] and appropriate levelling of challenges [g4] is stressed. The importance of feedback [g7] and rewards [g11 principle] is emphasised. To enhance the user experience, the importance of guiding the participant through the process [principle g10] is highlighted, so that they do not have to look for the next step. Finally, the game mechanics specifically mention the possibility of collaboration between participants. This element, also known as player mechanics, unless the specificity of the gamified process requires it, could in my opinion be equally classified as a player mechanic [g2]. Yet communication and interaction can be a broader category than this, and so I have included the design of participant-system interactions [principle g12] in a separate category, based on Liu et al. (2017). The authors present their proposed design principles in a well-structured way, which I show in 17. Figure.

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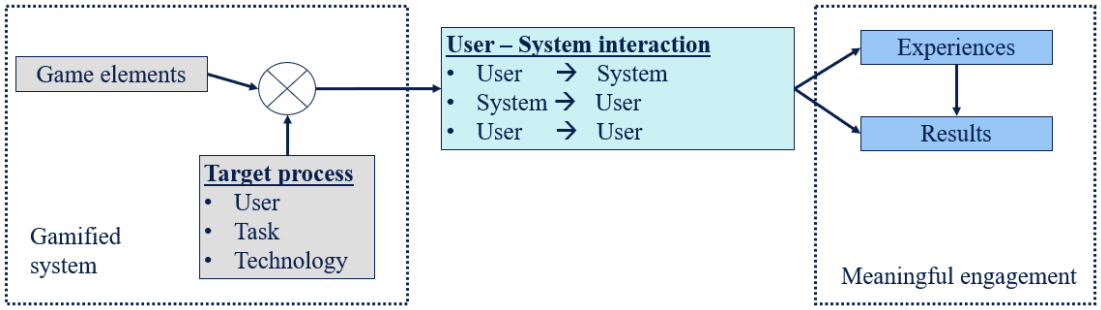
[60] Chapter 2.2.2.3, from page 61.

[61] In this article, their own software has been made more playful by developers.

*17. Figure: Planning and research of gamified systems*




Source: Liu et al. (2017)

Liu et al's cited work makes important observations on these design principles. For this gamified system to be effective, the following conditions are necessary: (1) the target task and the game mechanics, interactions, and design must be consistent , (2) the gamified environment must be compatible with the participants (here, the creation of a persona is important), (3) all of these must be compatible with the technology of the target system, (4) the experiences must be consistent with tangible outcomes (i.e., a better outcome means a higher score or reward). The authors thus emphasise that gamified processes should result in both an experience and a tangible outcome.

When all these are in place, gamification can be an effective tool to motivate and stimulate learners and improve their learning outcomes. However, the pleasure of the game experience should not be at the expense of knowledge construction. According to Deterding (2015b), academic and practitioner approaches to gamification suggest that there is a sensitive trade-off between the influence of experiences and outcomes, which can be paralleled with the previously formulated game - serious game - gamification scale[62]. To get this balance right, the elements of gamification must be subordinated to the characteristics of the target system (in this case education). In the experimental part of my research, knowledge construction, accountability and assessment followed the logic of the other parallel seminar groups.

I have summarised the design principles in 9. Table. In order for gamification to be effective, to have sufficient motivational potential and to function as a didactically coherent educational strategy supporting knowledge construction, it is important to define the objectives, to map the context (participants, target processes, technologies), to select and operate the elements of

[62] In chapter 2.2.2.1 from page 45.

gamification in a meaningful way. This should preferably take into account specific needs and differences. It is essential to provide feedback as quickly as possible, preferably positive feedback, and finally to measure the effectiveness of the system in some way.

*9. Table: Principles of planning gamified education*

| Categroy of principles | Principles of gamifying education | Codes |
|---|---|---|
| Goal and context | Determine learning outcomes | d9 |
| | Define goals | g1 |
| | Context (relating processes, technology) | g8 |
| | Persona | g3 |
| Gamification process | Select game mechanics | g2 |
| | Set levels | g4 |
| | Define metrics | g5 |
| | Design and process planning | g9 |
| | Balance of challenges and skills | d6 |
| | Consider diversity of studens | d4 |
| | Ease stress and anxiety | d2 |
| Operating the process | Guide the user thourgh the process | g10 |
| | User-user interaction | g12 |
| Feedback | Only positive feedback | d1 |
| | Continuous feedback | d3, g7 |
| | Immediate feedback | d8 |
| | Task broken down to chapters/subchapters | d7 |
| | Rewards | g11 |
| | User-system interaction | g12 |
| Measurement | Measurement | d5, g6 |
| | Pedagogical princpiles | d1…d9 |
| | Principles of gamifying processes | g1..g12 |

*Source: the author's own summary*

**This summary table is the response to the second objective of the research,** which, unusually, is not included in the Results chapter, as this preliminary study was necessary to carry out the empirical part.

## 3.6. Implementation of the experiment

In the empirical part of the dissertation, I present the specific design and implementation steps for the Decision Making Skills courses taught in the fall and spring semesters 2023-24. The reason for this is, on the one hand, that the gamification methodology for these courses was much more elaborated, building on previous experience. On the other hand, in the following

semester, I was able to teach in parts of several courses instead of one full course, so I could only implement part of the experiment there. I do not elaborate on the gamification methodology of the courses before 2023-24, but I have used the transcripts of the interviews with the students in the dissertation. The reason for this is that the general findings and attitudes (e.g. regarding competition or feedback) are, in my opinion, generally valid. The specific design and implementation issues will follow the steps outlined in the previous chapter.

*Principles on objectives and context*

The design principles for the objectives and context are:

- [principle d9]: setting learning objectives
- [g1 principle]: defining the objectives of the target system
- [g8 principle]: context and technology delimitation
- [g3 principle]: creating a persona.

**Setting learning objectives**

**Definition of learning objectives:** all the didactic elements of the course's subject[63] remain unchanged during gamification, which must not affect the formal learning objectives. However, the "unscripted and unspoken" learning objective relating to research question 2 is that **students understand the essential benefits of gamification and recognize the similarities between the gamification elements of the gamified course and the solutions found in the mobile applications and software used every day.**

**Defining the objectives of the target system**

**Setting objectives for** the **target system**: enhancing student experience and motivation. Measuring this back provides the answer to research question 1.

**Context and technology**

**Context** and **technology** elements for the gamified course: live contact seminar class, in the form of a series of "lectures and seminars". The technology used:

- computer, projector, PowerPoint slides

[63] Illustration: Annex 6.8, page 223.

- Use of Qualtrics, Mentimeter, Kahoot platforms for surveys, polls, and opinions/voting
- Google Timer for on-screen timekeeping
- Youtube to play short films supporting education
- Google Sheets to facilitate digital collaboration on various group projects
- Use QR codes to quickly access the above platforms.

**The creation of the** persona **and its significance**

**The creation of the persona is of paramount importance for gamification, but it also has significant links to the constructivist educational paradigm**. The persona is a hypothetical participant, to whom various attributes can be attached to make the participant, the target of the process, visible and tangible. In our case, this is a group of international students (CEMS) aged 22-24 years old, studying in English at Corvinus University of Budapest. They are active technology users, with laptops and mobile phones on the desk in class. As a teacher, by default, one cannot learn much more about students than this, yet during knowledge construction, student-teacher interactions can help provide students with personalized guidance and opportunities. The other relationship of persona creation that is specific to the gamification of this course is perhaps more crucial: the weaving of persona creation into gamified instruction itself. Given its significant role in my research, I will provide a more detailed overview of this.

The importance of personalized processes, personalized challenges, and the importance of autonomy has been mentioned several times before in relation to the essence of gamification. A practical way of doing this in the case of live classroom teaching is to assign a task or challenge close to the student's interests or personality. Interest, if directly related to the course being taught, is a good way of doing this. Still, it is very labor-intensive for the teacher: it is necessary to collect interest at an individual level, match it to the material, then feed it back, and then correct it and feed it back at an individual level as soon as possible. It is much easier for the instructor to provide a personalized experience with challenges and narratives linked to the subject and the student. Using the previously mentioned HEXAD (Tondello et al., 2019) validated scale based on personality typology,[64] so-called player type categories can be formed. This explains students' roles in group task-solving and playful activities. The author directly assigns to the player types the 52 game elements he formulated according to the affinity of the

[64] I have presented HEXAD in detail on page 64.

types. Thus, based on the test completed by the students, the instructor can get a specific game element hint according to the student's player type so that if the course gives the opportunity, the instructor can give a personalized, persona-specific challenge as a category. For a seminar group of 30 students, this means designing and implementing only 5-6 types of personalized challenges, which is an easier task than before. Based on the practical application of the test, I note that in each case several students belonged equally to 2 categories according to their score. In such a case, if the instructor assigns both types of challenges to the student and offers the possibility to choose, the motivational expectation of autonomy (decision) mentioned at the beginning of this paragraph can be fulfilled. It is important to note that I have not achieved either teaching or research success with "personalized" - or, more precisely, with tasks assigned to the types of person. This is because, despite my best efforts, many students considered that the tasks of the other group were easier to solve, which in turn violates the principle of equal treatment, and therefore, I did not issue compulsory individual tasks assigned to a person (type) later on. Instead, I gave way to autonomy by allowing them to choose from several small group tasks, and the approach to the final exam used in the course is a good example of this: they only have to choose four out of five questions. This gave the HEXAD-based persona a different purpose instead of its original use, and it enriched the feedback options. The most typical gamification elements are best used when the instructor intends to give feedback on some kind of work done or performance. Objectives broken down into parts and the points awarded for their assessment, league tables, badges, knowledge levels, and individual assessment can all exist when linked to some performance. Therefore, the first aim should be to allow for as many small achievements and their assessment as possible, which is also a feedback option for the instructor. With a few minor changes to the course data sheet[65] and the aforementioned personalization, feedback can be given on a significantly higher number of times the performance has been performed, thus increasing the amount of feedback and, in my opinion, increasing the motivational effect. The specific mechanics of personalization are described in detail in the next chapter.

### *Implementation - the design of the gamified process*

The next category related to the design of gamification is the design steps for the actual design of the gamified process itself:

[65] For this I am grateful to Dr. Judit Gáspár, Head of Department.

- [g2 principle]: choice of game mechanics (game elements)
- [g4 principle]: creating/defining levels
- [g5 principle]: choice of metrics (for measurement)
- [g9 principle]: creating design
- [principle d6]: balancing challenges and capabilities
- [principle d4]: taking differences into account
- [d2 principle]: stress reduction.

When considering the gamification possibilities of my own courses, I had to consider the object specificities and the principles of operation of the gamification mechanics to be used. In the absence of target software (e.g. Google Classroom or Class Dojo)[66] I had to manually design, create, and implement the gamification mechanics: manual individual assessment of student performance and, based on this, personalized feedback and gamification elements.

**Selecting mechanics and creating levels - the gamified feedback sheet**

**I have selected the following player mechanics**: onboarding, randomization, badges, rank/level, ranking, voting, autonomy, virtual marketplace, personalization, feedback, narrative[67]**. These playful mechanics were delivered to the students via email on a feedback/evaluation sheet containing playful elements and were also printed out and handed to them individually at the beginning of the class.** The appendix shows the stages in the development of the content and format of the feedback sheets[68].

**Onboarding game element**

The game mechanics of onboarding (in some authors, onboarding/tutorial, i.e. introduction and instruction) are designed to get the player on the scene, preferably immediately familiar with the rules of the game, and to do so in a quick and straightforward[69] way. Getting involved in

[66] Learning platforms similar to Moodle, with built-in gamification capabilities, on a subscription basis.
[67] For a description of the game mechanics, see chapter 2.2.2.2 from page 51.
[68] Annex 6.5, page 207.
[69] Onboarding can also be called an introduction or a guide, but I use the English term. There are two reasons for this. The English equivalent is a broader concept than a simple guide: it refers to the whole process of taking a newcomer 'by the hand' and guiding them through an initial introduction process, a meaning closer to the gamified element. On the other hand, onboarding is already part of the Hungarian business language:

new systems and processes can be anxiety-provoking for the newcomer, so the introduction mustn't discourage the participant. The first seminar class is crucial in this respect. From a didactic point of view, the clarification of the subject requirements is similar. From a gamification point of view, how game elements are used is similar. In my experiment, however, I introduced gamification in an unannounced and explicitly unexpected (surprising) way, so I only informed the students about its role when they received the player feedback sheet.

The way to clarify common values (= rules of behavior) is to involve students. Moreover, besides clarifying rules, other gamification mechanics can be linked to it: collaboration, autonomy, and empowerment, in addition to clear goals. I used two additional means of emphasizing shared values: firstly, the image on the Moodle tile of the course was always a photo of the shared norms (18. Figure and 19. Figure). On the other hand, the end-of-semester reflective interviews assessed whether we had succeeded in behaving in accordance with the values during the semester. As a researcher, it is a fascinating finding that at the beginning of the semester, the values expressed by the students - moderated by their teacher - were very similar to those I formulated in the results chapter after analyzing the interviews.

Clarifying the rules was another aspect that helped validate the research. Part of the course evaluation was an end-of-semester reflective discussion with the teacher. These provided the material for my qualitative interviews. In the first phase of the research, I was only able to include students who volunteered to take part, but unfortunately, in my experience, students are reluctant to complete a test or take part in an interview unless they have a tangible interest in doing so. Thus, in the second version of the research, I implemented the interview in a compulsory (but only 10% significant in terms of points) end-of-year reflection interview. This had three main objectives. Firstly, in the part of the interview that was included in the assessment (for 10/100 points), the student reported on the impact of what they had learned on their decisions and life. In the second part, I explored their experiences and opinions about the gamification experiment. Building on this, in the third part, I highlighted in discourse the role of the mechanics used in the gamification of the course in economic and social life. The second and third themes were discussions related to my research questions[70].

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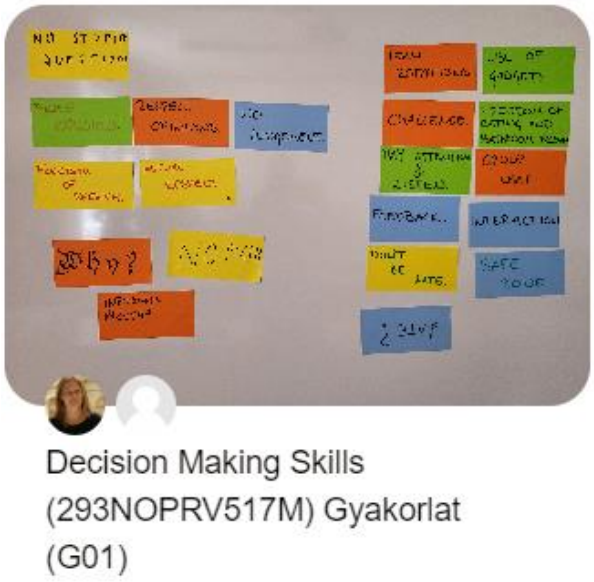
https://www.hrportal.hu/hr/onboarding:-a-megtartas-receptjenek-titkos-osszetevoje-20220511.html (downloaded 27.12.2024 18:46)

[70] Chapter 3.1, page 91.

*18. Figure: Psychological contract on Tiles in Moodle (2023-24 II. semester)*


- Safe space
- Politeness!
- Accepting Environment
- Respect
- Honest Feedback
- Sensitive topics in a diplomatic manner
- Real life examples
- Practicality
- Eat and Drink
- Freedom of choice
- Fair grading
- No stupid questions!!!
- Open mind
- Critical aspects
- Debate
- Be proactive!
- Being late (I did not agree to it, thought, so the post-it is separately placed)

*19. Figure: Psychological contract on Tiles in Moodle (2023-24 I. semester)*




- No stupid question(s)
- Free opinion
- Freedom of speech
- No judgement
- Team rotations
- Use of gadgets
- Challenge
- Freedom of eating and bathroom break
- Pay attention & listen
- Group chat
- Feedback
- Interaction
- Don’t be late

Source: the author’s own pictures

### The random/surprise game element

This game mechanic (surprise, umnpreductability, chance, random) was embodied in the way gamification was introduced to the students. Students were unaware that they would receive colourful, graphically appealing feedback with personalised messages and analysis. I will later elaborate on this when discussing the results. Equally unexpected was the announcement of the market/virtual economy (i.e. the system of redeemable points) and, in the last seminar course examined, the survey on the type of feedback students wanted from their teacher.[71]

### Levels, ranks, leaderboard

It is important to distinguish between rank, rank, levels and badges. However, this explanation only applies to this particular gamification experiment. First, it is worth clarifying that rank is not the same as ranking in the leaderboard. Students are ranked according to their scores, where they can be ranked first, second, etc. As we have read in the goal orientation theory, but also as we can see from the interview analyses presented later, not all students like to see their own ranking, or even the group average. To alleviate this, Pusztai (2018), suggests that for participants who rank lower in the ranking, the mechanics should not show the specific ranking but an interval or relative ranking. The feedback sheets I made for the game indicated the exact position up to 10th place, and the interval above (11th-15th, 16th-20th, 20th-25th).

In the experiment, level, rank and badge typically show the same performance. In gamified systems, an important detail is how different levels of knowledge (or experience) are achieved, which is important motivational feedback on progress. However, the scoring system of the course under study allows for a very unequal scoring logic by default. The evolution of the points available under the subject prospectus is shown in 10. Table.

*10. Table: The logic of grading in Decison Making Skills Course*

| | Points | | | | | | | Σ |
|---|---|---|---|---|---|---|---|---|
| Midterm exam | | | 40 | | | | | **40** |
| Final exam | | | | | | 40 | | **40** |
| Warmup tests | 2,5 | 2,5 | | 2,5 | 2,5 | | | **10** |
| Reflective interviews | | | | | | | 10 | **10** |
| Total | 2,5 | 2,5 | 40,0 | 2,5 | 2,5 | 40,0 | 10,0 | **100** |
| Total - accumulated | **2,5** | **5,0** | **45,0** | **47,5** | **50,0** | **90,0** | **100,0** | |

Source: the author's own work based on course syllabus

[71] 13. Table on page 123.

The table clearly shows that the dynamics of the points available are very uneven. Students are probably going head-to-head in terms of accumulating points, but the jump from 5 points to 45 points and from there to 47.5 points is not fortunate, too large or small. This can not create a real sense of competition in the dynamics of point accumulation. For the logic of leveling, Pusztai (2018 , pp. 136-138) provides explicitly useful guidance . He suggests that the point value calculated for each level in this way will be gameful and logical:

$[I]\ \ c(n) = \frac{d}{2} * (n + n^2)$, reordered from$[II]\ \ d = \frac{2*c}{(n+n^2)}$ , where

c = the value needed to reach the highest level

n = number of planned levels

d = the "level coefficient".

Based on these, if a 100-point course is divided into 4 levels $d = \frac{2*100}{(4+4^2)} = 10.$ The scores required for each level of knowledge are calculated by substituting each level into [II]:$c(1) = \frac{10}{2} * (1 + 1^2) = 10$, and the others c(2) = 30, c(3) = 60 and c(4) = 100. In this hypothetical case, the highest level would therefore be reached with the maximum score. The dynamics of the scores due to the differences (0→ 10 points, then 10→ 30, i.e. +20 points, then 30→ 60, i.e. +30 points and finally +40 points) present a clear path of progress and increasing challenge for the participating students. However, as the gradnig logic of the course (10. Table) shows, specific gamified course scores are less gamification friendly. Therefore, in this case, I had to define the levels as static snapshots and present them as such on the individual feedback sheets. I set the levels to follow an approximately bell-shaped distribution. So, for example, I put 17% of students at the lowest badge level, 33% and 28% at the next, and 22% of students at the top. The percentage distribution initially looked even less like a bell curve (normal distribution) because of the underlying scores, so I ended up deriving the levels from the sum of the points earned and the points "calculated" for class attendance. I emphasize that this was done to make the distribution of the levels more realistic. I attached importance to this because in the previous semester, several students had commented that they could not see any difference between the levels shown on their feedback sheets. This also contributed to my development as a researcher.

### The "survey" method (narrative, feedback, comparison with others game elements)

Considering the importance of - preferably - continuous feedback from a didactic and gamification point of view, the related course of warm-up tests and 2 quarterly final papers does not give too much room for feedback[72] . Therefore, I had to look for additional feedback opportunities that are relevant for both the student and the course. One of the data sets providing feedback opportunities is the results of the surveys completed by the students on the Qualtrics platform at the beginning of the semester, and the other is the students' class attendance. The tests are:

- **Player type (HEXAD) test[73]**. The test shows what role the participant takes on in a group task. A validated scale and scoring guide is available for the test, based on which the participating students received their own player type analysis on the feedback sheet. The relevance of this to the course is that it **is inextricably linked to the seminar materials relating to psychology of decision making, group decision making and conflict in decision making.**
- **The Big Five personality model** describes five basic dimensions of personality: extraversion (sociability, energy), agreeableness (cooperation, empathy), conscientiousness (purposefulness, organization), emotional stability or neuroticism (emotional balance, stress management), and openness to experience (creativity, receptiveness to novelty). The Big 5 scale is widely used in psychological research, recruitment, and self-awareness. The validated scale and scoring logic for the test are available at (Bidjerano & Dai, 2007; Busato et al., 1998; Komarraju et al., 2011). Because of the psychological factors that substantially influence decisions, the **test has explicit relevance for the seminar courses on the psychology of decisions, decisions and risk, and creativity.**
- **The risk aversion test** (Dospert test, Blais & Weber, 2006) characterises an individual's risk aversion and risk-taking propensity. It is a particularly **good complement to the seminar** session **on decision and risk.**
- **The Creative Performance Test** (Peterson & Carson, 2018) **is an aid for the Intuitive Decisions and Creativity seminar session**. The test does not measure creativity but assesses the performances of the respondent in 7 creative subject areas. It provides a

[72] Individual and group work was evaluated orally in class immediately after the presentation.
[73] For an explanation of HEXAD, see page 64.

good understanding of the difficulties of measuring creativity, contributes to the understanding of the phenomena of creativity and intuition and provides an additional opportunity for students to provide feedback.

The evaluation of the tests, the graphical presentation of the results and the presentation of the group average **provide an opportunity for an exciting discussion and reflection**. While constructing knowledge, **students can also draw on their own values for benchmarking.** This provides an additional feedback opportunity for the students, as well as a useful reference point in several seminar lessons ( Table 12.). Finally, I would like to add that I used the results of the tests to divide the students into working groups according to different logics each time. Typically based on similar or opposite test results. This method, because of the relation o the seminar material, is built up from a mixture of narrative, feedback and the game elements of relating to others. I will refer to it in the dissertation as "survey method", because of the way the students named this modus operandi.

.

*11. Table: The relation between "survey method" tests and seminar topics*

| **Seminar topics** | HEXAD | BIG 5 | Dospert test | Creative Achievements |
|---|---|---|---|---|
| Problem solvings | | | | |
| Decision making approaches | | | | |
| Bounded rationality, psychology of decision making | √ | √ | | |
| Normative and prescriptive decisions | | | | |
| Risk and decison making | | √ | √ | |
| Creativity and intuitive decision making | √ | √ | | √ |
| Midterm exam | | | | |
| Csoportos döntések | √ | | | |
| Konfliktus | √ | | √ | |
| Társadalmi döntések | | | | |
| Etika és döntések | | | | |
| A döntések kulturális beágyozottsága | | | | |

Forrás: saját szerkesztés

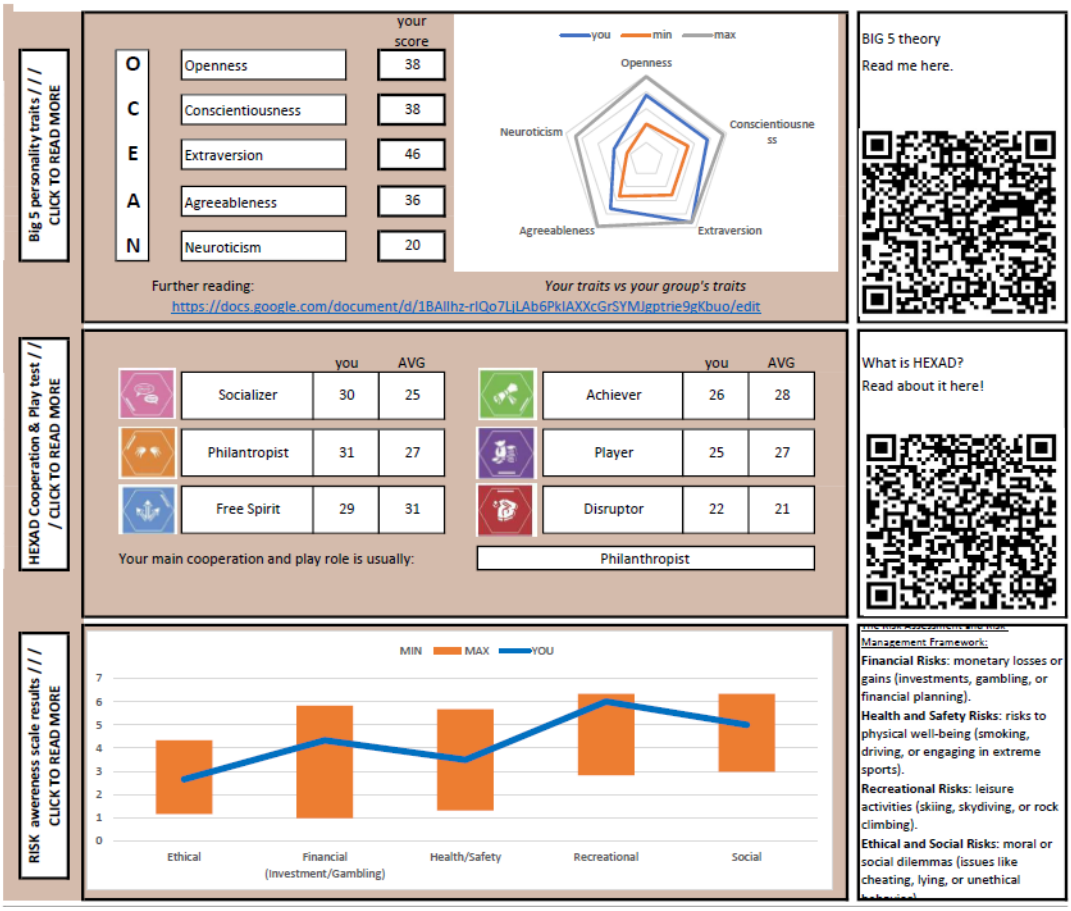
One very important issue with regard to tests needs to be highlighted. **The evaluation of personality tests may be a matter of concern** if the educator has no preliminary training in this respect. It is therefore essential to use appropriately validated scales. In addition, as a responsible teacher, it is necessary to emphasise to students that **there are no right and wrong scores**. For example, in the case of the BIG 5 personality test, the score for outstanding openness

may seem good because it is associated with abstraction, creativity and flexibility. On the other hand, the same high score may indicate a more difficult ability to concentrate and less practical problem solving. So, each of these high and low scores has useful and less useful implications. Another important aspect is that in my experiment I was able to use validated tests, available for free, which basically consisted of few (30-50) questions, the accuracy of which is far below the 120 or even 300 questions of an official Big 5 test[74]. Therefore, it should also be stressed to students that these simple tests are only for guidance. I should add that a third of my students had already seen or used the BIG 5 model before our course, and several of them had already completed it in other university courses. Overall, the completed tests are useful for self-reflection, engaging professional discourse and strengthening the connection between the course material and the student. Finally, they also provided a visually appealing feedback opportunity in the experiment.

I will discuss the issues related to visual representation in more detail in the Design section, but a researcher's reflection is also relevant here. Regarding the gamified feedback sheets, a student suggested that I implement this online in such a way that the content could be clicked on with a mouse. That way they can immediately see the underlying content. Unfortunately, I haven't had the opportunity to do this yet, but this student feedback inspired the QR codes on the feedback sheets. I encourage readers to look behind them!

[74] https://psytests.org/big5/ineoAen.htmlm (downloaded 19.12.2024. 19:00).

*20. Figure: BIG 5, HEXAD and DOSPERT results and evaluation on the feedback sheets*

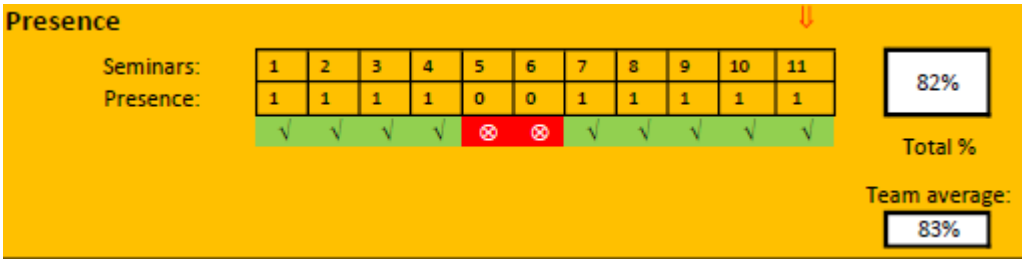



Source: the author's own work

I collected students' class attendance using a QR code in a Qualtrics database, and students verified their attendance by entering their Neptun code. The attendance tracking is insignificant yet graphically represented (21. Figure ) makes the feedback sheet come alive. In the analysis of results section, I will specifically discuss the reviews that evaluated this small detail. They said it was like writing a diary. According to the graph, the student (⇓ ) who was absent from the fifth and sixth seminar was at the 11th seminar, so had a slightly below average attendance rate (82%) for the group. The group average (83%) is also shown for community comparison.

To sum up, the results of the HEXAD, Big 5 and Dospert tests created by the "survey" method, as well as the feedback from the attendance, gave the students the experience of listening and feedback and of relating to the group, and helped them to get closer to the material of each seminar through reflection on their own values. They also provided the experimenter with an additional ("ongoing") feedback opportunity.

*21. Figure: Tracking presence on the feedback sheets*

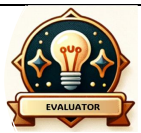



Source: the author's own work

### Badges, autonomy

The experiment conducted in the empirical part of my thesis has an additional feature. The gamification elements of levels, rank, badge and narrative are concentrated in one element: the badges. The logic of this was as follows: the defined levels were given a symbol ("rank"), which was derived from the narrative of the professional field of decision theory, and I created the corresponding badges. The specific example is summarised in 12. Table:

*12. Table: Levels-ranks-badges narrative in a unified logic*

| Szint | Rang | Jelvény |
|---|---|---|
| 1. | Analyzer |  |
| 2. | Evaluator |  |
| 3. | Critical thinker |  |
| 4. | Strategist |  |

Source: the auhor's own work

The badges do not just show a medal, cup or stars, but each one is a symbol associated with some decision theory: the Analyst rank badge shows a magnifying glass, while the Evaluator

rank badge shows a flashing light bulb symbolising an idea. The Critical Thinker badge is a brain, and the Strategy badge is a symbol resembling a sheriff's badge. Together, then, these are the levels, ranks, badges that can be associated with the decision-theoretic narrative.

I was able to implement a reduced version of the gamification experiment in the autumn semester of the academic year 2024-2025, because instead of a whole course I was teaching in a different mode at several courses, so I had less opportunity to give points and give feedback. Therefore, I was able to try a new approach. I did not level the performance based on the total score but set thematic levels. For example, students who scored high on the rationality question in the quarterly final exam could receive a *Structured Thinker* badge.

In this experiment, I also tested autonomy, or decision/choice game mechanics, and I include the design principle [d4] that requires **taking differences into account**. Indeed, before distributing the feedback sheets, I asked each student what kind of personal feedback he/she would like to receive from the instructor. Their answers are presented in 13. Table.

*13. Table: What type of personal feedback would you like?*

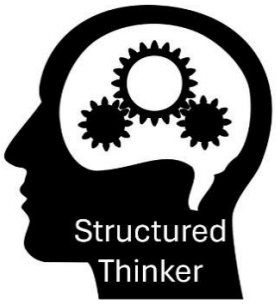
| Feedback | Related game elements | # of students | % of total |
|---|---|---|---|
| Achieved points | only points | 22 | 100% |
| Negyedéves ZH pontszáma | only points | 21 | 95% |
| written evaluation of exams | personalization, feedback | 16 | 73% |
| Big 5 and HEXAD test evaluation | progress, narrative | 15 | 68% |
| Place in the leaderboard | leaderboard | 13 | 59% |
| Group average of midterm exams | only social comparison | 11 | 50% |
| Presence% in class | only social comparison | 11 | 50% |
| Group exam statistics | only social comparison | 9 | 41% |
| Decision Making Skill badge | badge | 9 | 41% |
| Your rank in the DMS leaderboard | rank | 6 | 27% |
| Presence% in class: group statistics | only social comparison | 5 | 23% |
| ** note: nr of students: 26, nr or participants: 22* | | | |

Source: the author's own work

In addition to raw scores, students were interested in personal assessment and feedback, as well as summaries of their previous HEXAD and BIG 5 tests. Significantly fewer respondents were interested in using rankings or summary tables to compare their own results with the aggregate results of other students. As a researcher, it was reassuring to see that 9 respondents (40%) also proactively requested badges for themselves. I will make specific findings on the (otherwise overwhelmingly positive) perception of badges when analysing the results, but this survey is different in that the student only received a badge if they specifically asked for one. Which is

presumably a more honest way of expressing preference than would otherwise be the case in a verbal interview between student and lecturer. For a brief description of the badges in question, see 14. Table.

*14. Table: Different ways to create and grant badges*

| **2024-2025 I. Decision Making Skills badges** | |
|---|---|
| BADGE | BADGE EXPLANATION |
|  | The 100% **Achiever** badge was awarded to students who achieved the maximum score in the midterm examination. I was able to grant 3 of these badges. |
|  | This **Analytical Thinker** badge is awarded to students who have achieved at least 80% on a particularly complex, analytical task in their mid term quarterly exam. |
|  | **A Behavioural Analysis** rank and a badge was awarded to students who scored at least 70% in the answer to the heuristics question in the mid term exam. |
|  | This **Structured Thinker** badge was awarded for a score of at least 70% on the question on types of rationality in the mid term exam. |
|  | The **Diligence** badge was awarded to all students who attended all seminar classes. The advantage of this was that students who would otherwise have attended the classes but had a poorer learning outcome could also receive a badge. |

<table>
<tr><td> 
</td><td>The Critical Thinker badge was awarded to students who have provided a genuine constructive critique of the course or instructor in their learning diary. 10% of the learning diary assessment, or 1 point, was awarded for this aspect. As an instructor, I encouraged students to reflect honestly, so that only those who thought about the lessons with a critical eye and expressed this with a voice could receive a 100% mark for their learning diary.</td></tr>
<tr><td colspan="2">2023-2024 II. Decision Making Skills badges</td></tr>
<tr><td> 
</td><td rowspan="4">For this course, the badges were determined on the basis of a weighted average of the total number of points achieved and the "virtual" score for class attendance. I aimed for a kind of bell curve distribution of the levels achieved.<br><br>The distribution of the badges awarded was as follows:<br>Analyser: 17%<br>Evaluator: 33%<br>Critical Thinker: 28% and<br>Strategist: 22%.</td></tr>
<tr><td> 
</td></tr>
<tr><td> 
</td></tr>
<tr><td> 
</td></tr>
<tr><td colspan="2">Source: own design and implementation. Software used for badges: ChatGTP (DALL-E) and design.com</td></tr>
</table>

### Feedback, personalisation

The next gamification mechanics implemented are **feedback and personalisation:** these are the overarching ideas behind the gamified feedback rating sheet. Taking the personalization and feedback mechanics further, I created the personalized evaluation mechanic: the gamified feedback sheet provided students with a score and feedback on their answers in addition to the scoring of the pop-in tests and the quarterly final exams. This, they said, was a great help in preparing for the next final exam. This aspect will be highlighted in the analysis of the research results.

### Virtual economy, market, voting

The last player mechanic implemented is the **virtual economy/market.** In the experiment this was implemented as a combined game mechanic: **virtual market + autonomy + voting + narrative.** The game element was implemented in the last third of the semester. By this time, students are typically more tired. The virtual economy or mechanic meant that students could collect points (in this case: tokens) for their class activity, which they could later redeem. The narrative, purpose and solution for introducing the game mechanic was as follows:

- extra learning effort was needed due to the group's lower than expected quarterly final exam result
- students could earn up to 1-3 tokens per person for the last 3 seminar attendances and up to 2.5 tokens per person (1 token per point) for the last warm-up test score. This is a total of 5.5 tokens per person, for a total of 132 tokens per group.
- the rule for using the tokens:
    - 5 tokens per individual redeemable for chocolate
    - extra group consultation can be purchased for 80 tokens
    - questions from an older exam can be purchased as a group for 90 tokens
    - the purchase/redemption was done by anonymous online voting during the last seminar class.

I implemented the anonymous voting using a Qualtrics questionnaire accessible via a QR code. I introduced the mechanics of the market and voting in the Social Choices seminar class, so it

was well connected to the current curriculum. Based on the poll conducted in the last seminar class, most students chose the see questions from the previous exam paper[75].

### Selection of metrics

The basic principle for the choice of metrics is to observe phenomena that can be associated with gamification. In my dissertation, I analysed the impact of gamification predominantly through qualitative interviews, and it is important to add that this is a live seminar class, the gamification of which, although I used a number of technological tools in the process, was ultimately embodied in tangible, printed gamified feedback. Also, its electronic version in pdf format. Thus, the selection of metrics and measurement, which can be measured immediately on online platforms using gamified software solutions, is difficult to interpret and implement in a live "offline" environment, and by extension, the analysis of interviews, which is one of the objectives of my dissertation.

### Taking differences into account

One possible way to take differences into account was to conduct a personalised feedback survey, whereby each student only received feedback on information that they had pre-selected. Another way is to group students according to some uniqueness or personal trait, in which case they were placed in a group of similar students or even a mixed group based on previously completed HEXAD tests. The didactical significance of this in relation to group decision making methods is that one of the advantages of group decision making is the participation of multiple perspectives in the decision making process (Zoltayné Paprika, 2005), thus relating it to the subject being taught. Finally, the consideration of diversity is embodied in the personalised personal feedback and in all the game mechanics that depend on the student's choice. Such as voting or autonomy.

### A balance of skills and challenges,

The experiment in fact was the usage of feedback (including bagdes and other elements) and virtual economy and voting. The course material, grading logic of the related course could not be significanylt altered, so I personally saw the tuning of the balance of challenges and skills solely in communication between instructor and students. In other words, from an assessment point of view, there was (could be) no distinction between students, only their subject

[75] For more information on the virtual market/economy and voting game mechanics, see the Annex 6.6 on page 216.

knowledge matters. As a lecturer, however, I was able to support the construction of knowledge by being helpful, by looking at phenomena from different angles. In relation to the gamification of the course, I did not find any other correlation between the balance of skills and challenges so far.

### Stress reduction

Coping with stress can be basically problem-focused and emotion-focused (Lazányi, 2012). In the case of problem-focused coping, the student tries to eliminate the cause of the problem by changing the phenomena to what he or she can influence. This is typically done by influencing others through communication or action. In the emotion-focused direction, the student's solution is to influence the emotions triggered by the stressful situation, changing their intensity. As an educator, one can support the affected student by providing information, emotional support and facilitating positive peer interactions. In relation to gamification, specifically the gamified feedback model, I thought that it was important that this form of feedback should not cause stress. As mentioned earlier, the presentation of the ranking, other comparisons with others can cause anxiety, so I used this in the diplomatic way I had previously formulated: those at the back of the ranking could only see an interval, or, in the case of the last gamified feedback before the dissertation was completed, only receive this information if they specifically requested it. To reduce stress, the personal assessment helped to better understand the reasons for the scoring and helped students to prepare for the next final exam.

### Design, implementation planning

In terms of design and implementation, the steps of the design workflow were: (1) visual design of the player mechanics, (2) their positioning in relation to each other, and, most importantly, (3) the question of how to fill the empty design skeleton with content.

I have not explicitly used literature sources for the design. I created the visual elements based on my 20 years of experience as a financial analyst and manager and on the countless financial statements and management reports I have produced over the years. The exception to this is the badges, which I designed and produced using ChatGpt (DALL-E) and Design.com platforms. Some of the elements were easy to visualize (e.g., badges or graphical feedback on performance). Other playful mechanics are typically in tabular or textual form (for example, a personalized written assessment of a final paper). The relationship of the elements to each other

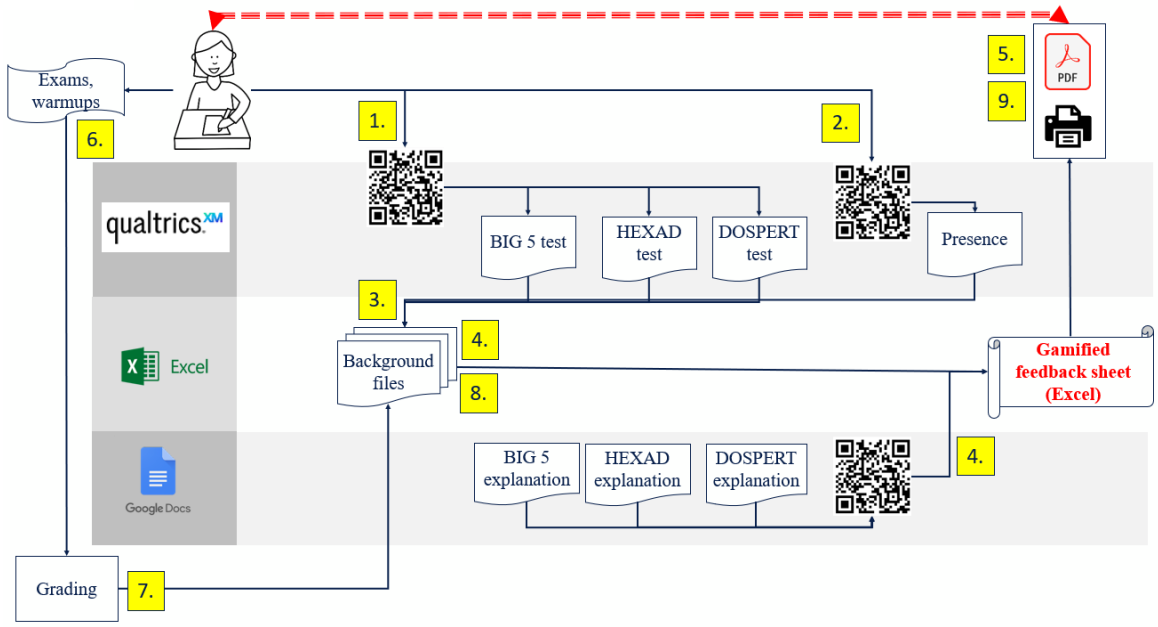
and their placement on paper was achieved through several iterations, versions of which can be tracked on the playful feedback sheets in the Appendix[76].

### *Principles of operating the gamified process*

The design principles of a gamified course include guiding the participant through the process and the participant-system interactions to make the process work. The concrete implementation of gamification is the feedback sheet for students, which contains interactive elements and thus includes both the guiding of students through the process (reading the sheet, using QR codes) and the participant-system interactions. However, closely linked to this is the production of the feedback sheets and the system of additional sheets behind the feedback and QR code.

The technology behind gamification is described graphically and step by step in 22. Figure.

*22. Figure: The processes and technology behind the gamified feedback sheet*




Source: the author's own work. The icons and logos are freeware under a Creative Commons license within Powerpoint software.

| The explanation of the process and technology | |
|---|---|
| 1. | Students complete the BIG 5, HEXAD and Dospert tests in Qualtrics using a QR code. |
| 2. | Students register their presence in Qualtrics every class using a QR code. |
| 3. | The data is transferred from the Qualtrics system to Excel, where it is stored in a database-like spreadsheet in a standard format. |

[76] Annex 6.5, page 207.

| | |
|---|---|
| 4. | The Excel database is linked to the otherwise empty feedback sheet format, also in Excel. The QR code links to the HEXAD, BIG 5, and Dospert test briefing materials stored in the Google document will also be included in Excel. Connected to the database, the feedback Excel can be used to produce personalized feedback sheets one by one in a few minutes. |
| 5. | The feedback forms will be printed out and given to students in person and subsequently sent by email in pdf format. |
| 6. | A further iteration of the previous process: students take pop-up tests and write a final paper. |
| 7. | After the papers have been graded, the points, sub-points and written evaluation of the student's answers are entered into the Excel database. |
| 8-9. | Students receive one more iteration of the feedback sheet. |

### *Feedback design principles*

The next set of principles for designing a gamified course are the steps for feedback:

- [d1 principle]: positive feedback only
- [d3 and g7 principles]: continuous feedback
- [g8 principle]: immediate/quick feedback
- [d7 principle]: tasks broken down to substeps; objectives, and feedback
- [principle g11]: rewards
- [g12 principle]: participant→← system interaction

#### Participant-system interaction, continuous feedback, segmented tasks

The participant-system interaction overlaps entirely with the previous chapter. The topic of feedback by levels and subtasks and continuous (or frequent) feedback has been presented earlier: it is helpful to break down student performance into sub-goals and provide feedback on each of them close to the completion time of the activity. All these are also related to Flow Theory, Locke Latham's goal theory, and Skinner's motivation theory because of the related motivational aspect[77]

#### Positive feedback

The principle of positive feedback is closely linked, among others, to the motivational theory of self-determination: the student's motivation and well-being require autonomy, a sense of competence and the ability to perform tasks, and positive, supportive relationships. Positive and authentic feedback can increase self-confidence and intrinsic motivation. According to Falus

[77] For details, see chapter 2.2.1 from page 30.

and Szűcs, "*students' academic achievement and motivation to learn increase when teachers provide their* students *with ongoing (formative) assessment and meaningful expressive feedback to support learning*." (Falus & Szűcs, 2022, p. 653) . The authors summarise that three factors determine the effectiveness of feedback: it should include the learning goal, indicate to the student his or her progress towards the goal, and include suggestions for further action.

In the case of the specific gamified course, I had to formulate the personalized written assessments in a way that would motivate the student, even if he or she had a lower score. In my opinion, this also includes the principle mentioned earlier, that only those students who (a) were at the top of the ranking list or (b) specifically requested to see this information should see their ranking. An example of written feedback:

> "*You've captured the decision-making approaches flawlessly; the answer on creativity is perfect; well done! You did not answer the question on risk. Unfortunately, you did not explain the Even Swap method's essence and the trade-off's meaning. What you have written are correct answers. Please pay attention in the future to read the question carefully. Next time you can do it*" (own source, own translation). In other words, the listener gave a perfect answer to two questions, did not read two others carefully, and did not describe the phenomenon asked. The scores for each task were displayed one by one on the feedback sheet.

### *The principle of measurement*

Measurement of impact is an exciting logical dimension of the dissertation and the design principles. When designing a gamified educational process, it is didactically [principle d5] important for the instructor to measure back what has been learned. And from a gamification perspective, [principle g6] proposes to measure back the effectiveness of the target system; the target system of gamification here is training. The back-testing of this could therefore equally be a measure of learning outcomes, or an analysis of the motivational impact of gamification from other approaches: engagement testing, measuring activity in using the process/system, etc. However, in the empirical part of the dissertation I also aim to measure the motivational impact of the supportive interventions (gamification). The gamification of the course involved a considerable effort from design to implementation and analysis. This work was considerably more thorough - because of the thoroughness, foresight, and detailed documentation expected of a dissertation - than it had been done as a daily exercise. However, measuring the

motivational effect would have required extra effort in the latter case. This extra effort is only worth investing if the instructor can be sure of its return on investment – that is, that the motivational effect has been realized. The results can b used used in a way that can make the next experiment substantially better. A simple but unscientific way of doing this is through self-reflection by the instructor (and the gleaming eyes of the students). For more serious assurance than this, some form of measurement is needed. In previous chapters, I have written in detail about the differences of implementing online gamification measurements compared to live "offline" gamification, where participant activity is automatically recorded by various indicators. In the case of a printed (or emailed) gamified feedback sheet for live training, these data are at most obtained from interviews or surveys. This, however, is yet another activity that the instructor would expect from the student. From my experience as a tutor, I can say that students are very reluctant to complete anything that does not earn them points or that does not further their learning, i.e. that they have no interest in. **From a didactic point of view, feedback is needed on what is learned, and from a gamification point of view, feedback is needed on the motivation or experience factor. After completing the dissertation, I will explore and find a way to implement an easy and catchy measurement methodology.** I must ensure that the measurement measures what I want to measure and does so reliably, i.e., a validatable and simple measurement tool must be found and developed.

I formally formulated the research objectives and questions in the third chapter of my thesis. I have outlined the theoretical model for these and deduced how the research journey led to the final methodology and research paradigm. Based on the knowledge of the research objectives, questions and methodology, I presented in detail the theoretical guidelines for designing and implementing a gamified course from a didactic and gamified process design perspective. I then demonstrated the implementation steps according to the design principles and covered the technical issues of process construction and operation. This was necessary because the results of the experiments are explicitly context-dependent, and generalisability can be difficult. However, by knowing the details of the design and implementation of the experiment, the interested reader can adapt the game elements and solutions I have used to the specificities of other courses. In the next chapter, I present the results of the research.

# 4. Results of the empirical research

I have previously placed my research in the pragmatic paradigm as a researcher. However, as an educator, I also strive for a constructivist approach. These mark two separate paradigm planes[78]. According to my pragmatic research side, reality is fundamentally knowable, but the details, their impact on the individual, and the way they are perceived are highly subjective. Therefore, I approached the research on motivation and perception with a qualitative methodology. The constructivist teaching side of my approach moves along this plane, trying to make the construction of knowledge as effective as possible in a way that enriches the interaction between student and teacher with experience and motivation.

In this chapter, I present the results of the empirical part of the research. The first two research objectives were already met in the literature search sections. The third research objective, to identify the factors that influence student experience, is answered by the empirical part of the research. Likewise, to measure student motivation back and to identify students' perceptions of gamified elements, I provide answers in this chapter through the analysis of interviews.

In my research, I conducted 51 interviews, the transcripts of which take a total of 196 pages. I categorized 120 codes under 3 themes into 17 categories and 13 additional sub-categories for the depth of the topic. The codes have been classified using about 1100 interview citations[79]. I have made the audio recordings of the interviews in connection with my research, the transcripts of the interviews, and the coding database available through shared online repositories, as shown in the Annex[80]. The interviewees cannot be identified from either the interviews or the audio materials. For this reason, all names from the interviews have been edited out.

At the beginning of the chapter on the results of the research, I conclude that the research has processed an adequate amount of data from a methodological point of view. I will then present the themes that emerged from the analysis of the interviews, followed by a detailed elaboration and explanation of the themes. In this chapter I will relate the research findings and the supporting quotations to the theories listed earlier in the thesis. In the concluding part of the

[78] I have written about this in more detail in chapter 3.4, page 100.
[79] An overview of the codes can be found in Annex 6.7, page 219. To examine the details, see the research's Nvivo database, available at Annex 6.10, page 228.
[80] Annex 6.10, page 228.

chapter, the research questions are answered. Finally, the validation of the results and a description of the known limitations of the research are presented.

## 4.1. Remarks regarding the methodology

Qualitative interviewing provides the researcher with a wealth of information, but there is also the question of how many interviews need to be conducted for the results to be reliable and generalisable. However, most of the methods in the literature are not rigorously justified. In their literature review, Vasileiou et al. (2018) have summarised a selection of the most common cases. In their analysis, the authors cited practical justifications such as the researcher's experience and judgment, the budget for the research, and the availability of samples (interviewees). Still others propose “consistency with existing research”. All of these cite an average of 20 to 30 interviews, which may be several times more for research intended to be representative, but for exploratory research 8 interviews are said to be sufficient. Another aspect is data or topic saturation. If new topics, codes or new data categories appear in the interviews, the research can be more robust by increasing the number of interviews.

In my research, the database of 51 interviews initially contained nearly 200 codes. This was reduced to 120 codes after the codes had been reconsidered and merged. In the first interviews in the processing sequence, many phenomena still had to be labelled with (new) codes. In the subsequent interviews, phenomena occurred in the same way, but then I assigned them the previous labels or codes. However, for nearly 200 pages of interviews, there were numerous occasions when I created a new code for a known phenomenon because I had not noticed the earlier one among the many dozens of other codes. This explains the reduction in the number of codes from 200 to 120. By sorting the interviews in the order of their analysis and observing the occurrences of the codes, I produced a saturation table of my research using Excel (15. Table). I grouped the interviews for simplicity and better visualization, because a 51-row table would not have been transparent.

*15. Table: code saturation in the interviews*

| Interview # | New codes | Distribution of new codes | Distribution of new codes - accumulated |
|---|---|---|---|
| 1 | 34 | 24% | 24% |
| 2-10 | 43 | 31% | 55% |
| 11-20 | 34 | 24% | 79% |
| 21-30 | 15 | 11% | 90% |
| 31-40 | 11 | 8% | 98% |
| 41-51 | 3 | 2% | 100% |
| | | | |
| **Total** | **140** | **100%** | |

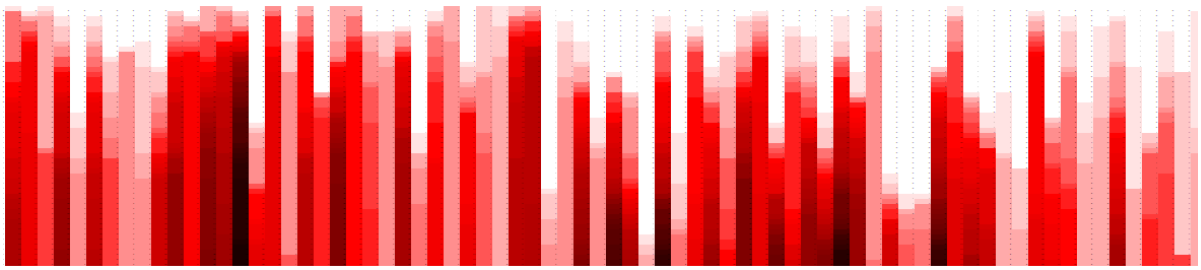
*Source: the author's work*

Based on the table, I find that the last 11 interviews contained a total of 4 new or partially new codes. Presumably, no significant new code would have been obtained by recording new interviews. The last but one (50th) interview resulted in one new code, interestingly enough, ia code about the student stating that gamification was "childish". As this is criticism and contradicts the assumptions and main research question of the study, I would have recommended further interviews in a different situation. However, I do not see the relevance of this in this research, as several interviewees have previously stated the opposite to my specific question on the childishness of gamification, meaning that I have sufficiently examined the phenomenon from this perspective. I will present negative opinions separately in this chapter.

For a more detailed illustration of the saturation of codes, I have created a so-called heatmap (23. Figure). The X axis of the graph shows the codes[81] , the Y axis shows the interviews - in reverse chronological order, i.e. the interview coded last is the one nearest to the origin. This gives the so-called heat map (in this case rather a "flame map") of codes and interviews. I have produced the graph in Excel, accumulating the occurrences of codes. Darker colour means more and more (accumulated) occurrences. The reverse chronological order of the interviews was put together this way just for visuality ("flames").

[81] Codes with low frequency (1, 2, 3 times) are not shown in the graph.

*23. Figure: The heat map showing the density of codes throughout the interviews*



Source: the author's own work

A detailed analysis of the heat map is beyond the scope of this dissertation. However, future research directions could include, for example, filtering out insignificant ("cold") themes, identifying and analysing outliers between themes, or using intensities to explore the relationship between themes.

The number of interviews is 51, which is higher than the 20-30 interviews cited earlier (for non-representative research), and I did not discover any new phenomena in the last interviews analysed. The salient messages I registered earlier, the codes that emerge at the end of the analysis are mostly minor differences in meaning, such as the interesting, exciting or useful nature of gamification. As for the number of codes, I could not find a logically justified minimum expectation in the literature, relative to the sample size. **I consider that the resulting 120 codes per 3 main themes, which are detailed below and comprise hundreds of relevant quotes (more than 1100 in total), have sufficient methodological power. From this point of view, the research was effective.**

The full list of final codes, categorised and considered during the analysis of the interviews, is available in the Annex[82]. Throughout the dissertation, I support the themes and codes with quotations extracted from interviews. In each case, the quotations are linked to a specific interview, and their marking logic is as follows:

- Original (NVIVO) interview line number illustration: <Files// 23_II_DMS_10>
- 23_II meaning: 2nd semester 2023
- DMS meaning: Decision Making Skills course
- 10 meaning: student's randomly generated serial number/identifier

[82] Annex 6.10, page 228.

- In the dissertation they are labelled: (Interview: 23_II_DMS_10).

## 4.2. Overview of themes

From the coding of the interviews, I identified 3 main themes[83]**. I gave the first theme the label "what or how"**. The reason for this is that I have classified here the more abstract philosophical perspectives and codes related to the construction of knowledge compared to the other themes.

For the question "which had a greater impact on you, content or form (what or how)", the vast majority of respondents considered the how, i.e. the way of constructing knowledge together, to be significantly more important. The research questions were then used to explore the factors that were important to the students and influenced their learning experience in relation to the previously discussed motivation, motivation to learn, and the links to gamification in general, and this is linked to the **second theme, "student attitude". The third theme is labelled "gamification"** and includes questions and answers directly related to the experience of gamification.

I will examine the results in the order of the first two themes, and I will assign codes and quotes from the third, gamification theme, related to the subject, to each item. In this way, the appropriate gamification mechanics and their perception are directly next to the mention of the student "need". This will make the application side of the coin more comparable and the research questions easier to answer. In each case, I will begin by presenting my findings and conclusions, followed by a presentation of the associated codes and quotes.

## 4.3. What is more important: the "what" or the "how"?

Looking for the place of gamification in business education, we read in the educational strategy of Corvinus University of Budapest (*Educational Strategy 2024-2027*, 2022, p.6) the importance of "*teaching competences by infusing them into course material*". Iván Falus described gamification as an educational strategy (Falus & Szűcs, 2022) . Finally, we know of

[83] It is also clear from the Nvivo database and the detailed code list shared in the appendices that I have identified 2 other main themes (constructivist and NPS), but I have not used them in this dissertation. They are included for completeness but are marked as "not used" in the detailed code list. Under the constructivist theme, there are a number of opinions on learning and curriculum. And under NPS is the so-called Net Promoter Score, which I asked most of the students out of self-interest. The NPS is a feedback tool attributed to consultant Fred Reichheld, it is all about how much the client recommends the service to his family and friends.

gamification as having no theory of self-learning. Thus, gamification is more of a "how" of education itself. The "how" category also includes several other elements of educational strategy, and the interviews show that the majority of respondents believe that the "how" has a more significant impact on the student than the content per se. This suggests an openness on the part of the students to judge the method of constructing knowledge. For only one of the 20 respondents was the “what” clearly more important, and for 2 students both were equally important factors. A few examples will illustrate why respondents thought this way.

In an interview the student said that most of the knowledge can be acquired by reading articles on one’s own, without going to university. However, collaborative work and discussion is very useful.

> (Interview: 23_II_DMS_10): “It was the "how" that really made it all make sense. I feel that I could have easily found content available on the internet or books and articles recommended by others if I was interested in the topic. But it was the 'how' that gave me more. This was one of my most collaborative classes in college. The really interesting part was listening to the students' opinions, developing a little discussion, and of course the whole framework of the class. I feel it gave me the opportunity to dig deeper into the studies. The articles themselves are great, but they are available anywhere and anytime. They are not specialised knowledge that can only be obtained from a particular professor or a particular university but are widely available material. However, the opportunity to participate in a framed debate meant so much more to me."

Another student added: the content is not interesting if it is not presented and discussed properly.

> (Interview: 23_II_DMS_12): 'For me, the "how" was definitely the most important, because although the content is always interesting, if it is not presented well and discussed in the right way, it is often overlooked. So the "how" was really interesting because it was interactive and involved us from all points of view."

The "how" means both interaction and that the listener (opinion, person) matters. However, there is no compulsion to act.

> (Interview: 23_II_DMS_11): "Indeed, I think it's all about the "how" <smiles>. Of course, the 'what' is very important, but the way we do it, the way we learn, completely changes whether we want to learn or whether we find it boring, as sometimes happens in class. In your class, however, this is not the case at all. Yes, the 'how' is very important, because it helps us to feel that our opinions matter and that we are involved in the lesson, not just passively listening, but actively participating. So, yes, I think the "how" is very, very relevant, and perhaps even more important than the "what" itself.

Others said that while working on complex challenges the way in which the student and the teacher work together that really counts.

> (Interview: 23_II_DMS_22): 'Definitely the "how" is the way we discussed the topics, because I think it's very difficult, really difficult to present things that are... difficult topics. These are topics that can generate uncomfortable conversations within the class, I think. And at one point you could see that you were really trying to make it safe for us to talk about certain things."

Still other listeners focused on the experience and the atmosphere rather than serious discussions.

> (Interview: 23_II_DMS_6): 'For me, it's definitely the "how" (...) I feel part of the class when I like the way the lecture is conducted, the way the class is led (...) And I think if the teacher or professor is passionate about the subject and willing to deliver the best information in the best way possible (...) The "how" was really fun. I feel it was very useful to see how it works. And yes, it's the 'how' that I really like."

As a counterpoint to the previous ones, there were students for whom both factors were important at the same time, and others for whom content was clearly the most important.

> (Interview: 23_II_DMS_16): "Oh, actually I think both, because everything is important: the way we discussed things and the topics themselves were important."

> (Interview: 23_II_DMS_15): "I think the "what" was more important for me, but of course I'm also interested in the "how", but the "what" is what was really important for me.

Finally, a pragmatic respondent ticked the box with the following exhaustive answer:

> (Interview: 23_II_DMS_13): "The how."

In the previous paragraphs, we have had a closer look at the philosophical approach that respondents took to the courses. I would add that in the case of a course that was highly reflective and dealt with 12 different interesting topics, the situation was not easy for the students, many of whom tended to lean towards the "how", but not clearly because they also found the content of the subject interesting. **The link of the subject with gamification is that gamification changes the "how" or the mode in the courses, independently of the content of the knowledge construction.**

## 4.4. Overview of the student attitude theme

During the interviews, I was looking to find out which factors the students thought might influence their learning experience and motivation, and whether the game mechanics (which can be linked to each factor) enhance their classroom experience and have a motivating effect. The phenomena and the related gamified mechanics articulated during the interviews are first

presented using a mind map in a comprehensive way[84], and then analysed in detail in the following subsections based on the codes and categories of the thematic analysis. In the mind map, I use rectangular text boxes to denote the factors that students perceive as influencing their learning experience, and hexagonal text boxes to denote the game mechanics developed and implemented around them. The latter are shown in a white hexagonal plane-diagram and the corresponding game ordering principle in a grey hexagonal textbox. I should add that not all of these phenomena will be discussed in detail. For example, opinions on curriculum or subject matter are not the focus of my dissertation, so I will only mention them.

As shown in the mind map (and in the interviews), an important factor for students is that the course material and the lesson should be practical and useful. It is important that they can encounter all of this in a way that is understandable and as interesting as possible. The narrative game element can help to make the material understandable and can make the experience more vivid, and the astonishment game element can also make the experience more interesting (exciting). Many students were looking for something new in the curriculum. In this experiment, the "survey" method was clearly novel, and in addition, this mechanic also added to the narrative by integrating the various surveys into the curriculum.

The teacher is seen by students as taking on a consultative and fair evaluation role, but these phenomena are not linked to a game element. At the same time, the teacher's attitude is important: be direct, dedicated, motivating and devoting time for the students. This direct attention can clearly be attribiuted to personalisation, which was achieved through personal feedback sheets. I have left the teacher's motivational attitude in place in the diagram and have not linked it to any other element. The whole research is about student motivation, I try to capture motivation independently of the teacher.

Most students explicitly mentioned the importance of team, teamwork, including the importance of diversity and the strength of community. Diversity could be coupled with the method of grouping students, which was implemented on the basis of the different results of the "survey" method, thus raising students' awareness of the importance of different perspectives. The creation of common norms was a major contributor to community building and can be linked to the game element of onboarding. This game element is also linked to the students' need for a clear and understandable set of rules.

[84] 24. Figure on page 144.

Freedom and autonomy are important factors for students. This is mirrored in the game principle of autonomy, which is embodied by the virtual market and voting game elements.

The possibility of competition can be linked to the game principle of comparison with others, in this experiment the badges and the ranking provided information in relation to competiton. These same game mechanics can also be a sign of progress.

In relation to communication, the importance of reflection and discourse was highlighted by the students. Based on my own judgement I also included the role of feedback and interactivity in this category. The importance of feedback was emphasised by most students, and the feedback sheet (and the results of the survey method presented on it) can be classified into this category. In relation to interactivity, I also mentioned the personal evaluations on the feedback sheet and the additional content behind the QR codes. On the one hand, they provided a basis for a high-quality professional discourse, and on the other hand, they also served the thrill of discovery (as a gamification principle).

Finally, I will present 3 overarching messages on the mind map. Firstly, the statement "how is more important than what" from the previous chapter is highlighted, as this is precisely the spirit of gamified training. On the other hand, according to the students (and the literature), the phenomena listed (communication, flexibility, team, teacher, etc.) can indeed contribute to a better learning experience and motivation. In this way, as students say that their aim is to develop and learn, also according to the literature and student responses, better learning outcomes can be achieved.

## 4.5. Student attitudes: rules, norms, goals

The collaboration between students and teachers often includes a psychological contract. In my experiments, and typically in all my courses, I base the collaboration on a normative group task as described earlier[85]. It is essential for the students to clarify the rules, and they mainly made statements about common values, such as respect for each other, acceptance of others' opinions, non-judgement. A gamification element may be linked to the clarification of rules, I could not find a specific gamification mechanism for mutual respect in the literature, so I can provide suggestions and directions at the end of this sub-chapter.

[85] 18. Figure and 19. Figure on page 115.

Clarifying the rules gives the students a sense of security, and the shared safe space makes them feel more confident in their interactions. Another important aspect of clarifying the rules is clarifying the reasons: as a teacher, in the first seminar I explained the meaning and role of the tests to be completed (Big5, HEXAD, etc.). In student refelctions it became clear that this was why they completed the tests at all. Finally, it is important that there was room for discussion and group agreement on the importance of following the rules, spoken out together as a community. And saying it together also strengthens group cohesion.

> (Interview_ 23_II_DMS_11): 'Like the first class when we agreed on the values (the psychological contract at the beginning of the course - author). So, it was really like it helped me, for example, to be more confident in the group and to feel safe to express myself. Even if I don't talk that much, I felt comfortable coming to these classes, participating in the interaction (...) And I think it helped us to continue to feel comfortable, to talk, to interact, to learn together ..."

> (Interview: 23_II_DMS_14): 'Ok, this is just my opinion, so I don't know what others think. In my opinion it is very important that you told us why you need these tests. So, at the beginning of the lessons you said that you needed these tests so that you could divide us into groups so that we could work together. So for me, that was a deciding factor whether to do the tests or not, because then I thought, okay, this is really fun."

> (Interview 23_II_DMS_14): 'And we, I remember, discussed with my classmates that what I was saying were psychological factors, rules that we had to follow in class. We knew that we could discuss everything. Okay, that's good. We can argue, that's good too. We can always ask questions. And I think that affected my emotional safety."

> (Interview: 21_VG_G11): " I felt that it was really good. Nobody judged, everybody listened to each other, accepted each other's opinions / I think that at Corvinus, for example, it makes a big difference and it's very impressive that there are a lot of incredibly intelligent people who are able to listen and accept each other's opinions. I think what we need is for people not to be narrow-minded."

> (Interview: 21_VG_G27): 'Well, mainly because we can all answer questions freely or have meaningful discussions without cutting each other off or laughing at each other when they say or ask the wrong thing. If I have that sense of freedom in the classroom and that sense of security, knowing that if I go in and say something wrong, I'm not going to be less of a person, and I'm not going to be ashamed because I'm not going to be humiliated by other people."

> (Interview: : 23_II_DMS_19): "So I think you built a safe zone in the first class. And like, I don't know, the whole first class went super smooth and stuff like that, that was also very important and the whole, I mean most of the class was active. "

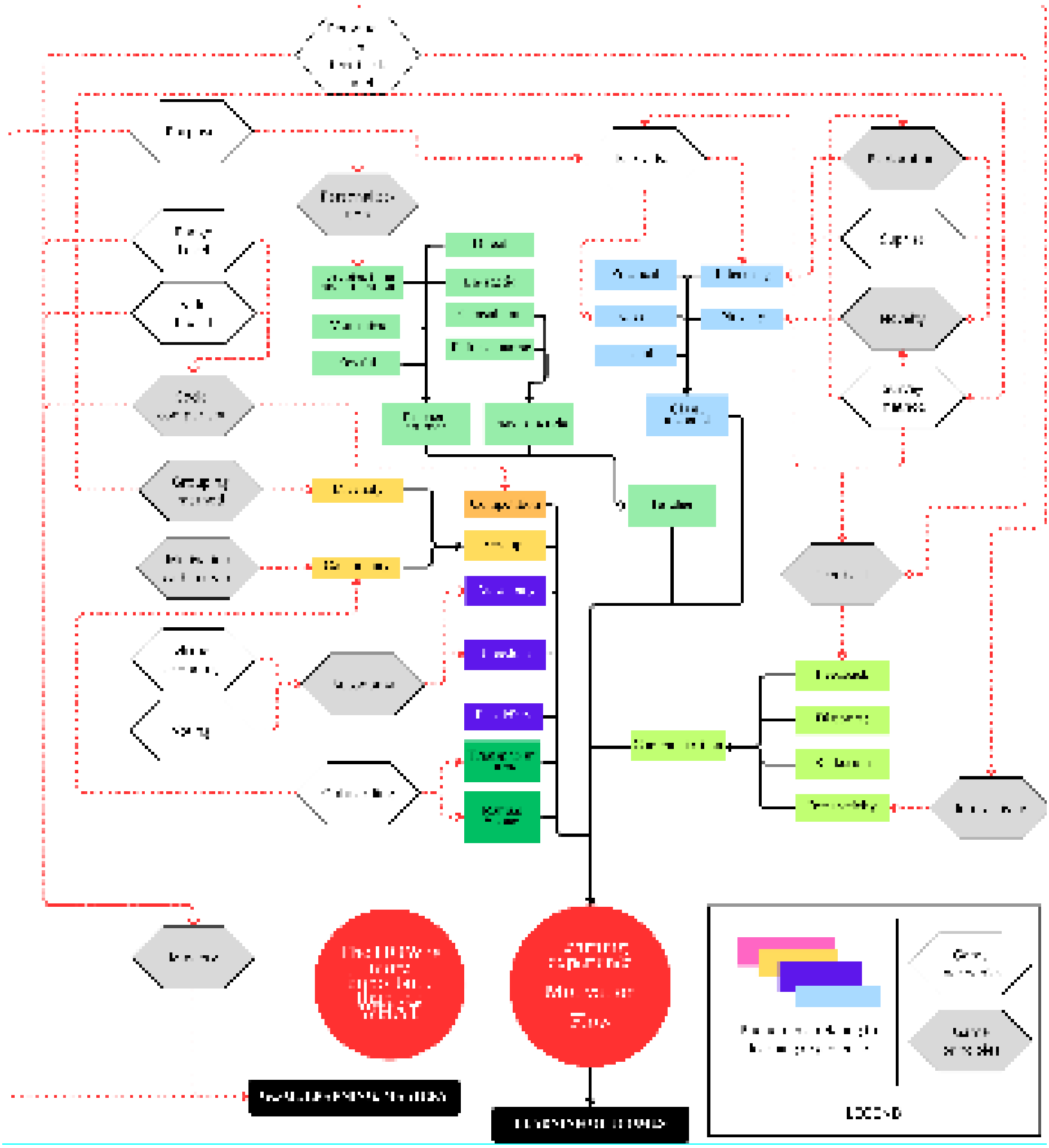
From the gamification aspect, to clarify the rules (which is onboarding in gamification) in this experiment (in addition to norm creation) the gamification link is the transparent presentation

of the tests to be completed (Big5 HEXAD) to the students[86] . It was important for students to understand that it is in their own interest to complete the tests that are related to the subject matter in a transversal way, because they can better understand their self-reflection and their perceived (measured) relationship to the phenomena they learn in the subject. During the second half of the course the way of introduction of the virtual economy also qualifies as clarifying the rules. Based on the student interviews, for some of the students the clarification of the rules was in line with their expectations.

> (Interview: 21_VG_G10): 'They actually set the framework, so it's good if they are clear and understandable. I don't think there was a problem with that in class."
>
> (Interview: 21_VG_G15): 'I liked the fact that maybe in the first seminar we laid down these ground rules (...) it's very clear what has to be done and how it has to be done. So that we have everything we need to know how to prepare for that class and how we can then achieve a good result."
>
> (Interview: 21_VG_G11): "The rules of the game are very important. It obviously adds a plus that there is no anarchy in the classroom."

[86] It is illustrated in Annex 6.6, from 216.

*24. Figure: The Mind map of the research results*



Source: the author's own work

In addition to knowing the rules, it can be of paramount importance whether the new information and reminders are achieving their purpose. The first versions of the gamified feedback sheet[87] in business economics class consistently drew attention to upcoming deadlines, assignments and other important events, as the "dynamics" of the subject required it. This was particularly appreciated by the students.

> (Interview: 21_VG_G28): "Yes, I think it can always be good when you communicate in an extra way what the deadlines are for what, because maybe that's a problem here, that it's quite difficult to keep track of all the expectations and deadlines for all the things"

The other side of the coin should also be considered when assessing the game elements related to rules and onboarding.

Some students experienced it as if the rules had changed. This may have been due to a new game mechanic that had been introduced in the meantime. Some people lost the plot in general, but by the end of the semester the picture had mostly cleared up.

> (Interview: 21_VG_G28): 'I think it's quite relevant! That's very good. It was also a bit confusing that the rules changed quite a lot at the beginning. So we had to adapt to that, but it was nice to have a scoring system, we have a set of rules and you can comply or not comply with them. So the rule system is quite important."

> (Interview: 21_VG_G25): 'I honestly got a little lost after a while in how the points were coming out. Or how there are the flat ones that count towards the ticket and the cup and there was a third kind, if I remember correctly. By the end I didn't even know what counted for what."

> (Interview: 21_VG_G24): 'I didn't really understand it until around the exam. For me, the points that I could use for this pre-exam thing were really clumped together, and the mug points were really clumped together for me. It dropped off in the last week and a half."

Some people found the "functionality" of the gamified feedback sheet too much or too complicated. Others said the design was unnecessary, a simple Excel spreadsheet would have sufficed as feedback. However, these responses are not always about learning the rules of the game but may already be related to the gamified element implemented.

> (Interview: 23_I_DMS_22): 'To be honest, I prefer the second, simpler, personalised feedback sheet. It's very simple, clean and straightforward. It's easy to see through, for example, "ok, I got 0.8 on

[87] Illustrations in Annex 6.5, page 207.

this warm-up test" and so on. The other one I think is more creative, but as I'm not a very creative person, I don't really see what advantage that would have. But this is perfectly fine (...) Exactly! I am a financial professional at home, so I like simple numbers that are easy to see and understand

(Interview: 23_II_DMS_3): "To be honest, maybe a little bit, how shall I say, not too much,... but it was like too much information that we didn't really know what it meant. We sat there side by side and looked at 'what does this mean, what does that mean' and it took us time to figure it out. But now, looking back, I think that even though there was a lot of information, it wasn't things that we didn't need to know (...) I was just talking about the design, not a lot of things, but as far as information goes, it was really something that was important to know."

The perceptions of clarification of the rules are proportionally high in the number of uncertain or negative comments. In the initial (business economics) phase of the experiment, the introduction of a new game mechanic may have caused misunderstanding, but only two out of 11 business economics students interviewed said so. The other critical comments were not clearly related to the prior clarification of the rules.

*25. Figure: Evaluation of "onboarding" game element*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 2.3.2_Clear rules are important | code | 8 | 11 | yes | + |
| 3.9.3.2_GMF FBS too much information, complicated | code | 3 | 8 | yes | - |
| 3.9.3.3_GMF not understood at first | code | 2 | 2 | yes | - |

| | | |
|---|---|---|
| 11 | 52% | + |
| 10 | 48% | - |
| **21** | **100%** | **Total** |

Source: the author's own work

**Based on these findings**, given the proportionally high number of neutral and negative experiences, and the importance of clear goals and expectations in motivational theories[88], my own research judgement **is that the onboarding game mechanics in this experiment were not successful.**

I have not researched and implemented any game mechanics in relation to the common values, but for the future I think quite simple game elements could be added to the student experience. For example, a gamified feedback sheet with appreciation and statements related to the course topics and common values. Awarding badges on such topics to students who openly practice

[88] Goal Setting Theory and Flow Theory in chapter 2.2.1, from page 30.

one of the common values, possibly voted on by fellow students through an anonymous voting mechanism and posted on the "wall of fame[89]". The motivational background for all this can be found in the need for relatedness, for belonging to a common tribe or guild. As mentioned in the theory of self-determination, for example. As a corollary, the use of group, guild, peer pressure game mechanics in relation to shared values can also be envisaged.

Rules and shared values are essential for individuals to work together effectively (and possibly in good humour) towards a common goal. In the following, I will review what the students' goal is and what factors are necessary for them to be motivated to work effectively. Where relevant, I also match them with gamification codes.

## 4.6. Student attitudes: student goals and their relation to motivation

The fundamental aim of students is to learn, to acquire new knowledge, to explore new directions, to improve their mastery. In addition to the initial definition of common values and goals, students had specific ideas and expectations about a good learning experience and a motivating environment. According to them, they are more focused when motivated and motivated students typically achieve better learning outcomes.

> (Interview: 23_II_DMS_12): “A good grade is always better, and that's fine, but I always focus on what the goal is. I'm always looking at what the goal is, what type of effort do I need to put in, and in the end it's okay, we can try to do the best we can, but what is the ultimate goal?”
>
> (Interview: 23_II_DMS_16): “step by step I started to realise that yes, this is very important, and we have to make an effort. Of course, I started to be really interested, mainly because of your involvement (referring to the teacher - author), the way you contacted us, the way you interacted with us and so on."
>
> (Interview: 23_II_DMS_7): “...it was important for my personal development because it was a kind of personal development and knowledge gain. And I think the last element was the language, because we had the opportunity to improve our English level, because everybody spoke English, and everybody had a good level of English."
>
> (Interview: 21_VG_G24): “The other one is also towards me, but that's more towards the outside world - that's the grade or the performance. That is, how I do in the essay, how I can speak in class for example, how I can contribute - that is also an experience of learning, that I have learned, and I

[89] It is also known as a wall of praise, or a knob of praise mechanic, but in my opinion a wall of praise is a more endearing name.

know what I can talk about in class with confidence and I can say what I want to say. If I can do that, it's an experience that the time invested has paid off."

(Interview: 23_II_DMS_20): “So I was wondering whether to take <a course> or not? Then I decided, okay, why not? I need to get more knowledge. Maybe I'll find a new direction, learn something. / I want to gain knowledge, experience, become more open-minded and see progress and motivation for me. So I asked myself, why are you learning? I want to gain knowledge and that's my motivation."

(Interview: 21_VG_G29): „ Accountability and .... I'm of the opinion that we have to give an account of what we know and what we have learned during the semester, so this can be done in the form of tests or even an exam, it's not so important how to tell what I know, because you have to learn the given thing anyway."

(Interview: 23_II_DMS_16): “And, if we really enjoy it, if it's fun, if it's interactive, then it's about positive emotions, then we have more motivation to learn something.”

So, according to students, motivation to achieve goals is key. No neutral or opposing views were expressed in this respect.

## 4.7. Student attitude: autonomy and gamification

Motivation requires a number of external and internal factors. Students identified autonomy and freedom of the student as a particularly relevant factor for motivation. They felt it was important to give the student space, both in terms of communication and freedom of choice. They particularly appreciated being able to share their own ideas with their peers. They considered it essential to be able to express their opinions freely and to contribute their own opinions to the group work.

(Interview: 21_VG_G2): “I really liked that one, for example, because **everyone could put their own ideas in there** and then we could start along those lines.”

(Interview: 21_VG_G22): “I'm actually a person who **likes to be listened to**. Like if **I have an opinion that could probably be constructive** in a class."

(Interview: 21_VG_G24): 'That is, how I do in the essay, **how I can speak in class, how I can contribute, for example - that's also a learning experience, that** I've learned and I know what I can talk about in class with confidence and I can say what I want to say. If I can do that, it's an experience that the time invested has paid off."

(Interview: 23_II_DMS_14): 'I think **it was** very **good that you gave us space** on certain issues. For example, when we were talking about sensitive issues, **you gave space so that if somebody wanted to answer, they could, but it was not obligatory.** There were also times when you were really interested in everyone's opinion. For me, it was a very nice way of collaboration between the teacher

and the students. Also, it was really nice that you involved us. **For each topic you asked:** you know, do you have any ideas about the topic? **Is there anything you would like to say? What are your ideas**?"

The main motivational drivers associated with their freedom are autonomy and competence, as discussed in self-determination theory. Related to this, the virtual economy/market and the voting game mechanics provided freedom of choice and creativity, and this was reinforced by the possibility to choose group tasks and option to offer alternative tasks. In the early development phase of the experiment (not analysed in detail in the dissertation), students could receive redeemable points for completing the motivation test, which they could exchange for chocolates, Corvinus University mugs or deadline extensions. In the case of[90], a previously presented version of the virtual economy and market game mechanics, they could buy and vote on more learning "services". As mentioned earlier, the market and voting mechanics were implemented and unified in one common game element. All of these are part of the student's impressions of autonomy, freedom and self-reliance. When asked about the motivating effect of the market and voting elements, the overwhelming majority of students gave positive answers.

(Interview: 21_VG_G11): "I think so and it also increased the number of respondents. I think it's a win-win situation."

(Interview: 21_VG_G13): "I didn't think it was childish! It was motivating for me, for example."

(Interview: 21_VG_G27): "...we are wired in such a way that if we get something for it, if we get something for a certain achievement, it motivates us to do more. I think that you telling us at the beginning of the year that you **could get a mug or a chocolate or something, that motivated a lot of people, like "oh my goodness", then finally someone will appreciate it if we** - I don't know - **speak in class or are active**"

(Interview: 21_VG_G28): "I thought it was really cool! That was probably the one I liked the most. For example, **I was also bragging to my colleagues that you guys don't have that, that you can buy it off**. But I think it also adds a little bit to learning. It kind of draws you in to the subject, I think that's part of it."

(Interview: 23_II_DMS_14): "... **so you offered us this opportunity to collect extra points, to gain something from it, to be better**. I think it **gave a lot of students the motivation to actually attend class, pay attention** and do well on the warm-up tests. I think that can really be an important factor."

[90] Illustration from page 126.

(Interview: 23_II_DMS_18): “I think it was great because **we had to choose and the result depended on the whole class. So yes, I liked it**. I really liked that.”

I found four neutral or rather negative opinions on the market and voting elements. These range from "interesting, but that's it" to "I don't think people were interested"

(Interview: 23_II_DMS_4): “‘I think, frankly, it depends on the group. For example, in our class I felt that they were not really interested in tokens and rewards. It depends.”

A total of 4 neutral or negative experiences or opinions were registered in relation to the related game elements, compared to 33 positive experiences (26. Figure). Based on these results, **the virtual economy, market and voting game elements collectively supported the students' desire for autonomy and autonomy and had a motivating effect in this experiment.**

*26. Figure: Evaluation of virtual market and voting game elements*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 3.1.3.6_GMF Virtual economy, market is positive | code | 21 | 30 | yes | + |
| 3.1.3.9_GMF voting is positive | code | 3 | 3 | yes | + |
| 3.9.1.1.5_GMF marketplace neutral | code | 4 | 4 | yes | - |

| | | |
|---|---|---|
| 33 | 89% | + |
| 4 | 11% | - |
| **37** | **100%** | **Total** |

Source: the author’s own work

## 4.8. Student attitude: role of community and gamification

Three shades of community related phenomena emerged from the interviews. The importance of teamwork was one of the most frequent messages, followed by quotes emphasising the importance of community, and then, looking within the community, nearly thirty quotes emphasised the benefits of diversity and the value of different perspectives. The perceptions of gamification in relation to community are uneqivocal in this case either. Group tasks are normal teaching strategies from the perspective of university, and therefore the parts of the student interviews emphasising the importance of group work cannot be clearly and only related to mechanics of gamification. After all, if group tasks are part of the courses anyway, their benefits and merits cannot be attributed to the use of gamification, even if group activity, group work, team, guild are known gamification mechanics. Therefore, in the experiment and the related interviews, I did not only focus specifically on group work, but rather on other aspects of its

design and implementation. Circumstances which, in my experience as a teacher and learner, are not part of group work by default. **All this in such a way that its experience and perception can be separated from the phenomenon of group work as it is generally known.** Likewise with assessment, which is an integral part of education (and also of gamification). Separating the phenomena is also difficult because group norm formation, ways of communication, and aspects of competition are also related to group activities. Therefore, in this subsection on communities, I will only deal specifically with the formation of groups and comparisons with each other. From this, I move on to competition and, in later chapters, communication, each contrasted with gamification. Therefore, in the following I will present some typical quotes from over 100 quotes on group work.

Friendship was an important and recurrent theme in the answers to the questions on community, group, team. Partly because of the need for community connection[91]. On the other hand, because of more effective learning and not least because of the good atmosphere of cooperation.

The emergence of friends and community in some interviews:

> (Interview: 21_VG_G2): "Obviously, if I have a friend sitting next to me, it makes the class an even more positive experience, because then I can share my opinion with someone, maybe after class, during class, if I fall behind, she can help me, and so on (...) I try - personally - to surround myself with people who are studying, who are regularly preparing for classes, who have a future plan, and so on. Obviously, that can be a very good pull."
>
> (Interview: 21_VG_G11): "I think it was really good that we worked in a group. The university is also about development and it's a very important skill to be able to work in a group."
>
> (Interview: 21_VG_G25): "...but for example the fact that there were so few of us is very good, because we got to know each other much better, and everybody relaxed a lot more."
>
> (Interview: 21_VG_G29): "I actually liked the fact that it was group work, as I said, I didn't have any friends, but I made contacts on the farm, who I'm still very close to and we still talk to this day".

In addition to the community and good atmosphere, the efficiency of the work was also highlighted by many.

> (Interview: 21_VG_G27): "...from then on, if you have a good teamwork, if you can work together, if you have a good atmosphere, then it can make a big difference (...) we had a good team and we worked together. We could work together."

[91] For a more detailed discussion of self-determination theory, see chapter 2.2.1, from page 30.

(Interview: 21_VG_G15): “Well, group work certainly adds to it. On the one hand it is a very valuable experience to work in a group with other people, and on the other hand it is an experience, if something comes out at the end. Success like this is an experience. And this is the last thing I would say, to feel as a student that we have had some success, that we have added something.”

(Interview: 23_II_DMS_19): “And, I don't know, the whole first class was super smooth and that was very important. The whole, I mean most of the students were involved. So, I really enjoyed it. Great, great group, everybody tried to contribute something.”

An important aspect of efficiency was also present in the interviews: the different skills and perspectives of the participants in the group work. This aspect is important in this experiment, moreover, because we devoted a special seminar session to group decision-making, during which we emphasised the benefits of group work with members from diverse backgrounds. **These perspectives brought us closer to the gamification elements of the community**, which concerned the different composition of the groups each time. During group work students always had the task of reflection on the collective activity, which was afterwards compared with the logic of the team set-up.

(Interview: 23_II_DMS_17___HU): “...and the best thing is that I've taken this in a group that is an international group. So it was very good to see how other people think about certain things.”

(Interview: 21_VG_G22): “... because it requires different skills, I think you need something that is diverse. Everyone should realize that you can't do it alone, because if you don't realize that, you can lose your sense of responsibility, you know that someone else can do it (...) **So you can get results and compare your knowledge with others, because that always motivates you.** It's not motivating and it doesn't move anyone forward in terms of social skills if everyone knows for themselves whether this is good or bad.”

(Interview: 23_II_DMS_10): “**I think it was one of the most collaborative classes I had at university.** The really interesting part is **listening to the students' opinions, having a little discussion**, and of course the whole framework of the class (...) I'm not sure I would be the one to initiate those conversations, but **if someone shares their ideas, (...) I'm very likely to get involved**.”

(Interview: 21_VG_G28): “I think what was really good and related to the learning experience was that there was a lot of teamwork (...) Well, the "who" doesn't really matter. Everyone - however you can put a team together in a way that is effective. How committed each member is, how much they understand that they are now working towards a common goal and not just individual goals. Anybody can make a good team in my opinion (...) **That's why it was interesting when we had to work with other team members, not always the same ones. Because they were different people, different personalities. Some took it a bit more humorous, some more serious and the alternation of these was very complementary**.”

However, in addition to the different perspectives seen and heard during group work, the social experience of comparing with others and comparing each other's results is of particular importance. This aspect will be deeply analyzed with regards to the gamified feedback sheet later in this section. In addition to the diversity of approaches and opinions experienced in the group work, the logic of grouping was based on the Big5 or HEXAD tests mentioned earlier, for which they were all given a personalised analysis. Thus, not only the differences experienced in the process of group work, but also the diversity of test results for each participant provided an opportunity for further discussion. And the significance of this, as described earlier, is that the narrative of the tests can be seamlessly linked[92] to the class material. The role of gamification is therefore to bring the results of the surveys and the logic of grouping to life through an appropriate narrative.

> (Interview: 23_I_DMS_19): "Because everyone has their strengths, but in a different way. For me it wasn't a bad effect or anything. It was interesting to see that I could recognise the person in person, either from the feedback or in some other way or something. And I think it was really fun to compare and see the differences, or even that there was no difference."

> (Interview: 23_I_DMS_2): "It was nice to see what the others got - we're all friends, we study together and everything, but our personalities are completely different. When we compared who got what, it was really fun!"

> (Interview: 23_I_DMS_14 ___HU): "It's more personal, I think it's more personal. It was handed out in class and we could sort of talk about it with the others, we could all see through it, we could learn more about each other, especially from the tests we could talk about it, relate and it gave a more intimate experience of it."

The novelty of the personal feedback sheet in the game made it an exciting phenomenon both inside and outside the group.

> (Interview: 23_II_DMS_4): "In this respect, you know, it has not only created a more engaged environment between teachers and students, but **I think it has also created a more engaged atmosphere between students. For example, I was talking to some friends of mine about this paper and we laughed a lot about it**."

> (Interview: 23_I_DMS_17): "Personal. I liked the fact that **you gave it to me on paper in class so we could compare and talk about it with each other,** not just read it on the computer, like, okay, I got a grade that might be worse than somebody else's... And **at least we got personal feedback so we know why our grades are the way they are**. I prefer personal feedback."

[92] Details can be found on page 119.

(Interview: 23_I_DMS_22): “I think **people** are excited about their grades and **want to share what type they are** (Big 5, Hexad results, badges - author's note) and **it's nice to compare who you are compared to others**. Yes.”

(Interview: 23_II_DMS_23): “And because we got these papers, **we could talk to our friends, "Oh, you have this, you have that." It was very good**. In class we compared it with my friend and she said, "Oh, that's very you, that's your score, that's your score." I think it was good that we got that in class. And then we used it afterwards to do group work. That was another good idea.”

The relevance of the results of the assessments, which were linked both to the curriculum and to some extent to self-awareness, was seen by some students as pure experience. Others thought further and looked for ways to use the (self-)knowledge acquired and to exploit synergies between them and to relate it to real life.

(Interview: 23_I_DMS_13): “It was good to get a different perspective on what we were doing. **Yes, a different perspective on how we behave** (referring to how the students behaved - author's note), especially with the Big Five thing. It was good to compare and see, for example, 'Oh, you're better at awareness' or something like that.”

(Interview: 23_I_DMS_17): “It was interesting to compare all the results and feedback.”

(Interview: 23_I_DMS_11): “**We do these tests in most classes, but we don't usually discuss the results**. We don't deal with what they mean or what they apply to (...) But I think it was interesting because **we could understand what areas we need to improve** or what our general thinking might be. So I think it **was very useful.** (...) It was interesting because now **we were** just **talking to the student sitting next to me. Just the one sitting next to me, and we were talking about what these results mean:** like, are we like this or are we like that way of thinking. Then we also discussed **how** we **could help each other with these badges, for example, if I am good at critical thinking and someone else is good at analysing results, how we could combine that when we write our thesis, for example.** We even talked about how we could support each other based on our strengths. And yeah, I think if we hadn't had these badges and things like that, we wouldn't have talked about it. If we had just gotten simple feedback, we wouldn't have felt the urge to discuss it in such depth.”

(Interview: 23_II_DMS_14): “Right from the beginning, when we had to fill in the personality tests, it was very interesting for me that you divided us into groups for certain games and situations (...) **This is something I haven't seen in other classes**. I think it's a great method because at the end of the day we're not just students, we're people and we're very, very different from each other. So I really liked that. Yeah.”

(Interview: 23_II_DMS_19): “So we filled out a lot of questionnaires, we had the materials in class, and maybe **it was all put in a real context: that what we learned looks like this in real life**. That was maybe a good feedback for us.”

(Interview: 23_II_DMS_23): “Oh, definitely the feedback and the tests that we had to fill in after the lessons. The personality test after class was very creative. I think it really helped us to know ourselves better. Even though I didn't know I needed it to understand how I work in groups, it was very creative on the teacher's part to really try to understand and help the students understand themselves.”

Of the 116 quotes on community and teamwork, only 11 were neutral or negative. Some felt that it was a bad experience that a fellow student took the lead or that fellow students had different opinions and were therefore slower to complete the task.

(Interview: 21_VG_G22) : “I have met people who have a completely different personality. they are a bit more withdrawn; they agree in teamwork whatever decision comes, I have met few analytical people. **However, I have certainly met people who are very quick to take the lead and can cause conflict**.”

(Interview: 21_VG_G24): “Because there was a task where you had to solve a puzzle. **It was a little bit harder for the team to work together because there were so many insights because there were so many people. It was difficult to get together at the beginning**.”

(Interview: 21_VG_G10): “Maybe there are some people who would much rather be left alone, let them do their thing and not have to work in a group in a company, there are a lot of people like that”

*27. Figure: The importance of community*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | | *FBS = FeedBack Sheet* | | |
|---|---|---|---|---|---|
| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
| 2.5.1.1_Importance of community in the classroom | code | 15 | 25 | yes | + |
| 2.5.1.2_The importance of teamwork | code | 28 | 46 | yes | + |
| 2.5.1.3_Teamwork, no slacking | code | 2 | 2 | yes | + |
| 2.5.2.1_Diversity of team is important | code | 12 | 14 | yes | + |
| 2.5.2.2_Other perspectives are valuable | code | 6 | 14 | yes | + |
| 2.5.3.1_Teamwork NEUTRAL | code | 3 | 3 | yes | - |
| 2.5.3.2_No need for community | code | 1 | 1 | yes | - |
| 2.5.3.3_Disadvantages of active students | code | 5 | 7 | yes | - |
| 3.1.2.1_GMF I liked the group forming method | code | 1 | 1 | yes | + |
| 3.1.2.2_GMF FBS also provides motivation within the group | code | 3 | 3 | yes | + |
| | | | 105 | 91% | + |
| | | | 11 | 9% | - |
| | | | **116** | **100%** | **Total** |

Source: the author’s own work

**However, it is difficult to separate neutral or negative experiences from underlying opinions about the community**. Among the positive responses to the group formation, underlying tests, I believe I can identify an effect associated with the underlying gamification, for which I did not identify any neutral or negative opinions. It is also important to reiterate that

in the experiment, the gamification elements were typically implemented in a non-independent way, but in conjunction with other elements[93]. The relationship between community and group work and gamification is difficult to disentangle. Accordingly (and in line with the specificities of the thematic analysis method), there is an overlap between the positive opinions. **And** the **positive experiences** referred to in this sub-chapter **are mainly focused on the "survey" method, for which I found only positive opinions in the interviews, 33 in total, so I consider the related game mechanics, i.e. the "survey" method,** its impact on group work, group composition, and comparison with each other, to **be positive in any case. In my opinion, this part of the experiment was successful**.

*28. Figure: Evaluation of "survey method" game elements*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | | | |
|---|---|---|---|---|---|
| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
| 3.1.3.8_GMF survey method -feedback- is positive | code | 19 | 33 | yes | + |

Source: the author's own work

## 4.9. Student attitudes: competition and gamification

I have dealt with several different theoretical aspects of competition in this thesis. Motivational factors associated with competition in educational settings are also addressed by goal orientation theory[94]. Driven by a motivation to compare oneself to others, learners strive to show their abilities, what they have learned and that they are smarter or more hardworking than other learners. Competition can be related to the balance between challenges and abilities in the Flow Theory[95], and finally, in relation to the competition to increase and demonstrate competence, the Self-Determination Theory[96] is also worth mentioning: the need for **competence** leads students to develop their abilities by challenging themselves beyond their abilities. However, according to the authors of the theory, if competition is characterised by mutual respect and appreciation, as well as good mood, it can also contribute to the saturation of the need for social connectedness. A similar approach to competition is taken by the author

[93] The details of this are set out starting on page 112.
[94] Details are available on page 42.
[95] I have written about Mihály Csikszentmihályi's Flow Theory on page 35.
[96] Deci-Ryan's theory can be found on page 38.

of HEXAD, (Marczewski,2017), who attributes the mechanics of competitive play to the socializer personality type.

I found few quotes specifically related to competition in the interviews, but significantly more on the game elements (ranking=leaderboard, level, badge) associated with competition, which helped to separate the phenomena in the analysis. Slightly more students were in favour of competition and the associated performance feedback (8 students) than those who were neutral or opposed (3 students).

> (Interview: 21_VG_G22): "So you can get results **and compare your knowledge with others, because that always motivates you.** It's not motivating and it doesn't bring anybody forward in social skills if everybody knows for himself that this is good or bad (...) I would also like to export this very much to other such classes where you typically have to be active. I think it's one of those, how shall I say...who's already got into one of these universities, I think **there's** definitely **a competitive spirit there I think.** So you can definitely get a hold of these people. Yeah, I think it's very good!"

> (Interview: 21_VG_G24): "For me it was very good because I always saw so much that I was in the top five and I was happy about that. I don't know how it was for other people, for me it was good. **It gave me a competitive spirit and it gave me something to learn**."

> (Interview: 21_VG_G28): "I think some motivation can be gained from it. Everyone here has similar competences, and if someone has a slightly lower score, you can motivate them by saying that they can then give themselves a little more to similar people."

At the same time, I have recorded understandable and important counterarguments from students.

> (Interview: 21_VG_G22): "I think it's also important to have something competitive in the tasks themselves. So you don't have to compete against other people. There should be some goal beyond being intrinsically motivated."

> (Interview: 23_II_DMS_2): "No. Honestly, I'm the guy who... I don't know how to say it... I'm probably an exception to the racing rule because I like to do well for myself. I don't like to compete. Oh, I've been in so many competitions, and now I'm just like, Ah, I don't care..."

In the case of perceptions of competition, it is also difficult to disentangle the activity used as part of teaching strategies from the impact of gamification mechanics on it, so in the dissertation and interviews I have sought to explore the embodiment of game mechanics that support and provide feedback on competition. This is the leaderboard game element in the experiment. Overall, the excitement of the analysis of the gamification experiment in this case was that those

who disliked competition made similar comments about the related gamification mechanics. For those who dislike competition, ranking or placement is not useful.

In relation to the leaderboard, I identified 42 positive quotes from 28 respondents, while 21 students expressed a rather neutral, sometimes negative opinion, according to 24 references

When asked about the usefulness of leaderboard, positive respondents said that the leaderboard they received as part of the gamification process and their position in it was important information. Also, they considered it important that the leaderboard was personal data and not public.

> (Interview: 21_VG_G10): "**I think it was very good because there is no benchmark for most subjects.** For the rest of them it's not public - it's not public anyway, it's just so you can at least get a shot."
>
> (Interview: 21_VG_G25): "Yes. But I'm glad that one by one, **each to his own...**"
>
> (Interview: 23_I_DMS_13): "Yes, really. **I'm very competitive**, so I really like to know."
>
> (Interview: 23_I_DMS_18): "Yes, I think it's a good thing for me because it pushes me to do my best. If I see, 'Oh, okay, somebody has achieved a great result, I can achieve the same if I put some effort into it.' So I think overall it's really good."
>
> (Interview: 23_I_DMS_2): "**I think it's really good to know my rank."**
>
> (Interview: 23_I_DMS_21): "'I looked at the rankings first. I saw that my ranking was not very high, almost at the bottom, but I was still okay with it (...) I somehow get more motivated to improve, to do better in this field. It also motivates me to learn more from the material."
>
> (Interview: 23_I_DMS_5): "...even when we are older, we compare ourselves with others. And we want to see if we have done better than others. But I liked the fact that you put out the ranking of the class , so you didn't have to ask the others separately..."

Some students – in addition to the comparison effect – associated a clear motivational effect with the leaderoard even if their ranking was lower.

> (Interview: 23_I_DMS_9___HU): "So, that there was such a thing, that in the group, compared to the average of the group, how we are doing, and it's also a bit of a competition, that if I see that I'm not as good as I want to be, then it motivates me. And anyway, it's really that I see that **my Midterm exam,** for example, is almost **the worst. So** it **really motivated me to change and to take a different approach,** and I think it's a good benchmark that **it wasn't the Midterm exam that was difficult, but I did something wrong. And then I have to change that**."
>
> (Interview: 21_VG_G11): "It **was useful from** the point of view that it either **reassured me or I knew I had to put a bit more into it. I think that's what's missing from most classes, or most**

**seminars, is that you hardly get any feedback on how other people are doing, so it's much harder to evaluate yourself**."

(Interview: 21_VG_G28): "I think there is some motivation to be gained from it. **Everyone** here **has similar competences, and if someone has a slightly lower score, you can motivate them by saying that they can then give themselves a little more to similar people**."

I found 5 patterns in responses that were not positive about the ranking. In 5 out of 24 responses, students were simply not interested in the scores. A total of 4 references belong here.

(Interview: 21_VG_G13): "I don't think it's that important in my opinion where I am in the ranking, because if that's not what I'm interested in, then it's not really going to affect me."

(Interview: 23_I_DMS_10___HU): "Sure! It doesn't affect me that much! I don't want to say that I don't care, but okay."

Others argue that only non-competitive students, or those who are only interested in their own work, are not motivated by the ranking. Six quotes fall into this group.

(Interview: 23_I_DMS_10___HU): "Well, the one who is more important is the competition or the ranking or I don't know how to put it. Who is a little bit more ambitious and who is a perfectionist, or how should I say it, or who strives for a very high performance in everything. Because you could do that in any subject, I suppose..."

(Interview: 23_II_DMS_10): "I didn't really concentrate on that. I wanted good marks and I'm glad I got them because I need good marks. But otherwise, I don't really care where I am in the group. As long as I get good points, it doesn't really matter."

According to the most common neutral response category, rankings can be motivating for those at the top of the rankings, but for lower ranked students, the presentation of their ranking can be demotivating.

(Interview: 21_VG_G2): "Well, I think that if someone is at the top of the list, then yes, but if not, then it can be a bit demotivating for someone who hasn't studied that much (...) Some people can be very motivated, for example, "I'll work even more", and if someone is of the mindset that they study a lot and yet they don't manage to be at the top of the list, that it's not enough that they have studied so much, then it can be very demotivating, that even that is not enough."

In the end, for some interviewees it didn't really matter, they experienced the lessons the same way, with or without a ranking.

(Interview: 23_II_DMS_15): "I knew how I was going to do in class, so it was fine for me."

I have not recorded any really negative opinions on the leaderboard. In my opinion, the motivation-destroying effect (placing lower performers in the ranking) is definitely against the game mechanics, but I would not put the "I don't care" and "I don't care" type opinions against the ranking as a researcher. Because if it doesn't bother the student, it can be a motivating factor for others.

*29. Figure: Evaluation of competition, and ranking/leaderboard game element*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 2.7.1_Competition is positive | code | 8 | 9 | yes | + |
| 2.7.2_Competition is neutral | code | 3 | 5 | yes | - |
| 3.1.2.4_GMF Ranking is positive | code | 28 | 42 | yes | + |
| 3.9.1.1.6_GMF ranking neutral | code | 21 | 24 | yes | - |
| 3.9.1.2.7_GMF ranking negative | code | 1 | 2 | yes | - |
| | | | 51 | 62% | + |
| | | | 31 | 38% | - |
| | | | **82** | **100%** | **Total** |

Source: the author's own work

The leaderboard was supported by 42 citations, 24 neutral and 2 negative opinions. The perception of competition is similar, with 9 supportive and 5 neutral or negative opinions found in the interviews. **If the success of the experiment is to be judged, I consider the ranking alone to be rather successful in this case. This is because students can see the ranking even in the case of unconventional feedback, but for students who experience the competition in a positive way, this can also have a motivating effect, so overall the effect is rather positive.**

It seems worth combining it with the feedback mechanism selection option[97] **. If the students only see a ranking if they explicitly request it**, the combined game mechanics (autonomy and ranking) **can be perceived positively.**

The competition can also be linked to the badge game mechanics, as it provides both feedback on performance and a way to compare against each other. The latter, of course, is only possible if the students share the badges. This is typically what happened in the experiment. In total, 26 positive and 4 neutral quotes were found in the interviews.

[97] See 13. Table, page 123.

One student said, a badge is an analysis condensed into a single point. Another was simply interested in what it was, why, how the teacher calculated it - and from there he arrived at his own result.

> (Interview: 23_I_DMS_18): “Yes, I think it's very interesting that our teacher analysed us.”
>
> (Interview: 23_I_DMS_19): “Because decision-making is a very complex thing and it is influenced by many things. I think that's why critical thinking is very important, because sometimes certain frameworks or things like that affect us, but we don't think about them consciously. So I feel like this has opened my eyes (referring to the badge on the personalised feedback sheet - author's note). It also helps us to think more critically and see how things work. Yeah, I just realized in class that - okay, it's not just the way it is.”

Others found it interesting, exciting and even "cool" to receive badges.

> (Interview: 23_II_DMS_13): “I liked the idea!”
>
> (Interview: 23_II_DMS_16): “Yes, yes, I liked it very much!”
>
> (Interview: 23_II_DMS_1): “Oh, the badge, that's OK. It's actually very good. We actually compared it with our friends. You know I had a lot of friends in our group and everybody was a critical thinker and I was a strategist.”
>
> (Interview: 23_I_DMS_7): “And I don't know, for example, these badges remind me of when we were little and the teacher would give you these badges if you did something good. So it's kind of a special feeling, because now, as an adult, you don't really see things like that very often. It feels good to see these graphics because they remind you of something from your childhood. I don't know, but in the end it kind of makes you feel good.”

There was an absolute minority of respondents who recognised, on their own or with a little help, the parallel between the badges and the apps running on the mobile phones in their pockets. This recognition is closely related to the second research question[98] , which investigates the recognition of a relation between the gamified course and the gamified mechanics that are otherwise present in a myriad of other socio-economic settings.

> (Interview: 23_I_DMS_5):
>
> “Q: Do you see this anywhere else? Signs, anywhere in your life?
>
> A: No, I don't think so.
>
> Q: What about in the apps on your mobile?
>
> Answer: oh yes (laughed), I could see that in apps.”

[98] The research aims and questions are formulated in the chapter 3.1, from page 91.

(Interview: 23_I_DMS_14 ___HU): “No, I actually liked it that way, and the description. It was really nice to read it, to compare. At first we thought it was related to personality tests, but then we realised it wasn't. But I really liked this one too, a very good one. For example, they do a lot of...I don't know, they do it on Duolingo. You know how the more you use it, the better you get, I mean badges... it was a bit like that, I really liked it.”

Neutral responses on badges and badges (4 quotes) typically showed indifference, satisfied with their scores. Alternatively, one student referred to another who was not satisfied with his badge.

(Interview: 23_II_DMS_15): “Yes, to be honest, I didn't really care about the badge.”

(Interview: 23_II_DMS_8): “No, I think it's funny and good. But I think every student has their own interpretation or feeling about it. It's fine for me, that's my statistics. But I didn't feel anything in particular.”

*30. Figure: Evaluation of the badge game element*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 3.1.3.2_GMF Badges are positive | code | 21 | 26 | yes | + |
| 3.9.1.1.3_GMF badges neutral | code | 4 | 4 | yes | - |
| | | | 26 | 87% | + |
| | | | 4 | 13% | - |
| | | | **30** | **100%** | **Total** |

Source: the author’s own work

**Based on the above, I think the perception of badge game mechanics is positive. And those with an indifferent opinion were apparently not bothered by the game mechanics. On this basis, I judged this part of the experiment to be successful.**

## 4.10. Student attitude: communication

Among the statements on the importance of communication, its effectiveness for students and their classroom experience, a high proportion of quotes are related to interactivity, followed by opinions on professional discourse and the importance of feedback. In my dissertation, the target process of gamification is education, which - similar to competition and community - already includes communication as an important part of itself, so in this case I gamified some specific forms of communication and measured the effects on them. The backbone of the

gamification experiment of my dissertation is the gamified feedback sheet. In the Appendix[99] I show several examples of this. As explained earlier[100] the feedback sheet has presented most of the game mechanics (ranking, badge, personal evaluation) to the students.

The importance of good quality communication (i.e. communication that is understandable and conveys quality content) is supported by a number of student opinions. The findings on general communication are not the focus of this dissertation, so I will only mention the summary statistics. Details of this are presented in 31. Figure:

*31. Figure: The importance of communication in the experiment*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interviews | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 2.6.1_Discourse is important | code | 11 | 21 | yes | + |
| 2.6.2_Reflection is important | code | 1 | 1 | yes | + |
| 2.6.3_Factual feedback is important | code | 5 | 9 | yes | + |
| 2.6.4_Interactivity is important | code | 19 | 30 | yes | + |
| 2.6.5_Importance of communication | code | 5 | 10 | yes | + |
| | | | 26 | 87% | + |
| | | | 4 | 13% | - |
| | | | **30** | **100%** | **Total** |

Source: the author's own work

Regarding communication platforms, I mentioned the 4-door model[101] , which offers different channels for different types of information, well adapted to the generational characteristics of the listeners. An interesting point of view is the so-called **café**, which is for informal communication, for the exchange of information between students (and the lecturer...?). The implementation of the café took the form of a chat room created by the seminar groups on Facebook Messenger and WhatsApp. Here, too, autonomy was involved: students could choose whether they wanted a chat room and could choose and create one from the platforms offered[102].

> (Interview: 21_VG_G11): "For me, this Facebook group was an example. Most tutors write on Neptune. Actually yes, it was the FB group (...) I liked it, yes."
>
> (Interview: 21_VG_G2): "Well, for example, the Facebook group, I think it's very, no one else has done it, no teacher has done a Facebook group. Maybe it was for statistics, it was just a Messenger

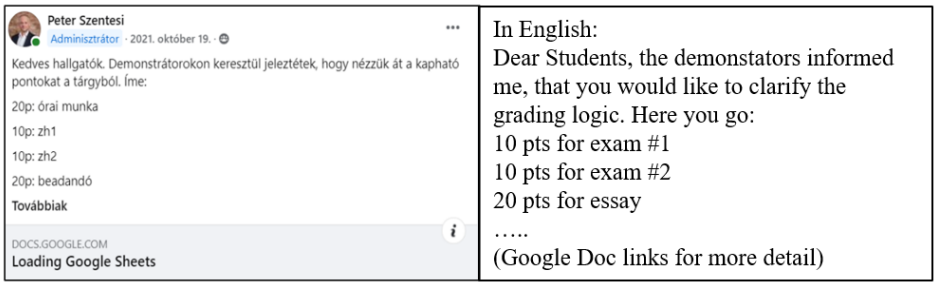
[99] The feedback forms can be found in Annex 6.5, page 207.
[100] The logic of the feedback sheets is described in detail on page 113.
[101] The 4-door communication logic is explained in detail on page 77.
[102] They could choose from MS Teams, Facebook, Facebook Messenger, Whatsapp, Viber, LinkedIn, Signal.

group, it was good to discuss things. (...) Well, it definitely made communication easier, because a lot of emails - this email address, that email address - it was a bit new."

(Interview: 21_VG_G28): "What I remember now - I don't know if this is relevant - is that **towards the end we started to use Facebook more actively, a lot of information was published there, it was very helpful.** There were times when you posted dates that were much more understandable than trying to find out from all the tables in a particular area what was going to take how long. **And also the fact that we could react to it, comment on it**, the reactions to it **really helped in the end** I think with the communication."

The café chat rooms can also be used for pre-class activation, as a further exercise of student autonomy, such as the group WhatsApp chat room vote[103] , in which the group decided on the topic for the next seminar. Also, taking into account generational specificities, they are particularly effective for clarifying rules or sending reminders and reminders (32. Figure).

*32. Figure: Clarifying rules in a seminar group's Facbook page*




Source: the author's own work

No negative opinions on the channels of communication were recorded in the analysis. The 71 quotes in total either reflect on the importance of discourse, reflection, interactivity, feedback, or the importance of communication in general, with positive experiences. There were "traces of gamification" in the communication, as autonomy and voting were used, but I did not specifically address these in the interviews. The 4-door model and the café became the preferred mode of communication for the students, which was appreciated, but I cannot attribute this to the gamified experiment**. Overall, the mode of communication (and the few small playful**

[103] Whatsapp voting: 11. Figure, page 80.

**mechanics) is successful based on the interviews, but independent of the gamification experiment.**

The teacher-student interaction was therefore perceived as an essential factor by the interviewees. From the instructor's point of view, communication was an important part of the key element of the gamified course, the gamified feedback sheet, which I have presented on page 113. The feedback sheet is a way of giving feedback and is thus a way of implementing communication. Yet, since the evaluation of attitudes towards the feedback sheet is the most important aspect of this dissertation, I will examine it in a separate subsection.

## 4.11. Student attitude: the gamified feedback sheet

The feedback sheet (last version), which was individually printed and sent to students by email, containing their personalised evaluation, included the following:

- the student's scores (warm-ups, midterm exam)
- the results and detailed written assessment of your written assignments (essay or written test)
- the results of the "survey method" tests[104]
- statistics on student attendance
- all graphically displayed, together with the group average, and
- information on the ranking

All this is illustrated with examples in the Annex[105] .

A printed feedback sheet is a static source of information, but it can be made interactive by adding additional elements. The individual assessment, personality test results, badges, graphs that could be linked to the students **induced student-teacher interaction**: students asked questions if their feedback sheet was not clear at first. **They also initiated conversations among themselves, and I hid additional explanations and additions available online hidden** behind a QR code on the feedback sheets, **which on the one hand was in line with the** game mechanics of **discovery**, and on the other hand I did not overload the sheets and only those who were really interested read the additional information. **In this way, the printed paper connected the different values and points of the student (according to the students,**

[104] For an explanation of the "survey" method, see page 118.
[105] Variants of the feedback forms are presented in Annex 6.5, from page 207.

**their "personality") to the learning material through the narrative game element, thus becoming a living, understandable and interactive source of information with important information.** For example, students were able to view their Big 5 personality test scores while I outlined the connections of the Big 5 personality traits to the psychology of decision-making.

The personal feedback sheet was well received by the majority of students. In the interviews, more than 200 quotes specifically referring to the personal feedback sheet contained positive adjectives (motivating, useful, something new, important information, etc.). A further 40 or so quotes indicated that they liked this feedback better than the conventional alternatives - for example, the points posted in Moodle at the end of the semester. In total, I was able to code less than thirty neutral or negative references, also in relation to the feedback sheet

In the gamification experiment, I used the surprise/surprise game element for the first handover of the personal feedback sheets. The students knew that we would deal with their tests at the beginning of the semester, but I did not communicate the time or the method to the group in advance. The feedback sheets were handed out at the beginning of the lesson, with the 2-page colour feedback sheet being pressed into the hands of the students as they came into the room.

> (Interview: 23_I_DMS_26___HU): "**It was quite astonishing for me, because no one has ever sent us something like that before, to summarise so much of what we have actually achieved so far in the course**. We were delighted, now on behalf of the rest of us."

> (Interview: 23_II_DMS_13): "First of all, nobody knew what it was because we didn't expect to get this kind of report or research sheet. So everybody was surprised, I would say. And after we got this paper, everybody started reading it to find out what exactly it was. Everybody, I think, looked at it curiously, and I would say that a lot of people were kind of shocked, I don't know, maybe because (student laughed - author's note) I think they found out their cumulative score throughout the semester."

In the interviews, several students said they had never received one before, and some also acknowledged the effort invested in by the teacher.

> (Interview: 23_II_DMS_14): "Honestly, I was like, yes, oh my goodness! I thought, 'Oh my God, that must have been a lot of work' (laughs - author's note). And I can't believe you did that for us. I was really shocked because **I don't think any of my teachers have ever cared enough about us to do something like that**. It must have been a lot of work, I think. **I'm very grateful to you for that because it was very informative. A really great way to show us where we are in the process, in our learning process. And it was a really fun way to give feedback because most of the time we just get points** or a grade at the end of the year. And it's a very good way to actually show us where we are and what we need to do to be better."

Another interviewee described the feedback sheet as perhaps a little more generously simple, but otherwise a great design.

> (Interview: 23_II_DMS_17___HU): “If I'm talking about a specific thing, as you can see from the reflective diary, I gave stars for everything, because I've never seen anything like that, when you first brought in those evaluation sheets. That, that's just...not a big thing, but just so brilliant,”

A total of two international students said they had received something similar in their university education, but due to the long time span, they could not give any specifics. For the vast majority, the gamified feedback sheet was definitely a novelty.

> (Interview: 23_II_DMS_1): “It was really interesting because it was the first time we had received something of this kind.”

> (Interview: 23_II_DMS_2): “I would say I really liked it. **I thought it was really cute and memorable. I've never seen a teacher ever use something like that**. Honestly, did you use any special tools to do that?”

> (Interview: 23_II_DMS_20): “Oh, are you talking about paper? Yes, I have it with me now. Yes, this paper, it's the first time I've ever had a paper like this. And I actually shared it with my friends, my family, because I was very surprised. Even my mom said, 'Wow, that's a very responsible attitude,' because usually students don't get that kind of feedback from teachers.”

> (Interview: 23_I_DMS_1): “I think it was really good because it was different from what we've been getting. I mean, I did five years of undergrad and I'm in my second year of my masters. So I**'ve been at university for seven years in** total, **and this was the first time I've had something like this**.”

Based on the first impression, I tried to make the students understand, without benig too specific, whether such feedback is really useful and motivating for them. There are several patterns in the quotes: for example (a) if the teacher spends so much time on the assessment it is motivating, (b) it helps to connect with the learning material, they remember it better, (c) it is motivating to see success visually and (d) it encourages more intensive work and proactivity when the student receives such feedback.

> (Interview: 23_I_DMS_1): “I think it's better. It's much more motivating. For me it was really more enjoyable. You can see visually your successes and your failures. I think it's much better than just seeing a number in Moodle.”

> (Interview: 23_I_DMS_14 ___HU): “I think it increases our motivation to work harder and to pay more attention. We know of people who didn't complete one and were sad that they didn't get an evaluation on it and **it motivates people to participate more and put in extra work if they get actual feedback on it**.”

(Interview: 23_I_DMS_19): “**I think you're much more motivated when you get that kind of feedback because you can see where you are and how you're doing. And based on the feedback, you know how you can do better in the final exam.** You are also motivated, for example, by the fact that if you are, say, a "critical thinker" (referring to the badge - author's note), you feel that you are on the right track and can think more critically about certain topics again. So, yes, I think the motivation has increased significantly.”

The interactive nature of the feedback sheet suggests that students relate the feedback they see, and its content, more closely to what they have learned. It also induced discourse between students.

(Interview: 23_I_DMS_10___HU): “**For me, it means I remember it better**. I combine it with the DM (Decision Making Skills class - author's note) and you, and it makes it absolutely more special. That's how I see it.”

(Interview: 23_I_DMS_14 ___HU): “**It's more personal**, I think it's more personal. It was handed out in class **and we could sort of talk about it with the others**, we could all see through it, we could learn more about each other, especially from the tests we could talk about it, relate **and it gave a more intimate experience of it**.”

(Interview: 23_II_DMS_4): “In that respect, you know, it's **created a more engaged atmosphere not only between teachers and students, but I think also between students**. For example, I talked to some of my friends about this paper and we laughed a lot about it.”

One of the criticisms of gamification of education is that the experience of play(ing) can distract students at the expense of learning. In contrast, the quotes listed earlier showed that many students were motivated to further improve their performance by a detailed analysis of their performance. Nevertheless, the interviews suggest that students also saw practical benefits from such detailed feedback.

A student with work experience compared the feedback sheet to the key performance indicators (KPIs) used to assess the achievement of workplace objectives. Others would like to see such feedback at work or in other areas of their lives.

(Interview: 23_I_DMS_2): “Because it looks like KPIs at work. But I think a lot of people didn't know because they were looking at it as students and they didn't have any work experience. But it was like when the manager gives an evaluation at the end of the job (...) It was like a self-reflection.”

(Interview: 23_I_DMS_21): “And it was really not only about our performance in class, but also about how we work in group work, group tests or presentations. So I think it's very useful for the future, not only during the lesson but also later on.”

In (Interview: 23_II_DMS_23) the student was asked if he would like to see this in the future in his workplace. The answer: "**Yes, I think so, yes."**

I have also recorded opinions on the achievement of the learning objectives. The feedback sheet was valuable because of its detail and helped many people to better anticipate the further work needed to achieve their goals.

(Interview: 23_II_DMS_12): “But yeah, it's great because we were all like, okay, now we know how much work we have to do for the final exam. Do we need to put in a lot of effort or not, because now we know where we are. So it's really interesting that we got this type of data before the end of the year.”

(Interview: 23_II_DMS_14): “I am very grateful for this because it was very informative. It was a really great way to show us where we are in the process, in our learning process. And it was a really fun way to give feedback because most of the time we just get points or a grade at the end of the year. And it's a really nice way to actually see where you're at and what you need to do to get better.”

As a teacher and researcher, it was a particular success for me to have a student respond to the same topic by referring to a required article and the course material.

(Interview: 23_II_DMS_15): “I read in the articles that the way to make good decisions is to present all the alternatives, all the possible options, on one page, at the same time. So, even if you know your score and how you're doing in class, this paper really shows all the information about you from all points of view.”

The information available on the feedback sheets, which provide a snapshot of the student's performance - in terms of the additional work required to achieve a good grade - can be summarised independently and simply by the students in the case of a conventional, non-gamed feedback mechanism (e.g. points uploaded to Moodle) as well. Some students therefore considered that the feedback sheet saved them time by presenting the necessary information on one page (2 pages, in fact).

(Interview: 23_II_DMS_13): “And it was an effective way of showing their status and their status and their score and things like that.”

(Interview: 23_II_DMS_8): “It's really useful. Because you can do it yourself. Each student should check for himself how many classes he has attended, what his results were in the warm-up tests. But here we could see all these things and we didn't have to spend time collecting them. So I'm sure everyone was grateful to see their statistics. It's very convenient because you don't have to spend time logging into Neptune or looking at your calendar to see which classes you were in, which classes you couldn't attend, and so on.”

An important aspect should be added to the previous findings. The feedback form could only be useful and informative for the students if it was received on time. On the one hand, the results of the "survey method"[106] tests were linked to a number of course materials during the semester. Since an important part of the feedback sheet is the analysis of the Big 5, HEXAD results, the feedback had to be prepared before the related seminar classes. On the other hand, the evaluation of the sub-scores, pop-up tests cannot be presented at the end of the semester, nor is it expected by the university. As Flow Theory and Skinner's motivation theory[107] point out: feedback is effective if it is given to the person being evaluated as soon as possible after the underlying action, preferably immediately. Similar codes have emerged in student interviews.

> (Interview: 23_I_DMS_9___HU): "**By the way, I think feedback makes more sense if you don't get it at the very end, but when you can improve things and make them worse**. Then I think it's important to see where we are going, to get the result we want at the end of the course"(...) Yes, **but only if we get it before the course is finished, because afterwards I might actually look at it, but it wouldn't motivate me as much as when I can still change it.** So, as very useful, yes, and I would like, it would be nice to have it from other subjects, yes."

I was able to record overwhelmingly positive opinions on the design and appearance of the feedback sheet.

Some students gave simple praise for the feedback sheet.

> (Interview: 23_I_DMS_1): "It was really good, and **I liked** the **design because most of it was easy to understand**."

For others, the structure of the feedback sheet was good and understandable

> (Interview: 23_I_DMS_10___HU): "**It was nice, it was structured, it wasn't that it was just such a mass, but it was great that it was divided up like that.** For me it was an absolute plus."

> (Interview: 23_I_DMS_7): "I think it's more visual, better organised and planned. It's more understandable for me. It helps me to see where I'm making mistakes or where I could improve (...) Yes... and I think for the current generation it's really appealing (...) Yes... and I think for the current generation it's really appealing."

I also looked at both neutral and negative opinions on the gamified feedback sheet. The most prominent category of these was the "rank-denying" student opinion on the rankings mentioned earlier in the context of the competition. Specifically, students who were indifferent to the

[106] an explanation of this can be found on page 118.
[107] for more on this topic, see chapter 2.2.1, from page 30.

feedback sheet the beginning of the "astonishment" phase did not understand why this was a good thing? The other group of negative opinions did not relate specifically to the feedback sheet but to the use of gamification in general, which I summarised in the chapter 4.14 to give a more comprehensive picture of the indifferent and the opposing party.

I have classified ambiguous opinions in the dissertation as neutral. Sometimes several phenomena were mixed up among the neutral answers, which I could not always clarify in the interviews due to lack of time, so they remained in the neutral zone. Examples of such confusion are the student's anxiety about his/her own results and the evaluation of the feedback sheet

> (Interview: 21_VG_G11): "**It was strange at first, because it was a bit scary! I mean I didn't dare to look at my results**, but it was nice to get some feedback anyway. **Anyway, it might have helped if we could have prepared for it. It wouldn't have been so unexpected**."

The same merging phenomenon can be detected, and in the case of the listener, the game mechanics of the surprise/unexpected event, i.e. the sudden, unannounced distribution of the feedback sheet, triggered the opposite reaction.

> (Interview: 23_I_DMS_9___HU): "First of all, this little badge, or I don't know what they call this little diagram, you look at who's what, and **then everybody started looking at the midterm exam**, **and then I got a little bit scared, so I didn't want you to see mine**. Anyway, we were curious to see who was what, but mainly we were looking at this main title."

On the topic of competition, many respondents used the diplomatic "it depends" answer to the ranking. I discovered this in several interviews. In validating the analysis, I make specific findings at the end of the chapter on whether the responses are otherwise plausible.

> (Interview: 23_I_DMS_1): "For example, one of my friends was excited about it, but the other one wasn't really, he didn't look at it very closely. So I think it depends on the person."

Some respondents quickly moved on from the feedback sheet, not finding it interesting and not bothering with it. One interviewee "remembered" that it was actually feedback from the teacher to the student.

> (Interview: 23_II_DMS_3): "First I had to understand what it was. What everything meant, all the measurements and so on. I think that's your feedback for us."

> (Interview: 21_VG_G29): "Yes, of course. **There were these emails that you used to send us, how we were doing**, what you thought our motivation level was, what our scores were**, so we definitely got feedback, of course.**"

In contrast to the student quoted a few paragraphs earlier, I also found a reference who explicitly did not want to receive such feedback at work.

> (Interview: 23_II_DMS_23): “But I'm not sure I would value that kind of feedback in a company. I would prefer an individual interview where we can talk everything through. But the mix of what you do is totally fine.”

Interesting contrasting views emerged between the "functionalist" and the "designer" students. One group was only interested in the presentation of the points achieved; for others the content was irrelevant because the design itself was impressive.

> (Interview: 23_II_DMS_21): “I think they were interested in him. They were mostly interested in the points, not so much the second side. So I think they were mainly interested in their points. I didn't hear that anybody was too keen on it, they were more just curious about the whole thing.”

> (Interview: 23_II_DMS_8): “So I think that seeing everything that we did before - like the warm-ups, the midterms, the classes, and your comments on the midterms - I think that's enough. I feel like, yes, it's enough.”

> (Interview: 23_II_DMS_8): “It's really colourful. I like it because no matter what's written on the paper, the colours are interesting and it's nice.”

Finally, I mention the students for whom the feedback sheet seemed too complicated. Some respondents just didn't understand the feedback sheets at first, while others found the overall structure of the sheet too complicated. I have tried to take their comments into account in the development of subsequent feedback sheets[108]: in the feedback sheet for semester II 2023-24, the colours have already guided the students' eyes from the summary table to the detailed statements. Furthermore, these comments also inspired the QR code edited on the feedback sheet, which leads to an online document with an explanation of the sheet.

> (Interview: 21_VG_G24)[109] : “I didn't really understand it until around the exam. **For me there, the points that I could use for this pre-exam thing were really clumped together, and the mug points were really clumped together for me. It dropped off in the last week and a half.**”

> (Interview: 21_VG_G25): “**I honestly got a little lost after a while in how the points were coming out. Or that there are flat ones that count towards the ticket and the cup, and there was some third kind, if I remember correctly.** By the end I didn't even know what counted for what.”

[108] The development phases of the feedback forms are presented in Annex 6.5 from page 207.

[109] Reference cited earlier already, but also relevant to this topic

(Interview: 23_II_DMS_3): “To be honest, maybe a little bit, how shall I say, not too much, but like there was too much information that we didn't really know what it meant. We sat there side by side and looked at "what does this mean, what does that mean," and it took us time to figure it out.”

Personalisation is, in my opinion, one of the most important gamification mechanics. In this experiment, it can be clearly linked to the feedback sheet, as students were given individual, personalised assessment and feedback. I found nearly 100 quotes that explicitly describe personalised assessment and feedback as useful and good - even in general.

(Interview: 23_I_DMS_10___HU): “Yes, it's a special thing, yes. It feels good!”

(Interview: 23_I_DMS_13): “Yes, yes. And when I get that kind of feedback, it makes me feel that what I'm doing has meaning.”

(Interview: 23_I_DMS_19): “I liked that too (the student smiles - author's note), because I tried to use your feedback to do better in the warm-up tests, for example.”

(Interview: 23_II_DMS_18): “Maybe the aim was to **show the students that they are important** and that they get appropriate feedback and assessment in the class.”

**An analysis of the gamification of feedback based on the student interviews would, in my opinion, clearly be considered a success in itself.** There are nearly four hundred positive quotes and twenty-three neutral or negative references; without weighing, it is not possible to put a mathematical relation between the results, but the magnitudes are reassuring in my opinion. However, as a researcher, reading through the interviews several times, the suspicion arose, no matter how much I tried to ask specifically about the feedback sheet, in several cases there might have been a confusion between gamification (in general) and the actual gamified feedback sheet. Since part of the analysis of the interviews in the dissertation follows later, I have briefly summarised the critical (neutral and negative) responses in a separate subsection and used them to prepare a gamified feedback sheet for the gamified experiment, i.e. my researcher evaluation, at the end of the chapter. **Finally, considering the order of magnitude, I judge that this part of the experiment is successful.** The codes for the feedback sheet are summarised on 33. Figure.

*33. Figure: Evaluation of the gamified feedback sheet*

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interview | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 3.1.1.1_GMF FBS good, exciting to see for the first time | code | 28 | 30 | yes | + |
| 3.1.1.2_GMF FBS interactive | code | 5 | 5 | yes | + |
| 3.1.1.3_GMF FBS motivating | code | 25 | 38 | yes | + |
| 3.1.1.4_GMF FBS is new, not seen elsewhere before | code | 20 | 24 | yes | + |
| 3.1.2.2_GMF FBS also provides motivation within the group | code | 3 | 3 | yes | + |
| 3.1.3.11_GMF FBS was unexpected / wow / positive | code | 2 | 2 | yes | + |
| 3.1.4.2_GMF FBS it was good to receive such a feedback | code | 20 | 27 | yes | + |
| 3.1.4.3_GMF FBS personalised assessment is positive | code | 22 | 30 | yes | + |
| 3.1.4.4_GMF FBS personalised feedback is overall POSITIVE | code | 29 | 44 | yes | + |
| 3.2.1_GMF FBS contains relevant information | code | 16 | 26 | yes | + |
| 3.2.2_GMF FBS effectively presents information | code | 4 | 4 | yes | + |
| 3.2.3_GMF FBS saves time for the student | code | 2 | 2 | yes | + |
| 3.2.4_GMF FBS shows that it was worthwhile to work | code | 1 | 1 | yes | + |
| 3.2.6_GMF FBS I would like to have this in my workplace | code | 2 | 2 | yes | + |
| 3.2.7_GMF FBS Overall useful | code | 10 | 18 | yes | + |
| 3.2.8_GMF FBS It was important to get it in time | code | 6 | 7 | yes | + |
| 3.3.1_GMF FBS better than Excel or Moodle | code | 32 | 42 | yes | + |
| 3.3.3_GMF FBS design was useful and good | code | 19 | 24 | yes | + |
| 3.3.9_GMF FBS the design is important, the rest is not | code | 1 | 1 | yes | + |
| 3.4.1_GMF FBS meant personal contact, attention | code | 10 | 19 | yes | + |
| 3.4.2.1_GMF FBS I see myself on the FBS | code | 3 | 4 | yes | + |
| 3.4.2.2_GMF FBS is like writing a diary | code | 1 | 2 | yes | + |
| 3.4.2.3_GMF FBS I felt special because of this attention | code | 2 | 4 | yes | + |
| 3.4.3_GMF FBS souvenir of the course | code | 2 | 3 | yes | + |
| 3.4.4_GMF FBS I got to know myself better | code | 1 | 1 | yes | + |
| 3.5.1_GMF FBS was a lot of work | code | 11 | 13 | yes | + |
| 3.5.3_GMF FBS teacher is responsible | code | 1 | 1 | yes | - |
| 3.9.1.1.1.1_GMF FBS personalized feedback is overall neutral | code | 2 | 2 | yes | - |
| 3.9.1.1.2_GMF FBS it was strange to see first, neutral | code | 9 | 10 | yes | - |
| 3.9.1.2.2.3_GMF FBS was boring to get it | code | 1 | 1 | yes | - |
| 3.9.1.2.2.4_GMF FBS I would not want to get this at work | code | 1 | 1 | yes | - |
| 3.9.3.2_GMF FBS too much information, complicated | code | 3 | 8 | yes | - |
| | | | 376 | 94% | + |
| | | | 23 | 6% | - |
| | | | **399** | **100%** | **Total** |

Source: the author's own work

During the student interviews I investigated phenomena related to perception and motivation. These are all complex constructs, and even in Hungarian it is not easy to get the interviewee to understand a concept in the same way as the researcher would like. However, the vast majority of the participants in my experiment were foreign-language students, whose English knowledge ranged over a very wide range. Under these circumstances, it is even more challenging to study linguistically complex phenomena. The experiment was specifically designed to gamify the course described earlier and to test its impact. In order not to pre-suggest answers to the

students, and due to the language constraints most of the discussion moved from the learning experience in general to the importance of motivation to gamification. This allowed me to register a number of opinions that were important but not specifically related to or related to the gamified feedback sheet, but in abstract response. These include some of the more personal experiences of students with gamification, as well as findings about the instructor and the technology. I list these in the next section. Finally, after that, I present a summary of both indifferent and negative opinions.

## 4.12. Student reflections on the experiment and gamification

In my analysis of the interviews, I have previously stated that I believe that personalisation is one of the most powerful game mechanics. Personalisation can be experienced as attentiveness by the participant in the process. Personalisation can make the process easier; it can make the target feel like the centre of attention.

The novelty of the gamified feedback was evident in several of the interviews: the foreign students interviewed had never received similar gamified elements at their home university.

> (Interview: 23_I_DMS_18): "No, it's interesting because I'm not really used to it. I think mainly because I go to a public university in Portugal and there the professors are not so attentive to the students."

Personalisation was perceived by the interviewees as a time and attention devoted to them. The attention paid to them was reciprocated with attention in return.

> (Interview: 23_II_DMS_11): "Yes, actually it's like you're keeping track of all of us and it'**s a kind of personal relationship that you develop with each student**. **You care about everyone**, and **you take the time to do something for each student and give feedback individually** (...) Because if you get general feedback, you might care less about what the feedback says because it's not about you in particular. **But feeling that you're listening to us individually might help us to get involved in the lesson and want to perform better.** As you give to us, we give back to the class, to the group. It's like a kind of "give and take" relationship, I don't know how you say it in English."

> (Interview: 23_II_DMS_15): "Yes, two things come to mind. One, it definitely shows that you care more, because I think most professors don't really care, I think."

There were students who encouraged me that I was on the right track.

> (Interview: 23_II_DMS_22): "You could see that everyone really enjoyed it and especially that it was really personalised. It's interesting. You could see that the students **felt special in a** way. **The feeling of being selected and observed and that you took the time to do that, I think everyone**

**really liked** that (...) We actually talked about how it might make some students feel better, feel special, like they had been selected and studied. (...) I think it's great. **It's great for the students to understand that you care about them**. We talked about this with the girls, if I remember correctly. It's important for us to see that feedback from the professor, and also that the professor cares about us as people, who we are."

In addition to the "thoughtfulness" of the instructor, some students remembered the feedback they received from the game as a self-awareness experience. They felt as if they had written a diary, and one of them kept the feedback sheet as a souvenir of the course.

(Interview: 23_II_DMS_19): "Maybe we see ourselves as we really are, and these results really show how we are in life."

(Interview: 23_II_DMS_7): "Yes, I think it's important because all the tests we have taken have allowed us to understand ourselves better. And I think it's important to see, for example, how our openness, our awareness, or what you mentioned. If I'm more of a social person, for example, rather than, say, a playful person, and I think it's important to see that from a personal point of view."

(Interview: 23_II_DMS_23): "Oh, definitely the feedback and the tests that we had to fill in after the lessons. The personality test after class was very creative. I think it really helped us get to know ourselves better. **Even though I didn't know I needed it to understand how I function in groups, it was very creative of the teacher to really try to understand us and help the students understand themselves**."

(Interview: 23_II_DMS_8): "So I think all the students really liked it. It's colourful and really interesting to watch. It's a bit like a strategy, it's not just simple statistics, it's statistics-like... you know, it's like... I don't know how to say it... One moment, one moment, sorry, I'm just looking at the word... **It's like a diary, a student's diary. Not just statistics, but a student's diary. And if every student had a piece of paper like that and had the opportunity to colour it in with a pencil, it would be like a diary. So that's one of the things that's interesting about it.**"

(Interview: 23_II_DMS_24): "**Yes, and I like it very much because I can keep it as a memory or a souvenir of this course."**

The following quotes illustrate the labour-intensive nature of personal attention to students. According to some students, the goal of improving the course for the students' experience was achieved.

(Interview: 23_II_DMS_22): "I like it. I like it because I understand that **it was a big job that you personalized for each student**. It's a lot, but it**s also a lot**. It gives a lot. So I think it really works what you're doing and what you stand for. Even if some students don't really pay attention to this paper, don't study it in detail, and don't take knowledge from it, the fact that you've prepared this for students means a lot, a lot. So I enjoyed it."

(Interview: 23_I_DMS_26___HU): “I wanted to say about that, that **there seems to have been a lot of effort in this**. To prepare it for all the students - I don't know how many of us there were, 35 or 40 - and that not everybody would do that for us. So thank you very much for doing that.”

(Interview: 23_I_DMS_5): “Because I think a lot of teachers are like, "Oh, I'll just do the assessment and then I'll hand it in at some point..." And then it's not done on time and you feel like they don't care at all. But it seems like you really put effort into it and you want us to feel like you're really giving us feedback that we can use. And I think that's really good.”

## 4.13. Awareness of gamification among students

One of my goals with the gamified educational intervention mentioned earlier was to make students aware of the importance of gamification in the economy and the world of work by creating a gamified motivational experience. I incorporated the gamification mechanics into the feedback mechanism for the course, which is similar to the way many processes, platforms and applications in business work. The second research question (RQ2) of my dissertation was: **do students consciously recognise the motivational-influencing aspiration in the application of gamification and discover its relevance to their later business life**? Do they find parallels between the rankings and badges they see in their coursework and most of the apps running on the mobile phone in their pocket?

To avoid suggesting expected answers to the questions, I have "started from a distance" during the interviews. I was curious to know if there was anything new in the communication between teacher and student in the classes? Did the instructor do something they had not encountered before? I did not get valuable answers. However, after mentioning the gamified feedback sheet, they confirmed that they had not received such before, with two exceptions. Thus, **respondents** were either self-contradictory or **just not yet aware of the mechanics of gamification at a conscious level.** Considering that **the purpose of gamification in business is precisely to influence and engage the participant without being noticed,** as a researcher on the topic I think the second option is more likely.

In total, only five interviewees linked gamification mechanics to other areas of life. One of them, as a specialist in gamification of training alongside his university studies, clearly knew what gamification was for. Another student could only articulate the purpose of gamification at a theoretical level.

(Interview: 23_I_DMS_1 (2)): “I have done several gamification projects. Actually, I am doing it now, I am currently working for a market research company and for our auditor training we are

> building an app from scratch with microlearning to help people understand better. And now I'm putting badges into that because auditors want to see their success."
>
> In response to a question on the essence of gamification (Interview: 23_I_DMS_5): "I actually did a paper on this in another class... The purpose of gamification is to make the experience more fun and more relatable for those who participate."

Two students were able to link their badges to specific mobile phone apps: Duolingo and Nike Running.

> Asked about his opinion on the badges (Interview: 23_I_DMS_14 ___HU): "No, I actually liked it and the description. It was really nice to read it, to compare. At first we thought it was related to personality tests, but then we realised it wasn't. But I really liked this one too, a very good one. **For example, they do a lot of...I don't know, they have them on Duoling. You know, the more you use it, the better you get, you know, badges, it was a bit like that, I really liked it**."
>
> (Interview: 23_I_DMS_7): "Yes, for example, in applications where you train, you get these little badges. For example, I have a Nike running app or other training apps where I get these badges (...) Yeah, I think I've seen in many apps these kind of badges that congratulate you when you achieve something."

Finally, I will show you again a student opinion, quoted earlier, who compared the feedback form to a job evaluation. In this the student is absolutely right, many HR software programs include gamification elements.

> (Interview: 23_I_DMS_2): "Because it looks like KPIs at work. But I think a lot of people didn't know because they were looking at it as students and they didn't have any work experience. But it was like when the manager gives an evaluation at the end of the job (...) It was like a self-reflection."

Based on these findings, as a researcher, I conclude that **the majority of students in** this **experiment did not recognise the link between the gamified course and the gamification of the socio-economic life around us.** Despite the fact that many students brought and held the feedback sheets they had received earlier to the interview. In fact, I also presented "intimate" findings that students compared the gamified feedback sheet handed to them to diary writing. **Thus, the underlying dimension of "HOW" was not successfully implemented in the experiment. In summary, the answer to the second research question is no, in this experiment the underlying connection was not realized by students.**

## 4.14. The other side of the coin: those who were reluctant to play with us

In the previous sub-chapters, I have predominantly emphasised positive views on gamification, together with the associated criticisms. However, an additional bias mights arise in the context of the experiment results. I recorded the interviews in two stages. In the first, the interviews were undertaken on a voluntary basis by the students. In this phase, the group 21_VG consisted of business economics students, and the focus in these interviews was more on exploring the student experience. This included students 23_DMS_I, who had taken a Decision Making Skills course and also volunteered to be interviewed, which was more focused on gamification. In the second phase (interviews labelled 23_DMS_II), the interviews took the form of reflective discussions, also with a gamification emphasis, which accounted for ten percent of the total course score (therefore more, or less mandatory). Of the voluntary interviews, 27 were completed and 24 of the compulsory ones. The bias is due to the fact that a higher proportion of the 51 interviews involved students who voluntarily gave up 30-45 minutes for the interviews for some personal reason. Presumably, they were more sympathetic to the teaching method, they perceived the teacher as friendly, etc. Their responses are therefore probably more positive as a result. So their opinions may not be representative of the whole group. Summing up the negative codes by category, I counted a total of 40 indifferent or critical quotes in the groups that responded spontaneously, and 39 in the case of the compulsory interviews. These are similar in magnitude, with an average of one and a half indifferent or critical quotes per interview recorded. This suggests that, although there is not a large variation in the patterns of responses, I assume that a larger sample size in the first stage would have resulted in slightly more indifferent and critical quotes.

I have already quoted the indifferent and critical opinions in the previous sub-chapters, here I will just summarise them. Some of the respondents gave the comfortable answers "it depends" or "it is good and bad". In relation to gamified mechanics, badges, visual presentation of progress, I have recorded indifferent opinions. In the section on competition, I analysed in detail the indifferent but rather negative answers regarding the ranking judgements. Not everyone bothered to understand the feedback sheet, some students found it difficult, slow to understand and overall would have been happy with just the score, possibly with a written assessment of their score. Overall, there were few really strong criticisms of the feedback sheet. One student thought it was childish and certainly would not want something similar in the workplace.

Once an error slipped into the experiment, this should be part of the researcher's reflection as well. Unfortunately, I made a technical error when preparing one of the feedback sheets. The attendance data and some of the scores were not updated correctly. This was reported by the students, corrected and received next time without errors. A separate group of negative opinions were 5 student opinions, who said that the incorrect player feedback could cause concern and anxiety, the student would feel insecure because they remembered their attendance differently.

> (Interview: 23_II_DMS_14): "...so, if I remember correctly, I only talked to the Hungarian students about this, so I'm not quite sure about the opinion of the whole group. They said that the first part of the first paper that you gave us was not very perfect and it was a bit misleading because there was some information on it that was not accurate."

In this case, of course, communication, clarification and correction were key. However, it is important to note that the students were willing to make critical comments in the interviews, which I believe contributes to the credibility of the results. I write more about this in the chapter on research validation[110].

## 4.15. Overall results of the research

In my dissertation, I investigated the design, implementation and motivational impact of gamification in business higher education. The field of play, education and motivation has a role in all of our lives. As children (and many even as adults) we play, we learn through play (in my case, we play while learning/teaching) and ultimately we learn for life. Behind all of this is the universal driving force, motivation and its thousand nuances. Through gamification I have smuggled a portion of the thousand shades into education. The research questions and objectives explore its implementation and impact.

### *Meeting the first research objective*

**The first research objective** was **to summarize the theories related to gamification**, to map the connections and similarities between them in **a level of detail that is not yet available in the literature.** The aim was therefore to identify the interrelationships between motivational theories, frameworks supporting the practical application of gamification, supporting pedagogical interventions, and to explore the possibility of intersection between the theories. The objective also includes a theoretical delimitation: the most frequently cited theories of motivational theories and frameworks of gamification in the literature were examined. I

[110] Chapter 4.16, page 184.

searched for new articles in the scientific search engines, following the saturation principle and sorting them by reference, until I found only repetitive theories. The intersection between theories is summarised in 6. Table. In the respective chapter[111] I illustrated through examples how this logic can be used: either as a necessary pedagogical intervention, as applied motivational tool, or as a favorite game mechanic. **The first research objective was met.**

- **Research objective 1: to formulate the links between theories related to gamified education**
- **Research objective 1 was met.**

*Meeting the second research objective*

**The second research objective was to i**nvestigate the gamification potential of a live seminar course, **to select, design and adapt the gamification elements** to the specificities of the course, with a particular focus on the ex-post measurability of the effects of the interventions. All this being done by **taking into account the design aspects of didactic processes and gamification procedures**. This also includes the definition and selection of the technical conditions for implementation. In the dissertation, I have therefore paid attention to the didactical aspect of gamification, and I have explored the guidelines in the literature[112]. I have supplemented these with the literature's expectations for the design of gamified processes and organised them in a single table. The design of the experiment was based on the expectations in the table. **Based on what I have read in the literature, my own research and teaching opinions, and also according to a student of mine[113] who was involved in the experiment and who, by the way, is a professional in designing gamified training, the experiment was in fact a gamification of education. I considered the second research objective to be successful.**

- **Research objective 2: to investigate the gamification potential of a live seminar course and to design the experiment with didactic and gamification considerations**
- **Research objective 2 was met.**

[111]Chapter 2.3 on page 86.
[112]Chapter 3.5, page 102.
[113] For a brief description, see chapter 4.13 on page 177.

*Meeting the third research objective*

The third research objective **was to explore the factors that influence the students' learning experiences.** This was a necessary prerequisite for analyzing the impact of gamification. In order to put the motivation-pedagogy-gamification logic of the first research objective into practice, it was necessary to see what motivates students and what values they like to work along in order to get more motivated students. From the interviews, patterns emerged relating motivation, attitudes towards rules, autonomy and competition. These were also very useful in the experiment and in the interviews. **In examining the results of this dissertation, I analysed these factors in detail[114] , and compared them with related gamification elements, which provided the basis for answering the first research question. I examined the phenomena in a way that was necessary and sufficient for the experiment and drew conclusions from them to answer the research question. The third research objective was met.**

- **Research objective 3: to explore the factors influencing students' learning experience**
- **Research objective 3 was met.**

*Answer to the first research question (RQ1)*

The main question of my dissertation is whether gamification in a live seminar setting can increase student engagement and motivation? Several articles in the literature section confirm the motivational effect of gamification. However, the vast majority of the articles refer to online courses or investigate live seminar courses but using some software or online platform. I have used infocommunication tools (QR codes) in the experiment, but only as a complementary tool, which I also use in non gamified courses. A very important aspect of offline, live seminar gamification is that it can be applied without significant investment, although it may take many hours of work. In presenting the results of this dissertation, I have examined whether or not the experiment can be considered successful on a topic-by-topic basis. A summary of the results is presented in 16. Table.

[114] From chapter 4.3, page 137.

*16. Table: Answer to research question 1. (RQ1)*

| Student attitudes | Gamification element | Result of experiment | Reference within the dissertation |
|---|---|---|---|
| Rules, norms, goals | Onboarding | ⊗ | Chapter 4.5, page 146. |
| Autonomy | Virtual economy | √ | Chapetr 4.7, page 148. |
| Social relatedness | Group forming | √ | Chapter 4.8. page 155. |
| Competition | Leaderboard | √ | Chapter 4.9, page 160. |
| Communication, feedback | Gamified feedback sheet | √ | Chapter 4.11, page 165. |

Source: the author's own work

All attitudes are important for the students. In my dissertation, I did not assign weights to these (their determination would be the result of another research and study), so the comparison of successful and unsuccessful outcomes can be achieved within the framework of the dissertation only by comparing the number of related quotes. However, **looking at the research as a whole, it can be seen that the vast majority of student feedback is positive, the gamified elements are perceived as novel, interesting, exciting and motivating. In my opinion, the overall answer to the first research question is YES.**

- **Research question 1 (RQ1): can gamification in a live seminar course environment increase student engagement and motivation?**
- **Answer to research question 1 (RQ1): The experiment I conducted in my research shows that gamification elements in a live seminar course environment can increase student motivation.**

*Answer to the second research question (RQ2)*

Another aim of my gamified educational experiment is to introduce students to the role of gamification in the economy and the world of work by creating a motivational experience. I did not develop a "gamification" course but incorporated gamified elements into the feedback mechanism of the course. It is similar to the functioning of many processes and platforms found in business and everyday life. The related question is: **do students consciously recognise the motivational-influencing aspiration in the application of gamification elements and**

**discover its relevance for their later business life? In other words, do they discover the parallels between the feedback gamified in the course and the gamification elements embedded in the applications running on their mobile phones.**

This was one of the most exciting aspects of the experiment for me. The mechanics of gamification have an imperceptible motivational effect, which is also the underlying idea behind the manipulation tactics of many modern commercial processes. In other words, the participant becomes more involved and immersed in the activity without knowing why it is so good. This was also reflected in my experiment: only 5 students independently recognised the link between the mechanics of the gamified feedback sheet and similar solutions in other applications, and one of the 5 students was involved in gamification, so the number of hits (the non-"experts") was rather only 4[115]. **The answer to the second research question above is <u>NO.</u> In this experiment, the vast majority of students did not recognise the parallel we were looking for.**

- **Research question 2 (RQ2): after participating in a gamified course, do students recognise the playful elements and equate them with the gamification found in business and social apps?**
- **Answer to research question 2: In this experiment, students <u>did not</u> recognize the correlation between the elements of gamification and similar solutions in other applications.**

After summarising the results of the experiment, it is necessary to discuss the validity and reliability of the research, the limitations of the experiment and the results.

## 4.16. Validation, generalisability, limitations and ethical aspects

In my dissertation, I analysed the implementation potential of gamification and its motivational effects on students in a gamified course at Corvinus University of Budapest. Using qualitative method, I studied the students' experience of the experiment through semi-structured interviews. **Given that the educational context, learning motivation and engagement are highly context-dependent**, the design, implementation and feedback logic of this particular educational gamification experiment **is difficult to generalise.** Therefore, in my research, the

[115] I draw conclusions on this in the concluding chapter of this thesis.

**design and implementation steps of** the course gamification **and the methodology of the feedback** were **precisely documented** and therefore may be transferable. As a result, the gamification efforts of seminar groups in other contexts will be comparable to a limited extent. Notwithstanding this, I need to assess the reliability and generalisability of the research methodology and results. For validation, I will draw on the studies of Appleton et al. (2006), Christenson et al. (2012), Grace et al. (2020), Marczyk et al. (2005), and Sezgin and Yüzer (2020) and also refer to a good overview Marczyk et al. (2005, pp. 173-198). Finally, an interesting read for me related to validation was Korstjens and Moser (2018), who described validation in terms of plausibility, transferability, verifiability instead of internal, external and construct validation.

The internal validation of the research involves evaluating the explanation of the research results, understanding it and correctly identifying the causal relationships of the model. The process was documented in detail in the qualitative methodology. The so-called audit trail of the work is available in the shared NVIVO database. The categories of codes and the themes developed are presented in a transparent way as disclosed in the Annex[116]. On the other hand, I have also made the NVIVO database containing all the interview audio material, transcripts, and coding and their aggregation available[117]. The design and implementation steps of the experiment can be found in my dissertation. I have placed particular emphasis on researcher reflections during the process and have been particularly careful with interviews and codes that expressed views contrary to the expected outcomes of the research questions, these are also noted in a separate subsection[118]. I have paid particular attention to the adequacy of the research in terms of sample size and have reported reassuring results in terms of data saturation.

The analysis and coding of qualitative interviews leaves a lot of room for subjectivity. In many cases, a paragraph is associated with several codes, or the researcher associates several quotes with the codes - this is a feature of the thematic analysis method. However, when writing the results chapter of the dissertation, I was confronted with the fact that in the original iterations of coding, I either did not notice additional content or I ended up with fewer code-quote relations. In other cases, I would have formulated the text in a slightly different way in the given situation, as a researcher approaching the end of the dissertation, or I would have considered

[116]Annex 6.7, page 219.
[117] The data are available in Annex 6.10 on page 228.
[118] Chapter

the text to belong to a fundamentally similar but different phenomenon or code. The interview questions have somewhat changed during the course of the research after I realitzed that I was not getting the answers I had originally wanted. Furthermore, for the same reason, it can be seen in the transcripts that I have described the phenomena at length in order no to give hints for the answers while asking the questions. On the one hand, this is a characteristic of the iterative research processes, and on the other hand, it embodies what I wrote in the pragmatic chapter: reality can be known in its essence, but the details and their impact and perception are subjective. If other researchers, or even I, were to recode the texts years later, they would probably produce slightly different codes, but the findings on the underlying phenomena are valid and the literature confirms this. Given, that the gamification was exciting for the students, a good experience, a surprise, interesting, or maybe eveneffective: all this leads to the same conclusion: **it was worth it**!

The internal reliability is demonstrated by the fact that the results of the research are in line with the literature, i.e. that gamification has a positive motivational effect. The theoretical model on which the research is based is similar to other empirically tested models and therefore I believe that **the internal reliability of the model can be confirmed.**

A more serious challenge is the external validation of my model and the results of my research (external generalisability). The way in which I gamified a specific seminar course is not generalisable to other courses. The reason for this is simply that gamification is a personalisation of the seminar class: personalized, fine tuned especially for the specifics: subject structure, course of the class, content, points and grade structure, nature of the class work, etc. However, it should also be noted that if I do not consider the specific gamified architecture but the design method and the technical details of the implementation[119] as the object of study, the gamification of other seminar courses can be approached using similar planning process. Thus, from the point of view of external validation, I declare that the approach can be transferred to other seminar lessons that meet the criteria. Of course, the implementation **challenge factor** will be **different[120].** The Decision Making Skills and Business Economics courses offer a lot of teaching freedom, and the former is an explicitly reflexive subject to which a number of playful mechanics can be easily attached.

[119] 17. Figure, page 108.
[120] This is illustrated by the quotes on page 176. and the technical description of the implementation on page 129, illustrated by 22. Figure.

Construct validation testing asks the question, " *whether the theory supported by the findings provides the best available explanation of the results (...) in other words, is the reason for the relationship between the experimental intervention (...) and the observed phenomenon (..) due to the underlying construct or explanation offered by the researchers*?" (Marczyk et al., 2005, p.188) . The theoretical model used for the research is based on a validated construct, and in the previous paragraphs I have reassuringly formulated the internal validation of the research methodology.

In relation to the empirical part of my dissertation, due to the change in research context, I must mention additional factors that greatly influenced the gamification procedures, the way of teaching, thus the data collection and probably the results[121]. Both the changes in data recording, the shift from quantitative to qualitative research, the numerous versions and development iterations of the gamified mechanics were necessary because the experiment and the result obtained from it - were not yet sufficiently stable and valid.

The specificities of the courses taught in the four years since the beginning of my research made the experiment very difficult: multiple subjects, two languages, online, live and blended learning and different student personas[122]. The online mode of teaching has evolved as a result of the coronavirus. First online only, then half of the seminar group online, another half of the group in a live classroom, and finally back to live classroom seminars. This had a significant impact on the teaching techniques, the way the classes were managed, the motivation and activity of the students and the way the gamification elements were introduced and operated. The subject taught also had a significant impact, as the timetable, dynamics, quality of the lessons, frontal and interactive, the structure of the points and the assessment varied, i.e. the elements of gamification had to be designed and introduced in different ways for each subject, so that all other elements of the context (assessment, lesson flow) were as unchanged as possible. The other variables: age of the students, level of education, work experience of the students, and finally the normal full-time education or international education (also the elite CEMS or the normal Stipendium Hungaricum group) had an impact on the behaviour and perception of the students. There is a significant difference between the interest, perception, classroom behaviour and self-esteem of an 18-year-old "freshman" student and a 23-24-year-old young person on an advanced English-language CEMS course already working in an

[121] These are summarised in Annex 6.3 on page 204.
[122] For details, see the Annex 6.3 on page 204.

international company. They are motivated in quite different ways, the latter - due to their focused, pragmatic approach and busier schedules - being more typically hooked by the extrinsic motivation: if it's worth a point, they do it. These considerations have played a role in my gamification solutions and the way I measured the impact. That said, it is important for me to point out that in a line of educational domain where adaptation is precisely what is expected and taught to students, it would be unfair to expect that the instructor/researcher should not be adaptive.

To validate the research, measurement, as a researcher I have set up one more test. It can be seen that the answers I received during the interviews with the students were overwhelmingly in support of the thesis. The question arises, how credible are these positive answers? How honest are the responses I have recorded? I originally recorded the interviews on MS Teams interface, I could clearly see the students' reactions and reflected on this during the interviews ("you thought long and hard about the answer..."), and I also captured in the transcripts the inaudible but visually defining reactions ("oh yeah*, it looks like an app< she laughs >*[123] "). From what I have seen, based on my own experience as a teacher, parent and leader, I judge that the students responded honestly. This perception is supported by the shared psychological contract highlighted by the students, in the teacher agreed with the students about the importance of honesty, mutual respect and feedback. Whedn asked about the interviews being voluntary (1st version of interviews) and about the "survey" method, 13 students unanimously stated that they were not afraid of being disadvantaged if they did not participate.

> (Interview: 21_VG_G11): "I think it was completely plausible. I didn't doubt it."
>
> (Interview: 21_VG_G22): "I wouldn't think so, because it was agreed that it was a voluntary thing, so you can't come out of it in a negative way. So there was no such pressure that this would now hinder my seminar activity or my seminar results (...) I should add that this can happen because the lecturers are quite exposed to student feedback. Students are confident that if they are disadvantaged, they have someone to turn to. So I wouldn't think that they would do this out of compulsion or genuine fear. I think students are already aware of what their rights are and that this would have been over the line."
>
> (Interview: 23_I_DMS_11): "Yes, yes, because you also explained at the beginning that it was different from the actual evaluation system and the questions were not specifically related to that particular weekly topic."

[123] (23_I_DMS_5) interviewee, chapter 4.9, page 156.

This is also evidence of honest communication between the students and the teacher

My researcher self-reflection contains uncertainty. I have investigated very complex phenomena and had to understand and articulate complex logical models, e.g. the Mind Map[124]. These naturally left me feeling uncertain. Furthermore, the potential impact of researcher bias has to be taken into account. In spite of the countless articles and nearly 50 years of gaming, I have designed and implemented the gamified agenda in one person. Similarly, I recorded and analysed the interviews in one person. All this has many distorting factors, and the subjective nature of the evaluation should not be forgotten. Nonetheless, by documenting the design and implementation, continuous reflections and accurate reporting of the results, I have tried to give a clear picture of a gamified educational experiment and its outcome.

At the end of this chapter, I think it is important to say a few words about the ethical implications of research. I have informed the students that I am collecting data for my own research and asked for their consent to participate in the research. I did not make participation compulsory in the first phase of the research. I assured the students that there would be no discrimination or adverse consequences for refusing to participate, and I have subsequently made this clear in several interviews and the students reassuringly confirmed this. Otherwise, teacher supervision or sharing and exchanging grading between teaching colleagues may be used, so that in fact the student's assessment is independent of the fact of participation in the experiment. Interviews were compulsory in the second part of the research. I processed the data in accordance with GDPR rules, and after the measurement was completed, I deleted the data that were not necessary and could be used for personal identification.

## 4.17. Critical views relating to gamification

In addition to discussing the limitations of the research, it is recommended to examine the criticisms of the phenomenon analysed by the researchers. The most obvious criticism of gamification is that it is difficult to see the return on investment, although the literature clearly supports its positive motivational effects. At the same time, it is very difficult to quantify the amount of time and energy invested by the teacher or the institution in gamification of education, so it is difficult to compare the benefits with the costs.

[124] 24. Figure, on page 144.

Relating to working enviroment  Deterding (2019) draws attention to the fact that gamification blurs the boundary between work and play, as playful (or gamified) processes seek to extract (Deterding used the word extract, with all its depth) constant motivation from the user. The danger of this is that without realising this, workers will put more energy into work than the 8 hours a day. In reference to this, the author coined the term "playbor", combining the words play and labor to refer to the playfulness of work. A more serious term is cited by Landers et al. (2018), who, citing other authors, call gamification "exploitationware".

Gamified education is highlighted as a potentially harmful effect (Rab, 2016) in the analysis of the effects of digital culture. He argues that educational institutions make a mistake when they replace the desire to learn for its own sake with a desire to be gameful. Furthermore, he points out that badges, point systems and levels of experience are in practice nothing more than an over-complicated grading system. Finally, he assumes that a student leaving a gamified (educational) bubble may find it difficult both to move to another, non-gamified educational institution and to cope in a non-gamified environment.

The motivational effect of gamification in education has been demonstrated by several empirical studies, but other authors argue that the motivational effect is not clear. Sailer and Homner’s (2020) meta- analysis of the motivational effect of some elements of gamification does not provide a stable measure of the motivational effect, but concludes that the use of different elements (also) influences the outcome of the measurement as a moderator variable. In my experience, the motivation of students is influenced by an infinite number of factors in the environment, just as no two instructors are the same, no two groups are the same, or no two seminar classes are the same. This is why the experience and adaptability of the instructor is important in order to choose the best possible method in difficult teaching situations.

An explicitly strong critique of gamification is made by Bomba et al. (2015). They argue that gamification is an ideology that infiltrates society through its technological platforms to capitalise on our personal data through algorithmicisation. They severely criticise this "anthropology of gamification" as an "unscientific variant of behavioural science" that simplifies processes to the extreme to ensure that participants only "play by the rules" and, if widely applied, can have a significant impact on social behaviour patterns ( Bomba et al., 2015, p.27.). By using playful elements, they can build persuasive and influencing processes on neurochemical influences, which can be further reinforced by using participant data and targeted motivation. Overall, the authors argue that gamification clearly promotes the interests

of the designer/operator, helps to maintain control over rules, systems and institutions and perpetuates existing inequalities (p.56)

In addition to the benefits of gamification of education, it is important to also mention the risks. Improperly applied gamification can make the learning process a failure (Szirtes, 2022). Such failures can include inadequate clarification of rules, overly complex mechanics, or if students perceive that the lesson has been turned into a game and abandon the learning.

These critiques range widely in thoughtfulness and emotion. Obviously, every researcher has his or her own agenda about what he or she publishes and what he or she **does not** publish. I believe that as responsible researchers and educators, we should always look at both sides of the coin and communicate the results in a transparent manner to the best of our ability. The 30 yeard old words of my teacher Dr Miklós Dobák ring in my ears: no one method is always right for every case, for every problem, there is no universally best solution. So we must not believe that only our chosen path, our method, our application, is always justified. This underlines the importance of an open discussion between parties who may have opposing views. In my dissertation analysing gamification, I specifically highlight the criticisms of it to see the other side of the coin. However, with regard to the criticisms that may be 'stirred up', I should add that they too have two sides. The other side is the so-called dual-use dilemma (Miller & Selgelid, 2007). Human inventions are always as 'good' as the people who use them. Scientific inventions are intrinsically neutral. The many ways in which they are used are limited only by human creativity, which may or may not be influenced by moral and ethical values. Laws, governance, market competition, human responsibility (or lack of it) can all set new and new directions for the use of the innovation. Thus, the use of new methods must be judged from two perspectives (Pustovit & Williams, 2010). On the one hand, pragmatically: within the framework and rules set by ethical principles and norms. On the other hand, from a so-called 'metaphysical' point of view: it is necessary to understand the nature of people, their goals, values and social relations in relation to the use of new inventions. The authors argue that both rule-making and metaphysical understanding should precede the use of new inventions in order to anticipate any possible harmful effects on nature or society. In my opinion, this is only the ideal, hypothetical case, because neither regulators nor researchers are able to keep pace with technological progress and the activities of the companies that exploit it. At the same time, I am sure about the potential of gamification: those who use it know what it is used for and why. Just as with inventions. Therefore, in relation to the above criticisms, I think that the discourse should now move into the moral and ethical space.

**I believe that one of our most important tasks as educators, researchers, parents, adults, leaders, is to raise awareness of all this for those who come after us.**

# 5. Concluding thoughts

What are games? Why do we play?

Play can be seen as a fundamental part of human life, an opportunity for self-expression, freedom and deepening human relationships. Play is voluntary, enjoyable and usually without explicit goals. What is not play is often compulsory, goal-oriented and devoid of pleasure. Play is therefore a free, creative expression of human existence. In my research, I have borrowed some building blocks from this liberated, self-indulgent activity for education and examined its impact.

Gamification is using game elements in non-game processes. In the teaching-learning arena, gamification is a so-called control-theoretical educational strategy that focuses on the active participation, motivation and management of the learning process by learners. The need for freedom and deepening of human relationships experienced through games, as well as the need for competence and development, both in games and in learning, are basic psychological needs in the self-determination motivational theory most often associated with the phenomenon of gamification.

In my dissertation examining the gamification of business higher education, I set the following objectives. My first objective was to build a bridge between the relevant theories related to gamification education. On this basis, **I was able to pair** the selected **game elements and frameworks related to** gamification **with the motivational theories discussed in the literature. Similarly, I found a relation with the educational interventions described in the pedagogical aspect chapters.** The result of all this is a unified table of gamification, motivation and pedagogical aspects in a coherent logical structure[125]. It can be compared to a board game, with a path from any starting point to any end point. In the dissertation I have only formulated the connections for the selected game elements, but with the knowledge of the theoretical background, any game element can easily be placed into this system, and this gives the meaning to the logic formulated in my dissertation.

[125] 6. Table, page 89.

My second objective was to develop a design procedure for the gamification of education in a way that meets didactic requirements and takes full account of the requirements of gamification planning as well. In my dissertation**, I have detailed the design and implementation steps for the** courses **I have gamified along the design process I have put together.** In my work I have repeatedly emphasised that interventions to support such gamified education are highly context-dependent. At the same time, the detailed description of the process and the formulation of the mistakes and dead-ends also provide an opportunity to use the above as a basis for gamification of other courses with different designs. My research can thus simplify the challenges for colleagues in education and research studying this topic.

In order to investigate the impact of gamified teaching, it was necessary to assess what students believe contributes to their good learning experience. Exploring these was the third aim of my dissertation. In my research, I was able to match the gamified elements to the prerequisites expressed by the students. In doing so, I captured the education-student-gamification force field in considerably more detail than articles in the literature[126].

The first research question of the dissertation was to investigate the motivational impact of gamification. **In my research, I showed that gamification developed for live seminar setting can increase students' learning experience and motivation**. The effect is consistent with the results reported in the literature. However, the majority of the literature is related to online education or gamification  live instruction but using an online platform. **The relevance of my research is due to the gamification implemented in conjunction with live seminars** on **the one hand, and the wide variety of gamification elements used** in my experiment on the **other.** Empirical research in the literature rarely goes beyond the use of badge/ranking/level game elements in live classroom teaching contexts, whereas in my research I tested a much wider range of game elements (onboarding, randomness/suprise, badges, rank/level, leaderboards, voting, autonomy, virtual marketplace, personalization, feedback, narrative).

The second research question places the thesis in the context of higher education in business. The university prepares students for the challenges and phenomena of business. One of the important tools of the twenty-first century that can influence the behaviour of consumers and users is gamification. My research question was whether, based on their experience of gamification in the course, students would recognise the elements of gamification. Whether

[126] All these are illustrated by 24. Figure, no page 144.

they would realise that they had encountered the same influencing mechanics as they had when using their mobile phone apps, for example. My answer to this question was in the negative, as **in this experiment only a fraction of my students noticed and indicated that they had encountered such game elements elsewhere.** The underlying reason can be that business influencing methods work well as long as they are not consciously recognised by consumers, in this case students. I emphasise that this result relates specifically to this experiment, but it is worth reflecting on whether there is a need to prepare students more consciously in this direction.

In my dissertation I explored in detail the interrelationships and connections between three areas: gamification, motivational theories and pedagogy. Building on this, I have documented in meticulous detail the design and implementation of gamification in my courses, pointing the way forward for educators wishing to incorporate gamification into their classes and for researchers wishing to investigate it. Finally, I have shown that gamification of a live classroom course "offline" can enhance the learning experience and motivation. The empirical part of the research involved 165 students from 3 courses over 8 semesters. The empirical analysis of the experience was carried out through a thematic analysis of the responses recorded during semi-structured interviews. In total, I identified three themes and 120 codes in the approximately 200 pages of interview transcripts to answer the research questions.

The main aim of writing my dissertation was to contribute to science by investigating an area - the use of gamification in business higher education - with its exclusively live teaching and offline gamification method, which is relatively under-researched, but also an important area of research due to the number of students involved in live classroom training and their generational characteristics. In addition to this, I have also formulated several personal motivations for myself: pathfinding, self-fulfillent, proof, innovation, learning to teach,  and teaching. Active learning and innovation are important 21st century skills, and accordingly, as a researcher and educator, I cannot stop after writing this dissertation. While writing this dissertation, I have formulated several further research directions.

Qualitative methods are well suited to investigate perceptions and analyse factors that influence motivation. However, conducting and analysing interviews is a particularly time-consuming task. I have also demonstrated the importance of rapid feedback in relation to gamification and motivational theories. Interviews and their analysis typically fail to provide this quick feedback to the teacher-researcher. Therefore, a suggested research direction is to explore and develop a

measurement tool ("thermometer") that allows for feedback and immediate evaluation and student feedback linked to a specific game element. The difficulty in doing so is the difficulty in separating perception of the game element from the rest of the context. This seems to be feasible in practice, for example by providing a 'tick box' for certain game elements of the feedback, whereby the listener can indicate that they wish to see this type of feedback in the future. An alternative is the pre-voting, game-item enabling, presented in my experiment.

Such a quick-response feedback tool can allow you to evaluate the game elements one by one. It can also allow a deeper examination of individual player mechanics. Thus, a further possible research direction is the application of player elements one by one and a deeper investigation of their effects. This could also be complemented by a more detailed formulation of the game elements that were not in focus when writing this thesis.

The qualitative research methodology used in my dissertation also offers a number of additional possibilities. Thematic analysis gives a great deal of research freedom, as the coding can be significantly influenced by the researcher's person and subject. Therefore, in order to improve consistency between interview analyses and to strengthen the generalizability of the analysis, **sentiment analysis (emotion analysis**) can be conducted on the interview transcripts. This methodology can group the words spoken by the interviewees into emotive categories, thus making it possible to quantify opinions in favour and against. A summary table of the codes recorded during the interviews and thematic analysis can also be used **for cluster analysis.** In this way, for example, by clustering interviews and feature codes, perspectives zones can be formed, which can be an additional input for gamification of a subsequent course.

Important mechanics of gamification are feedback, and its pleasing visual representation. Feedback is also important for the tutor-researcher. In my dissertation, one visual representation of the results was the heat map shown on page 136. Either a more detailed analysis of the heat map, or the literature exploration or development of a visual visual illustration tool based on the sentiment analysis or cluster analysis mentioned in this chapter, could be useful for the researcher. Indeed, the articles I have processed have typically only included graphs, flow charts, diagrams of the platform and badges.

A very important additional aspect should be the measurement of the impact of gamification on learning outcomes. This is the direction that the application and measurement of game elements one by one - let's call it micro-gamification of micro-learning - can lead to. This will require greater didactic freedom and very detailed design.

To achieve all this, the experience of many more gamified courses are needed. However, in addition to the gamified courses, the development of a gamification course could be a valuable research and teaching direction. In my research, the vast majority of students did not consciously realize the relationship between the game elements and similar elements in the online and offline world around them. In my opinion, there is a need to increase "consumer" awareness, I believe that a participant in a process will benefit from understanding the ways in which influence is exercised over him, or her. Or, conversely, if later on the former student has to develop processes that easily carry the user through without attrition and friction. I would add that many business schools abroad have been offering gamification courses for years[127].

Overall, my thesis explored the theoretical link between gamification, motivational theories and pedagogical interventions, and based on empirical research, I showed how learning experiences in the classroom can be intensified through gamification, thus enhancing motivation. It is my hope that these findings can help to make the use of gamification in business higher education more conscious and effective, and provide a basis for further research.

I still have many methodological and practical questions to answer, but in the meantime, I go to every class with a big smile and bright eyes: to teach, to learn and to play. Because play is always part of my story. Ludus in fabula.

[127] Details are available on page 27.

# 6. Annexes

## 6.1. Annex: comprehensive list of game elements collected during the literature review

I have categorised the game elements found in the literature based on my own experience of gamification. For this, I drew inspiration from the Octalysis (Yu-Kai, 2017) and the UK Gamified website (Marczewski, 2017)I have added explanations for the more abstract elements, the other mechanics are easy to understand or not the focus of my dissertation.

**Game elements for personalisation and identity**

1. Avatar
2. Customization

**Rewards and motivational game elements**

3. Badge/achievement/trophy
4. Points (exchangeable)
5. Points (xp= experience points)
6. Rewards
7. Bonuses for special tasks
8. Free lunch (get resource for free)
9. Milestone unlock (special event needed to access new information)
10. Unlock rare content (based on activity, or trading in points)
11. Mystery Box, random reward
12. Certificates
13. Gifts
14. Recognition
15. Reputation
16. Rockstar effect (a comprehensive game elements that ais to make the user the star of the game)

**Challenges and competition**

17. Anchored juxtaposition: anchored or guaranteed opposition (conflict)
18. Challenge
19. Competition (enforced explicit rules)
20. Leaderboards, Ladders
21. Boss Battles (a more serious challenge at the end of an activity round, such as a final exam)
22. Conflicting goals

**Game mechanics associated with progress**

23. Access (to some important resource)
24. Levels
25. Progress (progress bar, or porgress %, etc).
26. Progress loss (e.g. negative points)
27. Performance graph
28. Next step, anticipation
29. Booster (condition-dependent scoring-multiplying mechanics)

**Elements related to exploration**

30. 3d environment
31. Evolved UI (advanced /visually lucrative user interface)
32. Exploration
33. Curiosity
34. Easter eggs (funny details or content hidden in the process, hard to discover, which refer to another part of the narrative/process)
35. Dangling ("carrot dangling", the act of revealing a reward in order to move the participant on in the process)
36. Event (not foreseen events with some impact)
37. Quest
38. Signposting (to make it clear to the participant where to go next)
39. Status quo sloth (the game element exploits the fact that people generally don't like change, they stick to the familiar)

**Game elements that support social interaction**

40. Social engagement
41. Cooperation
42. Teams, guilds
43. Social treasure
44. Bragging button
45. Humanity hero (a game element encouraging community welfare activities)
46. Care taking
47. Resource Sharing
48. Sharing knowledge
49. Competition (less formal, than #19.)
50. Social pressure
51. Conformity anchor (impact of group norms, similar to social norms)
52. Elitism
53. Group Quest
54. Paralel communication platform (for separate teams, stakeholders)
55. Rightful heritage (similar to elitism; these are privileges because of group membership)
56. Social status

**Elements of decision making**

57. Branching choices (decision making alternatives, paralel operation routes)
58. Decision freedom, authority
59. Strategy
60. Choice (meaningful)
61. Choice perception (illusion of making a real choice)
62. Clear goals (goals being transparent)
63. Complex task breakdown to subtasks, or chapters
64. Consequences
65. Purpose, goal
66. Voice
67. Voting

**Economy and resources in games**

68. Virtual goods

69. Virtual currency
70. Marketplace, economy, trade
71. Limited resources

**Learning and development related game elements**

72. Learning, new skills
73. Creativity tools (opportunity to be creative)
74. Development platform, in some cases known as light touch innovation, or anarchy (a platform to debate and test/pilot new ideas without real consequences)
75. Freedom to fail

**Time related game elements**

76. Appointment dynamics (time window, or time scheduling)
77. Deadlines, scheduling
78. Time pressure
79. Countdown timer
80. Evanescent opportunity (practically a countdown timer, only instead of counting down, the good in question fades away)
81. Torture break, forced break (a game element is a deliberate difficulty or waste of time due to activities that do not directly contribute to the participant's goals, such as long waiting times or unnecessary obstacles)

**Narrative and stroytelling game elements**

82. Narrative, meaningful stories
83. Story/theme
84. Onboarding/tutorial
85. Context (part of the narrative os story)

**Feedback and reflection related game elements**

86. Feedback

**Other**

87. Anonymity
88. Water cooler (safe place for ventillation)
89. FOMO (fear of missing out)
90. Beginners' luck (new entrants to the process are given better or better luck than usual, so as not to discourage new participants)
91. Chance, random lottery
92. Flow (balance of challenges and skills + feedback)
93. Investment, Ikea effect (the game element takes advantage of the fact that the participant values his/her own created product higher than other products, due to own invested energy)
94. Sunk cost (the game element exploits the participant's tendency to stick to an activity that is no longer worthwhile simply because he has already invested a lot of energy in it)

95. Loss aversion (the absolute utility (negative side) of a given absolute value of loss is higher than the utility of the same absolute value of gain, i.e. preferences for losses are steeper[128])
96. Different game styles (the participant can choose between different modes of operation, e.g. difficulty levels)

[128] For more details Tversky & Kahneman (1992) describe this effect.

## 6.2. Annex: illustration of how gamification framweorks can be used

*Example of how to use MDA*

One possible way of applying the MDA conceptual model could be the following. as an example, a teacher in a business economics seminar would like to track student progress in a playful, visual way and provide personalised feedback to the student. The instructor registers points for some activity of the students (class work, activity, questions, extra submissions, knowledge assessment results, etc.), which can be understood within the framework of the subject. In the case of business economics, these could be, for example, student→ trainee→ specialist→ team leader→ manager→ CEO. The levels achieved can either be communicated directly to the student or (subject to ethical rules) presented to the seminar group as a group ranking. In terms of the model, this means the following:

- Experiential levels (game element, and through storytelling, narrative, the game dynamic effect can be interpreted)
- Competition (game mechanics)
- Feedback and representation of development (game dynamics)

A non-gamified alternative to this exercise is the student IDs and scores in Moodle.

*Example of using RAMP / HEXAD*

Based on Marczewski's RAMP model and HEXAD's player types, the following gamification can be implemented. As an example, an teacher of a seminar on business economics wants to enrich the learning experience with gamification. As a prerequisite, the teacher will have the students take the HEXAD test (taking into account ethics and GDPR rules). The test will give the teacher an idea of the potential attitudes of students in group work. With this in mind, the teacher can increase student motivation either by dividing students into groups and tailoring the game to the group, or by using a variety of game elements for the whole group. Optional or completely optional topics to be submitted for **free choice.** The teachercan encourage **achievers** with small challenges (extra submissions or extra classwork) or by presenting leaderboards with immediate feedback (with ethical considerations in mind). The teacher can make **community** players more interested by teamwork or group competition. The teacher can make **philanthropic** students more engaged by analysing group work, giving them the opportunity to praise others, or by giving them "advisory" status in group work. The teacher can better engage the "**player**" types with the experience levels discussed in the MDA model, or for example with the possibility of buying off the points received (for example, a certain amount of class activity can buy +1 day time limit to hand in).

*Example of how to use Octalysis*

Based on the Octalysis model, the previously imagined seminar in business economics can be boosted with different game elements according to the motivational drivers.

**Epic meaning**: from the Human Resource Management seminar topic, homework is to create a student's LinkedIn profile and tag each other. The longer-term goal of this is important for the student's career, since - if he/she has not had a profile so far - he/she will have a completed profile with many connections and possibly uploaded content for the job market competition.

**Accomplishment**: visual demonstration of progress in the curriculum, testing their accumulated knowledge and the associated feedback can be a game element to reinforce this drive (this is also prominent in the other two models).

**Empowerment (creaticity+feedback)**: a lesson or assignment in which they can express and present their own opinions and ideas. Typically open tasks. For example, a comparison of classic and modern marketing tools for an industry, company or product of their choice.

**Ownership/responsibility**: this is the driving force that motivates the student if he/she can control, or own something. Therefore, it may be appropriate to choose a task from a predefined long list, or to give the student the freedom to choose how to solve the task (this seems to overlap with the power of creation and feedback). Another type of motivation for ownership may be some kind of prize, rank, badge, or other small (virtual or real) bonus.

**Social influence**: community interactions, group formation (e.g. based on the HEXAD player types mentioned earlier), group competition. Such a motivating force could also be to increase interactivity in the classroom through MS Teams, conducting polls.

**Scarcity**: this is one of the black hat (not particularly ethical) motivations, because it tries to motivate the individual by offering the possibility of avoiding some negative experience. Typically, it may be caused by the lack of some information, asset, value, complement, or the delayed transfer of some information, asset, value, complement, or the expiry of a time frame. Therefore, I have not used it in education.

**Unpredictability/surprise**: although this is also a black hat motivation, it can create curiosity and anticipation when used appropriately. In a business economics seminar, for example, it can be triggered by the appearance of an "external" obstacle (changed goal or circumstances, fewer resources) controlled by the instructor during group work. Just like at work in the real world.

**Avoidance**: also a black hat motivation, because it is something to avoid, not to achieve. This could be a strict deadline for submission, or a deadline for redeeming points, or other disqualification mechanics.

## 6.3. Annex: changes in the educational-research context: course and student diversity

| Course | Seminar on Business Economics 2019-2021 | | | Decision theory seminar 2021-23 | | Decision making skills seminar + lecture 2022-2024 |
|---|---|---|---|---|---|---|
| **Teaching method** | Live | Online | Live + online | Live | Live + online | Live |
| **Quantitative measurement logic** | 2 parallel groups, test A-B, not used in dissertation | 2 parallel groups, test A-B, not used in dissertation | 2 parallel "half" groups, test A-B, not used in dissertation | 2 parallel groups, test A-B, not used in dissertation | 2 parallel groups, test A-B, not used in dissertation | was not. |
| **Qualitative measurement logic** | | semi-structured interviews | | learning diaries (not used) | | semi-structured interviews |
| **Class observations** | no | MS Teams "analytics" automatic report (not used in dissertation) | classroom observations with the help of demonstrators (not used in dissertation) | | no | no |
| **Bsc/Msc** | Bsc. | Bsc. | Bsc, | Msc. | Msc. | Msc. |
| **Comment** | | | international (Scholarship H.) | | | CEMS |
| **Language** | Hungarian | Hungarian | English | Hungarian | Hungarian | English |
| **Univ. year** | 1 | 1 | 2 | 3-5 | 3-5 | 3-5 |
| **Age of students** | 18-19 year old | | 19-20 years old | 22+ years old often already working | | |

Source: own work

## 6.4. Annex: the place of gamification within economic disciplines

Gamification can be found in many professional fields: education, health, tourism, etc. It aims to maintain the attention of the individual involved in the process through game mechanics. Thus, on the one hand, it relates to phenomena known from psychology (attention, motivation), while higher motivation and thus more effective activity is already the domain of business and economics. The chapter defines a more precise place for gamification within economics.

Neoclassical economics assumes fully rational and utility-maximising decision-makers, using mathematical modelling tools to search for economic equilibrium on aggregate data sets. Behavioural economics analyses patterns of individual behaviour through a filter of cognitive processes, community interactions, personal characteristics and emotions. Behavioural economics examines questions similar to economics: why people buy, how they make business decisions, but assuming irrational behaviour of the individual: individuals exhibit non-rational behaviour under the influence of cognitive biases, social stimuli, and accordingly the influence of different contextual elements is recognised and taken into account. "*Behavioural economics (...) does not regard man as a perfectly rational, calculating machine. It studies actual behaviour, and the observations made in this way lead to the conclusion that human beings are irrational*" (Ariely, 2014, p.16). The results of analyses in behavioural science and behavioural economics can even be translated into regulatory guidelines and have an influential impact in the form of behavioural interventions. In this context, behavioural approaches can be thought of as complementary to classical economics in their ability to better understand and describe human behaviour. By combining economics and behavioural science, it is possible to describe economic phenomena more effectively and thus formulate more effective regulatory policies (Amir et al., 2005; Ariely, 2009).

Behavioural science studies the patterns of human behaviour and the environmental influences that affect it, with scientific foundations in economics, biology, anthropology, sociology and psychology. These disciplines cover aspects of human behaviour. In sociology, culture refers to the general values generally accepted by the community, which imposes roles, goals and tasks on the individual; the individual's preferences are practically programmable. One of the secrets of the success of the *homo sapiens* species is this reprogrammability, this flexibility: the frequency of activity internalised by the individual, reinforced by self-motivation, increases, the individual carries out the activity out of self-interest (Gintis, 2007).

Human decisions are often sub-optimal, even when the information needed to make an optimal decision is otherwise available and can be processed by human standards. On the one hand, it uses simplifying rules of thumb (heuristics) to make decisions more accurate, and on the other hand, it also makes assumptions and beliefs (biases) that can lead to poor quality decisions. The 'irrational' patterns of behaviour followed by individuals can be observed at the societal level and analysed as systematic phenomena. Both by identifying individual erroneous decision patterns and by better understanding perception and related decisions, better, more efficient decisions and functioning at the societal level can be achieved by introducing regulatory or market mechanisms (Amir et al., 2005; Ariely, 2009, 2014, 2015) .

The clear aim of gamification is to maintain and strengthen individual **motivation**. From a behavioural science perspective, both intrinsic motivation (in the case of activities performed for one's own pleasure) and extrinsic motivation (in the case of activities driven by external stimuli) can play a role. In the first case, it influences individual behaviour by designing processes and tasks that exploit individuals' natural desire for autonomy, development or

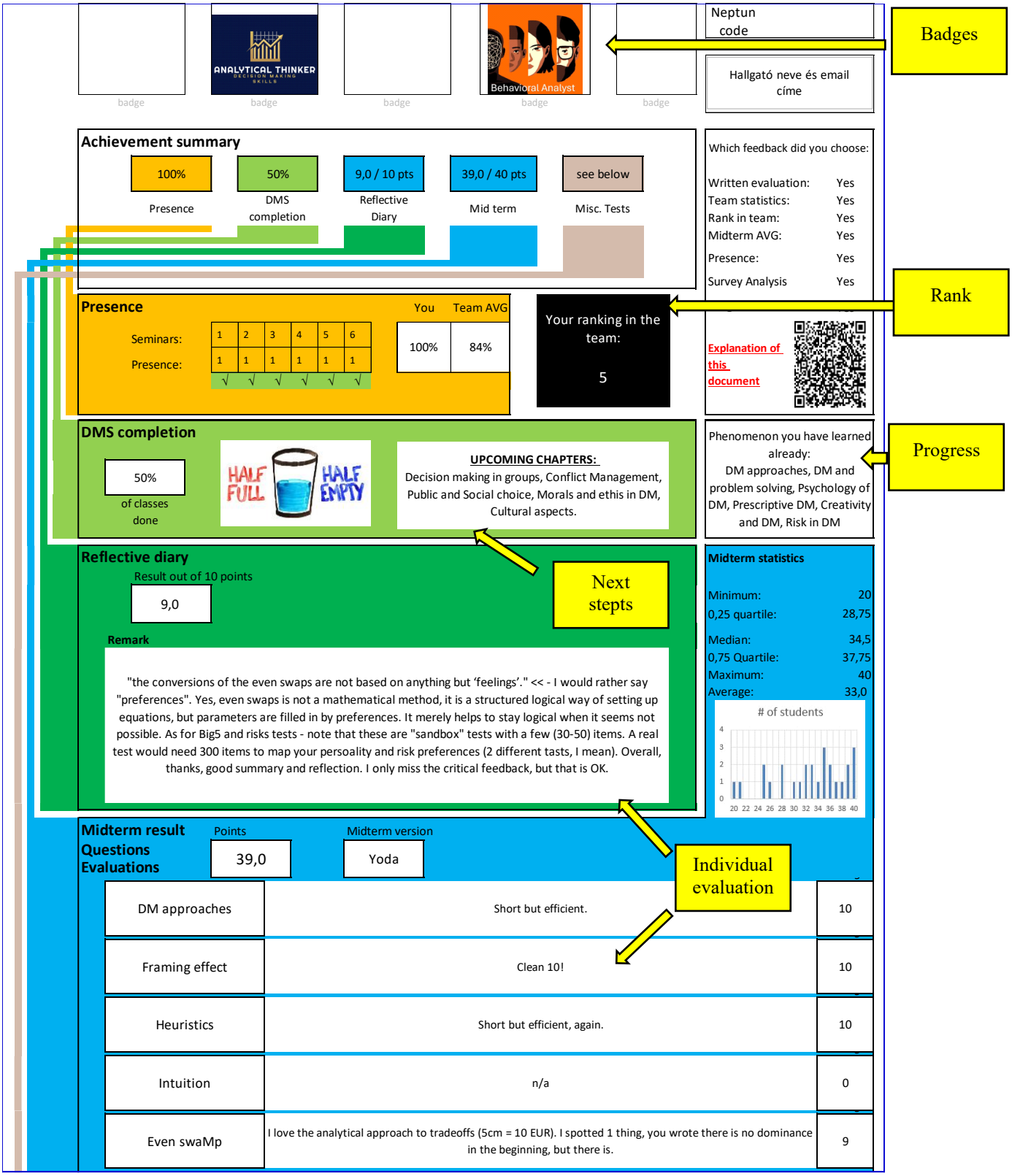
community bonding, and in the second case, it influences individual behaviour by providing badges, virtual (or real) gifts.

Researchers and practitioners using the tools of behavioural science **aim to change** an individual's **behaviour, or to maintain** and reinforce **a pattern of behaviour** (Samson, 2020b, 2020a). Gamification contributes to this by increasing the likelihood that the targeted behaviour will occur (Deterding, 2019). In this context, a number of playful mechanics such as leaderboards, benchmarks, challenges/mission sets all allow individuals to compare themselves with other members of the community, to cooperate or compete, and consequently to gain recognition (Marczewski, 2015; Salamone & Correa, 2012). Successfully influencing behaviour requires the setting of clear goals, as well as monitoring and immediate feedback. This is what gamification methodology addresses by breaking tasks into subtasks and more easily achievable goals (Mora et al., 2018).The related literature can be found, among others, in the context of Csikszentmihályi's Flow Theory (Buzady & Almeida, 2019).

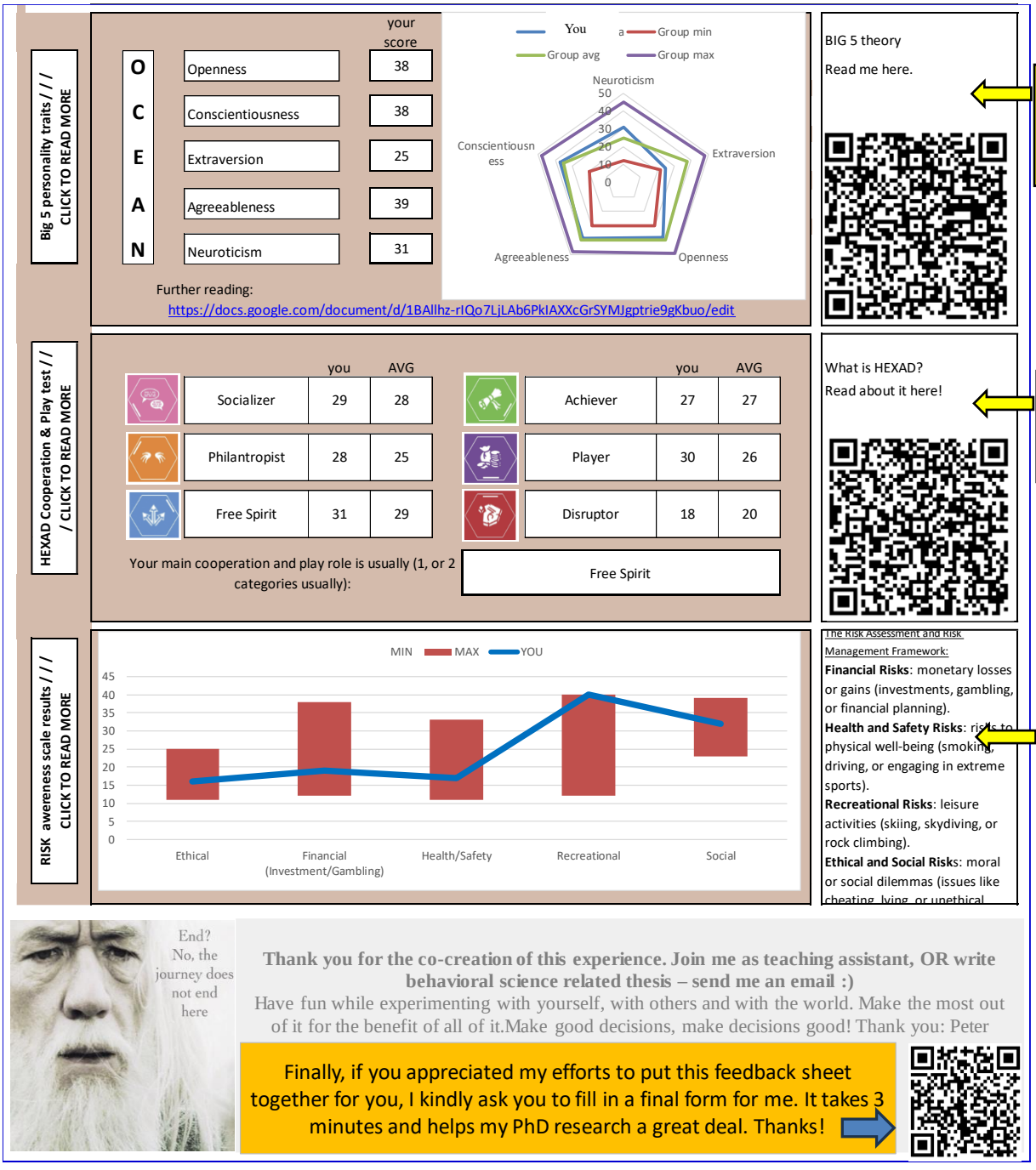
To summarise: gamification aims at influencing, motivating or sustaining the participant in the target process with its own game elements, while behavioural science aims at mapping and influencing individual and social behaviour. **From this perspective, the theoretical and practical field of gamification overlaps with the field of behavioural science. In my opinion, gamification is a special case of influcencing behavior.**

## 6.5. Annex: developmental versions of the gamified feedback sheet

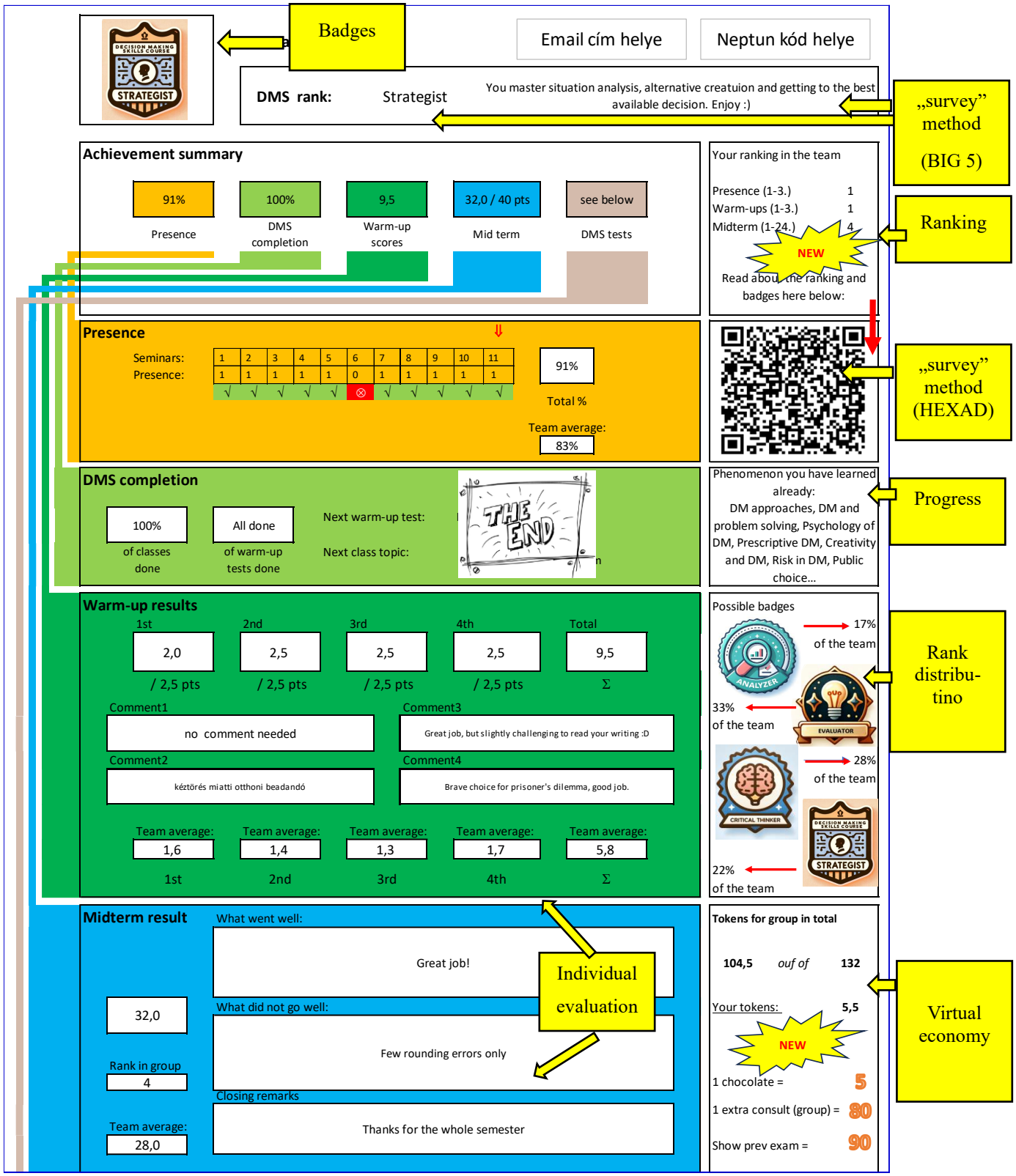
**Version 5:** 2023-24 Semester I Decision Making Skills course. First page. Short explanations are in the yellow text boxes.



**Version 5:** 2023-24 Semester I Decision Making Skills course. Second page. Short explanations are in the yellow text boxes.



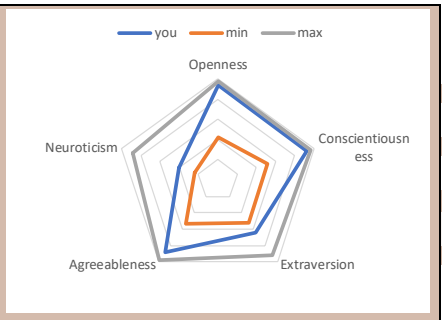
**Version 4:** a 2023-24 I Semester DMS class gamified feedback sheet. Page 1.



**Version 4:** a 2023-24 I Semester DMS class gamified feedback sheet. Page 2.

Big 5 personality traits / / / CLICK TO READ MORE

| | | your score |
|---|---|---|
| O | Openness | 47 |
| C | Conscientiousness | 46 |
| E | Extraversion | 32 |
| A | Agreeableness | 44 |
| N | Neuroticism | 20 |




Further reading:
https://docs.google.com/document/d/1BAIlhz-rIQo7LjLAb6PkIAXXcGrSYMJgptrie9gKbuo/edit

*Your traits vs your group's traits*

BIG 5 theory
Read me here.

„survey" method (BIG 5)

HEXAD Cooperation & Play test / / / CLICK TO READ MORE

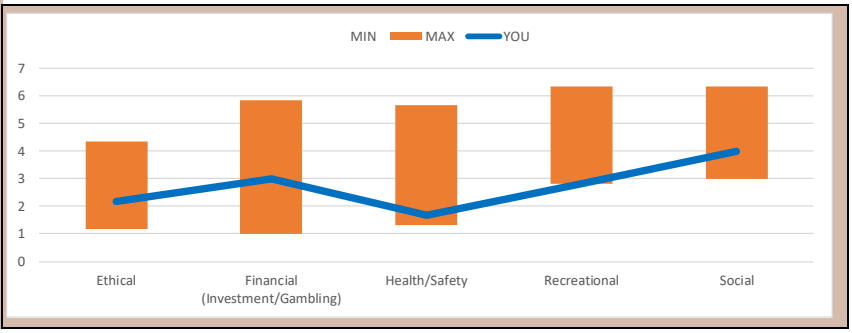
| | you | AVG | | you | AVG |
|---|---|---|---|---|---|
| Socializer | 18 | 25 | Achiever | 29 | 28 |
| Philantropist | 31 | 27 | Player | 21 | 27 |
| Free Spirit | 24 | 31 | Disruptor | 24 | 21 |

Your main cooperation and play role is usually: Philanthropist

What is HEXAD?
Read about it here!

„survey" method (HEXAD)

RISK awereness scale results / / / CLICK TO READ MORE




The Risk Assessment and Risk Management Framework:
**Financial Risks**: monetary losses or gains (investments, gambling, or financial planning).
**Health and Safety Risks**: risks to physical well-being (smoking, driving, or engaging in extreme sports).
**Recreational Risks**: leisure activities (skiing, skydiving, or rock climbing).
**Ethical and Social Risks**: moral or social dilemmas (issues like cheating, lying, or unethical

**PREP QUESTIONS FOR REFLECTIVE DISCUSSIONS**
Are there any elements of this coopeation (DMS class) that contributed to / changed on any aspect of how you see the world? What and how?
What was your perception about class: "AHA" experiences, things you loved. What was unique/special to this class worth keeping?
What must be changed/improved to help students better? And some more questions about our common human experiment in DMS class.

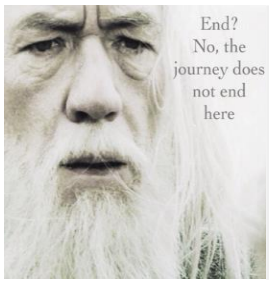
NEW

Your reflective survey results (pts and comments ---->)

| survey | 1 | 2 | 3 | 4 | 5 | AVG |
|---|---|---|---|---|---|---|
| You | | 4,5 | 4,7 | 5,2 | 5,2 | 4,9 |
| Class | 5,1 | 5 | 4,8 | 5 | 5,4 | 5 |

affable
nice
Relaxed

NE




Thank you for the co-creation of this experience. Now what?

Opportunity to join as teaching assistant, OR write behavioral science related thesis – send me an email :)

Have fun while experimenting with yourself, with others and with the world. Make the most out of it for the benefit of all of it.Make good decisions, make decisions good!
Thank you: Peter

**Version 3:** 2023-2024 II semeser Decison Making Skills class, feedback sheet. Page 1.

# Personal Feedback Sheet

Decision Making Skills Course

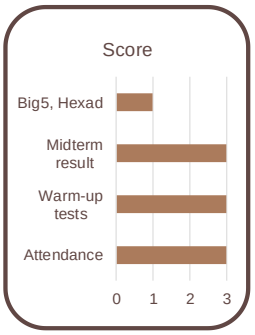
Name: ***student name*** Neptun ID:

Your rank: Skilled Strategist

Badge


**Skilled Strategist**

Learners at this level start focusing on strategic decision making.
They learn to consider long-term consequences and analyze complex situations.
They develop skills in forecasting, risk assessment, and considering multiple perspectives before making decisions

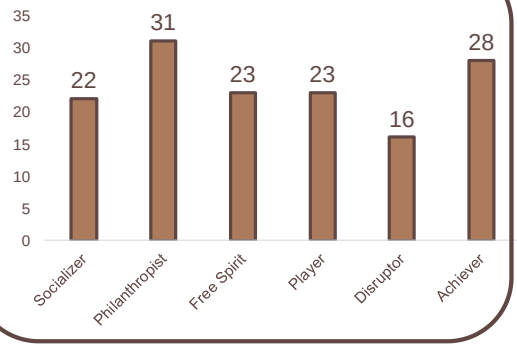



Attendance to DMS classes:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 0 | 1 | | | | | | | | 83% |

Your cooperation and mutual play persona (HEXAD):

„survey" method (HEXAD)

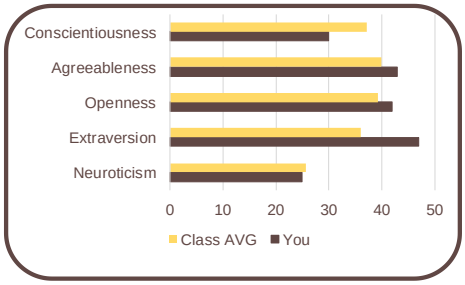



Your main HEXAD type
Philanthropist

Philanthropists are motivated by Purpose and Meaning. This group are altruistic, wanting to give to other people and enrich the lives of others in some way with no expectation of reward.

Your Big 5 results:

„survey" method (BIG 5)




| | YOU | CLASS AVG |
|---|---|---|
| Neuroticism | 25 | 25,6 |
| Extraversion | 47 | 36 |
| Openness | 42 | 39,3 |
| Agreeableness | 43 | 40 |
| Conscientiousness | 30 | 37,2 |

How to understand it?

**Version 3:** 2023-24 II semester Decison Making Skills class gamified feedback sheet. Page 2.

# Personal Feedback Sheet

## Decision Making Skills Course

Name: ***student name***

individual evaluation

**Warm-up test results:**

| W/U 1. | W/U 2. | W/U 3-4. |
|---|---|---|
| 1 | 1 | 1,7 |
| (1 pt) | (1 pt) | (2 pts) |

**Feedback:**

I am not sure you totally understand even swap based on this. Also, you miss the example for creativity.

**Mid term result:**

| M/T |
|---|
| 39 |
| (40 pts) |

**Feedback:**

In Q1 you missed a part of the question ("what about the AI part?"), but otherwise very good work, keep it up!

**Reflective diary result:**

| Diary |
|---|
| 5 |
| (5 pts) |

**Feedback:**

1 - "Therefore, when the different options are quite similar, and choosing one over another only will have a minimal effect on your net gain, I think a "good decision" all over could be to eliminate some of the time it takes reaching the decision" - Peter: I love this sentence! DO you want to join and teach DMS?
2 - " also wish that we had gone a bit deeper into the different approaches" - Peter: now it is your decision to dig deeperif you are interested...

**POINTS SUMMARY**

| W/U | | Mid term | | Diary | | Σ |
|---|---|---|---|---|---|---|
| 3,7 | + | 39 | + | 5 | = | 47,7 |

max: 49

**RANKING**

| 1st tier |
|---|

You rank as first tear within the DMS class. Congratulations!

Please fill in my research test.

**Version 2:** 2023-2024 II semeser Decison Making Skills class, feedback sheet. Page1.

# PERSONAL FEEDBACK SHEET

Student name
Student NEPTUN

Personal seminar summary

Ranking (several ranking options)

| Attendance | | Attendance% | | Rank among class |
|---|---|---|---|---|
| 7 | out of 9 | 78% | | 6 |

Based on your attendance you belong to the following "class":

**Progress Pioneer**

| Warm-up tests | Points | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | out of 1 | 100% | | You rank as | 2 | in the group |
| 2 | 1 | out of 1 | 100% | | | | |
| 3-4 | **1,7** | out of 2 | 85% | | Group minimum | | 2,4 |
| 5-6 | 2 | out of 2 | 100% | | Group Average | | 4,9 |
| 7 | 1 | 1 | 100% | | Group maximum | | 6,8 |
| **Total** | **6,7** | **Out of 7** | | | | | |

| **Other results** | |
|---|---|
| Mid term | 39 |

| | |
|---|---|
| Your rank is | 1 in the group |
| Group minimum | 25 |
| Group Average | 33,125 |
| Group maximum | 39 |

Overall DMS seminar ranking, as Peter sees it:

| | |
|---|---|
| **Proficient Critic** | Learners at this level become more critical thinkers.<br>They learn to identify biases, assumptions, and fallacies that can hinder effective decision making.<br>They develop skills to question and challenge their own thinking as well as the decision-making processes of others. |

**Version 1:** 2021-22 I semester Business Economics course, gamified feedback sheet.


## SZEMÉLYES HALLGATÓI VISSZAJELZÉS

Kedves **«Név»!**
**[ «Neptun_kód» ]**

Ebben az üzenetben kapod a vállalatgazdaságtan szemináriumi órára vonatkozó személyes visszajelzésedet, illetve ezúton tájékoztatlak a szemeszter hátralévő részére vonatkozó, újonnan meghirdetett pontgyűjtő és pontbeváltó folyamatról!

#személyesfeedback,
#hallgatóikarakterlap,#haeztolvasodkapszcsokita télapótól

**HEXAD jellemzésed**

A játékostípus (HEXAD) teszted alapján te ilyen csapatjátékos vagy: «HEXAD1»«HEXAD1»«HEXAD2». A rövid leírását itt találod.
«HEXAD1» - «HEXAD1_narrativ».
«HEXAD2» - «HEXAD2_narrativ».

„survey" method (HEXAD)

**Pontjaid**

| | |
|---|---|
| Órai aktivitásodért kapott | Pont |
| Órai csapatmunkáért kapott | «Ora_aktív_p»Pont |
| Negyedéves zh-n szerzett | Pont |
| Extra vállalásért kapott | Pont |
| Eddig összesen | Pontod van |
| Ez a max pontszám | %-a |
| Eddigi max pontszám: | **Σ Pont (100%)** |

Szeretnéd tudni, hogy ezzel hol jársz a többi hallgatóhoz képest? Ha igen, jelezd emailen kérlek.

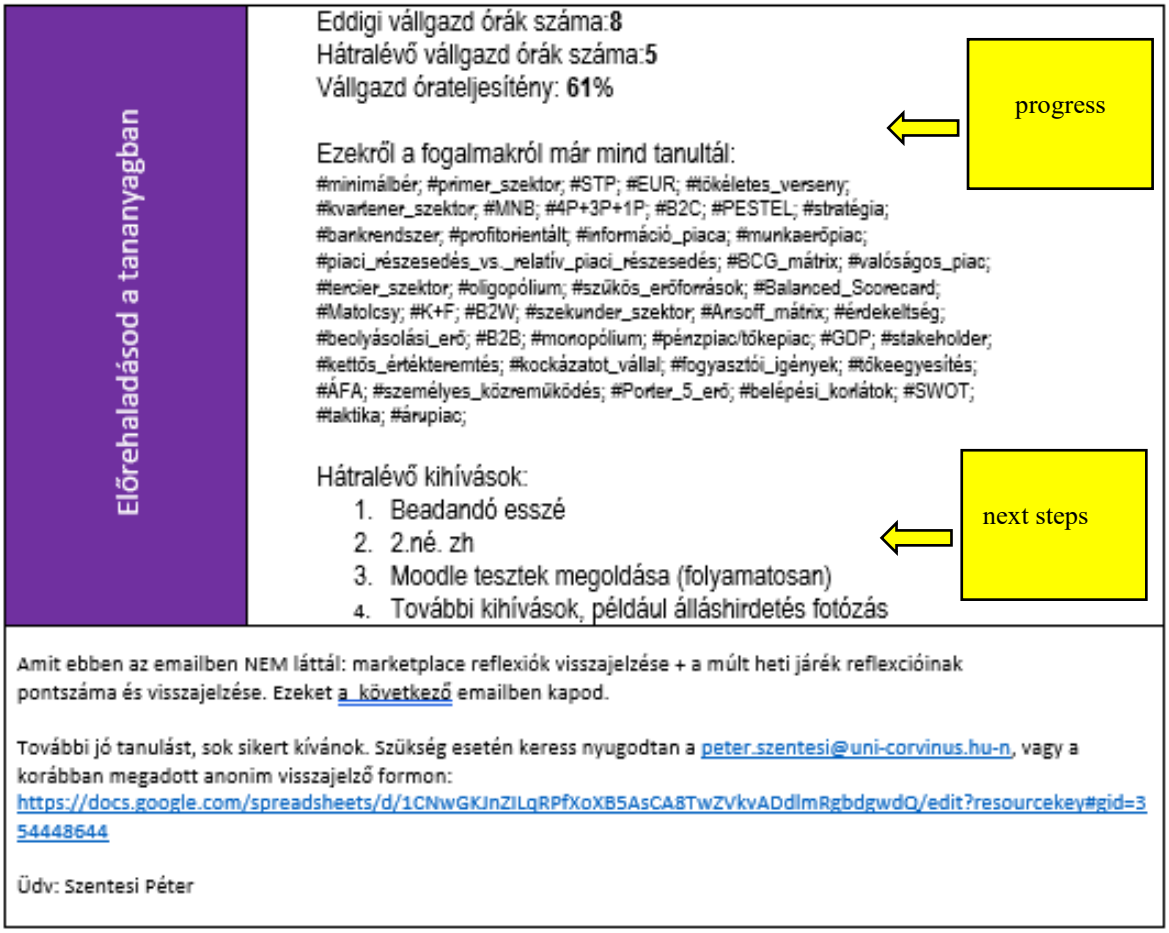
**POWER UPs**

**Oktató kérésére kitöltött tesztek**
Kitöltésre vonatkozó bögrepontszámod:
Első felmérés: «Bögrepont» pont.
Második felmérés: pont.
(a második határideje e hét péntek)

**Bögrepontok levásárlása**

100 pont exkluzív fehér BCE bögre
85 pont sárga BCE bögre
76 pont tábla csoki
57 pont csoki szelet

„survey" method (HEXAD)




Forrás: saját szerkesztés

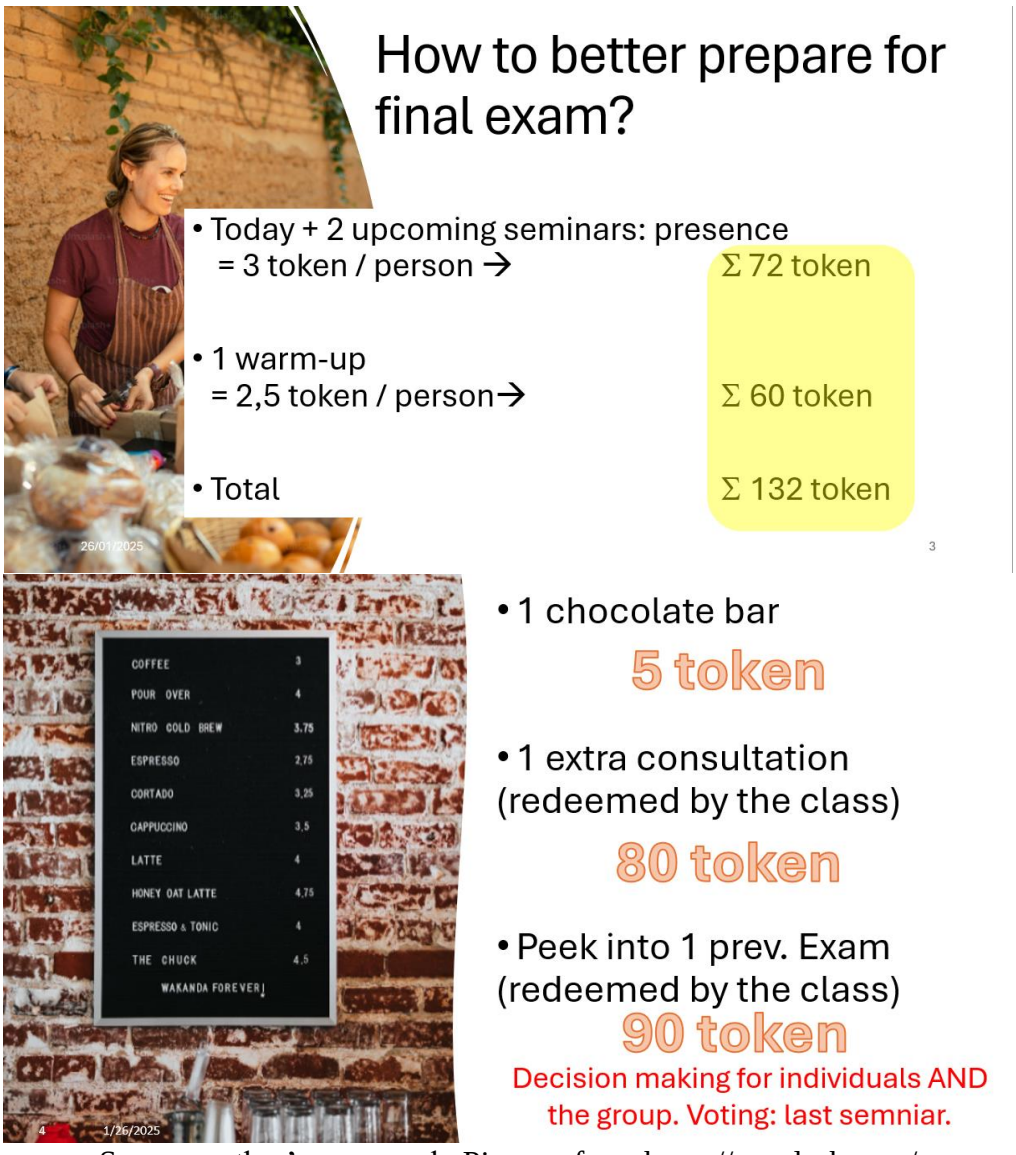
## 6.6. Annex: explanations to some of the game mechanics

*Clarifying rules for the virtual economy/market mechanism*

2023-24 Semester I Decision Making Skills course.

Rules clarification at seminar 9 (translated from original English to English), followed by the voting and results.

*34. Figure: Clarifying rules for virtual market and voting game elements*




Source: author's own work. Pictures from https://unsplash.com/

I explained the rules in class. In total, the team collected 132 tokens for attendance and good results in the pop-up tests. The final token count was 120. In the last seminar, I asked for the answers to a Qualtrics questionnaire, accessible by QR code, and then immediately aggregated them and projected them to the group.

*35. Figure: Closing down the market / voting mechanism*


Source: author's own work. Picture ource: https://www.freepik.com/

*17. Table: Result of voting/marketplace game element*

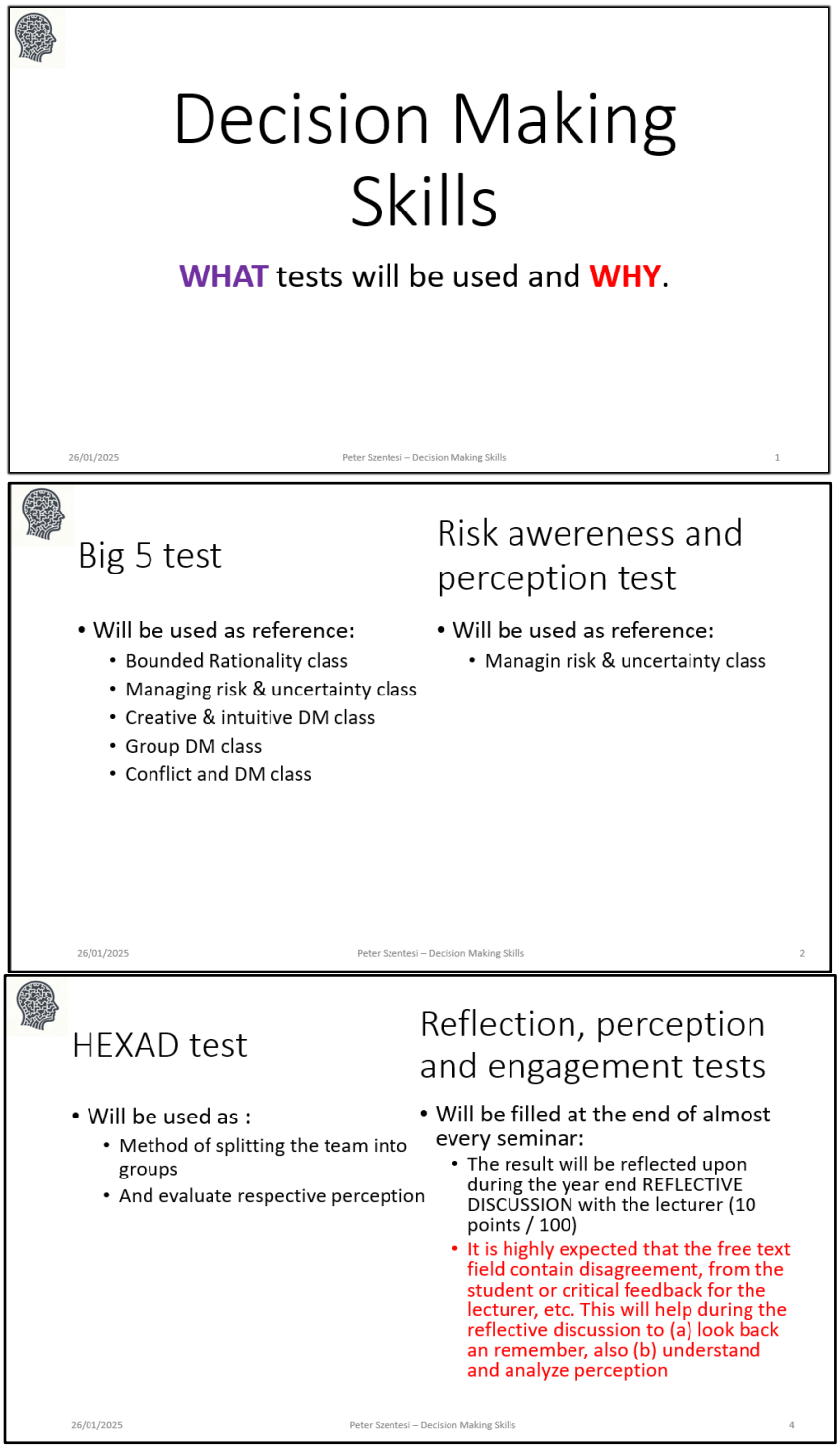
| Goodies to vote for | Respondents | |
|---|---|---|
| Chocolate (5 token) | 2 | 8% |
| Contribute to extra consultation (total of 80 tokens) | 1 | 4% |
| Contribute to previous test peek-in (total of 90 tokens) | 21 | 88% |
| | **24** | **100%** |

Source: author's own work

The majority of students voted for a peek into a previous exam. This has been delivered to them.

*Clarifying rules in relation to the survey method*

2023-24 I. semester Decision Making Skills course.




Source: the author's own work

## 6.7. Annex: all codes and themes created during the thematic analysis

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interview | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 1_Constructivist method | theme | 39 | 88 | no | + |
| 1.1_What vs. How | theme | 20 | 21 | yes | + |
| 1.2_Constructivist learning | code category | 15 | 25 | yes | + |
| 1.2.1_LRN students and teacher co-create learning | code | 1 | 1 | yes | + |
| 1.2.2_LRN Learning pyramid | code | 1 | 1 | no | + |
| 1.2.3_LRN I liked the way we worked | code | 14 | 23 | yes | + |
| 1.3_Student activity | code category | 12 | 21 | yes | + |
| 1.3.1_Student activity for points | code | 9 | 13 | yes | + |
| 1.3.2_Significance of student activity | code | 5 | 8 | yes | + |
| 1.4_Other | code category | 19 | 21 | no | + |
| 1.4.1_Learning efficiency increased over time | code | 1 | 1 | no | + |
| 1.4.2_What should be improved in the subject | code | 19 | 20 | no | + |
| 2_Student attitude | theme | 49 | 647 | yes | + |
| 2.0_Values | code category | 20 | 53 | yes | + |
| 2.0.1_Mutual respect is important | code | 19 | 27 | yes | + |
| 2.0.2_Pssychological contract is important | code | 4 | 5 | yes | + |
| 2.0.3_Acceptance and non-judgement are important | code | 18 | 21 | yes | + |
| 2.1_What is the OBJECTIVE of the students | code category | 7 | 9 | yes | + |
| 2.1.1_Success, experience of success | code | 1 | 1 | yes | + |
| 2.1.2_We are here to learn | code | 6 | 8 | yes | + |
| 2.2_Motivation | code category | 35 | 98 | yes | + |
| 2.2.1_What influences learning experience? | code | 2 | 5 | yes | + |
| 2.2.2_Importance of motivation | code sub-category | 15 | 28 | yes | + |
| 2.2.2.1_Classroom experience is better | code | 2 | 2 | yes | + |
| 2.2.2.2_Motivation helps to focus | code | 2 | 3 | yes | + |
| 2.2.2.3_Flow experiences | code | 4 | 5 | yes | + |
| 2.2.2.4_Why motivation is important | code | 14 | 18 | yes | + |
| 2.2.3_Motivation and performance | code sub-category | 18 | 33 | yes | + |
| 2.2.3.1_Motivated students perform better | code | 18 | 27 | yes | + |
| 2.2.3.2_Non-motivated students can also perform well | code | 2 | 2 | yes | + |
| 2.2.3.3_Non-motivated student performs weaker | code | 3 | 3 | yes | + |
| 2.2.3.4_Motivation helps to be successful | code | 1 | 1 | yes | + |
| 2.2.4_Motivation questionnaire | code sub-category | 22 | 32 | no | + |
| 2.2.4.1_What the engagement survey measured | code | 18 | 20 | no | + |
| 2.2.4.2_How engagement changed and why | code | 12 | 12 | no | + |

The Theme/Code name contains abbreviations in places to simplify coding and clarity, typically "GMF" = gamification, or FBS, which refers to the gamified feedback sheet (FeedBack Sheet). In the dissertation, I have deliberately not reworded the codes so that the interested reader can clearly find the codes in the shared NVIVO database. The Level in the table header indicates the hierarchy of the subject category code. The Number of interviews and Number of citations indicate the number of times the code was discovered in interviewer responses and the number of times, respectively. For illustration, the figure shows that I found a total of 741 quotes for 3_Gamification from 51 interviews. The last two columns of the table indicate whether I used the codes for the results section of the dissertation (yes or no), and whether I detected a positive opinion (+) or a neutral/negative one (-).

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interview | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 2.3_Rules | code category | 8 | 13 | yes | + |
| 2.3.1_Flexibility is important | code | 2 | 2 | yes | + |
| 2.3.2_Clear rules are important | code | 8 | 11 | yes | + |
| 2.4_Autonomy | code category | 19 | 33 | yes | + |
| 2.4.1_Autonomy is important | code | 1 | 1 | yes | + |
| 2.4.2_It is important to feel free or to decide | code | 1 | 2 | yes | + |
| 2.4.3_It is important for the students to get space | code | 18 | 30 | yes | + |
| 2.5_Community, team, group | code category | 40 | 112 | yes | + |
| 2.5.1_Benefits of community, team | code sub-category | 32 | 73 | yes | + |
| 2.5.1.1_Importance of community in the classroom | code | 15 | 25 | yes | + |
| 2.5.1.2_The importance of teamwork | code | 28 | 46 | yes | + |
| 2.5.1.3_Teamwork, no slacking | code | 2 | 2 | yes | + |
| 2.5.2_Benefits of diversity | code sub-category | 18 | 28 | yes | + |
| 2.5.2.1_Diversity of team is important | code | 12 | 14 | yes | + |
| 2.5.2.2_Other perspectives are valuable | code | 6 | 14 | yes | + |
| 2.5.3_Community, team neutral and negative opinions | code sub-category | 8 | 11 | yes | - |
| 2.5.3.1_Teamwork NEUTRAL | code | 3 | 3 | yes | - |
| 2.5.3.2_No need for community | code | 1 | 1 | yes | - |
| 2.5.3.3_Disadvantages of active students | code | 5 | 7 | yes | - |
| 2.6_Communication reflection, feedback | code category | 25 | 71 | yes | + |
| 2.6.1_Discourse is important | code | 11 | 21 | yes | + |
| 2.6.2_Reflection is important | code | 1 | 1 | yes | + |
| 2.6.3_Factual feedback is important | code | 5 | 9 | yes | + |
| 2.6.4_Interactivity is important | code | 19 | 30 | yes | + |
| 2.6.5_Importance of communication | code | 5 | 10 | yes | + |
| 2.7_Competition | code category | 10 | 14 | yes | + |
| 2.7.1_Competition is positive | code | 8 | 9 | yes | + |
| 2.7.2_Competition is neutral | code | 3 | 5 | yes | - |
| 2.8_Game, play, playfulness | code category | 17 | 29 | yes | + |
| 2.8.1_Games are important | code | 15 | 24 | yes | + |
| 2.8.2_I learn better with games | code | 1 | 1 | yes | + |
| 2.8.3_Games, Playfulness, pushing boundaries, GMF | code | 1 | 1 | yes | + |
| 2.8.4_GMF feedback, playfulness | code | 2 | 3 | yes | + |
| 2.9_The teacher | code category | 27 | 52 | yes | + |
| 2.9.1_A good teacher's attitude | code sub-category | 26 | 39 | yes | + |
| 2.9.1.1_The teacher's attitude is important | code | 5 | 6 | yes | + |
| 2.9.1.2_A good teacher is direct | code | 2 | 3 | yes | + |
| 2.9.1.3_A good teacher is energetic, motivating | code | 11 | 12 | yes | + |
| 2.9.1.4_A good teacher is dedicated | code | 2 | 5 | yes | + |
| 2.9.1.5_A good teacher is attentive and devotes time for the student | code | 10 | 13 | yes | + |
| 2.9.2_The role of the teacher | code sub-category | 8 | 13 | yes | + |
| 2.9.2.1_The advisory role of the teacher | code | 5 | 7 | yes | + |
| 2.9.2.2_The teacher reassures the main goal to learn | code | 3 | 4 | yes | + |
| 2.9.2.3_Fair assessment / scoring is important | code | 1 | 2 | yes | + |
| 2.10_Curriculum, lessons useful, understandable, interesting, enjoyable | code sub-category | 34 | 104 | yes | + |
| 2.10.1_Is is important that a course is practical | code | 19 | 31 | no | + |
| 2.10.2_Learning material was useful | code | 14 | 20 | no | + |
| 2.10.3_The class was enjoyable | code | 14 | 26 | no | + |
| 2.10.4_Interesting class / material | code | 8 | 10 | no | + |
| 2.10.5_It is important that I learn something new | code | 2 | 3 | no | + |

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interview | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 2.10.6_Comprehensible | code sub-category | 9 | 14 | no | + |
| 2.10.6.1_The lesson or subject should be well structured | code | 3 | 5 | no | + |
| 2.10.6.2_The well-structured and understandable lesson is motivating | code | 2 | 3 | no | + |
| 2.10.6.3_The lesson was understandable and interesting | code | 5 | 6 | no | + |
| 2.99.1_Difficulties of learning | code sub-category | 21 | 54 | no | - |
| 2.99.1.1_Anxiety due tolearning and low points | code | 12 | 21 | yes | - |
| 2.99.1.2_Difficulty maintaining focus | code | 10 | 22 | yes | - |
| 2.99.1.3_Just too much to do. | code | 5 | 5 | yes | - |
| 2.99.1.4_We got tired by the end | code | 5 | 5 | yes | - |
| 2.99.1.5_We loved the class, we weren't scared, we didn't study, we failed the exam | code | 1 | 1 | no | - |
| 2.99.2.2_Learning NEGATIVE answers | code sub-category | 2 | 5 | no | - |
| 2.99.2.1_Learning should stay within walls of university | code | 1 | 2 | no | - |
| 2.99.2.2_We have already learned part of the curriculum elsewhere | code | 1 | 1 | no | - |
| 2.99.2.3_Curriculum was boring | code | 1 | 2 | no | - |
| 3_Gamification | theme | 51 | 741 | yes | + |
| 3.1 Gamification POSITIVES | code category | 51 | 406 | yes | + |
| 3.1.1_GMF GOOD | code sub-category | 41 | 97 | yes | + |
| 3.1.1.1_GMF FBS good, exciting to see for the first time | code | 28 | 30 | yes | + |
| 3.1.1.2_GMF FBS interactive | code | 5 | 5 | yes | + |
| 3.1.1.3_GMF FBS motivating | code | 25 | 38 | yes | + |
| 3.1.1.4_GMF FBS is new, not seen elsewhere before | code | 20 | 24 | yes | + |
| 3.1.2_GMF Group, community | code sub-category | 31 | 50 | yes | + |
| 3.1.2.1_GMF I liked the group forming method | code | 1 | 1 | yes | + |
| 3.1.2.2_GMF FBS also provides motivation within the group | code | 3 | 3 | yes | + |
| 3.1.2.3_GMF Comparison with others is important, positive | code | 4 | 4 | yes | + |
| 3.1.2.4_GMF Ranking is positive | code | 28 | 42 | yes | + |
| 3.1.3_GMF Mechanics | code sub-category | 49 | 142 | yes | + |
| 3.1.3.1_GMF Autonomy, choices are important | code | 5 | 6 | yes | + |
| 3.1.3.2_GMF Badges are positive | code | 21 | 26 | yes | + |
| 3.1.3.3_GMF Progress is positive | code | 9 | 10 | yes | + |
| 3.1.3.4_GMF Joy of discovery is positive | code | 2 | 2 | yes | + |
| 3.1.3.5_GMF ecpi meaning/goal is important, positive | code | 3 | 3 | yes | + |
| 3.1.3.6_GMF Virtual economy, market is positive | code | 21 | 30 | yes | + |
| 3.1.3.7_GMF narrative is enjoyable, positive | code | 12 | 14 | yes | + |
| 3.1.3.8_GMF survey method -feedback- is positive | code | 19 | 33 | yes | + |
| 3.1.3.9_GMF voting is positive | code | 3 | 3 | yes | + |
| 3.1.3.10_GMF unexpected event is positive | code | 11 | 13 | yes | + |
| 3.1.3.11_GMF FBS was unexpected / wow / positive | code | 2 | 2 | yes | + |
| 3.1.4_GMF Significance of Personalisation | code sub-category | 45 | 117 | yes | + |
| 3.1.4.1_GMF Personalisation is positive | code | 13 | 16 | yes | + |
| 3.1.4.2_GMF FBS it was good to receive such a feedback | code | 20 | 27 | yes | + |
| 3.1.4.3_GMF FBS personalised assessment is positive | code | 22 | 30 | yes | + |
| 3.1.4.4_GMF FBS personalised feedback is overall POSITIVE | code | 29 | 44 | yes | + |
| 3.2_Effectiveness of gamification | code category | 32 | 72 | yes | + |
| 3.2.1_GMF FBS contains relevant information | code | 16 | 26 | yes | + |
| 3.2.2_GMF FBS effectively presents information | code | 4 | 4 | yes | + |
| 3.2.3_GMF FBS saves time for the student | code | 2 | 2 | yes | + |
| 3.2.4_GMF FBS shows that it was worthwhile to work | code | 1 | 1 | yes | + |
| 3.2.5_GMF Situation, status, useful and positive | code | 5 | 6 | yes | + |
| 3.2.6_GMF FBS I would like to have this in my workplace | code | 2 | 2 | yes | + |

| *Abbreviations: GMF=gamification* | *LRN=learning/material* | *FBS = FeedBack Sheet* | |
|---|---|---|---|

| Name of theme or code | Level | # of interview | # of quotes | Used in dissertation? | Positive / negative |
|---|---|---|---|---|---|
| 3.2.7_GMF FBS Overall useful | code | 10 | 18 | yes | + |
| 3.2.8_GMF FBS It was important to get it in time | code | 6 | 7 | yes | + |
| 3.2.99_GMF GMF awareness | code | 5 | 6 | yes | + |
| 3.3_GMF technical and implementation aspects | code category | 43 | 84 | yes | + |
| 3.3.1_GMF FBS better than Excel or Moodle | code | 32 | 42 | yes | + |
| 3.3.2_Advantages of technology and platforms | code | 10 | 15 | yes | + |
| 3.3.3_GMF FBS design was useful and good | code | 19 | 24 | yes | + |
| 3.3.8_GMF FSB inferior, v neutral compared to Excel, Moodle | code | 2 | 2 | yes | + |
| 3.3.9_GMF FBS the design is important, the rest is not | code | 1 | 1 | yes | + |
| 3.4_Gamification and student SELF | code category | 29 | 52 | yes | + |
| 3.4.1_GMF FBS meant personal contact, attention | code | 10 | 19 | yes | + |
| 3.4.2_GMF FBS good to read about oneself | code sub-category | 10 | 15 | yes | + |
| 3.4.2.1_GMF FBS I see myself on the FBS | code | 3 | 4 | yes | + |
| 3.4.2.2_GMF FBS is like writing a diary | code | 1 | 2 | yes | + |
| 3.4.2.3_GMF FBS I felt special because of this attention | code | 2 | 4 | yes | + |
| 3.4.3_GMF FBS souvenir of the course | code | 2 | 3 | yes | + |
| 3.4.4_GMF FBS I got to know myself better | code | 1 | 1 | yes | + |
| 3.4.5_No penalty for not completing the questionnaire | code | 13 | 14 | yes | + |
| 3.5_Gamification and TEACHER | code category | 13 | 15 | yes | + |
| 3.5.1_GMF FBS was a lot of work | code | 11 | 13 | yes | + |
| 3.5.2_The teacher improved his methods | code | 1 | 1 | yes | + |
| 3.5.3_GMF FBS teacher is responsible | code | 1 | 1 | yes | - |
| 3.6_Items for improvement | code category | 11 | 22 | yes | - |
| 3.9.1_Gamification neutral, negative | code category | 37 | 75 | yes | - |
| 3.9.1.1_GMF neutral, good and bad, it depends | code sub-category | 33 | 60 | yes | - |
| 3.9.1.1.1.1_GMF FBS personalized feedback is overall neutral | code | 2 | 2 | yes | - |
| 3.9.1.1.2_GMF FBS it was strange to see first, neutral | code | 9 | 10 | yes | - |
| 3.9.1.1.3_GMF badges neutral | code | 4 | 4 | yes | - |
| 3.9.1.1.4_GMF progress neutral | code | 3 | 3 | yes | - |
| 3.9.1.1.5_GMF marketplace neutral | code | 4 | 4 | yes | - |
| 3.9.1.1.6_GMF ranking neutral | code | 21 | 24 | yes | - |
| 3.9.1.1.7_GMF unexpected event neutral | code | 3 | 4 | yes | - |
| 3.9.1.1.8_GMF negative page - actually why not negative | code | 7 | 9 | yes | - |
| 3.9.1.2_GMF negatives | code sub-category | 13 | 15 | yes | - |
| 3.9.1.2.1_GMF general negative opinions | code | 8 | 8 | yes | - |
| 3.9.1.2.2_GMF childish | code | 1 | 1 | yes | - |
| 3.9.1.2.2.3_GMF FBS was boring to get it | code | 1 | 1 | yes | - |
| 3.9.1.2.2.4_GMF FBS I would not want to get this at work | code | 1 | 1 | yes | - |
| 3.9.1.2.2.5_GMF I didn't like the personalised task | code | 1 | 1 | yes | - |
| 3.9.1.2.6_GMF negative feedback is not good | code | 1 | 1 | yes | - |
| 3.9.1.2.7_GMF ranking negative | code | 1 | 2 | yes | - |
| 3.9.3_Technical NEGATIVE | code sub-category | 10 | 15 | yes | - |
| 3.9.3.1.1_GMF printing is not environmentally friendly | code | 1 | 1 | yes | - |
| 3.9.3.2_GMF FBS too much information, complicated | code | 3 | 8 | yes | - |
| 3.9.3.3_GMF not understood at first | code | 2 | 2 | yes | - |
| 3.9.3.9_GMF incorrect feedback sheet | code | 4 | 4 | yes | - |
| 4_NPS final result | theme | 48 | 61 | no | + |
| 4.1_NPS what is needed for 10 | code | 12 | 12 | no | + |

## 6.8. Annex: Illustration of the Syllabus for Decision Making Skills course

293NOPRV517M – Decision Making Skills

| | |
|---|---|
| Course leader: | Richárd Szántó, PhD |
| Lecturer(s): | Péter Szentesi |
| Department: | Department of Decision Sciences |
| Office hours: | TBD – students can reach out in email an phone |
| Availability: | Phone number: ********** |
| | Room: Main Building, Room 130 |
| | Email address: peter.szentesi@uni-corvinus.hu |
| Course type: | Elective |
| Prerequisites: | The course relies heavily on other fields of management studies, such as Strategic Management and Organizational Behaviour. However, there are no prerequisites. |
| Credits: | 6 |
| Learning hours required incl class, etc. | 6 x 30 = 180 standard hours (45') |
| Number of hours per semester | Two 90-minute classes per week, 1 lecture and 1 seminar (1+1), both in interactive formats |
| Time of class: | Thursday 09.50– 11:20 and 11:40 – 13:10 |
| Venue: | TBD |

### Aims and objectives and description of the course:

This course provides an overview of the field of behavioural decision making and decision analytical perspectives. It addresses both the theoretical and practical processes and skills of decision making at the individual, organizational and social levels.

### Learning outcomes:

The following is a partial list of course objectives:

- Gain an understanding of central concepts in decision making
- Understand the intersection of analytical and behavioural perspectives on decision making
- Develop expertise in decision making
- Improve decision making skills
- Develop ability to think critically
- Learn to avoid common decision making traps

### Course description:

The course starts with a short historical introduction to give an understanding of the field of decision theory. This is followed by a primarily problem-centred approach to the subject, which incorporates several case studies, role playing, self-assessment tests and various applications. The course provides a comprehensive examination of issues in personal decision making: how to describe the processes involved in forming judgements, how to plan actions and evaluate consequences, how to understand the dynamics of social decision making in the context of conflicting personal objectives, how to manage risk. Techniques for aiding decision making and methods for embedding these techniques into the decision making processes are explored and investigated.

The course content also relates to the multiple disciplines, organizational contexts and professional domains in which managers may work. Problem structuring, modelling, decision making and its techniques are covered with emphasis on their managerial aspects. Therefor the course will concentrate on what are sometimes called 'ill structured' decision problems. We will not use „ready-made" problems, but those where, at the outset, there is uncertainty about how to represent the structure of the decision problem, how should consequences of courses of action be conceptualized, and what other acts and events might intervene before consequences are reached. We will also examine the extent to which representing the decision problem is the best way to improve the communicative competence of the participants who have to do something about it. We shall examine how decision theory, originally developed as a theory for individual decision making, can be improved as a theory for organizational and social decision making and look at problems which have been associated with attempts to do this.

## Methodology to be used:

Each class, we will cover an area in depth and discuss some of the critical issues that have been raised regarding the theory and experimentation. We will use short cases, group work and group discussions. Students are expected to attend all class meetings and to be prepared.

## Detailed class schedule, 1st – 14th week:

| Week | Class date | Topics | Remarks |
|---|---|---|---|
| 1 | 12.09.2024 | Problem Solving & Decision Making | |
| 2 | 19.09.2024 | Different Approaches, Schools of Decision Making | Warm-up test about week1 |
| 3 | 26.09.2024 | Bounded Rationality, psychology of D.M. | |
| 4 | 03.10.2024 | Prescriptive & Normative Decision Making | Warm-up test about w 2+3 |
| 5 | 10.10.2024 | Managing Risk, Uncertainty; Risk Perception & Management, Prospect Theory | |
| 6 | 17.10.2024 | Creative & Intuitive Decision Making | Warm-up test about w4+5 |
| 7 | 24.10.2024 | Midterm exam during class | Midterm exam during class |
| 8 | 31.10.2024 | No class | Autumn break |
| 9 | 07.11.2024 | Group Decision Making | |
| 10 | 14.11.2024 | Conflict Management | Warm-up test about w9 |
| 11 | 21.11.2024 | Public Choice & Social Choice | |
| 12 | 28.11.2024 | Responsible Decision Making: Moral Embeddedness of Decisions | Warm-up test about w10-11 |
| 13 | 05.12.2024 | Cultural aspects of decision-making | Reflective discussions |
| 14 | 16-20.12.2024. | Final exam | Reflective discussions |

## Assessment, grading:

| Points | Assessment type | | Material |
|---|---|---|---|
| 40 | Midterm | Written exam | Class discussions, class ppt and mandatory reading materials. |
| 40 | Final exam | Written exam | |
| 10 | Warm-up tests | Short written exam | Class ppt and discussions for previous classes. |
| 10 | Reflective discussions | Student-teacher discussion | Overall discussion on students' perception and understanding of DMS. Discussion of "why" and "how". |
| **100** | **Total** | | |

## Class attendance:

Class attendance is mandatory as classes are mix of lecture and seminar/practical work. The acceptable level of absence is ¼ of all lessons (i.e. 3 seminars). In exceptional cases (hospital treatment, permanent illness) provided that the total absence is less than 50%, the tutor can (if he/she so decides) give an opportunity for supplement. Study and Examination Regulations – 21§ (3) and (5). In such case only verifiable, official hospital- or treatment center documentation proving hospital treatment or permanent illness shall be accepted.

Absence above 3 occasions (partial seminar attendance or repeated late arrival can be counted as absence), will result in a "not signed" (aláírás megtagadva") grade. Students receiving the "not signed" grade will not have the option of taking either the final or any of the retake examinations but shall have to retake the course in a subsequent semester.

## Cheating, plagiarism

Any attempt at cheating or plagiarism in quizzes, assignments or at examinations shall result in an automatic "F" (fail) grade and the student will not be able to take either the final examination or the retake examinations but shall have to retake the course in a subsequent semester.

## Examinations and retake examinations

In keeping with the Corvinus Study and Examination Regulations, a total of 3 examination opportunities shall be offered in the case of core courses. The examinations will be spread across the official examination period. Students must sign up for exams through the Students Information System (Neptun). Registration for and deregistration from chosen exam date(s) may be modified not later than 24 hours prior to its start. Students are granted 1 free exam retake (midterm, or final) during the normal examination occasions.

## Compulsory reading:

Please find links to the selected Harvard Business Review Articles on the Moodle: one article per week. Reading material for the first class:

Wedell-Wedellsborg, T (2017): Are You Solving the Right Problems? Reframing Them can Reveal Unexpected Solutions. Harvard Business Review, January-February, URL: Are You Solving the Right Problems? (hbr.org)

## Recommended readings:

- Harvard Business Review on Making Smart Decisions (Harvard Business Review Paperback Series) Paperback – April 12, 2011
- Ariely, Dan: Predictably Irrational, Harper Collins, NY, 2009
- Fischer, Roger – Ury, William: Getting to YES, Penguin Books, England, 2011
- Gladwell, Malcolm: Blink, Blink: The Power of Thinking Without Thinking Paperback – April 3, 2007
- Kahneman, Daniel: Thinking Fast and Slow, Farrar, Straus and Giroux, New York, 2013

## 6.9. Annex: questions of the semi-structured interviews

Semi-structured interviews are particularly suitable for examining motivation or perception. To ensure that, as a researcher, I really get an answer about the phenomenon I am looking for, in many cases the questions are preceded by a short summary or clarifying conversation before the specific question, or by a text spoken by the interviewer. In this appendix I indicate the directions of the questions, the specific questions are typically longer and are embedded in the context and discourse.

- **Questions related to the learning experience**
  - What made the biggest impression about our collaboration?
  - What is “learning experience”?
  - What factors influence learning experience?
  - What was more significant: the "what" or the "how"?
  - What interactive activities or phenomena did you encounter in the lesson?
  - What activity or phenomenon you encountered in this course first?
  - What factors are motivating for a student?
  - Why is motivation important?
  - How did their engagement change during the course?
- **Questions about gamification and feedback sheet**
  - How did they feel when they first received the gamified feedback sheet?
  - Do they prefer the feedback sheet or the points uploaded to Moodle?
  - Do they find the feedback on their progress (progress indicator, badge, etc.) useful?
  - How important is freedom of choice for the student?
  - Do badges motivate or distract the student?
  - Is the ranking motivating or distracting?
  - How important are onboarding elements?
  - Do you find personalised (individual) feedback useful?
  - Do you find the virtual economy/market mechanics useful/enjoyable?
  - What is the importance of narrative?
  - Are random or surprise techniques exciting or confusing?
  - Overall, how do you rate the personalised feedback sheet?
  - What negative or detrimental effects might such gamified elements have?
  - Have you encountered such playful elements elsewhere in your life or work?

## 6.10. Annex: interviews, transcripts and Nvivo database

The audio of the interviews recorded during my research, the transcripts and the database captured by the Nvivo software used for the analysis can be accessed via the link below and also by using the QR code.

Shared folder (URL):
https://drive.google.com/drive/folders/1foTtsQ18RP8p14IV7TYXltOBFt6akjlG?usp=sharing

shared folder (QR):

The structure of a shared folder:

- 1_transcripts
- 2_Nvivo database and exported Matrix Query report for saturation calculation
- 3_interview audio.

The shared material includes transcripts, audio and interviews from the Nvivo database, all encoded in the same way, the logic of which is presented on page 136. And the themes and codes in Nvivo are equivalent to the items listed in the Annex 6.7 (page 219.) and the tables referred to in the presentation of the results.

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