Title: Effects of gamification in the banking industry: A comparison analysis between gamified and non-gamified training

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Effects of gamification in the banking industry: A comparison analysis between gamified and non-gamified training.

by

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Abstract

As competition in the banking sector increases, banks strive to maintain professionals in their workforce who can make a difference in this scenario. While gamification has emerged as a solution to increase employee motivation and engagement, many companies still view it with fear, due to the lack of scientific proof of its results and standardisation. This research seeks to discover gamified training outcomes in the banking sector, comparing them with traditional training outcomes. The outcomes analysed were competence, autonomy, relatedness, engagement, and job satisfaction. The fuzzy-set analysis provided an in-depth investigation since it also considers non-linear and asymmetric results. The findings support that gamification applied in banking training results in job satisfaction at levels higher than traditional training. However, it was not supported that there is a significant difference in relation to competence, relatedness and engagement. Autonomy, on the other hand, was not found as an outcome in both gamified and non-gamified training. This work contributes to the field of research on gamification, for companies in the banking industry and those that can benefit from gamified training, such as training and service companies.

Keywords: gamification; bank industry; motivation; engagement; training; fs/QCA

Dedication

I dedicate this work primarily to God, who gives strength to the weary and increases the power of the weak (Isa 40:29). Without Him, I would not have the strength to continue this arduous journey that is life. I owe to God all that I am, that I was and that I will be. I also dedicate to my wife, Ana, who was my rock, helping me to endure moments of many uncertainties, difficulties, and anguishes. Without you, I wouldn't have made it. And also, to my daughter Agatha, who unknowingly motivate us to try to be better, so that she is even better. Without you, all of this would lose its meaning.

Agatha, I love you.

Ana, te mutuno.

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I would like to thank the Southern Institute of Technology, for providing me with this opportunity to reach a new knowledge form. Thanks also to the instructors who helped me along this path and my supervisor who supported me in this thesis. Last but not least, a special thanks to my colleagues who, from different parts of the world, provided a cultural wealth that only came to contribute to our formation.

Kia Ora.

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List of Acronyms

IMI	Intrinsic Motivation Inventory
UWES	Utrecht Work Engagement Scale
JSI	Job Satisfaction Index
MTurk	Mechanical Turk
HIT	Human Intelligence Task
SPSS	Statistical Package for the Social Sciences
QCA	Qualitative comparative analysis
fsQCA	Fuzzy-set qualitative comparative analysis
SIT	Southern Institute of Technology
PPPII	protected personally identifiable information
SDT	Self-determination theory
PAF	Principal Axis Factoring

Chapter 1. Introduction

1.1. Introduction

Gamification is the application of game-design elements and game principles in non-game contexts (Deterding, Khaled, et al., 2011). With several studies pointing out the significant effects of gamification in training for employees, companies are encouraged to increasingly adopting it as a tool to assist the company in reaching a more engaged and motivated workforce. Despite the vast contribution of research on gamification and some papers investigating gamification in-company training, there is a scarcity of studies investigating the effects of gamified training in the banking industry. The present thesis will address this theme, seeking to find which outcomes gamification can bring to bank employees. In the same way, this paper will help unveil which aspects of gamified training trigger such behaviour changes. This study contributes to human resources, applied to the banking sector, specifically in the training and development area.

This research seeks to find a direct correlation between gamification and increased engagement, motivation, and job satisfaction. As stated above, this correlation will be sought in employees of banking companies who have undergone gamified training in the organisation. With 13 years of experience in the banking industry, the researcher participated in various types of training, both gamified and non-gamified. During that time, he went through several levels in the institution, working in different sectors. He was therefore able to know various aspects of the sector from the inside out. He brings to this research a view of the employee, but also of the manager. It contributes with the eyes of who participated in engaging training, and others not so much.

1.2. Statement of the problem

It was found that 85% of all employees in the world are not engaged in work (Gallup Inc., 2019, p. 8). Other research identified that when team engagement and motivation decrease, job satisfaction declines, employee loyalty is reduced, production shrinks and, consequently, profits fall (Nink & Robison, 2016). Many companies have adopted gamification as part of their tools in training their teams to manage this lack of engagement and motivation. Accordingly, there is agreement among studies suggesting that gamification increases motivation and engagement (Barata et al., 2013; Brigham, 2015; De-Marcos et al., 2014; Glover, 2013; Iosup & Epema, 2014; McIntyre, 2018; Muntean, 2011; Sands, 2013; Singh & Prasad, 2018). However, despite the number of research papers studying gamification applied to company employees' training, there is a gap in this type of research in the banking sector, which this thesis seeks to fill.

The fact that gamification is arousing so much interest from companies in the training of their employees is mainly due to the benefits resulting from its application in emblematic cases, such as Xerox (Oakes, 2012), Allstate (Everson, 2014) and Bridgestone Tires (Schumann & Prokopeak, 2017). However, there have been numerous unreported or poorly reported failure of the application of gamification in companies. The main reason for this scarcity of ‘disastrous’ examples of gamification implementation is the lack of interest of companies in disseminating poor strategies, demonstrating a company's failure to plan and execute successful programmes. The ‘fear’ of companies, in this case, lies in the image. Bogost (2015, p. 65) calls gamification a “terrifying yet appealing medium for businesses”. On the one hand, companies have the perception that gamify training of their employees can provide gains in motivation and engagement; on the other hand, the same companies fear the uncertainty in the results of such application. This paper aims in removing this uncertainty in the results of the application of gamification in banking training.

1.3. Significance of the study

The importance of this study resides in the fact that the financial industry is, naturally, a place where competitiveness among its members is a vital attribute. With its products and services commoditised, banks seek to differentiate themselves from their competitors through their personnel. Therefore, the professional qualification has been a great ally in the differentiation among these institutions, seeking to have the best professionals in their team specialised in the most different financial expertise. Therefore, the banks adopt diplomas, courses and certifications as qualification parameters, in addition to professional experience. However, not all the above criteria guarantee the difference in a work team so that a financial organisation stands out from its competitors. Having qualified, certified, updated and experienced professionals in an organisation's activity is essential for it to remain alive in the financial market, an industry in constant transformation. Therefore, it demands more and more from its employees.

With the level of competition increasingly fierce, it is natural to seek professionals with the skills and abilities expected to deal with banking activity dynamics. For this reason, financial organisations have teams and selective processes designed to seek this high-class professional, in addition to maintaining an active search for the most qualified professionals for the activity, even if they are currently working with the competitor. It is necessary, though, that in addition to being trained and qualified, the employee demonstrates engagement and motivation in the activity performed; the observed attitude will represent these outcomes. This study is based on the importance of engagement and motivation among bank employees and the promise of gamification as a tool to change user behaviour.

As will be outlined in the next chapters, gamification has had applications in a few areas and industries, gathering some positive results and some, however, negative. Several studies indicate that for success in the gamification of a particular activity, extra caution is required both in planning and execution (Robson et al., 2016; Sanmugam et al., 2014). Consequently, there is a false sense of security that this caution is enough for a company to implement a gamified activity successfully. Furthermore, numerous papers explore motivation and engagement in the banking sector. However, there is a dearth of studies analysing motivation and engagement as consequences of gamification in employees' training in the banking and finance sector (Perryer et al., 2016, p. 8). This research will scrutinise gamification's relationship with the training applied in banks and financial institutions, seeking to understand the relationships between gamification, motivation, engagement, and job satisfaction.

1.4. Research question/aim and objectives

1.4.1. Why the study is important

This research is important because it adds to the body of knowledge about gamification's effects in the banking industry, specifically applied to its employees' training. Being an agile, dynamic industry, which is continuously changing and transforming itself, provided either by demographic and environmental changes and by competitive pressures, banks need to have in their staff qualified and prepared professionals to deal with such an environment's demands. The constant need for guidance and practising is a common point among organisations participating in the banking system, where training enables professionals to adapt quickly to changes. Simultaneously, gamification has stood out to assist companies in motivating and engaging their employees from various sectors. Attracted by this promise of engagement and motivation and the need to increase their employees' engagement and motivation, banks began to resort to gamification to solve this discrepancy.

This scenario presented above leads to the need to analyse the effectiveness of the measures taken. What are the outcomes that the use of gamification can bring to the banking sector? Does it indeed increase employee engagement? To what extent? Is there an increase in motivation? Is there an increase in job satisfaction? Would conventional (non-gamified) training be able to bring the same outcomes? If so, what would be the recipe for the expected results to be effectively achieved? Even though not having answers to these questions, several banks implement gamification in their training, aiming to get these results. What can be seen by some as an unnecessary risk, others see as taking advantage of opportunities. This thesis leads to understanding if a gamified training yields superior results compared to standard ones. The questions above introduce the following research objectives:

1. Identify if there is a significant difference between the motivation perceived by the bank employee who participated in gamified training in the work environment of the one who did not.

2. To assess the difference in bank employees' level of engagement after gamified training of those who had non-gamified training.

3. Investigate and compare the degree to which job satisfaction is affected by gamified and non-gamified training when applied in a banking environment.

1.4.2. What the study is about

This research seeks to fill the literature gap by identifying the effects of gamified training on employees in the banking sector compared to non-gamified training. More specifically, this study will analyse whether gamified banking training applications offer users engagement, motivation and job satisfaction. In line with the Deci and Ryan (1985)'s study, three sub-factors will compose the results of motivation, i.e. competence, autonomy and relatedness. This paper will also compare the same results with respondents who declared they had no gamified training experience. For this purpose, the following hypotheses were formulated:

1. Gamified training better meets the need for competence compared to conventional training;

2. Gamified training better meets the need for autonomy compared to conventional training;

3. Gamified training better meets the need for relatedness compared to conventional training.

4. Gamified training increases engagement at a higher level than non-gamified training.

5. Gamified training increases job satisfaction at a higher level than non-gamified training.

To make these comparisons represented by the hypotheses above, the researcher prepared a questionnaire to be applied to employees worldwide in the banking and finance sectors. The questionnaire (Appendix B) consisted of demographic questions and a combination of three scales: The Intrinsic Motivation Inventory (IMI) (Ryan & Deci, 2000), the Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2004), and the Job Satisfaction Index (JSI) (Brayfield & Rothe, 1951). These scales demonstrated acceptable reliability. They were chosen because they are widely used as a measure of motivation, engagement and job satisfaction, respectively, and being adaptable to the context of this research. A questionnaire was chosen for this research because it provides a data collection capacity in an abundantly larger amount than other options, such as a focus group. The inclusion of an online response collection provided an extended reach, making it possible to analyse responses from different cultures and places.

To support the collection of responses virtually, the researcher used Microsoft Forms (forms.microsoft.com). In this online questionnaire service, it was possible to formulate the questionnaire and make it available to respondents and collect data at the end of the survey, in a spreadsheet format. The researcher printed some questionnaires so that the answers could be collected in person in Invercargill, New Zealand (where the research was conducted), and later included them in the Microsoft tool for joint data analysis. For collecting the remaining questionnaires, the researcher sent e-mails to Brazil, where he developed his experience as a banker, with invitations to participate in the research containing the link for participation by the Microsoft Forms. Simultaneously, the researcher used MTurk (www.mturk.com), the Amazon's online marketplace of service providers, which produces responses in a comparable and even superior way to other forms of data collection as email and face-to-face (Casler et al., 2013, p. 2156). This tool contributed to this work to produce a more significant demographic extension, reaching respondents represented on all continents.

1.4.3. What benefits (organisation/industry) could be expected from this study

Firstly, this study will provide an overview of what gamification is, its forms of application, recommended practices, and those practices that should be avoided to not having setbacks, which can occur either in the planning or implementation phase.

Secondly, based on the existing literature, this paper will display guidelines for a gamification application with effective results, which will leave a positive legacy on employee morale. Thirdly, all analyses and studies present in this thesis will be firmly based on theories related to the central theme, bringing even more certainty to the results presented. Finally, when understanding the results of applying gamified training in banks, managers can be more confident in deciding whether to use gamification in their organisations and how. Scientific research based on rigorous analysis can provide this factual basis that helps in decision making.

1.5. Limitations and delimitations

The present research did not have a specific delimitation by geographic area; on the contrary, it was applied unrestrictedly and openly worldwide. However, there was, as the industry object of the study, a sectoral delimitation. As it aims to analyse the gamified training results applied to the banking sector, it was limited to that specific sector. Although data collection through the questionnaire also took place in person, it was mostly done electronically, using tools available on the world wide web.

1.5.1. Industry

The banking sector plays great importance worldwide, a sector that is at the heart of economic scenarios. Due to its constant growth, there is a voracious competition, where the participants in the service chain must keep their employees updated and motivated and engaged in the goals and objectives outlined by the organisation's guidelines. In line with this need, banks always seek to be updated on new trends in the relationship with employees, especially regarding their workforce's training and qualification. Therefore, the reasons above are the main grounds for delimiting the research object for this industry. The researcher's experience of more than ten years in this sector reveals another critical reason for this choice, since having had this experience in banking, he was able to experience in the dynamic banking environment both gamified and non-gamified training. With these experiences, he was able to gain insights into the possible relationships between the causes and consequences of desirable behaviour changes for the organisation.

1.5.2. Geographical area

The option for not having a geographic delimitation was intentionally adopted because it concerns the banking sector. It is an industry that deals mainly with two variables: people and money. Although cultural and demographic differences greatly influence the former, it does not play such a dominant role in the latter. Both the standardisation level present in the practices of the organisations involved and how they prepare their employees for the relationship with their customers makes the sector perfect for a worldwide comparison. Therefore, an eventual geographical delimitation was disregarded.

1.5.3. On methodology

On the one hand, a survey with global reach can provide rich data due to respondents' diversity, both geographically and culturally. Respondents with such different life experiences can offer a more globalised view of the problem analysed since they do not have cultural or demographic biases. The other side of the coin is that such a comprehensive and diverse collection of data presents some difficulties to the researcher. The primary limitation of this research is the fact that it relied on the participants' memory. The analyses used a questionnaire in which the first question asked whether the respondent has already participated in gamified training. After this question, the respondent was directed to three questionnaires to collect perceptions about the experience perceived in this training (or in the last training conducted, if one answered ‘no’ to the question about gamification).

This approach has some limitations. Firstly, as stated above, it has a high level of dependence on the participants' memory, as the recalled training may have taken place in the week before answering the questionnaire, but it may have happened more than a year before. Secondly, because it does not take into account the time that has elapsed since the last training, even if the participant has vivid memories, these memories will be numb with other experiences in the company or even in other situations in the participant's life, because current feelings, emotions and experiences influence how people reconstruct their memories. Thirdly, this research does not consider the quality of the gamification applied to the training carried out. The training that the participant performed may have had a desultory application of gamification, i.e., including only the use of badges, points and leaderboards in an indiscriminate manner and without enough basis in acceptable practices explained in the existing literature, formed by scientific experiences. It may also have been formulated perhaps without proper planning, without considering users' expectations, which can cause the execution to fail.

Finally, this research relied entirely on the respondent's judgment to assess whether the training he experienced was indeed gamified training or not. The researcher noticed this limitation during the application of face-to-face questionnaires. When respondents faced this question, they wanted to understand what gamified training meant. The online survey included a link with an explanation of what gamification was. However, only a link is not enough to guarantee this understanding by the respondent (nor will he click and read the content before answering the question).

1.5.4. Process and resources

During this research, there was a change in plans regarding how the researcher would carry out data collection that changed the research design completely. Thenceforth, the process went from qualitative to quantitative research. The reason for this change in the process was the limitation of resources, both financial and time. The original idea involved developing a gamified and non-gamified training for application to volunteers to separately analyse the participants' reaction during and after the training session, using observation (during) and a focus group (after). In this respect, there were two main factors: firstly, to develop a game it would be necessary to hire a professional or company, which proved to be unattainable, both financially and concerning the time required for such development. Secondly, before the start of the research, the COVID-19 pandemic spread globally, and from then on, there was an intense international commotion for people to avoid meetings that were not sorely needed. Therefore, the choice that best suited the existing limitations was to collect questionnaires and analyse the differences between gamified and non-gamified training participants, having to rely on their memories.

1.6. Interchangeable expressions used in this study

Although the word gamification has already been used, the term became popular in 2011, through Zichermann and Cunningham (2011). As a relatively new science, gamification has not yet defined certain concepts, and some standards are not universally accepted, with different theories and schools of thought taking place. Therefore, this section seeks to clarify the expressions used in this work, facilitating the reading and understanding the topics covered. As it is a study on the application of gamification in the training of bank employees, the training itself, depending on the context to which it refers, will be named training, game, activity, gamified activity, application or gamified application. The person who actively participates in the training will be named in this study user, participant or player. Depending on the context, the person may also be called employee or student.

The questionnaire's determining question asked whether the participant has already had experience in gamified training in the company. Participants who answered 'yes' will henceforth be called gamified participants or gamified respondents and those who answered 'no' will be called non-gamified participants or non-gamified respondents. With these clarifications, it will be easier for the reader whom the text is referring to. In some parts of this paper, especially in chapters 4 and 5, where the fuzzy-set nonlinear analysis procedures will be detailed, some variables will be gathered as causal conditions to result in an outcome. Although the author of this theory sometimes names algorithms for this combination of causal conditions, this researcher has chosen to keep writing simple and name such combinations of variables as recipes. For some, the word algorithm may seem intimidating and hinder the assimilation of the content this research intends to transmit.

1.7. Structure of the thesis

1.7.1. Chapter two: Theoretical constructs and industry analysis

In this chapter, the problem that is the object of research will be deepened, seeking new insights about this investigation's purpose. Therefore, the theoretical constructions that served forms the pillar of the formulation of hypotheses and an analysis of the banking industry will be examined. In the subsection of theoretical constructs, the self-determination theory (SDT) and engagement at work will be outlined, in addition to a contribution from neuroscience. All the theoretical constructs above will be explained in the study of gamification, motivation and engagement. Similarly, the justifications for choosing these constructs for the analysis of this research will be outlined. In the subsection of sector analysis, the banking sector will be analysed comprehensively to unveil the research problem's complexity. Therefore, models and frameworks enshrined in applied management will be applied as analysis parameters in the banking industry. In the end, the reader will have a clearer view of the sector under study, and the problem addressed, paving the way for more detailed analysis in the following chapters.

1.7.2. Chapter three: A literature review

The literature review was structured to present the reader with both the literature that served as a basis for formulating the underlying hypotheses and thoughts and the possible solution paths. Besides, also address the findings of other scholars and researchers on the topic, addressed from different points of view, so that the reader has a more holistic view of the topic. The objective was to determine the main findings that previous research has made in this field of investigation. It begins with a view of scholars on the concept of gamification, moving on to a brief explanation of the game elements. A list of current uses of gamification in different areas and forms of use follows. After that, the reader will discuss the observed outcomes of gamification through research on the topic. Finally, the details of the planning and implementation stages will be highlighted, followed by a discussion of ethical aspects and a view on the criticisms, limitations and problems in the application of gamification.

1.7.3. Chapter four: Research methodology

In this chapter, different methodologies that can be applied to answer research questions of interest to management professionals and researchers will be compared and criticised. Subsequently, the criteria for choosing the techniques adopted for this study will be explained, as well as the justifications. The processes for choosing the research target audience will be outlined, concerning the origin, sample size, geographic delimitation, the form of contact and approach, and the reasons for these choices. This chapter will also detail the questionnaire used, questions included in it, and the study's reliability and validity. Then, the reader will understand the forms of data analysis chosen and the applications used for that and, in the end, the biases found, and the ethical issues will be outlined.

1.7.4. Chapter five: Findings and analysis

This chapter will analyse and interpret the methodologies, using the methodologies chosen and detailed in the previous chapter. After the analysis, the reader will find a summary of the research findings, with appropriate conclusions and recommendations related to management practices and compared with other research findings found in the existing literature.

1.7.5. Chapter six: Recommendations and conclusions

Referring to the research questions and hypothesis and the limitations found, Chapter six will draw conclusions and recommendations for management professionals and researchers in the area. It will also outline areas of future research for better development and understanding of the topic. Thus, presenting a summary of the findings, the conclusions generated by the research and recommendations based on these findings will be highlighted.

Chapter 2. Theoretical Constructs and Industry Analysis

2.1. Introduction

This chapter will address two aspects that form the backbone of this research: first, the theoretical constructs, and finally, an analysis of the industry this thesis investigates. Theories that support research are the theory of motivation, by Deci and Ryan (1985) and engagement at work (Kahn, 1990). After concluding the chapter, the reader will understand the research's theoretical context and comprehend it more appropriately. In the second part of the chapter, the reader will find an analysis of the banking industry, where strategic, tactical, and managerial aspects will be broadly explained, with an overview of how the banking market is doing and its structure and operating dynamics.

2.2. Theoretical constructs

2.2.1. Motivation: A Self-determination theory approach

Gamification has been studied from the perspective of the self-determination theory (SDT), a theory developed by Deci and Ryan (2002), which defends that human beings are naturally prone to explore unknown points-of-view, pursuing challenges while incorporating and remodelling cultural conventions, because of their intrinsic desire to perform and elaborate their effects. Self-determination theory supported gamification in diverse scenarios (Leclercq et al., 2020; Mitchell et al., 2018; Perryer et al., 2016; Sailer et al., 2017; Seaborn & Fels, 2015; Simões et al., 2015; Teixeira et al., 2020; Torres, 2016; Vallerand, 1997; Wolf et al., 2018; Wolf et al., 2020). Rooted in the assumption that all individuals have an innate tendency to develop a unified sense of self, SDT conceives human being as someone oriented towards personal growth, which seeks challenges in its environment, trying to achieve its true potential (Deci & Ryan, 2002, pp. 5, 8).

SDT raises that human beings have three basic psychological needs: competence, relatedness and autonomy. Deci and Ryan (2002) define *competence* as the ability to do what is necessary for their social environment's interactions. According to their study (2002), *relatedness* is the feeling of being connected to others and the environment, being part of a group. Finally, Deci and Ryan (2002) define *autonomy* as the feeling of acting according to one's wishes. Seaborn and Fels (2015, p. 19) defended that SDT, including intrinsic and extrinsic motivation, form one of the necessary theoretical foundations used in gamification frameworks. Furthermore, Deci and Ryan (2002, p. 9) argued that "to the extent that an aspect of the social context allows need fulfilment, it yields engagement, mastery, and synthesis; whereas, to the extent that it thwarts need fulfilment, it diminishes the individual's motivation, growth, integrity, and wellbeing.". Therefore, SDT in gamification uses these opportunities to fulfil basic human needs to promote motivation.

Intrinsic and extrinsic motivation. According to SDT, as explained by Deci (The Brainwaves Video Anthology, 2017), to boost motivation in whatever activity and promote optimal performance and wellness, it is necessary to support basic human needs: competence, relatedness and autonomy. They divided motivation into intrinsic and extrinsic motivation. Whereas in intrinsic motivation (which is one type of autonomous motivation), motivation comes from an exciting or enjoyable activity, in extrinsic motivation, the person performs the activity due to a separate consequence that this achievement (or lack thereof) can cause (The Brainwaves Video Anthology, 2017). Intrinsic motivation is the primary motivation sought in gamification because it has a longer-lasting effect and increases perceived autonomy.

Furthermore, Perryer et al. (2016, p. 5) argued that the difference between intrinsic and extrinsic motivation is analogous to the difference between work and play. Situations, when one works for the pleasure of the activity, are not very common; on the other hand, it is not so difficult to imagine the opposite situation, playing for the pleasure of the game itself. Vallerand (1997, p. 279) discussed that these types of motivation differ theologically since intrinsic motivation has the purpose in the activity itself, while in extrinsic motivation the purpose lies in the benefits that one can obtain by participating in the activity.

Autonomous versus controlled motivation. The prevailing view on motivation focused on the amount of motivation, observing whether an individual is 'more' or 'less' motivated. Instead, Deci and Ryan developed a different approach on motivation: focusing on types of motivation (The Brainwaves Video Anthology, 2017, 1:29), Deci discussed the primary distinction between what he and Ryan called *autonomous motivation* and *controlled motivation*:

> Autonomous motivation describes what you are doing when you are felling a full sense of willingness, volition and choice. Whatever the activity is if you are doing it with a real sense of interest, enjoyment and value than it is likely that you are autonomously motivated. In contrast, there is controlled motivation. Controlled motivation refers to doing something in order to get some reward, or to avoid some punishment; it means doing something because you are feeling pressured, demanded, obliged to be doing it. (The Brainwaves Video Anthology, 2017, 1:45)

As far as gamification is concerned, Torres (2016, p. 107) found that the autonomous experience has a fundamental role in the gamification effectiveness since employees feel accountable for their learning, engaging with the content. Inversely, Vallerand (1997, p. 297) argued that there are activities in which employees feel somewhat controlled; in these activities, the researcher noted some intrinsic contextual motivation reduction. Most people perceive motivation as something that comes external to the individual; when considering motivation from this point of view, they are considering, in fact, the controlled motivation. Deci and Ryan found that with autonomous motivation, by contrast, the levels of engagement, wellness and performance are superior (The Brainwaves Video Anthology, 2017). This type of autonomous motivation that the use of gamification seeks to provide.

Intrinsic need satisfaction: conceptual definitions. It is logical to state that gamification meets the satisfaction of intrinsic individual needs, because according to Mitchell et al. (2018, p. 328) when using gamified applications in the work environment, employees feel their needs for autonomy, competence and relatedness satisfied. In line with this discussion, Torres (2016, p. 158) argued that game elements' influence lies in the satisfaction of employees' psychological needs. As defended by Perryer et al. (2016, p. 15), Gamification allows the satisfaction of multiple needs via a single application. Below, these concepts will be addressed separately, as well as their relationship with gamification.

Autonomy. *Autonomy* is defined by Deci and Ryan (2002) as the feeling of acting according to one's desires. This feeling makes the one feels empowered in the control of one's destiny. Deterding (2011, pp. 2-3) called voluntariness of play, which is the autonomy of playing, the more granular level of game design pattern, essential to motivate people. Furthermore, he suggested (p. 3) that autonomy when playing voluntary acts as the most primordial element of personal interface or game design pattern, playing the agency of motivation. Autonomous experiences, when people perceive themselves acting from interest and integrated values (Deci & Ryan, 2002, p. 8), brings effectiveness to the program since it makes employees feel engaged to the content while feeling responsible for their learning path (Torres, 2016, p. 107). For the reasons cited above, Deterding (2011, p. 3) claimed that gamification applications must be voluntary and free of consequence to provide autonomy.

Competence. Deci and Ryan (2002, p. 7) defended that the need for *competence* drives people to explore challenges compatible with their skills, using their full potential to achieve something they believe attainable and to keep using their full capability throughout the activity. Likewise, Deterding (2011, p. 2) argued that motivation is afforded when a person's skill is balanced with an object's features, as this person encounters satisfaction of the need for competence when interacting with this object. In gamification, features enable users to learn new skills, set clear goals, and receive prompt feedback. According to Xi and Hamari (2019, p. 212), these affordances can fulfil the need for competence since they evidence their competence through their achievements. A single task can impact one or more intrinsic need satisfaction. However, depending on the dynamics, the impact will be higher in one need than in other. If an activity performed in isolation produces competency feedback, this activity will likely have a stronger impact on satisfying the need for competence than on satisfying the need for relationship (Vallerand, 1997, p. 304). Therefore, the context in which the activity takes place influences the need to be satisfied.

Relatedness. Deci and Ryan (2002, p. 7) conceived *relatedness* as the need to feel related to others and the community; it is necessary to be securely and in unity with one's pairs. Relatedness needs can be satisfied, as stated by Xi and Hamari (2019, p. 213), with some social features, such as social networks, groups, or cooperation. According to their research, these components support relationship-building among users in the same gamified application and are positively related to autonomy, competence, and relatedness need satisfaction (Xi & Hamari, 2019, p. 211).

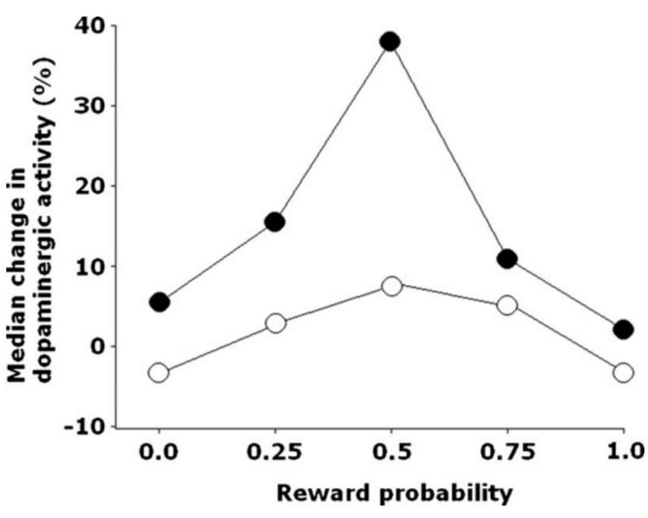
2.2.2. Neuroscience

In addition to the theories presented in this chapter, this section will outline contributions from neuroscience supporting findings and theorists on topics related to the research object: motivation, engagement, and job satisfaction. As they rely on brain observations and assistive technologies to determine observed behaviours and the brain's functioning during that behaviour, such findings help defend the theories summarised here.

The Uncertainty that Motivates. Gamification is strongly related to motivation theory, and in particular, with intrinsic motivation. Ryan et al. (2006) found that playing video games triggers intrinsic motivation via the satisfaction of autonomy, relatedness, and competence needs, contributing to continuous participation. Analogously, gamified applications are likely to yield the same outcome. Attempting to clarify the processes behind these triggers, neurobiologists found that some uncertainties can contribute to one's excitement since one feels competent and autonomous enough to decrease this uncertainty (Anselme, 2010). For example, Fiorillo et al. (2003)'s research has shown that the higher the level of reward uncertainty, the more slow and sustained activation of dopamine neurons in areas of the ventral midbrain occurs, which associates with one's motivation. In opposition, such activation did not occur while the level of uncertainty of the reward was low, as Figure 1 displays. In the graph, each line represents data collected from four different monkeys. It displays clearly that in the highest level of uncertainty (*P*=0.5), the sustained activation of dopamine neurons climbs to its top value.

Manipulating uncertainties. Koster (2013) found that besides competency and autonomy, when more than one player attempts to control the uncertainty together, the uncertainty is likely to foster relatedness. As Leclercq et al. (2020, p. 4) concluded, gamification design's role is to manipulate uncertainty so that the task shifts from an ordinary activity into an intrinsic motivating one, producing enduring outcomes on user actions and interactions. Gamification uncertainty means a certain level of anxiety. Wolf et al. (2020) found that "gamified services as extrinsic stimuli not only promote 'fun' but also can result in perceived stress" (p. 361). Fun and stress are not necessarily separate sensations but often co-occur; in this case, perceived stress is fun. However, Sailer et al. (2017, pp. 377 - 378) argued that the psychological needs are fulfilled by certain game elements insofar the users recognise these elements.

Figure 1. Effects of reward probability on dopaminergic activity in the midbrain region in monkeys.



The black and white circles represent data collected using two different monkeys. Figure modified after Fiorillo et al. (2003, p. 1900).

Challenge as a reward. Judy Willis, a neurologist who became a teacher, investigated the engagement of students in learning. She released significant findings of the role of goals and challenges (Willis, 2011b): “Students working toward clear, desirable goals within their range of the perceived achievable challenge, reach levels of engagement much like the focus and perseverance we see when they play their video games” (para. 11). Here, the teacher-neurologist defended a strong relationship between challenge and engagement. Furthermore, she argued that players are generally placed at their achievable challenge level when playing. Instead of having their efforts rewarded only with the final product, they receive recognition of the incremental goal's progression, which, in turn, releases dopamine (Willis, 2011c, para. 1). In other words, the challenge rewards the challenge: her findings revealed that the best reward for a challenge is a higher level of challenge.

Intrinsic reinforcement. Willis argued that what a human’s brain is always looking for is dopamine, which provides pleasure. She found that the player's brain releases dopamine whenever it receives feedback that her actions or responses are correct (Willis, 2011c, para. 15). With that, she emphasises the importance of feedback in the rewarding process that will generate engagement. Still using games to exemplify how engagement works, Willis (2011c) argued: “A computer game does not hand out cash, toys, or even hugs. The motivation to persevere is the brain seeking another surge of dopamine - the fuel of intrinsic reinforcement.” (para. 7). She found that when the brain finds a reasonable possibility of successfully solving a problem or accomplishing a goal, it ignites the dopamine reward circuit (Willis, 2011c, para. 8). So, the brain allows the player to invest her full energy in the activity. The main point is that the brain always needs a higher level of challenge; otherwise, it does not release dopamine (Willis, 2011c, para. 15). The dopamine reward circuit follows the pattern: achievable challenge > dopamine release > pleasure.

2.2.3. Engagement

Engagement, as defined by Kahn (1990), is “the simultaneous employment and expression of a person’s ‘preferred self’ in task behaviours that promote connections to work and to others, personal presence (physical, cognitive, and emotional) and active, full performances" (p. 700). Being physically, cognitively, or emotionally involved in one's tasks does not necessarily characterise engagement since, in engagement, these involvements occur simultaneously and synergistically (Kahn, 1992). An engaged team member is often perceived as psychologically present, fully there, attentive, feeling, connected, integrated, and focused on their role performances. In his theory, Kahn (1990, p. 694) states that people use personal engagement and personal detachment to deal with their ambivalence regarding participation in ongoing groups. This movement, which he called self-in-role, refers to the behaviours people assume in their work functions or abstain from presenting.

> I defined personal engagement as the harnessing of organisation members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances. I defined personal disengagement as the uncoupling of selves from work roles; in disengagement, people withdraw and defend themselves physically, cognitively, or emotionally during role performances. (Kahn, 1990, p. 694)

Kahn recognises engagement as a facet of being, something that the individual has at his disposal and uses according to what the environment provides. According to his theory, people choose actions and attitudes that they can perform at will, as a way of directing energy, whether for emotional, physical, or cognitive work (Kahn, 1990, p. 700). Such self-employment goes based on what scholars call flow (Csikszentmihalyi, 1975) and intrinsic motivation (Deci, 1975). In opposition, personal disengagement occurs as simultaneous defence and removal of the self in physical, cognitive, and emotional disconnection from the subject to the stimulus, playing a passive and incomplete role. In this case, the personally disengaged individual sees the stimulus, in fact, as a lack of stimulus (Kahn, 1990, p. 701).

Similar to personal engagement, *employee engagement* is "the involvement and enthusiasm of employees in their work and workplace" (Gallup Inc., 2020). When it comes to organisations, besides personal engagement, companies are far more immersed in two other types of engagement: customer and employee engagement. *Customer engagement* was described by Brodie et al. (2013) as a state of the psyche that is context-dependent, and their primary characteristics are their dynamic, iterative mechanisms. Diversely, the function of employee engagement as argued by Kahn (1990) is to promote and strengthen the employee's bond with the company and their functions, recognising and valuing their job enthusiasm, involvement in tasks, and satisfaction with the meaning of work.

There are companies whose focus is exclusively on customer engagement; others use its vital forces to leverage and maintain customer engagement while addressing employee engagement in the background, saving resources with this strategy. On the other hand, some companies deal with employee engagement as a priority, conscious that cultivating an engaged workforce generates a harvest of engaged customers. Managers must be aware that employee engagement contributes strongly to customer satisfaction (Harter et al., 2002). Therefore, managers should cherish the maintenance of the engagement of their employees, as it can return severe consequences for the future of the company: in the same way that it can bring positive results such as job commitment and organisational relatedness, it can also avoid unfavourable results, as it is negatively correlated with intentions to quit (Saks, 2019).

2.3. Industry analysis

The banking industry is an intense competition sector. The companies in this sector seek not only the financial return; they mainly seek returns above what investors expect to receive from the risk, named *above-average returns* (Hitt et al., 2016, p. 5). In turn, risk addresses the uncertainty of whether an investment will result in gain or loss (Miller, 2007, p. 11). Based on the above-average risk and return, one can conclude that to achieve its primary objective, which is to obtain above-average returns, a company must control two variables: risk and return: the higher the risk, the greater the expected return. On the other hand, when the risk is shallow, the expectation of return decreases. Therefore, the rule of thumb is to reduce the risk and increase the return. Depending on the company's strategy, it can pursue only one or the other or even both at the same time. Companies participating in the banking sector mainly use the latter option.

According to Hitt et al. (2016), there are two models of above-average returns*:* *the industrial organisation (I/O) model* and *the resource-based model*. The first model argues that management decisions within organisations have less influence on the company's performance in the market than the industry or segment it chooses to compete (Bowman & Helfat, 2001; Karniouchina et al., 2013). On the other hand, the resource-based model argues that a company's ability to obtain above-average returns comes from the unique set of resources and capabilities that each company has, and which forms the foundation of a company's strategy (Costa et al., 2013; Jacobides et al., 2012; Kraaijenbrink et al., 2009). The banking industry rely on the latter model to formulate the company's strategy, believing that the principal forces are on their resources and capability. Hitt et al. (2016) define *resources* as inputs into a firm's production process. As resources, a company can have talented managers, patents, individual employees' skills, capital equipment, and more.

However, when used in isolation, a company's resources are insufficient to guarantee a competitive advantage in the market. (Arora & Nandkumar, 2012; Naor et al., 2014). The *competitive advantage* of a company is generated from the moment that it starts to use a strategy that is seen by the consumer as superior so that its competitors find it difficult to replicate, either because it is expensive or even impossible (Sirmon et al., 2011; Sirmon et al., 2007; Teece, 2014). Therefore, to form a competitive advantage, a company needs to apply its resources to structure a capacity, a set of resources capable of carrying out an activity in a coordinated manner (Hitt et al., 2016; Schilke, 2014; Teece, 2014). There is also a relevant concept for this paper – the *core competencies* - the capabilities transformed into a competitive advantage for companies to stand out from their competitors. (Holahan et al., 2014). With this structure explained above, of above-average returns, resources, capability, core competencies, and competitive advantage, it becomes easier to analyse the banking industry, yielding more clarifying conclusions. A summary of the concepts listed here can be viewed in Figure 2.

Figure 2. The resource-based model of above-average returns

Figure adapted from Hitt et al. (2016, p. 17)

2.3.1. A new scenario

In previous scenarios, banks relied on oligopolies, lack of customer information, and a level of loyalty in which the customer was almost a "hostage-like" to the bank (many were afraid that their account would be closed at the bank's will). Today, in contrast, banks must promote diversification in what they offer to customers. However, this diversification has proved to be increasingly difficult, as banks imitate each new product or service launched by others in a short time, and sometimes even better. Therefore, portfolio diversification is not enough; it must be viewed holistically by diversifying its value through the service. Banks' investment in people has become a competitive advantage for several institutions, transforming their employees' capabilities into essential skills. Banks seek to properly explore all their essential competencies, implementing a competitive advantage over their competitors and, thus, being present in consumers' minds and hearts.

Online courses have become popular over the years, as they allow agility, convenience, flexibility, updated content, and modulation. Many banks are adopting gamification to generate greater engagement in banking courses and training, primarily online. However, several banks are not yet adopting this type of training in their institutions. The reasons for not using gamification in training bank employees are many. Firstly, even though appealing, gamification still terrifies organisations, notably large companies (Bogost, 2015, p. 65). Secondly, there is no standardisation in the gamification application; not just in banks, but in any organisation. Without this standardisation, implementing a gamified activity becomes quite laborious, requiring research and pilots to test its efficiency in the institution. Thirdly, while there are numerous success cases in applying gamification in banks, some failure cases are notified, not to mention the several possible failure occurrences not reported.

2.3.2. Five forces analysis

Among the various types of industry analysis existing, an analysis of the five forces developed by Michael Porter is by far the most used, and not without reason, as it presents a precise conjecture of the industry and makes analysis easier (Porter, 1997b). According to Porter, any industry in the market is subject to five indubitable forces that influence and are influenced by the firm. His theory's mainstay is the argument that the power and quantity of customers, competitive rivals, suppliers, substitute products, and new entrants to the market influence a company's profitability (Porter, 1997a). This analysis is widely used to identify a sector's structure and its strengths and weaknesses, making it a powerful tool to plan corporate strategy. It also measures an industry's attractiveness, profitability, and intensity of competition in the market.

Porter's Five Forces is a business analysis model that explains why various industries can sustain different profitability levels (Porter, 1997b). The banking sector is a peculiar sector, where the same character plays different roles, sometimes at the same time. To exemplify this peculiarity, there is the account holder who invests his money in the bank (playing the role of supplier), and who takes a loan (playing the role of the customer), or a financial technology company (Fintech), which are start-ups that propose to optimise and innovate financial activities. These fintechs enter the market with a different way of transacting money between people, using social networks. In the first case, this account holder plays the supplier's role when investing money in the bank and the customer's when taking a loan. In the second case, a fintech launched a substitute product on the market, and at the same time, became a new entrant in the market. However, fintechs also have a bank account, which makes them customers and even suppliers. This dynamic makes the financial industry unconventional regarding this type of analysis. Below is a more detailed analysis of Porter's five forces for the banking industry.

Bargaining power of customers. The banking sector has undergone several adjustments over time. An example is its relationship with consumers. Not long ago, banks relied on high exchange costs to retain their customers. Some countries are adopting the concept of banking portability, in which various products, such as current accounts, salary receipts, and banking products in general, are more easily transferred between banks, mediated by the central bank. Today, information is more accessible to the population; people connect more frequently and more intensely. This democratisation of information has created a new consumer profile that, while on the one hand, presents challenges to industry participants, on the other hand, brings opportunities. Table 1 shows the main differences observed in today's banking consumer, compared to the traditional.

Table 1. Comparison of bank consumer generations

Old banking consumer	***New consumer***
Has an account at only one institution	Multi-bank
Contact the manager for information and advice on finance	Searches for information from various sources such as specialised websites, YouTube channels, social networks
Appears at the bank whenever needing a financial service	No longer need to commute to the bank, as banking services are available from anywhere
Loyal, usually stays in the same institution for life	Not loyal; closes an account as quickly as opened it; always seeks the best cost-benefit ratio

Suppliers. The movement of capital, from the investing client to the bank and, finally, to the borrowing client, empirically demonstrates that, in the banking sector, the client is the supplier. In many cases, the same client is an investor and borrower, which can occur in two ways: in the first, the client keeps funds invested in the bank, but for various reasons, such as grace period, liquidity, and interest rate, he borrows money from the same Bank; in the second, the client makes a loan with the bank and, at the same time, applies the amount taken at the same bank, also for different reasons, such as not needing the money at the moment, liquidity, economic uncertainty, among others. With financial intermediation as the primary function, banks need an investor base as well as borrowers. The solution is to invest in the relationship with these suppliers (who are the investing customers) to guarantee enough funds to lend.

Competitors. Competition in the banking industry today is less about who offers the lowest rates but rather the best and fastest service. To have the best and most agile service, banks invest heavily in their workforce, transforming an employee and each employee into the image that the bank wants to convey to its customers. These changes have dramatically transformed competition between banks, which strives to offer the customer the most personalised service possible, even at the customer's entry-level of segmentation. This type of competition for the best service comes to the point that the price charged takes the background to negotiate with the customer. Availability and convenience have been at the forefront, which makes the competition even more fierce.

Substitute products. Virtual service bots, offering customised products and services, video chat. Just as technology has helped banks to engage with customers, it poses threats. Even though there is still no substitute for everything a bank can do for a customer, several products individually provide the services that banks offer. Today, even the cell phone makes face-to-face financial transactions, paying bills directly at Eftpos terminals, using approximation technology. This facility, coupled with the increase in power that large Internet companies are reaching, such as Facebook and Amazon, threaten banks with non-traditional products, which break paradigms by presenting different ways for the customer to relate to their own money and how to transact it. With these types of threats, banks strive to give customers reasons to keep using their services through a differentiated service, which any competitor would have difficulty imitating.

The threat of new entrants. Fintechs are the best-known new entrants to the banking industry. They represent a breaking point in the banking structure, introducing new paradigms of how personalised service can be and how close it is to the ideal product or service to reach forecasting and meeting needs. These companies mainly took advantage of their small size, which provides flexibility and speed, the power of the internet and cell phone apps, and not all the traditional bank regulations. Nevertheless, it is not just fintech that threatens banks as new players: there are also big techs, which are high-tech companies that expand their services to the financial products and services industry (OECD, 2020, pp. 7, 8). Big tech platforms have all the advantages fintechs have without having, however, most of their drawbacks. Examples of big tech include Google, Facebook, and Amazon.

With these threats presented above, the entry barrier is not enough to prevent fintechs and big data companies' success. To deal with these companies, incumbents transform the form of interaction with their customers, starting to treat them as users, seeking each interaction with the customer to generate business and collect updated information from that customer to feed their database. Big data is becoming mandatory in the sector. Banks have always had millions of customers contacting them daily, demanding products and services, and they previously did not maintain detailed information about each contact. Today, data is worked in an integrated way, so that strategic insights are generated, not only to personalise the service to that customer but to understand patterns and trends and improve that customer's next service.

According to Deleon (2019, subheading "Intelligent engagement and actionable insights"), in order to face these new entrants, institutions in the banking sector must intensify the use of this data advantage, transforming it into a competitive advantage, which will allow a more organic and real relationship with the customer. For this reason, banks have intensified their technological apparatus, often integrating with fintechs, using internet application programming interfaces (APIs), cloud computing, smartphones, digital currencies, and blockchain technology. Banks have also invested heavily in data processing professionals through hiring, but mainly through specific courses and training for the task, since they need highly specialised human capital.

2.3.3. Swot analysis

It is essential to understand the sector's strengths, weaknesses, opportunities, and industry threats in meaningful industry analysis. According to Hitt et al. (2016, pp. C-8), this analysis's fundamental goal is to recognise a company's position in the sector. *SWOT analysis* is a tool used to inform the search for market data, using organisations' strengths and weaknesses (Everett, 2014, p. 61). A SWOT analysis results empower managers with insights helping them choose a firm's paths and strategies (Hitt et al., 2016, pp. C-8). Below the strengths, weaknesses, opportunities, and threats of the banking industry will be discussed.

Strengths. Among the fundamental strengths of banks are:

Fostering economy. The traditional banking system is seen as the economy's driving force because banks control money and business that revolve in an economy through financial intermediation. It serves as a thermometer to measure market warming, investor mood, and consumer confidence. In this way, banks play a direct and indirect role in promoting the development of a country.

Scope. Traditional banks have a wide range of banking products and services, allowing them to serve all kinds of customers in virtually any situation. There are products for all types of customers. For all segments, banks have developed services for each stage of life: With this breadth of activity, banks maintain a hedge from risk, distributing it among different segments and activity areas.

Image of solidity. Compared with fintechs and big data companies, banks have an image of solidity that still guarantees them an advantage in some customers' preference. Those most risk-averse customers prefer to bank with an institution that has existed for a longer time, serving all regulations required by the government. Preferably those banks that have already gone through one or two crises and are still standing. This solidity image becomes even more critical in crisis times, where uncertainties dominate the market, and the appetite for risk plummets.

Customer information. One of the great strengths that banks have today, and many still do not use it properly, is the amount of information generated daily in all customer contacts. In turn, these data must be added to a set of information to generate more significant knowledge of the customer, their consumption profile, their lifetime, and thus generate, in addition to demand forecasts, insights into customer group patterns. Managing to take advantage of this position, banks will survive in this new big data reality.

Weakness.

Non-Performing Assets. Banks must deal with various types of credit, including those considered difficult or impossible to recover. These are non-performing assets, which weigh heavily on banks' balance sheets and present themselves as weaknesses in the sector.

Worldwide coordination. , A centralised coordination is crucial to promote interconnectivity, which is necessary today in the globalised world, enabling single and integrated systems, standardised processes, stabilised rates, and exchange rates, and, finally, greater security in financial transactions materialise in benefits for the customer directly. Banks worldwide do not currently have an institution such as the World Health Organisation and the World Trade Organisation, which globally manages the parameters and guarantees the liquidity, solidity, and smooth running of relations between banks from different nations.

Old technology leads to vulnerabilities. Although many financial institutions keep their technological apparatus up to date, some still operate with outdated systems and processes, resulting in security breaches and slower processes than necessary, and credit analyses that do not match the client's reality. This weakness must not be seen individually; instead, it needs to be understood as something sectorial, affecting an entire sector.

Opportunities.

Demographics and socio-cultural factors. As part of the nature of society, it is evolving on a worldwide scale. Just as this can present itself as a threat, it can also be an opportunity if handled correctly. Banks need to stay connected to their users if they are to remain in the market. For example, today, consumers want to be co-creators of the product they are buying. This type of evolution in the consumer's mentality must be understood and assimilated at all institutions' levels. Being in tune with sociocultural changes and the opportunities these changes can generate will bring significant results.

Expansion. There is a considerable gap in rural areas that will be filled. Likewise, customer segments are overlooked or under-served, such as customers with disabilities and elderlies. So, the thought goes: "if I am not available to these customers, another one will be." Looking at it through the lens of opportunity will make it possible to explore new possibilities and remain in consumers' minds as a present brand.

Threats.

Intense competition. The financial industry is a desirable industry, despite having significant barriers to entry. It is mainly due to the enormous potential business returns. However, the competition is highly intense, which presents a significant threat to all members. If not well worked out, this competition can lead to a significant reduction in return on equity.

Global market. The industry is highly susceptible to fluctuations in the world market. Whether due to economic, fiscal policies, exchange rates, or even wars and elections in key countries, the number of variables is immense. In addition to external exposure, a country's internal factors also significantly influence the sector.

Data breaches. As there is a more generous offer of service options and online interaction, the banking sector is increasingly subject to data breaches. It is intensified by the fact that the banking system does not have its cyber defence system, making full use of the cyber world. As a result, despite significant cybersecurity investments, criminals take advantage of this weakness to attack their customers.

2.3.4. External environment analysis

The banking industry, not unlike other sectors, deals daily with the consequences of external influences. To understand and deal with these external influences proactively, companies carry out an external environmental analysis (Hitt et al., 2016, p. 43). By analysing these opportunities within the banking industry, one can more clearly visualise the presented threats and opportunities, transforming them into strategic information. Table 2 summarises the external factors that influence the banking industry.

Table 2. External factors that influence the banking industry

Ambient	***Factor***
Political	Strong governmental regulation
	Access to government funds to implement public policies
Economic	Highly subject to market fluctuations
	Lack of centralised coordination
Socio-cultural	Dramatic changes in the profile of the banking consumer
	Changes in the bank's expected role by society
Technological	Technological advances allowing more intense and significant forms of customer-bank interaction
	The constant need to update systems and policies to protect customers' data and money

2.3.5. Summary

The scenario facing banks today is undoubtedly very different from what it was a few years ago. Changes in internal and external environments have been pushing for changes, and they are happening more and more quickly. In general, the banking sector is very well prepared to face the changes that are to come. The biggest challenge is to serve a consumer with increasingly specific and individualised demands and more connected: with other consumers, other companies, with the natural and political environment, with society, and with oneself. This consumer seeks to extract meaning through the value received in each interaction.

As customers are more demanding than before, banks are trying different ways to increase value. The banks that do this are creating a competitive advantage. The way they are adding value to customers is often by increasing their workforce’s skills. Therefore, the role of people in the relationship with this new consumer is fundamental. The sector professional must be prepared to empathise with his consumer's desires to attend even his needs for relatedness, ownership, and meaningfulness. The companies that are part of the banking system seek to have the best professionals in their team, especially in the front line, which is the customer's point of contact.

However, to have this professional, it is not just resorting to hiring, because it would be unfeasible; with this objective, investment in qualification is very high in banks with a more prominent presence in the market (OECD, 2020). The most common ways of preparing staff are providing training, encouraging and sponsoring specialisations, master's and MBA, and investing in certifications. In the end, companies that manage to keep the best and most engaged professionals will remain in the mind and heart of the consumer. Within this framework, this thesis seeks to understand whether the gamification applied to training in the banking sector can help banks prosper in this scenario.

Chapter 3. Literature Review

3.1. Introduction

The present literature will gather findings from scholars on the topic gamification. It will begin by defining the term and finding relationships with other denominations while seeking to discover the theories that support the concepts. Then, gamification will be studied concerning its function as a learning tool, comparing and contrasting findings and discussions. Next, the scope of gamification performance concerning areas, target audience, and technologies will be addressed. Following, this literature review will cover the gamification outcomes, reporting the findings in several studies, confronting similarities and dissimilarities among them. Thereupon, gamification will be evaluated from implementation and then followed by problems, limitations, and ethical aspects.

3.2. Bounding the concept

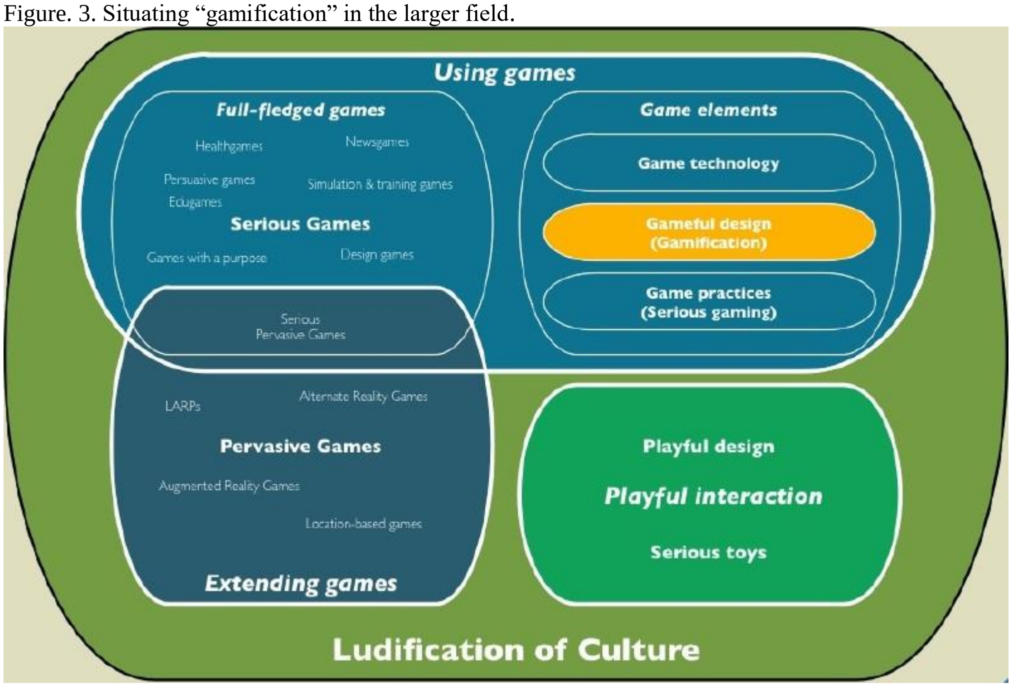
3.2.1. Concept and background

The term "gamification" is currently defined as "the use of game elements in non-game contexts" (Deterding, Khaled, et al., 2011, p. 2). This definition differentiates gamification from other related subjects, such as serious games, game-based learning, and design for playful interactions. Glover (2013, p. 2000) suggested that distinctly from these, which target developing games and game-like experience, educational gamification improves the learning process by adding game-like concepts. Sailer et al. (2017) made a parallel with the latter definition, describing it as "the process of making activities in non-game contexts more game-like by using game design elements" (p. 372). Deterding (2012) clarified that "Instead of creating full games, gamification's guiding idea is to use elements of game design in non-game contexts, products, and services to motivate desired behaviours" (p. 14). That is the goal of gamification: motivating people to engage in a context (Nicholson, 2015, p. 300).

In a further analysis, Deterding, Dixon, et al. (2011, p. 11) discussed that it is possible to compare the components of gamified applications to games because games provide users with differentiated gameplay and fun experiences. However, they argued that it is still necessary to clarify the difference between game-related approaches, such as gamification and serious games, giving today's accepted definition of gamification, as stated above. In their paper, the authors discussed the relationship of gamification with other concepts related to games. Figure. 3 situates gamification in the broader field. Analysing this theme through the lens of the learning industry, Glover (2013) clarified:

> Educational gamification is not to be confused with game-based learning, simulation, or serious games. These focus on creating games (and game-like experiences) which impart an educational benefit and includes software such as simulators. This concept is the direct opposite of educational gamification, which seeks to add game-like concepts to a learning process. (p. 2000)

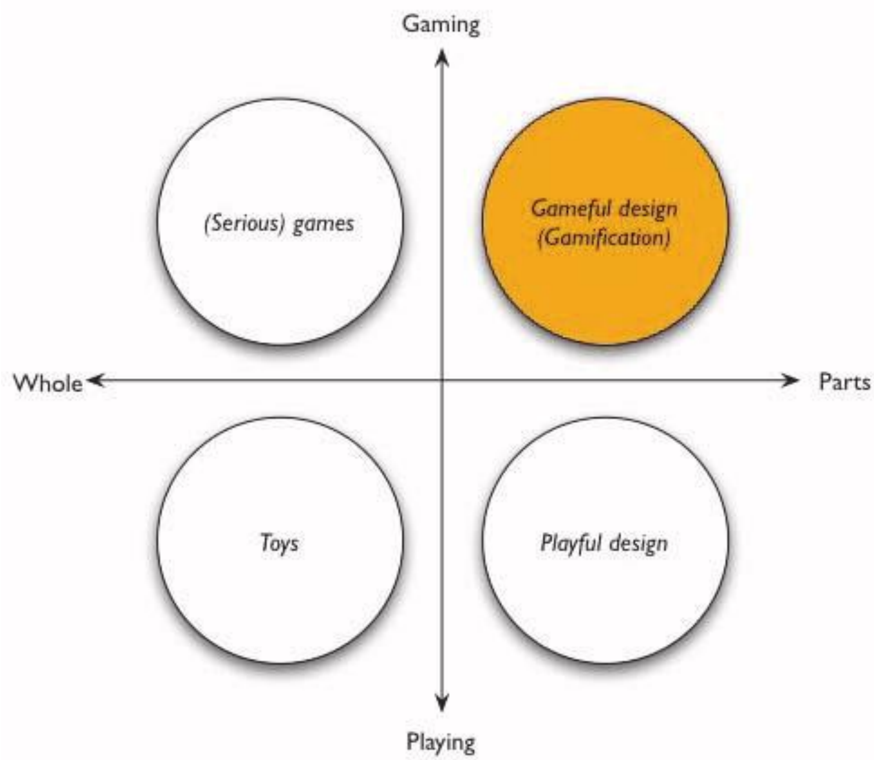
Figure. 3. Situating "gamification" in the larger field.



Source: Deterding, Dixon, et al. (2011, p. 13).

Furthermore, Deterding, Dixon, et al. (2011, p. 11) differentiated serious games from gamified applications explaining that although both are used for non-recreational purposes, the former's design is a complete game, while the latter uses only elements of games. Following this reasoning, one can conclude that while gamification brings game elements to a non-game context, serious games brings users into a game designed for serious purposes. So, to have the intended effect, designers should use elements appropriate to the context. Otherwise, they can have the opposite effect, that is, undermine engagement. The authors (2011, p. 13) proposed another diagram that situates gamification in a two-dimension plan, between game and play, whole and parts (Figure. 4).

Figure. 4. "Gamification" between game and play, whole and parts.



Source: (Deterding, Dixon, et al., 2011, p. 13).

Conversely, Hung (2017, p. 57) suggested that gamification has characteristics similar to other game-based educational activities, including game-based learning, serious games, and learning by design. The author (p. 57) defends that as they value different aspects of the games, these concepts have different approaches, although they are often exchanged. Albeit agreeing with the previous papers that serious games and gamification are different approaches, Fleming et al. (2017) explored this overlap, defending that both are, in a particular aspect, games; however, with a purpose not only that of fun. The author (2017, pp. 3-5) defended that both should be called applied games, divided into six types, according to Table 3. On the other hand, the author agreed with the suggestion from the previous papers that serious games and gamification are different approaches: while the former are computer games for serious purposes, the latter uses only elements of the game for non-game environments (Fleming et al., 2017, p. 1).

Table 3: Types of applied games

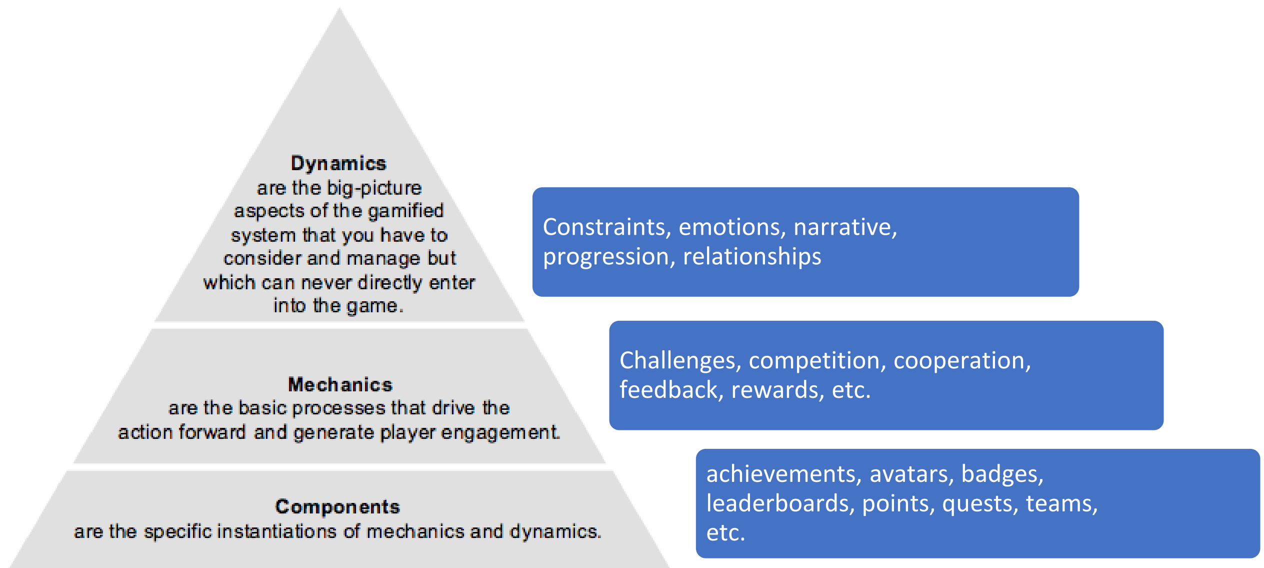
EXERGAMES	SPORT OR MOVEMENT-BASED GAMES
Virtual reality games	immersive interactivity in a virtual or augmented world
Cognitive behaviour therapy	Uses both gamification and serious games to change behaviour
Entertainment computer games	A traditional game but applied for therapeutic purposes.
Biofeedback-based games	Games that receive feedback from users' body
Cognitive training games	Games training users' awareness, perception, reasoning, and judgment

3.3. Game elements

After researching more than one hundred implementations of gamification, Werbach and Hunter (2012) found that the main game elements and the most used are the named PBL: points, badges, and leaderboards. The use of PBLs is so frequent that, according to the authors, they are often described as if they were gamification. Despite emphasising the importance of these three game elements, the authors warn that they are not the only ones who compose gamification (Werbach & Hunter, 2012, p. 71). According to the authors (2012), the other elements can be classified into three categories: decreasing abstraction order: dynamics, mechanics, and components. These elements are outlined in Figure 5 below.

Werbach and Hunter (2012) elucidated that while the dynamics deal with the general structure, elements that meet the user's long-term goals, mechanics are more basic processes that direct the player's engagement, used to achieve one or more of the existing dynamics. The authors explained that components, on the other hand, are more specific than mechanical or dynamic forms, perceived more easily by the user, as they have a lower level of abstraction than the others. Using this classification, Table 4 displays the game elements analysed by some papers, with their respective authors. As one can see, the most frequently studied elements among all papers are points, badges, and leaderboards, confirming what was reported by (Werbach & Hunter, 2012). Regarding dynamics, the only paper that directly addressed them was Werbach and Hunter (2012)'s, which related constraints, emotions, narrative, progression, and relationships as the most important to be applied in gamification

Figure 5. The Game element hierarchy.



Adapted from Werbach and Hunter (2012, p. 82)

As Table 4 displays, scholars have neither a definitive list of game elements nor a conclusive concept for gamification. This lack of standardisation is why it can have distinctive configurations, depending on both the game elements used and its implementation (Sailer et al., 2017, p. 372). Sailer et al. (2017, p. 373) justified their presented selection of game elements based on how visible to the players they are, the ease with which it is possible to activate them experimentally, and the strength with which, within the theoretical framework proposed by the authors, these can be used to address motivational mechanisms.

Table 4: Research on crucial game elements for gamification

	Papers	Werbach and Hunter (2012)	Nicholson (2015)	Dicheva et al. (2015)	Wolf et al. (2020)	Morschheuser et al. (2015)	Hamari (2017)	Deterding, Dixon, et al. (2011)	Simões et al. (2015)
Components	Points	●	●	●	●	●			●
	Badges	●	●		●	●	●		●
	Leaderboards	●			●	●		●	●
	Avatars	●						●	
	Levels	●	●		●				●
	Teams/groups	●						●	●
	Clear rules							●	●
	Make-believe							●	
	Achievements	●							
	Quests	●			●				
	Items		●						
	Goals								●
Mechanics	Fun								●
	Feedback	●			●			●	●
	Social enabled				●				●
	Competition	●						●	
	Cooperation	●							
	Challenges	●	●						
	Rewards	●				●			●

3.4. The power of feedback

There are several studies (Brigham, 2015; Fleming et al., 2017; Hung, 2017; Karimi & Nickpayam, 2017; Perryer et al., 2016; Sands, 2013; Torres, 2016; Willis & Willis, 2020; Xi & Hamari, 2019) that point to feedback as an element borrowed from games to transform an activity into a more game-like experience. According to Hung (2017, p. 62), gamification feedback should be meaningful, helping users know precisely how they are doing in the activity. That is why games, according to Willis (2011a, 10:03), can leverage engagement: they give users incremental progress feedback. Torres (2016, p. 120) stated that feedback supports and rewards the motivation to complete challenges, arguing that it supplies participants with real-time tracking of their progress, encouraging the completion of the challenge while serving as a positive reinforcement when the program is completed.

Therefore, feedback acts as a reward mechanism in games and game-like experiences since it creates a strong bond between action and consequence because it is instantaneous (Torres, 2016, p. 163). According to Perryer et al. (2016, p. 17), regular feedback and checking mechanisms should be immersed holistically in the gamified application to enhance its effectiveness to achieve this level of promptness. Thenceforth, according to Xi and Hamari (2019, p. 212), feedback helps to increase the satisfaction of the need for competence because it evidences users' competence through active monitoring of their achievements. On the other side, Torres (2016, p. 120) added that feedback also increases the satisfaction of the need for autonomy as it enables the user to reflect on their progress and the choices they made. The importance of feedback was highlighted in the Gallup Inc. (2019) research, which found that employees are three times more likely to engage if they have daily feedback in the workplace than those who receive feedback once a year or less.

3.5. The role of challenge

As studied in Section 2.2.1, the human brain seeks endorphin through the performance of increasingly challenging activities in an incremental increase of the challenge. This need for incremental challenges must be satisfied by applying the game to promote continuous learning in game-based learning environments (Hamari et al., 2016, p. 170). Comparing games with reality, McGonigal (2011) stated:

> in a good computer or video game, you're always playing on the very edge of your skill level, always on the brink of falling off. When you do fall off, you feel the urge to climb back on. That's because there is virtually nothing as engaging as this state of working at the very limits of your ability—or what both game designers and psychologists call 'flow.' When you are in a state of flow, you want to stay there: both quitting and winning are equally unsatisfying outcomes. (chapter one, "fix #1" section)

Nicholson (2015, p. 13) defended that engagement is triggered when the challenges match the player's skill level. Flow is what defines enjoyment, according to Torres (2016, p. 158), defending that it is the state gamers seek in a mainstream game. The author explained that flow could be achieved by programs that are easy to learn and use, so the program will be enjoyable for the user when the flow is present. As outlined above, fun must be present in a gamified application because it differentiates game applications from non-game ones. Thus, challenge plays a crucial role in fun because when users' skills match the game challenges, flow happens (Torres, 2016, p. 161). In other words, the program should be neither too easy nor too difficult but challenging enough for the player to conclude that he or she can overcome it, even if he or she fails at that moment.

3.6. Scope

By definition, gamification is commonly observed in contexts not considered playful (Ferri, 2014, p. 215).In an organisational environment, for example, not only employees benefit from the use of gamification (Robson et al., 2016, p. 8). Customers are also among the beneficiaries of a company's gamified activities. Nevertheless, Robson et al. (2016, p. 8) supported that all stakeholders will benefit; among them, employees represent most internal stakeholders, while customers are the most representative type of external stakeholder.

Regarding the age group most affected by gamification, there is no consensus among the studies analysed. McIntyre (2018, p. 29) argued that generation does not limit gamified engagement, while some studies contended that millennials (born between 1986 and 1995) have more acceptance of gamified training (Brigham, 2015, p. 474; Sands, 2013, p. 59; Singh & Prasad, 2018, p. 35). The crucial point for differentiation, following Brigham's study (2015, p. 474), is that, to the same extent that generation Y (born after 1996) seeks the team's synergy, they appreciate instant feedback. In the same reasoning, Sands (2013, p. 69) found that countries endowed with a younger workforce will have fewer challenges in implementing gamification. Pathak (2020, p. 593) argued that changes in the work environment promoted by technology, in the same way have employees' expectations.

According to some studies, however, (Deterding, 2016; Deterding, Dixon, et al., 2011; Deterding, Khaled, et al., 2011; Sanmugam et al., 2014), gamification is not just limited to digital. For example, the designer Daniel Disselkoen (Disselkoen, 2015) developed an augmented-reality game for the Amsterdam tram's users to play while commuting. He attached two stickers, one posted inside the window, with a shape of something that looked like a monster-fish (Figure 6), and the other, larger, on the back of the seat in front, explaining the simple rules. The goal was to "eat" as many pedestrians' heads as the passenger could. The game was a success, used as an example that it is not necessary technology to play engaging games and how make-believe and playful design play a vital role in this engagement. That is what makes gamification so full of possibilities: it can be implemented electronically and non-electronically (Sanmugam et al., 2014, p. 4).

Figure 6: Disselkoen's Man-Eater

Source: Deterding (2016)

Due to its capacity in increasing engagement, gamification has been adopted in a variety of areas such as:

- training and education (Deterding, Dixon, et al., 2011; Deterding, Khaled, et al., 2011; Dicheva et al., 2015; Domínguez et al., 2013; Glover, 2013; Hamari et al., 2016; Hanus & Fox, 2015; Hung, 2017; Simões et al., 2015; Willis, 2011c)
- marketing (Wolf et al., 2020; Xi & Hamari, 2019)
- journalism (Conill, 2016; Conill & Karisson, 2016)
- employee onboarding (Torres, 2016)
- mental health (Fleming et al., 2017)
- banking (Baptista & Oliveira, 2017; Morschheuser et al., 2015; Pathak, 2020; Rodrigues, Oliveira, et al., 2016)
- wellbeing (Fleming et al., 2017)
- loyalty programs (Hwang & Choi, 2020)

- arts (Heljakka & Ihamäki, 2019; Juul, 2005)
- recruitment (Armstrong et al., 2016)

Despite the broad scope, some authors (Domínguez et al., 2013; Glover, 2013) defend e-learning as the ideal framework. Whether in a primary school, university, or corporate training of company executives, the critical aspect is working on how these organisations deal with education and learning. As asserted by Hamari et al. (2016, p. 177), this is a vital learning feature: engagement. Muntean (2011) argued that gamification is less creating a game and more shifting education into a more engaged and fun activity, without deconstructing its credibility. This promise to promote engagement is what has inciting many companies to use gamification. However, games, as suggested by Bogost (2015), "remain a terrifying yet appealing medium for businesses" (p. 65). The author explains that traditional organisations fear games because they do not understand them.

3.7. Gamification: (E)-learning tool

Some scholars (De-Marcos et al., 2014, p. 91; Muntean, 2011, p. 323; Pavlas, 2010, p. 1; Wawak & Woźniak, 2012, p. 125) agreed to state that e-learning is the most appropriate use of gamification, for several reasons. Firstly, Wawak and Woźniak (2012) outline the difference between e-learning and the traditional approaches, arguing that "by using e-learning it is possible to engage students and employees by allowing them to study in the way that is more friendly for them, time-effective" (p. 131). This affirmation was supported by Glover (2013, p. 2005), who argued that the ideal settings for implementing gamification are virtual learning environments (VLEs) and learning management systems (LMSes) because these locations ordinarily provide support for collaboration, competition, and content sharing while tracking the progress and interactions of user activity.

Secondly, De-Marcos et al. (2014, p. 91) defended that the use of gamified e-learning could lead to an engaged, motivating, and more participative learning experience. They used a quasi-experimental design to test and compare social networking and gamification in three groups of students of an undergraduate course, which were, respectively: gamification, social networking, and control group. The study found that although both techniques performed better than a traditional e-learning method, just promoting achievements, collections, and competitions is not enough to encourage participation (De-Marcos et al., 2014, p. 90).

Notwithstanding the number of articles analysing gamification as being carried out only by digital means, Deterding, Dixon, et al. (2011, p. 11) claimed that it would be limiting to believe that gamification cannot be implemented in face-to-face training without the use of more current technologies. Therefore, the term “gamification,” despite being explicitly related to digital, should not be restricted to digital technologies (Deterding, Dixon, et al., 2011, p. 11). Furthermore, games and game design were argued as transmedia categories themselves since they are not limited to one media. (Deterding, Khaled, et al., 2011, p. 2).

3.8. Outcomes

3.8.1. Increasing engagement and motivation

There is an agreement in the researched articles that mention engagement as a result of gamification (Barata et al., 2013; Brigham, 2015; De-Marcos et al., 2014; Fuchs et al., 2014; Glover, 2013; Hamari et al., 2016; Hussain et al., 2018; Iosup & Epema, 2014; McIntyre, 2018; Morschheuser et al., 2015; Muntean, 2011; Sands, 2013; Singh & Prasad, 2018). In the same way, there is much evidence in the literature (Armstrong & Landers, 2018; Barata et al., 2013; Brigham, 2015; Deterding, 2012; Hussain et al., 2018; Iosup & Epema, 2014; Pereira et al., 2018; Silic & Back, 2017) that found gamification responsible for increasing motivation in the workplace. Xi and Hamari (2019) found that such increases in motivation happen through intrinsic need satisfaction. Their survey-based study (N=824) analysed the associations among immersion, achievement, and social-related features with autonomy, competence, and relatedness need satisfaction. It was suggested that gamification features should be aligned and combined with their business goals and objectives, satisfy different intrinsic needs of consumers, and improve marketing performance.

In general, gamified learning tends to ensure greater interest and motivation from participants (Armstrong & Landers, 2018, p. 164). This strategy, as debated by Brigham (2015, p. 473), can be used to solve problems, in addition to its benefit in increasing motivation and learning. The company Gallup researched the differences in performance between engaged and actively disengaged business/work units, covering more than 82,000 teams – over 1.8 million employees – in 230 organisations across 49 industries and 73 countries. In the research (Gallup Inc., 2019, p. 5), it was found that the top engaged teams undoubtedly outperformed the bottom ones on the performance results in Table 5. Such results highlight companies' need to value engagement promotion, as any organisation needs an engaged workforce to yield the results displayed.

Table 5. The difference in outcomes between engaged and disengaged employees.

OUTCOME	***DIFFERENCE***
Absenteeism	41% lower
Safety incidents	70% fewer
Turnover (in high-turnover organisations)	24 % less
Turnover (in low-turnover organisations)	59% less
Sales	20% higher
Profitability	21% higher
Customer ratings	10% higher

Source: Gallup Inc. (2019)

As far as the perception of employees over gamification is concerned, Talent IMS (Apostolopoulos, 2019) surveyed almost 900 employees questioning whether they noticed any gamification element in the workplace. From 61% interviewed who received gamified training, 83% felt motivated, while 61% of those who did not receive gamified training felt bored and unproductive. Besides, 89% of the respondents who reported using gamification at work said that gamification made them feel more productive, while 88% said it made them happier. The summary of their findings can be found in Figure 7.

Figure 7. TalentLMS gamification survey 2019 summary.

Source: Apostolopoulos (2019)

3.8.2. Impact on intrinsic motivation:

As detailed in chapter 2, intrinsic motivation means to perform a task because it is satisfying in itself, while extrinsic motivation is doing a task because of an agent external to the activity, such as a punishment or reward (Deci et al., 1999, p. 649). Thus, when planned and implemented appropriately, gamification has the power to raise the intrinsic motivation of the players (Sands, 2013, p. 72). Mitchell et al. (2018, p. 328) followed the same reasoning, arguing that when a gamified application yields autonomy and competence needs satisfaction, intrinsic motivation arises. In opposition, Mekler et al. (2017, p. 525) defended that the effect of game elements, such as points, levels and leaderboards on intrinsic motivation is not significant enough to attest to any positive correlation.

Indeed, findings on this study of Mekler et al. (2017, p. 525) demonstrated that these game elements positively impact performance rates, as they operate as extrinsic incentives. In line with this demonstration, Perryer et al. (2016) defended that the distinction between intrinsic and extrinsic motivation distinguishes work and play. Nonetheless, a desirable gamified system should also consider how to drive the player's intrinsic motivation, to become effective in the long run, instead of focusing only on adding game elements to a non-game context (Simões et al., 2015, p. 4).

3.8.3. The satisfaction of employees' psychological needs

Mitchell et al. (2018) researched the relationship between outside workplace pressures and gamification outcomes. He conducted an online survey with 291 respondents who were currently using or have used a gamified application in the last three months in a workplace context. In this study (p. 328), he found evidence that when the use of the gamified application is motivated by personal benefit, employees' autonomy, relatedness, and competence needs are more likely to be met. The author concluded that although extrinsic motivators are likely to decrease employees' autonomy and competence needs satisfaction, it can support intrinsic motivation when internalised.

Mitchell et al. (2018) raised that when gamification is designed with both company and users' needs in mind, it is more likely to support users' intrinsic motivation through a long-term approach. As argued by Nicholson (2014), "focusing on building longer-term loyalty for engagement with an organisation can be more beneficial in the long term than continually bribing participants with rewards" (p. 294). By focusing only on the short-term consequences, such as rewarding participants fiduciarily or using points and leaderboards to constrain employees, the organisation misses the opportunity to build real engagement, where employees perceive themselves as part of the company, realising they are having their needs met, not just those of the company. Nicholson (2015, p. 18) also suggested that rewarding users with badges and points are useful only in the short term, at best. However, in most cases, this approach can be seen as superfluous or cause a feeling of manipulation (Armstrong & Landers, 2018, p. 164).

3.8.4. Learning

Another result of gamification is intensifying learning (Barata et al., 2013; De-Marcos et al., 2014; Iosup & Epema, 2014; Muntean, 2011). There is, indeed, much room in education to be strengthened. Firstly, a failure of traditional e-learning, as pointed out by Muntean (2011, p. 323), is the lack of capacity to convey emotion and engage students as a teacher would. However, the author argued that gamification could fill this gap by encouraging students in other ways, such as using elements of the game to boost both intrinsic and extrinsic motivation (Muntean, 2011, p. 326). Secondly, as reported by an empirical study by De-Marcos et al. (2014), gamified e-learning can produce "participative, motivating, engaging and meaningful learning experiences" (p. 91). Their study compared the effect of social networking and gamification on the performance, participation, and attitude of undergraduate students and found that both approaches presented better performance than a traditional e-learning approach. However, the results suggested that just having gamified content will not increase participation; in this regard, social networks play a more influential role, especially when working together with careful instructional design guided by clear objectives. (De-Marcos et al., 2014, pp. 90-91).

Thirdly, Muntean (2011, p. 328) presented that gamification can increase students' interest in subjects when applied to school, culminating in more significant learning. Supporting this affirmation, the study of Barata et al. (2013, p. 16) found that gamified courses can be more motivating and most comfortable to learn, improving learning outcomes. The authors carried out a longitudinal experiment for five years, where the last two years were gamified, and the first three years were non-gamified, for comparison purposes. According to their findings (p. 16), these results led to increased rates, attention, participation, and proactivity. Such outcomes were assessed through increased participation in classes, proactivity in forums, improved grades, and student feedback (they reported the course as more motivating and exciting than the regular ones).

Finally, these findings were supported by Iosup and Epema (2014, p. 7)'s research. They found that with students, gamification can contribute to diverse outcomes, rising cooperation, and increasing passing rates while leveraging student satisfaction (Iosup & Epema, 2014, p. 7). In this study, they applied gamification in a longitudinal study for three years for graduate and undergraduate students of a technical university in the Netherlands. They found the gamified approach strongly correlated with the escalating passing rates, voluntary participation, and in-class interaction.

3.8.5. Knowledge sharing

Sands (2013, p. 68) discussed that knowledge sharing is a consequence of gamified activities since it can promote collaborative cultures and see the whole picture while promoting a sense of competition and continuous feedback. Silic and Back (2017, p. 1313) conducted a longitudinal survey online with 147 employees of a large company. They found that in gamified training, employees reported feeling more recognised by their colleagues and superiors than in the control group (formal training), which they perceive as a benefit. Consequently, this recognition leads to an increase in knowledge sharing, because according to the same study (p. 1313), the motivation to share knowledge expands in the same proportion in which employees perceive the extent to which it can benefit them. These findings are in line with those of Iosup and Epema (2014, p. 6), whose research proposed that a gamified activity, even if for the company's benefit, is something personally gratifying, which culminates in user engagement.

3.9. Planning

3.9.1. Meaningful gamification

When hearing about training, an app, or even a gamified class, fun comes into mind. The word *game* brings this expectation, and this must be considered in the planning stage. Therefore, when planning gamification, the flow should be considered. Torres (2016, p. 161) clarifies that the game elements must be simple to both learn and control so that the flow experience is not interrupted, which would make the participation hard, so the program would not be enjoyable. On the other hand, if the activity to be gamified does not have enough value, gamify, will not increase motivation (De-Marcos et al., 2014, p. 91; Simões et al., 2015, p. 12). “The entity being gamified needs to have some intrinsic value already” (Deterding, 2012, p. 17). These thoughts are in line with Glover (2013, p. 2006), who argued that although gamification can bring more engagement to learning, it cannot be applied in isolation from other mechanisms and tools. A conclusion that condenses the above statements is that of Rodrigues, Costa, et al. (2016), who states that the gamified application must be a reflection of the product, in a game analogy.

One of the methods to avoid this separation from gamification to the activity to be gamified, according to Sands (2013, p. 67), is by linking Human Resources (HR) and business strategy *before* implementation, which is mandatory to yield favourable outcomes. This link helps users to see consistency and purpose in the activity. According to McCarthy et al. (2019, p. 16), managers should be accountable for ensuring that the gamified activity corresponds to the desired organisational results. On the other hand, there is no point in applying gamification to a project, hoping that it will be successful by itself. Using a set of techniques does not assure, according to the findings of Philippette (2015, p. 198), that users will take part in the activity, and meaningful gamification presupposes voluntary participation. However, if an organisation develops a non-mandatory gamified application, designers must plan a product that is attractive to the user; that is attractive, but without leaving any doubt to them that the use is by their own choice, without pressure from the company, whether direct or indirect.

3.9.2. Rewards

Nicholson (2015, p. 3) analysed the role of rewards in gamification and argued that reward-based gamification could be sufficient to generate engagement in tasks where it is not possible or necessary to develop intrinsic motivation; this is no longer recommended, however, when the objective is a long-term engagement when a change of behaviour in the subject is intended. In this case, according to the author, using rewards can be dangerous and harmful in the long run. He defended meaningful gamification, described as the use of game elements to forge intrinsic motivation, fuelling non-game settings with meaning. In meaningful gamification, instead of rewarding users' behaviour, the gamified system should help them find their reasons to engage with the behaviour (Nicholson, 2015).

To serve the purpose of meaningful gamification, designers should use game elements, as argued by Nicholson (2015, p. 4), to increase intrinsic motivation, rather than being used as a form of reward, which will only promote extrinsic motivation. The author elaborated the concept of meaningful gamification, which uses game design elements to foment intrinsic motivation, consequently enhancing the meaning in contexts not related to games. Nicholson (2015) developed a RECIPE for meaningful gamification, which consisted of six stages, the initials of which form the word RECIPE:

- Reflection—helping users understand their game-based experience and the meaning in the real-world. This can be presented as a debriefing, reflecting on their experience, alone or in groups, allowing learning with others' insights.

- Exposition— presenting a narrative layer or make-believe through game design elements to highlight the connection with real-world settings, giving more meaning to the gamified experience.

- Choice—empowering participants with the choice of engaging with the system in the manner he or she desires.

- Information—allowing participants to precisely understand the "how" and the "why" behind all the activity using game design and game display concepts.

- Play—providing fun by allowing users to explore and fail in-game settings within boundaries freely.

- Engagement—Personal and social engagement: the production of an engaging gameplay experience personally and socially, inspiring users to learn from each other.

3.9.3. Cognitive and emotion

Some authors (McCarthy et al., 2019; Mullins & Sabherwal, 2018; Robson et al., 2015) agreed that cognition and emotion must be considered for designing gamified systems. Fleming et al. (2017, p. 312) defended that gamification's cognitive-emotional perspective offers a promising way to seek instrumental results while engaging users. Furthermore, Robson et al. (2015, p. 416) claimed that to have a successfully gamified experience, designers and managers must understand the mechanics, dynamics, and emotions and how these principles are interrelated. Accordingly, with this planning, the system should be designed to engage users directly with real-world settings (Nicholson, 2014, p. 301). This design makes it easier for the user to see the whole picture, increasing relatedness need satisfaction.

3.9.4. Organisation and users' expectations

In recent research (Gallup Inc., 2019), it was found that many organisations have engagement programs that are disconnected from various aspects of the employee experience. Therefore, adequate planning is essential for efficient and effective gamification. Careful planning should occur before implementation to apply the correct game mechanics both in the system and the user (Sanmugam et al., 2014, p. 4). What makes this planning intricated is that there is not a universal rule about the adoption of gamification; instead, gamification designers must consider the particularities of the environment in which it will be applied, such as the type of industry and the essence of the workplace (Hussain et al., 2018, p. 105). Organizations should consider selecting different gamification features according to their business objectives and targeting them to satisfy consumers' different intrinsic needs. (Xi & Hamari, 2019, p. 218).

Still, before implementation, McIntyre (2018, p. 74) indicated in his "five-step guide to installing gamification" that it must have clear communication of rules and purpose. Congruent with his study, another paper supported that "clear goals and defined stages of play allow people to map their performance and calibrate against the organisations' expectations" (Sands, 2013, p. 67). Moreover, the planning before implementation should include understanding the participants' attributes and controlling their expectations; this activity is essential for the design of the gamified activity (Robson et al., 2016, p. 7). It is in line with the discussion on the paper of Perryer et al. (2016, p. 16), which considers users' needs and expectations as a premise defended that game designers must opt for strategies to achieve organisational and employees' long-term goals.

After understanding who users are and what they want, the activity to be gamified must align with the organisation's tasks and objectives, according to Perryer et al. (2016, p. 16). Furthermore, users' expectations and technology experience must also be considered, especially when dealing with technology-based applications (Wolf et al., 2020, p. 361). Finding and pursuing employee's expectations and long-term goals is mandatory because a gamified program should always be planned with both organisation and employee expectations in mind, creating shared value (Mitchell et al., 2018, p. 328). Hence, as evident as it may seem, gamification is more efficient when it meets the objectives for which it was planned (McCarthy et al., 2019, p. 10).

Furthermore, Raczkowski (2015, pp. 157-158) added that every gamified application carries specific assumptions about the user for whom the game was intended, through design decisions, code or hardware architecture, and the physical quality of the game elements. These assumptions act bilaterally: while gamified applications carry assumptions about the user, the user carries assumptions about the application. For example, when interacting with video game elements, users have the assumption that their actions will impact the game in some way (Torres, 2016, p. 106). Hence, while planning and implementing gamification in an organisation, designers should keep in mind users' expectations.

3.9.5. Cooperation versus competition

Perryer et al. (2016, p. 14) argued that a gamified system that emphasises competition is less likely to be effective than that which promotes cooperation. For example, Domínguez et al. (2013) studied the implications of gamifying some learning activities. For this experiment, they designed and built a gamification plugin for an established e-learning platform to be used in a university course, and one of their findings was that leaderboards could increase and decrease motivation, depending on the users' perception (p. 391). The authors explained that while seen as a form of feedback, having ones' achievement recognised instantly, is likely to motivate the user; on the other side, while seen as social comparison, it can even discourage the user from continuing the activity. In agreement with this point of view, Kim and Werbach (2016) indicated that disclosing the numerical productivity scores can be perceived as an act of harassment, as it is seen as offensive or even humiliating.

However, Perryer et al. (2016, p. 15) concluded later in their paper that if the competition involved is team-based (uniting players in teams against a shared opponent), the chances of being adequate to increase due to healthy competition and the social bond among group members. In the same paper, the authors also argued that:

> utilising team-based competition assists players in satisfying their drive to bond with their teammates, which enhances an organisation's culture, while simultaneously satisfying players' drives to defend. This type of competition has the added advantage of appealing to players with varying achievement orientations (Perryer et al., 2016, p. 15).

In line with this thought, Xi and Hamari (2019) concluded that cooperation and other resources related to social networks, such as social networks, can increase the satisfaction of relationship needs since it provides users with tools to relate within the same system socially.

What differentiates cooperation and competition is how this interaction is established: in cooperation, participants work together towards a common goal, while in competition, participants are on opposite sides and compete for positions or rewards. Oppositely, the common feature is that both are social-related elements: one cannot compete or cooperate without interaction with one another. Xi and Hamari (2019, p. 213) suggested a link between these social-related elements and relatedness needs satisfaction: they defended that the first can satisfy the latter because it promotes social relationships among users in the same system or service. In this scenario, the type of social interaction will influence motivation through competition or cooperation. According to Vallerand (1997, p. 277), a person's motivation is strongly influenced by others because motivation is more social than an intrapersonal phenomenon.

3.10. Implementation

3.10.1. Voluntarily

As seen above, gamification can foster engagement. Robson et al. (2016, p. 1) highlighted, however, that such a result can only come from correct implementation.

Thus, both designers and managers should move their focus to ensure that gamified application provides co-created experiences, rather than concerning only with game elements: designers preparing an application that promotes collaboration and managers assisting the progress of such integration (Wolf et al., 2020, p. 361). A critical point that there is agreement among some authors (Deterding, 2011; Fuchs et al., 2014; Golian & Ghasemi, 2018; Kim & Werbach, 2016; Perryer et al., 2016; Robson et al., 2015) is that all gamified activity must be carried out voluntarily. In opposition to voluntariness, imposing play undermines spontaneity and self-determination, which are the foundation of play (Perryer et al., 2016, p. 11).

As Nicholson (2015) claimed, "if something is not optional, then it is not, by definition, play" (p. 6). When a user truly consents in participating in a gamified experience, the positive outcomes emerge; when there is no consent (or at least not a real consent), there is a decreasing positive outcome (Burawoy, 1982; Mollick & Rothbard, 2014). As an example, Deterding (2015, pp. 309-310) argued that gamified activities in mandatory and consequential contexts, such as workplaces or formal education, are at risk of being perceived as "electronic whips": instead of foster motivation, fun, and performance, they decrease them, undermining autonomy, on the other hand.

Perryer et al. (2016, p. 11) affirmed that one of the problems on gamification occurs when imposed from the top-down to reinforce organisation goals, in opposition to games, with its spontaneous bottom-up approaches. This approach allows the need for autonomy to be satisfied, leveraging the best outcomes. Deterding (2011, p. 3) argued that substantial experience of autonomy (which is an internal motivation) could emerge through voluntary participation in an activity; therefore, this participation must be free of consequences. On the other hand, if the game elements are used separately, they will play external motivators, as Mekler et al. (2017, p. 525) argued. As external motivators, the elements tend to have positive effects only in the short term. However, they can even have adverse effects if users feel manipulated (Armstrong & Landers, 2018, p. 164).

3.10.2.Fun

There is agreement among some papers (Karl et al., 2005; Mitchell et al., 2018; Muntean, 2011; Pavlas, 2010; Robson et al., 2015; Sanmugam et al., 2014; Simões et al., 2015) about the role of fun in gamified activities. One of the primary reasons for playing a game is having fun; this is the rationale why "play and entertainment should not be secondary in serious games" (Pavlas, 2010, p. 120). Additionally, the author (p. 120) found play and fun as vital elements of the game-based learning platform and its core benefits. Concerning the importance of fun in gamification, Nicholson (2015, p. 6) supported that when fun is present in a gamified activity, external rewards are unnecessary because players reward themselves with fun.

In this case, the author concluded that it is the play and no longer points and badges that bring engagement to the participants in the real-world context through gamification. As play and fun generate motivation in games, by importing this motivation, gamification gives a purpose to that, employing it to generate real solutions to real problems; this is the crucial point of gamification (Golian & Ghasemi, 2018, p. 11). According to Mitchell et al. (2018, p. 328), fun is one of the features that makes gamification sustainable and effective in the workplace: it transforms a gamified application into something pleasant and attractive. Sanmugam et al. (2014, pp. 3-4) agreed with this affirmation and summarised that the positive aspects of the game-based experience are based on the fun of playing, not the points themselves.

3.10.3.Flow

To feel the enjoyment of fun, flow is a necessary state for the player. Described by Csikszentmihalyi (2014) as "a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself" (p. 230), flow occurs when there is a balance between challenge and player's skill. Mitchell et al. (2018) defended that an adequate gamified system "should have elements that stretch participants' knowledge, skills and abilities, but should avoid too high a learning curve that could lead to demotivation"(p. 16). This strategy is in line with one of the cardinal points of McGonigal (2011)'s study, who stated that games keep the challenge in a place where the difficulty is always adequate to the player's skills: neither too easy to cause boredom nor too difficult to the point of giving up: this is called the state of flow. The implementation of flow is based on the main idea behind the process: the user. Gamified programs should have a user-centred perspective to maintain the state of flow, facilitating experiences instead of just focusing on designing game elements (Torres, 2016, p. 161; Wolf et al., 2020). And being user-centred means that both program designers and facilitators (managers or tutors) must focus on users.

3.10.4.Roles in gamification

Robson et al. (2015, p. 414) outlined four roles in gamification, depending on whether they act passively or actively in the activity:

- Players: people who compete in the game
- Designers: people in the organisation who plan, develop, design, or manage the gamified experience
- Spectators: people who, despite not competing, impact how the experience of players works due to their presence
- Observers: people who are external to the experience and therefore do not influence the players' experience. Their presence and quantity, however, impact the reputation of the gamified experience.

All the roles mentioned above exert equal importance for the success of the gamified activity. However, according to McIntyre (2018, p. 73), the manager is in charge of gaining an optimistic perception of the program's effectiveness and maintaining it at all times. One method for the manager to maintain this positive perception is to monitor the game's appeal to players, looking for signs that that appeal is waning, as suggested by Robson et al. (2015, p. 419). The experience, the authors continue, must be monitored internally and externally, considering if it still makes sense for both the company and the players and whether the participants (players, observers, and spectators) are still enthusiastic and engaged. The authors (p. 419) argued that due to the role that both spectators and observers have in energising and instigating different behaviours on players, which can change the results, designers and managers need to be attentive and understand when it is time to incorporate these actors in the process or even remove them.

Despite the importance of designers during planning, managers have a powerful position in implementation, as they play the role of mediators, “to ensure that players are still engaged and are not breaking the rules” (Robson et al., 2016, p. 7). Other influential extrinsic motivators could be physical rewards, such as gifts or vouchers; it was found to make employees feel valued (McIntyre, 2018, p. 59). On the other hand, there is a point where there is no consensus among the studies analysed: one of the elements of games that may be present in a gamification strategy is the leaderboards. While some studies (Armstrong & Landers, 2018; Brigham, 2015) defended that general classifications are appropriate elements to provide motivation if this motivation is extrinsic, Mekler et al. (2017, p. 525) and McIntyre (2018, p. 57) found that in organisations leaderboards are not positively recognised by employees (McIntyre’s study identified that they feel that it highlight their weakest performance). His findings were supported by Wolf et al. (2020, p. 361), who concluded that leaderboards could backfire if managers are not careful when facilitating combined feelings of social connection, expressive freedom, and social competition.

3.11. Criticism/limitations/problems

Some studies (De-Marcos et al., 2014; Deterding, 2012; McIntyre, 2018) agreed that gamification implementation errors could lead to problems in its execution. As advocated by McIntyre (2018, p. 74), Implementation can be deficient if there is a lack of clarity in information about rules and purposes, which can cause the entire project to fail. Therefore, it is preponderant that there are transparency and seriousness in all phases of the process. Deterding (2012, p. 17) pointed out that not taking gamification seriously could collapse any strategy. Just “designing a gamification approach that promotes achievements, collections, and competitions do not necessarily stimulate participation” (De-Marcos et al., 2014, p. 90).

Moreover, there is a necessity to think about which game elements to use: according to Armstrong and Landers (2017, p. 18), the addition of a game element may not affect or even harm learning outcomes. “Simply adding game elements to training without carefully reasoning through the psychological impacts is unlikely to lead to desirable change and may even harm outcomes” (Armstrong & Landers, 2018, p. 167). For example, Nicholson (2015, p. 8) argued that managers must be aware that the narrative is always linked to the real world when using a narrative design and not a distraction from it. This simplification can lead to using some game elements alone to implement gamification, which tends to a big fail (Armstrong & Landers, 2017; Mekler et al., 2017).

More than just creating a game, implementing gamification is thinking and developing a method to transform an activity into something pleasant and enjoyable, albeit maintaining its integrity (Muntean, 2011, p. 38). Furthermore, Sands (2013, p. 69) studied the effects of a “bad gamification” on employees, explaining that it can be even higher than the engagement one would have got if done correctly. Robson et al. (2016, p. 8) defended that most gamification failures are due to a lack of alignment between the users and gamification principles. In the same line, a failure could happen when there is not enough alignment between organisational and employee’s long-term goals (Mitchell et al., 2018; Perryer et al., 2016).

Gamification has been criticised for being manipulative (Armstrong & Landers, 2018; Bogost, 2015; Sands, 2013). Bogost (2015, p. 320) presented that the main criticisms that gamification has received stand out for its exploratory, coercive and manipulative characteristics. If the employees perceive game elements as manipulative or even superfluous, it could fail the entire project (Armstrong & Landers, 2018, p. 164). “The use of game psychology and game mechanics is not about the manipulation of individuals but that people can see the relevance, importance, and reward of the gamified initiative in the greater scheme of their work-life.” (Sands, 2013, p. 80). A participant is more likely to feel manipulated when he feels compelled to participate in an activity. That is why many such problems in gamification occur in more severe environments, such as formal education and work (Deterding, 2015, pp. 309-310). In the same way, it was found by Wolf et al. (2020, p. 361) that gamification can backfires if the social competition is emphasised because it can drive discordant behaviours. This scenario, according to the authors, accentuates the role of the manager in diluting this feeling.

The study from Hanus and Fox (2015) supported that adding rewards not strictly necessary can harm engagement and motivation because participants see it as controlling. Similarly, the authors also found that gamify an already motivating activity is likely to kill engagement. Following this reasoning, Gallup Inc. (2019) reported that despite efforts in planning a program that engages employees in companies, in many cases, the way that planning is implemented has caused these programs to fail. Gamification can play a crucial role in this process. In the planning stage, the manager's role as a facilitator should be emphasised, with the appropriate training and scope of action. On the other hand, information technology can play an important role, reducing this scope, or even eliminating the need for a facilitator.

Critical problems occur when users need to direct too much their attention on how to learn and control the program, as it becomes demanding to focus on aspects such as content and learning objectives, which are more meaningful. (Torres, 2016). Some papers, such as Morozov (2013), debated that some “technological solutionism,” such as gamification (using McGonigal’s approach as an example), big data, and learning analytics induce people to believe that they are the solution form the problem even without people understand the nature of this problem. This simplification, according to Bogost (2015), is why gamification has become so prominent.

The author suggested that gamification is being used primarily by consultants and marketers to build an opportunity and exploit it for their benefit. Following the author's reasoning, these professionals use an old and questionable marketing tactic: create a problem and then sell the solution. From this moment on, as highlighted by Dragona (2015), a counter-gamification movement emerged that can be described as:

> a form of opposition to the increasing use of game elements within non-game systems, which aims to disrupt the processing and exploitation of users’ data; it

> calls for gaming with the system, for a disruptive play with its rules and content while being within it. (p. 239)

The author explained that this movement, aiming to stop, confuse, subvert, or change gamification processes, has different practices (Dragona, 2015, pp. 239-243). The point is to take back control over the actions (autonomy) of users.

3.12. Ethics in gamification

Critics on gamification, as asserted by Kim and Werbach (2016), although made significant progress, tend to over-generalise, pointing out that most gamification practices are beneficial only to companies that adopt it, to the detriment of users. The authors argue that critics fail to consider that gamification is a motivational tool for employees and customers in most cases. Their ethical analysis on gamification was based on two primary issues they found not covered adequately by previous literature: conflict in the coexistence of organisational and individual interests and the difficulty in establishing and maintaining standards that protect both real-world and virtual world relationships (Kim & Werbach, 2016). The authors propose that the central ethical concerns on gamification lie, whether it is (p. 12):

- Exploitative
- Manipulative
- Harmful (intentionally or not)
- Detrimental to character

Following this line, Zichermann and Cunningham (2011, p. 321) concluded that if a gamified application comes with informed consent and does not harm the user, it is ethical. According to Marczewski (2017), a code of ethics in gamification needs to have transparency and honesty with the user about the gamified system's intentions as pillars. With this objective in mind, the author launched in 2013 a code of ethics (https://ethics.gamified.uk/) that is structured in 5 central themes: honesty, integrity, transparency, quality, and respect. As a new concept, gamification still lacks initiatives like this so that society recognises it as a fair and beneficial tool for all parties and no longer as a weapon that companies use to manipulate users (whether employees, customers, or students).

3.13. Summary

This literature review has sought to scrutinise the topic gamification, addressed in an investigative approach: the concept, support theories, its validity as a learning tool, scope, its outcomes, observations about implementation, and problems in implementation, limitations, and criticisms. When analysing the published studies on the theme, it was possible to conclude that gamification, based on the self-determination theory (SDT), differs from other related concepts due to its objectives and the fact that it uses only the game elements, such as was seen above. Authors on gamification emphasised planning and implementation, highlighting senior management's commitment and encouraging participation while maintaining the voluntary aspect. The importance of linking the HR strategy and the business strategy before implementation becomes evident. In the last section, the limitations, as well as the criticisms of gamification, were analysed. Concluding, this literature review sought to compile the scholars view on the outcomes of gamification. The next Chapter will display the methodologies the researcher will apply to analyse these aspects of gamification.

Chapter 4. Research Methodology

4.1. Introduction

Having addressed the theoretical constructs that underlie this research, the analysis of the banking industry, and the literature review, this chapter will explain, in a transparent and elucidative way, all the research methodology chosen for this thesis. It will also be apparent to the reader which procedures were adopted for the sampling choice, why the researcher considered the methodology applied in this research to be adequate for data analysis, and the choice of sampling and research methodology.

4.2. Research philosophy and design

In this study, the research philosophy is positivism since the focus is upon working with reality to produce precise generalisations that arise unambiguous and accurate knowledge (Saunders et al., 2016, p. 135). As positivist research, the existing theory was used to formulating the hypotheses to be tested, which means that some steps were taken before starting the data collection. First, the researcher explored gamification in detail through a literature review, assimilating the concepts, paradigms, and points of view. Secondly, the researcher raised some questions not yet formulated or not explained by the current literature. When answered, these questions could lead to insights and new procedures to use directly in the banking sector to develop a more vigorous class of workers, ready to apply what they have learned in the gamified training to achieve tremendous results for their company.

This research used a deductive approach based on theory, which served as a basis for formulating hypotheses to be tested through a research strategy, applying rigorous and meticulous tests. In a deductive approach, the research tests the theories to eliminate those whose research reveals false and supporting the remaining ones. Then, the researcher was decided by the acceptance or rejection of the hypotheses. The main objective of choosing deduction as a research approach was to generalise the research findings. By knowing the outcomes of gamified training in banks, members of the financial industry can benefit by preparing better ways to train their staff, whether using gamification or not.

As the study's main objective is to analyse the results of a large number of data statistically, the researcher chooses a quantitative method as the research design. The principal objective was to examine relationships between variables and measure them using statistical techniques. In the quantitative method, the data must be gathered in a standardised manner to assure reliability of the research. All the analyses should be reproducible, producing similar results. In the quantitative method, the researcher is independent of the process. As the data will be collected only once, the cross-sectional method was applied to the research. The qualitative methodology was discarded for two reasons: in addition to limiting the scale of data collection, preventing research from having a worldwide reach, it would be difficult or even prohibited by the isolation restrictions imposed by the New Zealand government, due to the advance of COVID-19 disease.

4.3. Method: Questionnaire

4.3.1. Purpose and design of the questionnaire

The researcher opted for the questionnaire as the data capturing method for the research since it allows the types of questions needed to be answered with a reasonable degree of precision so that the respondent could have a greater sense of anonymity, which is necessary for a more reliable result. Compared to other forms of data collection, research strategies through questionnaires enable collecting data more economically, providing a simple way to explain and understand the results. The questionnaire was developed in a web environment to be applied in two ways: in-person and online. A web service called Microsoft forms, from Microsoft Corporation, was used. This service provider was chosen because it facilitates data collection, has 24-hour access, and can be printed, facilitating data collection in person.

In addition to the facilities mentioned, the tool generates a detailed report with graphs at the end of the research and allows transposing all data to electronic spreadsheets. However, what was decisive for the service's choice, especially in comparison with other providers, was the time counter. In each completed questionnaire and the data from the questionnaire itself, the system also provides the time to complete it. Therefore, in cases where the respondent completed the questionnaire in such a short time that it would be doubtful to have done it correctly, the questionnaire was disregarded from the survey. This procedure was adopted so that the data collected represented the participants' perceptions and not just a semi-automatic filling.

The questionnaire was designed with five parts, forming a single and sequential body for the respondent. Firstly, it started with two questions, one eliminatory and the second segmental. The eliminatory question sought to know whether the participant works or has worked in the banking or finance sector. If completed online, answering 'no' to that first question ended the questionnaire immediately, as the respondent does not belong to the survey's target audience and, therefore, their answers were not relevant. The second, segmental, questioned whether the respondent has already participated in gamified training in the workplace. The question segmented participants into two groups of respondents - gamified and non-gamified. When answering ‘yes,’ the respondent was directed to a brief orientation to the next question, which asked that the next questions be answered based on the last gamified training and the environment in which it was carried out. When answering ‘no,’ an orientation was followed so that the next questions were answered based on the last training received in the work environment (without mentioning that the training had been gamified).

Secondly, followed the intrinsic motivation inventory (IMI), developed by members of the Rochester Motivation Research Group (Plant & Ryan, 1985; Ryan, 1982; Ryan & Deci, 2000; Ryan et al., 1983), which is a multidimensional way of measuring the experience of subjects in experimental tasks. This scale, applied under the name ‘Company training perceptions,’ was included in the research because it proved reliable in several tests and adequately measured one of the main objects of study in this paper: motivation. The full scale contains seven subscales, namely: interest/enjoyment, perceived competence, effort/importance, pressure/tension, perceived choice, value/usefulness, and relatedness, adding up to a total of 45 items. They were applied using the Likert scale of seven points, from 1 (not at all) to 7 (completely). Among these items, there were some on the reversed scale, which means that while most items refer positively to the measured factor, they refer negatively. In the data analysis, these items were properly reverted to the final score.

The instrument was adapted for this research, either by eliminating subscales not related to the investigation (like the pressure/tension subscale), eliminating questions not part of the study, or even changing other questions to adapt to the context, without changing its purpose. For example, instead of using ‘After working at this activity for a while, I felt pretty competent,’ the sentence used was ‘After working at this training for a while, I felt pretty competent.’ Moreover, instead of ‘I didn’t try very hard to do well at this activity,’ the sentence used was ‘I didn’t try very hard to do well at this training.’ After this procedure, the intrinsic motivation inventory had 34 items, shuffled in their order, according to the scale manual's instructions.

Thirdly, the Utrecht Work Engagement Scale (UWES) was applied, a self-report questionnaire developed by Schaufeli et al. (2002), which seeks to measure three aspects of work engagement discovered by researchers: vigour, dedication, and absorption. With a total of 17 items, the scale was applied to a 7-point Likert scale, ranging from 1 (never) to 7 (every day). The scale was developed containing three parts, six items for vigour, with items like 'at my job, I feel strong and vigorous', five items for dedication, with items like' I find the work that I do full of meaning and purpose, 'and six more items for absorption, with items like' When I am working, I forget everything else around me. ' All items were used for this scale without changes, after being considered adequate to what is being measured. Unlike the previous scale, it does not have negative items; the questions were just scrambled in the same way as the previous scale.

Fourthly, the Job Satisfaction Index (JSI), developed by Brayfield and Rothe (1951), was incorporated into the questionnaire. According to the authors, this scale was constructed based on the inference that the respondent's attitude towards work has on job satisfaction (Brayfield & Rothe, 1951, p. 307). Comprising 18 items on a 5-points Likert scale and ranging from 1 (strongly agree) to 5 (strongly disagree), this scale features items to be reversed, as well as the Intrinsic Motivation Inventory (IMI). However, it was unnecessary to make any changes either in the order or how they were asked. Lastly, a short sequence of four demographic questions was included, which had a twofold objective: getting to know the respondents' profile better, allowing later analysis to assess whether any of the demographic profiles interfere with the outcome gamification provides bank employees. The questions were about the time working in the sector, gender, origin, and age.

4.3.2. Pilot testing

The questionnaire was applied as a pilot to a group of master's students in New Zealand. The pilot had the participation of 22 respondents who answered the questionnaire online. Although not everyone has experience working in a bank (only three did), they were asked to pretend they had this experience to test the questionnaire. After finishing the piloting, it was possible to make some wording adjustments to better understand the respondent's research. Following suggestions, a short explanation of gamification was also included, accompanied by a link for a more detailed understanding.

4.3.3. Procedure

With the questionnaire already prepared, formatted, piloted, and approved by the SIT ethics committee, the researcher started data collection. Data collection took place from July 6th, 2019, to September 12th, 2019. As he worked in the banking industry in Brazil for more than ten years, he prepared a version of the Portuguese questionnaire and contacted his former agency colleagues, initially via social media, and then formalizing it by email. Using the snowballing technique, he also asked them to get colleagues interested in conducting the research. Then, the researcher also sent e-mails to the indicated colleagues. A week after the emails were sent, a new email was sent reminding them to answer the questionnaire.

While waiting for the answer to the questionnaires sent to Brazil, the researcher, based in Invercargill, New Zealand, contacted the local banks, asked to speak with the general manager, and explained the research purpose. In this conversation, the anonymity of both the participants and the institution was guaranteed. A copy of the questionnaire was also presented to the manager to make sure that there were no sensitive or confidential questions. In some banks, authorization was immediate, and data collection took place in-person, so the researcher had the opportunity to further explain the research and the questionnaire itself to the respondents, remaining available to answer any questions. In other banks, however, to not disturb the employees' work routine, the questionnaires were left to be filled out later, and the researcher returned the next day to collect them.

Such a procedure is not ideal, as, in addition to not knowing who completed the questionnaire, it was delivered to employees by their managers, which characterises a bias. The employee could feel inhibited from answering, for example, questions like "I consider my job rather unpleasant" or "I'd really prefer not to interact with my co-workers in the future." The boss could be watching they filling out, or even if not, the employee might not be sure about the responses' anonymity. However, this form of collection only occurred in one bank and with two respondents, which represents 0.52%. Adding the two forms of data collection described above, a total of 27 valid and completed questionnaires were collected.

To gather more respondents for the survey, the researcher used the service provider service from Amazon called MTurk, which intermediates the requester and the service provider. Several papers have used MTurk in academic research, such as Armstrong and Landers (2017); Casler et al. (2013); Mitchell et al. (2018) Casler et al. (2013) statistically analysed the difference in the responses of participants recruited via MTurk, in person or via social networks. They developed a face-to-face behavioural test and converted it to an online test. They then recruited respondents on the social networks Facebook, Twitter, and Reddit. Also, they recruited students on a college campus to be personally tested. Although there was no significant difference in the three samples' results, the participants recruited via MTurk showed greater demographic diversity than the other two samples of respondents. Due to the importance of this service in the total of questionnaires collected, its procedures will be detailed below

Mturk respondents. When requesting registration as a service provider, the candidate must fill out a detailed form, send the request, and wait for the answer (the company does not disclose the criteria for choosing the registration). As soon as the provider is registered, he can start providing services (what the company calls Human Intelligence Tasks - HIT). In the case of questionnaires, no additional skills are required. However, on the requester portal, when registering the survey on the portal, the researcher has several options for qualifying workers, such as age, location, gender, income. However, the following qualifications stand out: HIT approval rate (%), number of HITs approved, and employment industry. There is also the possibility of not accepting services from workers who have already participated in previous surveys of the same requester. This option was useful because the Microsoft Forms service only allows a maximum of 200 responses per questionnaire. Therefore, other identical questionnaires were registered as soon as the total of 200 responses was reached. It was, therefore, necessary to register another service on the MTurk portal, including this qualification of not having participated in previous surveys.

In addition to the qualification options, there was also the master worker, a unique qualification for high-performance workers across a wide range of HITs. At the beginning of data collection, this qualification was used, and, with a week, no significant difference was noticed, despite having a substantial impact on the service price. Therefore, the researcher decided not to use this qualification, only the other three mentioned below, which helped in the responses' quality. As workers only receive payment for the service after the requester's approval, the researcher analysed each of the questionnaires received, refusing those completed in less than two minutes, those in which several questions did not make sense to each other, or questionnaires in which the answer to the first question was 'no' (the one that asked whether the respondent was a banking worker).

The criterion of two minutes was established after the analysis of some questionnaires. Although the response time varies from 8 to 20 minutes in other forms of data collection (in person and by email), with an average of 07:27 minutes of completion, it was observed that MTurk workers managed to maintain consistency in the answers even completing in two minutes. Additionally to the criteria mentioned above, the respondent who accessed the questionnaire through MTurk was asked to enter his MTurk code so his acceptance could be confirmed without jeopardising participants' anonymity. Table 6 displays the acceptance criteria for questionnaires filled through MTurk.

Table 6. The message included in the task description for MTurk respondents

MTurk criteria for questionnaires acceptance	
1.	This task is to be answered only by banking and financial workers.
2	Answers must make sense among itself.
3	You must answer all questions
4	You must put your worker ID (last question) correctly

In addition to the qualification of not participating in previous surveys, there were three other qualifications mentioned in Table 6. The first one, HIT approval rate (%), refers to the percentage of approvals that the worker had in his services, whatever they may be. The second qualification, the number of HITs approved, filtered out workers with little or no experience with the tool. The third qualification, employment industry, despite being a paid qualification, was the most important of all qualifications because it selected employees from the banking sector. All other qualifications only served to reduce the work involved in analysing the responses because in the end, only the questionnaire that indicated that it had been appropriately filled out would be included in the survey.

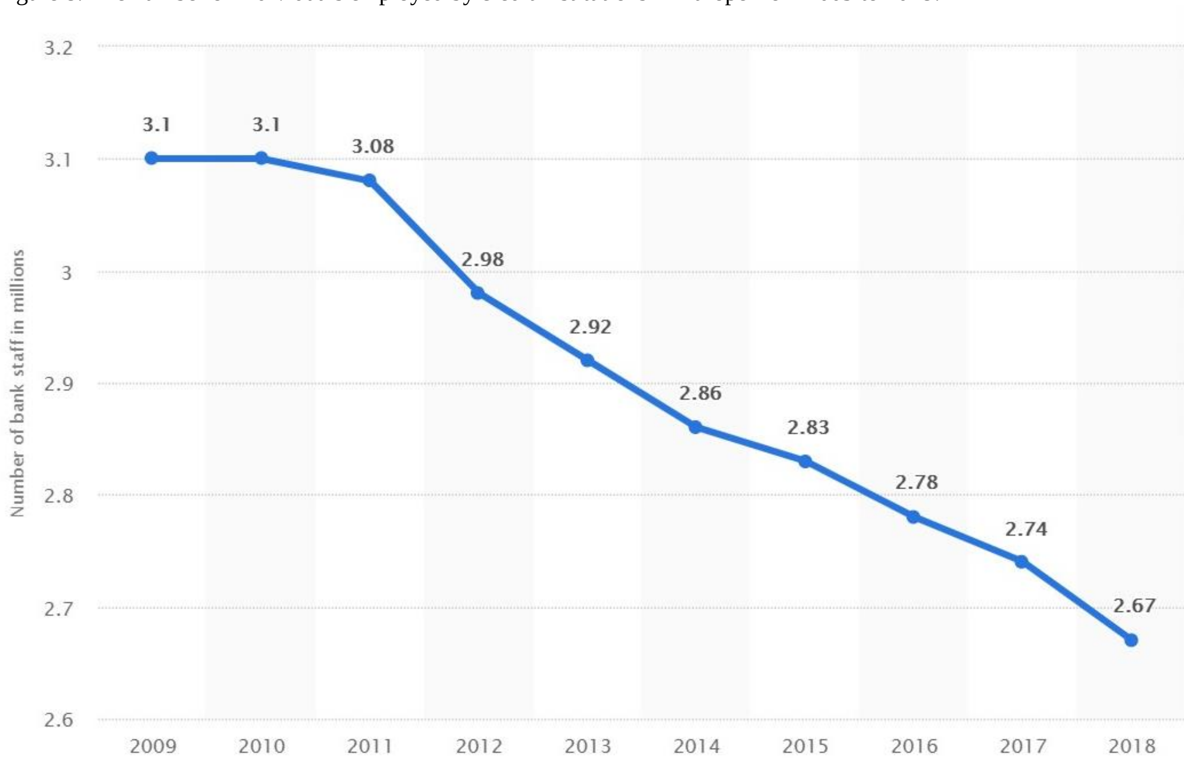
4.3.4. Participants and sampling

The target population for this survey was all bank and finance employees worldwide. Due to the impossibility of collecting data from all members of the researched population, sampling was adopted. To calculate the minimum number of respondents to form an adequate sampling, four pieces of information are needed (Saunders et al., 2019, p. 299): level of confidence in the data, the margin of error to be tolerated, types of analysis to which the data will be submitted, and the size of the target population. For this research, the confidence level was set at 95% and the margin of error at 5%. The population was not so simple to establish. As stated in the SWOT analysis - weakness section, the financial industry does not have a centralising institution that could measure or estimate the total number of workers in the sector globally.

However, some data helped to get a rough estimate. Calculations were performed in three stages. Firstly, the total number of workers in the banking sector in Europe was obtained, as shown in Figure 8. The choice of Europe was due to its great representation in intensity and presence of banks. According to the estimate, in 2018, Europe had 2.67 million employees in the banking sector (Statista, 2020), called item A. Secondly, item B, the total population of Europe in the same period (2018), was estimated at 746,419,000(United Nations, 2020). Thirdly, the world population, represented by item C, which in 2018 was 7,631,091,000 (United Nations, 2020). Fourthly, the simple ratio of A divided by B was calculated: 2,670,000 / 746,419,000 = 0.3577% This ratio was called D.

Lastly, this percentage was applied to the world population, resulting in a conservative estimate of how many workers there are in the banking sector worldwide (C*D) since the average number of workers in Europe seems to be higher than the average of many countries, due to the intensity of the economy and the concentration of several economic centres in one place. The latter account resulted in the number 27,296,413. This is the estimated number of bank workers worldwide and, therefore, the population surveyed by this paper. According to Saunders et al. (2019, p. 302), for a target population greater than 10,000,000, the minimum sample size for a 95% confidence interval and a margin of error of 5% is 384 samples. This is the minimum amount to estimate that the results of analyses performed on this sample reflect the same results as the total population. Therefore, for a sample of 384 participants, the results can be statistically generalised.

Figure 8. The number of individuals employed by credit institutions in Europe from 2009 to 2018.



Source: https://www.statista.com/statistics/940990/number-of-bank-staff-in-europe/

The target sample size for this survey was established in 500 questionnaires collected. Despite all attempts at personal contacts with former bank colleagues, contacts with local banks in person, and, ultimately, via MTurk, the number of questionnaires collected was 388, having already discounted invalid questionnaires. Even if the desired quantity of samples for analysis was not obtained, the quantity obtained was adequate for significant analysis. Adding that to the short time to analyse data, the researcher decided to continue with this amount. To test the hypotheses, both employees who have already taken part in gamified training and those who had no experience with such training participated. The objective was to have a comparative basis of outcomes. Comparing the outcomes of those who participated with those who did not participate allows knowing if there is a statistically significant difference between them, especially concerning engagement, motivation, and job satisfaction.

The following biases related to sampling were also considered:

- There is no way for the researcher to know if the person indeed participated in gamified training:
    - There is no universal acceptance of the concept of gamified training, so understanding is individual
    - The respondent may feel that he/she participated in a gamified training, when not, or that he/she did not participate when he/she did
    - The company where the respondent works may have said that it was gamified training when it is not
- Lack of standardisation. One participant may have had gamified training planned, implemented, and managed correctly, as outlined in Chapter 3. Another participant, in contrast, may have participated in training with poor gamification practices. Indeed, the perceived outcome will be different, as different things are being measured.

As can be inferred, most, if not all, the inferred biases could have been avoided if a study was carried out in which the research participants would participate in the same gamified training developed by the researcher, after which they could answer questions about the same. Simultaneously, develop another non-gamified training to be carried out by the same number of participants, followed by a collection of perceptions about the training. This collection of perceptions could occur through a questionnaire or a focus group, depending on the number of participants. However, this alternative was not chosen for some reasons. Firstly, because it would not be possible, with this choice, to analyse the same number of responses as in the chosen option (questionnaire only).

Secondly, global reach in a different format than that established for data collection in this research would not be possible. It would be impracticable to apply the same training (gamified and non-gamified) to people in different geographical locations. Thirdly, for logistical reasons. It would be necessary to develop two pieces of training: a gamified and a non-gamified one. However, the researcher neither had enough knowledge to create such content nor had enough financial resources to pay for the service. Notwithstanding, quantitative research using a questionnaire proved adequate for the limitations found and the proposed objectives. Other papers supported such sample and form of data collection, such as:

- Singh and Prasad (2018) (*N*=320): studied the role of psychologic climate and workplace gamification in predicting employee engagement

- Golian and Ghasemi (2018) (*N*=310): investigated the effects of two Gamification aspects of performance and attitude on customer behaviour of Mellat Bank in Shahrood city, Iran.

- Mitchell et al. (2018) (*N*=291): Used MTurk to investigate the impact of extrinsic motivation, such as social pressure or internalized guilt, on employees' psychological needs satisfaction and behavioural intention

- Sailer et al. (2017) (*N*=419): the researchers developed a game (online simulation environment) followed by a questionnaire to assess the effect of specific game elements on psychological need satisfaction.

- Karl et al. (2005) (*N*=242): investigated attitudes of employees from three sectors (public, non-profit and private) toward in the workplace.

- Baptista and Oliveira (2017) (*N*=326): studied the impact of gamification in the acceptance of mobile banking services.

4.3.5. Data analysis

SPSS. All data was separated into a few different questionnaires. One was the Portuguese version, the other was the face-to-face collection, and three others were the questionnaires collected from Mechanical Turk, due to the limitation of a maximum of 200 responses by the Microsoft Company in Microsoft Forms. These separate questionnaires, separated in numbers, from 1 to 5, generate each one a different Excel spreadsheet with all the data. All the results of the analyses explained here can be found in item 5.2 (results) of chapter five, with this section only providing a detailed explanation of the procedures. The data analysis occurred throughout several steps described below. Firstly, after translating the Portuguese questionnaire, all these spreadsheets were brought together in a single spreadsheet, and each respondent received a unique number: the participants in questionnaire 1 had the number 1000 added to their sequential number within the questionnaire itself.

The respondents of questionnaire 2 received the number 2000, and so on. For example, respondent number 35 from questionnaire number 3 had the unique number 3035. The participants also received a general number, from 1 to 388, to represent its unique research position. The purpose of this numbering was to facilitate data handling. Secondly, the data, now gathered in one place, were transformed into numbers. This transformation aimed to allow using the software that followed in the next steps of data analysis. Similarly, as in the other stages, it required extra care since, in case of any error in the data transformation, all the analysis would be impaired.

Thirdly, the .csv file was imported to the computer program IBM SPSS Statistics (version 26), and the researcher prepared all the variables in the variable view of the program, adjusting name, type, labels, value labels, measure. In the same step, the reversed items from IMI and JSI were reversed, using the function ‘recode.’ Fourthly, with all data set in the software SPSS, the researcher performed demographic data analysis and the scales' averages, creating new variables for them. Fifthly, the factor analysis was run for each scale separately. The extraction method was principal axis factoring and the rotation Varimax. The researcher found this extraction method appropriate for this research analysis since although maximum likelihood is the best choice for data relatively well distributed when multivariate normality is violated, the principal factor analysis is recommended (Fabrigar et al., 1999, p. 277; IBM, n.d.).

Although the analysis results will be outlined in section 5.2, to justify the choice of principal factor analysis as the extraction method, it is essential to release that according to the Shapiro-Wilk test results, the data is not a multivariate normal distribution. The researcher opted for Varimax as the rotation method because the factors were not correlated with each other, and because orthogonal rotations (such as Varimax, Quartimax, and Equamax) produces results less complicated to interpret (Costello &

Osborne, 2005, p. 3). After performing the factor analysis, the researcher decided the number of factors to retain based on the factors loaded on the scree plot and KMO and Bartlett's test. Likewise, the researcher decided which items to discard and which items are in which factor, based on the rotated factor matrix. After deciding what factors to retain, the researcher named them and averaged each factor's responses using the function 'compute variable' on SPSS, creating a new variable for each of them.

Sixthly, the researcher performed the reliability analysis for all scales and factors separately, taking notes of the Cronbach alpha (Cronbach, 1951) to check if the factors are reliable. After the reliability analysis, the researcher found whether to continue using the factor loaded or the whole scale, depending on the Cronbach alpha resulted. Seventhly, the researcher performed Pearson's correlation analysis. From the correlation, the researcher realised which factors or scales were correlated and in what intensity. These findings were useful to support the final results found in the next step. Lastly, the researcher used a different type of analysis named fuzzy-sets qualitative comparative analysis (fs/QCA). Fs/QCA is a technique for analysis that uses Boolean algebra instead of matrix algebra to establish comparison principles (Ragin, 2016). This last step comprised some procedures outlined after explaining the principles behind the fuzzy set analysis. All the results of the analyses explained here can be found in item 5.2 (results) of chapter five, with this section only providing a detailed explanation of the procedures.

Fuzzy-set analysis. The fuzzy set analysis investigates the relationships between sets and the intensity and the way these relationships occur. This analysis helps to establish whether a causal condition, or more specifically, a group of causal conditions, is responsible for a given outcome. In this set-theoretic approach, the relationships between the sets are defined in terms of necessity and sufficiency. Necessity means that a given causal condition must be present, alone or in conjunction with others, for the outcome to happen. In this case, the causal condition is necessary for the outcome to happen. The sufficiency concept establishes that a causal condition alone is responsible for an outcome without another causal condition. In this case, the causal condition is sufficient for the outcome to occur.

The choice to use this type of analysis, rather than just analyses based on symmetric theory and tests, such as structural equation models, ANOVA or correlation, was based on the possibility that an outcome is not always the result of a single causal condition. That is the gap that fuzzy-set analysis seeks to fill. Such symmetric tests cannot provide the necessary precision when predicting individual case results (Fiss, 2007, 2011; Fiss et al., 2013; McClelland, 1998; Ordanini et al., 2014). Complexity theory defends that in the same data set, a simple condition can relate positively and negatively to an outcome, and the relationship of this outcome to the causal condition will depend on the combination of other simple conditions (Ang & Woodside, 2017).

The theory also defends the existence of asymmetry, which means that a causal configuration with a high presence of the outcome is not directly opposed to a causal configuration with a low presence of the same outcome. With fs/QCA, the researcher assumes that things are less straightforward than one might think; a single causal condition does not always cause an outcome. Therefore, in this theory, algorithms are established that are attributed to a given result. These algorithms Ragin (2008) call recipes. There can be as many causal conditions as are necessary for the outcome to occur in a recipe. Often, negations of causal conditions make up the recipe for achieving the outcome. Therefore, a recipe is what determines the occurrence of an outcome. The analysis, therefore, defines a group of recipes for the causal condition to occur.

Boolean operators are used to communicating the relationships between causal conditions, recipes, outcomes, and set relations. The plus sign (+) is used to communicate the logical “or”; the mid-level dot (•) is used to communicate the logical “and”; the side tilde (~) is used to indicate negation. Those are the main signs; Ang and Woodside (2017, p. 14) gathered a list of the complexity theory's core tenets, which can be found in Table 7. Complexity theory has some tenets that contrast from conventional templates for social research, and those tenets form the bottom line of its application. Table 7, developed by Ang and Woodside (2017), outlines the core tenets of complexity theory, exemplifying its Boolean expressions.

To assist social researchers in their analysis, Ragin (2008) developed the fsQCA software (www.fsQCA.com) that allowed this analysis to be facilitated. The fsQCA analysis differs from the QCA analysis: QCA analyses use data in crisp sets, which are used conventionally. In a crisp set, a case is either 'in' (1) or 'out' (0), as the data are transformed into numbers 0 and 1, in a dichotomous way (Ragin, 2016). However, in fsQCA analysis, fuzzy-set data is used, which, despite varying membership between 0 and 1, in the same way as the crisp set, allows this variation to occur in scale. That is, thresholds can be classified according to the convenience of the research. A case can be "fully out" (membership = .00) and "fully in" (membership=1.0), but it can also be "almost fully in" (membership=.90) or "barely more out than in" (membership=.45). Likewise, the crossover point (membership=.5) is also registered as a threshold. Ragin (2016) highlights that, although it is up to the researcher which thresholds will be used in the analysis, this needs to be made very explicit so that other scholars can replicate the research.

Table 7. Core tenets of complexity theory

Tenet	*Concept*	*Description*	*Boolean expression.*
T1	Insufficiency	High X may be necessary, but this condition is insufficient for identifying high Y.	X//→Y
T2	Equifinality	A few, not one, distinctly unique complex configurations of antecedent consider indicate the same outcome.	(X•R)≤Y+(~X•T)≤Y
T3	Contrarian	Both high X and low X associate with high Y. Both high X and low X associate with low Y.	(X•R)≤Y+(~X•T)≤Y (X•W)≤~Y+(~X•F)≤~Y
T4	Causal asymmetry	Complex antecedent conditions for low Y are not the mirror opposite of complex antecedent conditions for high Y.	(X•R)≤Y≠(~X•~R)≤~Y
T5	Emergence	System effects in creating configurations of simple conditions are greater than the sum of the simple conditions (where SE = self-esteem, GSE = generalized self-efficacy, LC = locus of control, ES = emotional stability, and CSE = core self-evaluations.	(SE•GSE•LC•ES>CSEtotal)

Key: Boolean algebra operational meanings: mid-level dot, "•",indicates the logical "and"; sideways tilde, "~", indicates negation; the plus size "+" indicates "or"; the less than or equal sign, "≤" indicates scores for the model input statement are all or nearly all lower than scores for the outcome, Y or (Y•Z); the not equal sign, "//→" indicates that the input model (simple or complex) does not indicate an asymmetric pattern that screens for Y or ~Y where "Y" refers to cases with high Y scores and "~Y" refer to cases with low Y scores, the negation of a Y score; "X" refers to high X scores and "~X" refers to low X scores. X, R, F, and W refer to simple antecedent conditions; Y and Z refer to simple outcome conditions; "≠" refers to causal asymmetry.
Notes. A useful heuristic is to discretize scores when calibrated values of a variable into fuzzy-set scores so that all cases in the lowest quintile have fuzzy-scores ≤ 0.10 and high (Y) scores and in deciding on the limit necessary for models of complex antecedent conditions to surpass to indicate high accuracy in predicting Y or ~Y.
Source: Ang and Woodside (2017)

Diversely from variable-oriented approaches, which put the focus on variables in the analysis stage, the qualitative comparative method has a case-oriented approach, meaning that in all stages of analysis, the focal point of the research remains on that causal conditions conceived as variables, to form recipes, which are the combinations of the causal conditions (Ragin, 2014, pp. 168-169). Ultimately, the case-oriented method represented by fuzzy sets bridges quantitative and qualitative analysis and between two traditional methods: comparative and statistical methods. In a traditional comparative method, there is subjectivity in abundance in the analysis, and research is difficult or impossible to replicate due to the high level of subjectivity. In a traditional statistical method, on the other hand, the analysis relies heavily on numbers, which means that in their most in-depth phase of analysis, the cases, with their idiosyncrasies, have their importance reduced.

Calibration. In the first stage of analysing using fsQCA, the data must be calibrated. Calibration in fsQCA means transforming data from conventional interval-scale variables into fuzzy-set data, using external criteria to set up the calibration (Ragin, 2008). There are two techniques of calibration: the direct and the indirect method. In the first method (direct), three qualitative breakpoints are set, displaying correctly the degree of membership of each variable in the target set when data are calibrated: full membership (.95), full non-membership (.05), and the crossover point (.50). In the second method (indirect), the thresholds depend on the degree of membership set by the researcher based on a broader range of memberships, such as the six key qualitative categories shown below (Ragin, 2008, pp. 95-96):

1. In the target set (membership = 1.0)
2. Mostly but not entirely in the target set (membership = 0.8)
3. More in than out of the target set (membership = 0.6)
4. More out than in the target set (membership = 0.4)
5. Mostly but not entirely out of the target set (membership = 0.2)

6. Out of the target set (membership = 0.0)

As far as this research is concerned, the direct method was selected because it is more representative of the reality studied and facilitated the analysis. The process to calibrate data using the direct method is automated in the software fsQCA since version 2.5.

The Truth Table. After calibrated, data were ready to be analysed in fsQCA. The second stage consisted of performing the truth table analysis. As depicted by Ragin (2018, pp. 50-57), the fuzzy truth table algorithm bridges three pillars:

1. the correlation between the rows of a crisp truth table and the coordinates of the corners of the vector space defined by fuzzy set causal conditions

2. the analysis of the cases scattered across different logically possible combinations of causal conditions, and

3. the investigation of the consistency of the evidence for each causal combination with the argument that it is a fuzzy subset of the outcome.

The method of performing the analysis of the truth table for this research consisted of three steps: in the first step, with the data set open in fsQCA software, the researcher must then select the outcome and the causal conditions. This procedure was done by selecting them among the variables in the data set. Both the outcome and the causal conditions can be set negated (i.e., the absence of an outcome). Since fsQCA investigates which causal conditions conduce to an outcome, and the purpose of this research is the direct opposite, investigate which outcomes (e.g., motivation, engagement) arises from a causal condition (gamified training applied in the banking industry), the researcher had to change the strategy; instead of performing one analysis, he performed several investigations.

In this stage, when the researcher should set the outcome and the causal conditions, he performed all possible combinations, always setting gamification in the causal conditions. In the outcome field, all scales and factors were tried, and in causal conditions, additionally to gamification, all the other variables were included in all possible combinations. This procedure of covering all potential solutions, although strenuous, was necessary to ascertain that no recipe has been overlooked. After selecting the outcome and the causal conditions, the software displays the truth table. The Truth Table (Figure 9) displays all possible combinations of causal conditions in the left, followed by the number of occurrences of each combination. Presented in the same column is the cumulative percentage of cases.

The table's left side displays the other three columns: raw consistency, PRI consistency, and SYM consistency. *Raw consistency* is the degree of consistency in which the combination of causal conditions is a subset of the outcome. Both PRI consistency and SYM consistency are not relevant for the analysis in this research. In the second step, after producing the truth table from the fuzzy data, the researcher refined the table, setting apart the relevant configurations from the irrelevant ones. For this, the researcher established a rule that defines which configuration was relevant and not, based on the number of cases for each configuration and the individual raw consistency. So, the researcher set thresholds for the number of cases and raw consistency.

Ragin (2018, p. 53) advised that the frequency threshold should be one or two if the total number of cases (*N*) is small. He clarified that when N is large, however, the research should use a more substantial threshold. In this case, the author (p. 53) argued that the distribution of cases across conditions must be analysed to determine the highest frequencies, suggesting that the configurations selected should capture at least 75-80% of the cases. Notwithstanding the author did not determine what he meant by “small N” or “large N”, the researcher decided that the number of cases in this research (N = 388) is large. This decision was taken upon reading the various examples Ragin displayed in his book (Ragin, 2008) and the fsQCA manual (Ragin, 2018): in none of them, the number of cases even reached 30. Thereupon, the researcher chose to determine the frequency thresholds according to what Ragin suggested for studies with a large number of cases.

Figure 9. Example of the Truth Table before setting the frequency and consistency thresholds

Edit Truth Table

File Edit Sort

cgamif	cworktime	cfemale	cmaturity	cengagement	cenjoyment	cinterest	number	ccompetence	raw consist.	PRI consist.	SYM consist
0	1	1	1	1	1	1	17 (8%)		0.990823	0.973384	1.000000
0	1	0	1	1	1	1	16 (16%)		0.983997	0.955223	0.962963
1	1	0	1	1	1	1	14 (24%)		0.907436	0.693469	0.728617
1	1	1	1	1	1	1	11 (29%)		0.954476	0.821689	0.866583
1	0	1	1	1	1	1	9 (34%)		0.990469	0.960118	0.983358
0	0	1	0	1	1	0	9 (38%)		0.997694	0.992403	0.999044
0	0	0	1	1	1	0	9 (43%)		0.997441	0.991971	0.992695
0	0	0	0	1	1	0	9 (48%)		0.993261	0.977310	0.979691
0	1	0	1	1	1	0	5 (50%)		0.995151	0.980332	0.980331
0	1	1	1	1	1	0	4 (52%)		1.000000	1.000000	1.000000
0	1	1	1	1	0	1	4 (54%)		0.987513	0.922049	0.947368
0	0	1	1	1	1	1	4 (56%)		0.992537	0.970663	0.970663
0	0	1	1	1	1	0	4 (58%)		0.999690	0.998879	0.998879
0	0	0	0	1	1	1	4 (60%)		0.989767	0.956764	0.961024
0	0	0	0	1	0	1	4 (62%)		0.994872	0.972222	0.972222
1	1	1	1	0	0	0	3 (64%)		0.943063	0.318917	0.325966
1	1	0	1	1	0	1	3 (65%)		0.964870	0.762804	0.762802
1	0	0	1	1	1	0	3 (67%)		0.991308	0.958983	0.958984
1	0	0	0	1	1	1	3 (68%)		0.986777	0.937622	0.937623
1	0	0	0	1	1	0	3 (70%)		0.984302	0.919390	0.952596
0	1	0	1	1	0	1	3 (71%)		0.989992	0.942530	0.942529
0	0	0	1	1	0	1	3 (73%)		0.993060	0.959650	0.969858
1	1	1	1	1	0	1	2 (74%)		0.960676	0.593496	0.593496
1	1	1	1	1	0	0	2 (75%)		0.957326	0.646664	0.646666
1	1	0	1	0	0	0	2 (76%)		0.948267	0.231342	0.234848
1	0	1	0	1	1	1	2 (77%)		0.993068	0.947542	0.963333

Specify Analysis | Cancel | Standard Analyses

Still, in the second step, the next threshold to determine was the raw consistency. Ragin (2018, p. 53) suggested identifying significant gaps in the upper range of consistency after sorting the consistency scores in descending order. The author highlights that the values should be at least 80%. In most of the configurations tested, the raw consistency threshold was above 97%. As outlined before, the researcher tried several configurations, always setting gamification as a causal condition in conjunction with others. Thus, various configurations meant different thresholds, depending on the raw consistency column and the frequencies. The researcher included one more step before proceeding to the next stage of the analysis. As this research's crucial point was to investigate gamification outcomes, it would not be reasonable to analyse combinations in which gamification was not present, as this result was not relevant to this research.

For this reason, the third step consisted of deleting the combinations in which gamification did not occur before moving on to the next stage. This additional procedure was tested by comparing samples of different configurations and comparing the results. It was found that this additional procedure avoided the presentation of numerous recipes that would have to be discarded because they did not comprise gamification in their combination, disclosing a 'cleaner' result. In addition to this advantage, it made the process much more straightforward, reducing the use of prime implicants (next step, to be outlined in the next paragraph)—all of this without changing the results obtained. An example of the Truth Table after these data reductions can be found in Figure 10.

Figure 10. Example of the Truth Table after setting the frequency and consistency thresholds

Edit Truth Table

File Edit Sort

cgamif	cworktime	cfemale	cmaturity	cengagement	cenjoyment	cinterest	number	ccompetence	raw consist.	PRI consist.	SYM consist
1	0	1	0	1	1	1	2	1	0.993068	0.947542	0.963333
1	0	0	1	1	1	0	3	1	0.991308	0.958983	0.958984
1	0	1	1	1	1	1	9	1	0.990469	0.960118	0.983358
1	0	0	1	1	0	0	2	1	0.988528	0.882651	0.882652
1	0	0	0	1	1	1	3	1	0.986777	0.937622	0.937623
1	0	0	0	1	1	0	3	1	0.984302	0.919390	0.952596
1	0	0	0	0	0	1	2	1	0.970669	0.369049	0.407894
1	1	0	1	1	0	1	3	1	0.964870	0.762804	0.762802
1	0	0	1	1	1	1	2	1	0.962143	0.808556	0.808552
1	1	1	1	1	0	1	2	1	0.960676	0.593496	0.593496
1	1	1	1	1	0	0	2	1	0.957326	0.646664	0.646666
1	1	1	1	1	1	1	11	1	0.954476	0.821689	0.866583
1	1	0	1	0	0	0	2	1	0.948267	0.231342	0.234848
1	1	1	1	0	0	0	3	1	0.943063	0.318917	0.325966
1	1	0	1	1	1	1	14	1	0.907436	0.693469	0.728617

Specify Analysis Cancel Standard Analyses

Prime Implicant Chart. The principal aim of the truth table is data minimisation. In the fsQCA software, there is an algorithm running that reduces the table until no further simplification is possible. In this stage of analysis in fsQCA, when the algorithm could not wholly minimise the table, there is a need for further minimisation. Hence, the researcher faces the prime implicant chart, which can pop twice, if necessary. A prime implicant chart is a minimisation tool developed to decide which prime implicants are logically essential (Ragin, 2018, p. 34). In this chart, the researcher can see mapped prime implicants and primitive expressions. Since the researcher used various combinations of causal conditions and outcomes, there were many analyses. Although not all of them displayed the prime implicant chart, most of them did. When it happened, the researcher selected the prime implicant to keep, based on the literature studied.

Standard analysis. The software allows both to use 'standard analysis' and 'specify analysis.' Following Ragin (2018, p. 42)'s recommendation, the researcher opted to use standard analysis because while the option 'specify' analysis derives a complex and a parsimonious solution, standard analysis is the only option that derives an intermediate solution, in addition to the other solutions. Next, the researcher selected whether each causal condition should contribute to the outcome, whether present, absent, or if it does not matter. As the research object, the researcher marked 'present' for gamification in all the analyses.

Similarly, following the literature on gamification, the researcher marked 'present' for all scales and factors used. In this table, it was necessary to indicate how each causal condition should theoretically contribute to the outcome, and, according to the literature, all factors and scales used (motivation, competence, relatedness, autonomy, engagement, job enjoyment, job interest, job satisfaction) together with gamification, contribute to the outcome. Following the same reasoning, the researcher marked all the causal demographic conditions as 'present or absent' because there is no evidence in the literature that such characteristics affect any of the analysed outcomes.

Intermediate solution. The results of all the steps above are the complex, the parsimonious, and the intermediate solution. As this research considers literature in the analysis, the researcher considered only the intermediate solution. In this solution, there were displayed some recipes that together represented the overall solution. It meant that one OR other OR other recipe resulted in the outcome selected in the first stage of the analysis. Each recipe had represented its raw coverage, unique coverage, and raw consistency.

Similarly, the result displayed the solution coverage and the solution consistency, representing the solution's coverage and consistency as a whole. The criterion used to verify whether a recipe would be relevant or not for the final result of this research was to have a solution consistency greater than .85, a raw consistency greater than .85, and a raw coverage greater than .20, provided that its value is different from zero. Al thresholds used in this research can be found in Section 5.2.7. For a more detailed explanation of the procedures to carry out this analysis, one can consult Ragin (2018), which entails step by step the method with examples.

4.4. Limitations, reliability and bias

As outlined before, this research had severe limitations in time, financial resources, and the limitation provided by the COVID-19 disease. Notwithstanding, there were some limitations in the methodology applied, which were previously detailed:

- The high level of dependence on the reconstruction of memory by the respondent
- The time elapsed since the last training the respondent participated
- The quality of gamified training in which the respondent has participated
- The judgment on whether the training was gamified or not was up to the respondent.

Therefore, to overcome the limitations mentioned above, an ideal framework would be that two training sessions were developed exclusively for this study: the first traditional and the second gamified, developed based on the best practices listed in the literature. With the two training pieces developed, the participants, under similar conditions, would be submitted to the training, and their perceptions collected shortly after that. This procedure would control the 'freshness' of data collection and the gamification quality applied in the survey. Develop a game and apply it personally in different parts of the globe to control the application and data collection quality. Both time and financial resources were obstacles for this alternative to becoming a reality in this research.

Most questionnaires were collected online, through a paid service. Thus, the more questionnaires the worker answers in a day, the more he will earn. On the one hand, if the worker's interest is to complete the questionnaire as soon as possible. On the other, Mturk uses some tools to minimize the occurrence of poor service. Firstly, it is not possible for all interested people to work on MTurk. While anyone can register and apply to be a worker, Amazon decides at its discretion who can work on the site. Secondly, there is a ranking of workers, where each service provided and approved counts positively so that the worker has a better classification. This ranking serves not only so that the provider has access to the best services, but mainly so that he can remain active on the website because if he does not keep an acceptable percentage by the approved HITs company, he is no longer able to work on MTurk. Thirdly, in addition to the previous ranking, the company grants workers with proven superior experience the status of a master worker.

MTurk also provides other tools available to the service requester to control the quality of the responses collected. Firstly, when registering the HIT, the researcher can choose a minimum number of tasks that the worker has performed. That avoids, for example, the selection of workers who have just joined the service. Second, there is also the option of establishing a minimum percentage of approved HITs. This option allows the researcher to maintain the quality of the responses. Thirdly, MTurk only pays the worker for providing the service after the requester’s approval. That is by far the most useful tool to obtain the best service results, and it is with this option MTurk delivers reliability to the requester. For each questionnaire received, the researcher must review it to check discrepancy points, which show that the questionnaire may have been answered incorrectly, sloppy, or carelessly. In this case, the researcher rejects the questionnaire.

The tools mentioned above help maintain acceptable reliability in research. However, they do not exempt from bias. Even if the questionnaire is valid, that is, the questions are answered coherently, the respondent may have answered without enough reflection. Perhaps considering what he thinks is an acceptable answer, rather than marking the real answer, which reflects his reality. Another bias was in the collection of face-to-face questionnaires. As previously reported, not all questionnaires were completed in the presence of the researcher. Some were left with the manager to be collected the next day. In this case, the bias was:

- not being sure who answered the questionnaire
- the potential constraint felt by receiving a questionnaire from the boss

- the potential inhibition of answering questions about the quality of training and the relationship with other colleagues

4.5. Ethical considerations

This research was approved by the Southern Institute of Technology (SIT) ethics committee, which considered all aspects listed below. As for the form of data collection, it was found appropriate to use the questionnaire to be applied to 500 participants in the banking sector, both in-person and online, by email or using the MTurk tool. The questionnaire model, with its scales already applied, was also submitted for approval by the committee. As for the methodology, the innovative use of fuzzy set / qualitative comparative analysis was also approved, using the fsQCA software, as well as the dissemination of results contained in this paper and made available in the SIT library. These results were also authorised to be presented at conferences and published in relevant journals.

As a majority online survey, there are ethical considerations to be addressed. Thus, this research considered the 15 ethical recommendations for research listed in the study of Buchanan and Hvizdak (2009, pp. 44-46). Total anonymity of the participants was guaranteed, even in the face-to-face collections, so that in any phase of data collection it was not collected any protected personally identifiable information (PPII), such as names, employer name, address, or any data that may be used to identify the participant at present or in the future. All respondents were treated as numbers at all stages of the survey. Although questionnaires have implicit consent, each respondent received an information sheet about the research and the ethical aspects. This form also contained the information that a summary of the results would be available upon request. In the online data collection, the researcher made this information available in the introductory part of the questionnaire, before the questionnaire instructions, so that such information could not be overlooked. As the research did not collect any protected personally identifiable information (PPII), such as names or any data that may be used to identify participants at present or in the future, they were all treated as numbers at all the survey stages.

4.6. summary

This chapter systematically addressed the methodologies applied to the research so that the reader could understand the processes adopted and the reasons for choosing them. It began with the research philosophy chosen: positivism, working with reality to produce precise generalisation. This research's approach is deductive, based on theory, then formulating a hypothesis and testing them. The method chosen was quantitative because it fits more precisely with the research objectives in a cross-sectional method. The researcher applied this method mainly because of the limitation in time. The form of data collection was survey. The questionnaire design was composed of three scales: The Intrinsic Motivation Inventory (IMI), the Utrecht Work Engagement Scale (UWES), and the Job Satisfaction Index (JSI).

In addition to the scales, the initial question was designed to verify whether the respondent has already participated in some gamified training in the workplace. The questionnaire was piloted with 22 respondents, from where the researcher could get good feedbacks and used them to improve the questionnaire in form, content, and presentation. The answers were collected in person, via e-mail, or through the MTurk tool. There was no choice of participants; the only criterion used was to be a bank employee. Due to the universe to be studied, comprising the totality of bank employees worldwide, it was calculated that the amount of a minimum sample so that if it were representative would be 384 responses. Fortunately, despite wanting 500 responses, the researcher managed to collect 388 valid questionnaires.

Data analysis was performed using both the SPSS and fsQCA software. The first was used for the symmetric step of the analysis, while the second was used for the asymmetric (non-linear) step based on fuzzy sets. The researcher found the selected research methodology suitable for answering the research question. Finally, limitations, reliability, and bias were addressed. The main limitations were related to the reliance on the questionnaire response on the respondents' memory. As most of the data collected came from MTurk, the researcher adopted procedures to guarantee the reliability of this tool. Lastly, the bias was outlined, and it consisted briefly of how the paid respondents answered the questionnaire and how face-to-face questionnaires were collected.

Chapter 5. Findings and Analysis

5.1. Introduction

Grounded on the methodologies detailed in Chapter 4, this chapter will detail the results found and present the analyses carried out to provide the reader with information in the most transparent way possible to understand the findings and conclusions reached fully. Likewise, this full detail of the results will replicate the research by other scholars interested in gamification, management, banking, or training. This chapter is organised into three main sections: results, discussion, and a summary of the chapter

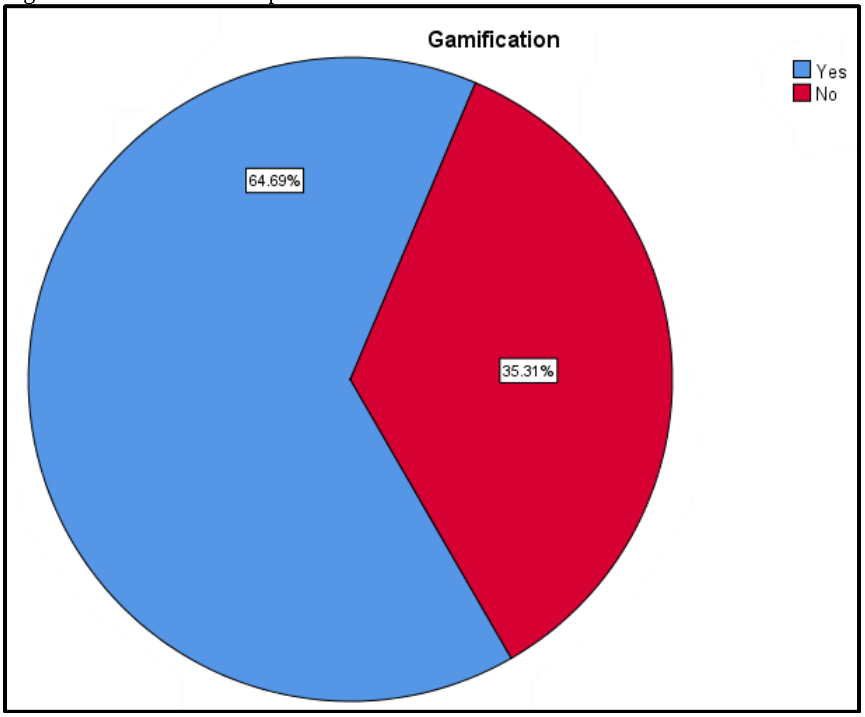
5.2. Results

5.2.1. Background of the sample

Four hundred and forty-eight respondents participated in this research, answering the questionnaire. This sample represented approximately 0.00001421% of the total population of 27,296,413. Responses were collected both online and in-person, on paper forms. Most of the respondents were recruited by the MTurk service, and the others responded to the survey through invitations via email and social networks or by attending face-to-face approaches. After discarding the questionnaires filled out incorrectly and those from MTurk that did not meet the requirements displayed in Table 6, 388 valid questionnaires remained in total. (*N* = 388). The next sections will examine the percentage of respondents experienced in gamification, in addition to age, gender, working time, and origin of participants.

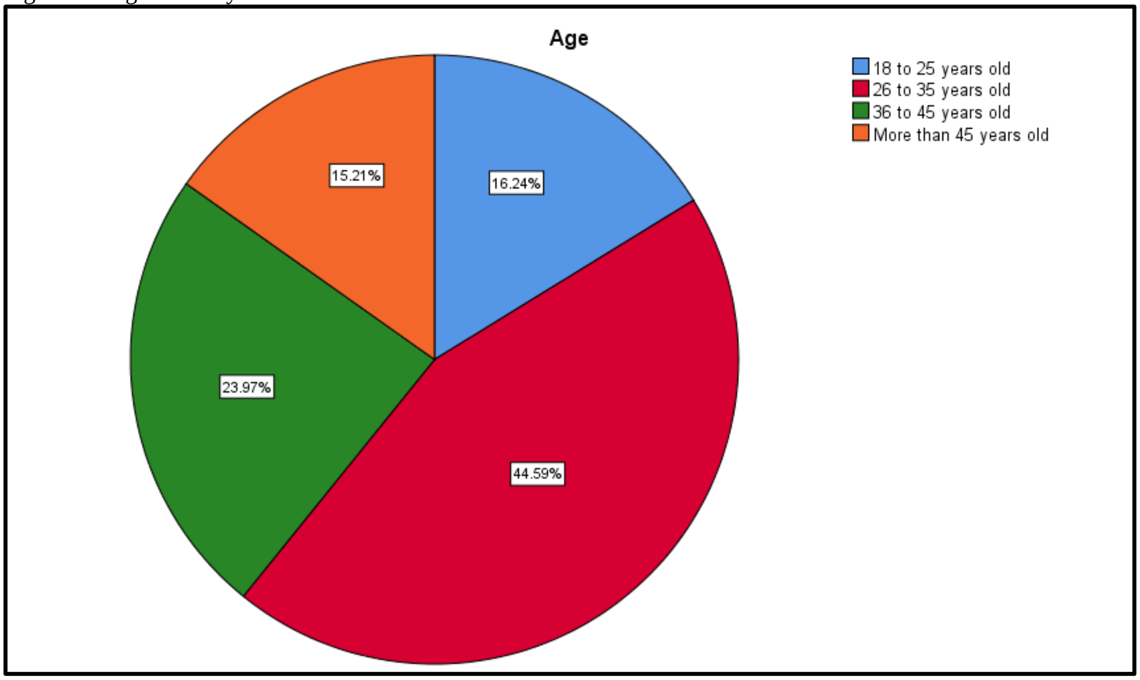
Gamification. Among the survey participants, approximately 64.7% (N = 251) answered 'yes' and 35.3% (*N* = 137) answered 'no,' meaning that they had never participated in gamified training in the work environment. As already explained in Section 1.6, the first ones will henceforth be called gamified participants, and the latter will be called non-gamified participants. This result can be found in Figure 11.

Figure 11. Gamification respondents



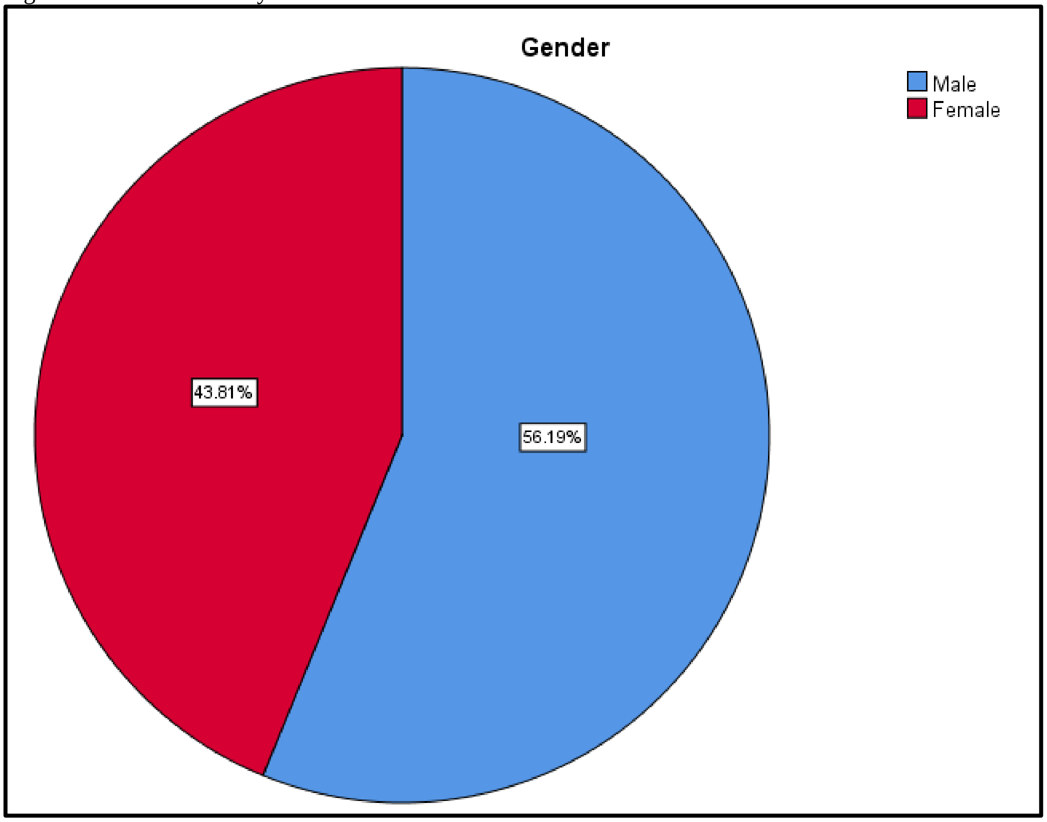
Age. According to displayed in Figure 12, a participants' frequency analysis of age revealed that approximately 16.2% (*N* = 63) of the respondents reported belonging to the group aged 18 to 25 years, 44.6% (*N* = 173) declared belonging to the 26-35 group, 24% (*N* = 93) to the 36-45 group and 15.2% (*N* = 59) declared to belong to the group over 45 years old. No respondent declared to belong to the group under the age of 18, which was expected in a certain way, because despite being considered a minor in most countries worldwide, in several countries employment contracts for minors are allowed, being called as an apprentice, or minor worker, for example. However, in addition to having minimum percentage participation in the total, these were not the research's target audience. The results revealed that it was a sample mainly of young adults to middle-aged professionals: while the age group with the highest representation was 26-35 years old, the second most representative age group was 36-45 years old, and together, both represent approximately 68.6% of the total.

Figure 12. Age diversity in this research



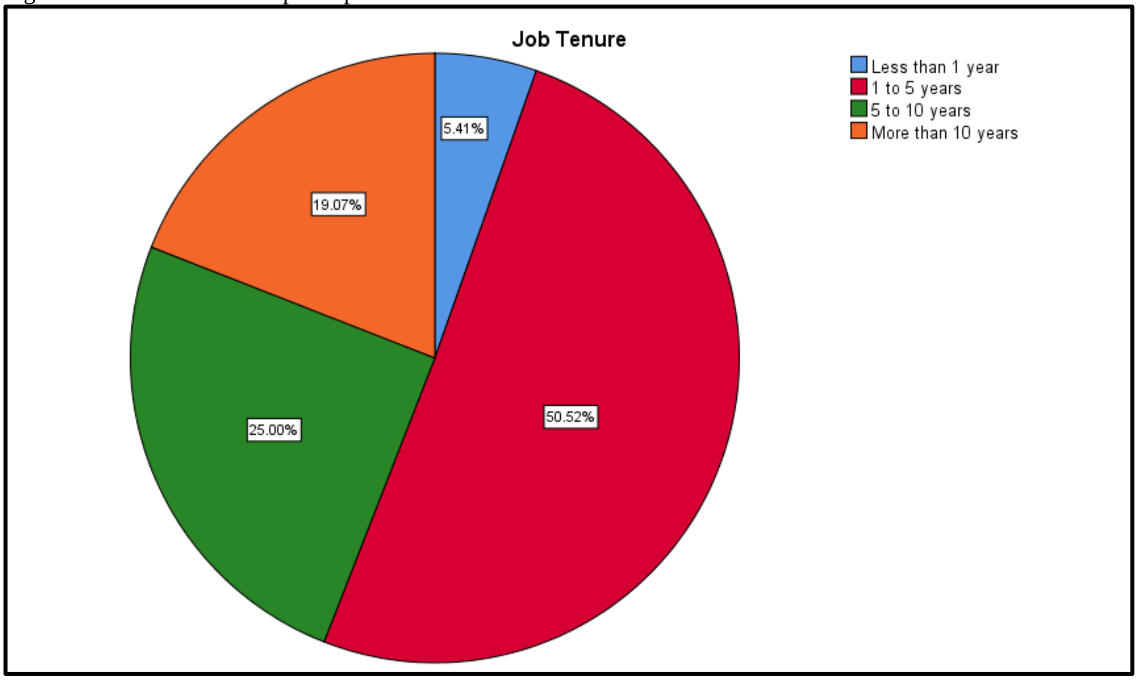
Gender. Regarding gender, the results showed in Figure 13 were somewhat balanced. Approximately 56.2% (*N* = 218) reported being male while 43.8% (*N* = 170) reported being female. Although there is a third option, 'diversified gender,' none of the interviewees declared to belong to this option. That was an interesting factor that may indicate a bias in the way the question was asked, or it may indicate a hesitation by the participants to reveal their sexual option in an open survey, even with all the care taken to guarantee anonymity. Unfortunately, due to the absence of a centralized study of the bank's profile on a global scale, it was impossible to obtain data that could serve as a comparison with the data presented here. However, this researcher finds it very unlikely that there are no participants, out of 388, who have a different gender than the male / female binomial.

Figure 13. Gender diversity in this research



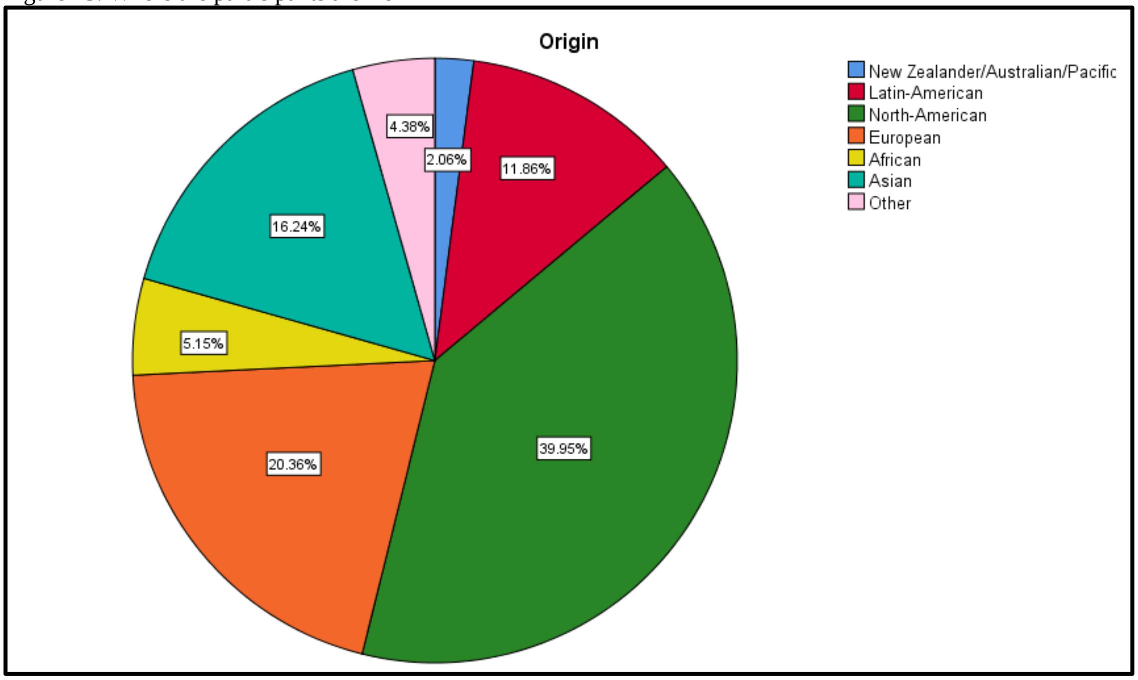
Job Tenure. The question about job tenure asked how long the participant has worked in the banking sector, allowing five options. Among them, approximately 5.4% (N = 21) declared to have less than one year of experience, 50.5% (N = 196) said to belong to the group of 1-5 years of experience, 25% (N = 97) belonged to the group of 5 to 10 years, and 19.1% (N = 74) of the participants had more than ten years of experience in the sector. These numbers displayed in Figure 14 clearly show that more than half of the respondents (50.5%) have one to five years of experience, which present support for the dynamism of the sector regarding the turnover of their employees.

Figure 14. Job Tenure of the participants



Origin. The question about the participants' origin produced interesting results, which can be followed by Figure 15. Although the research was carried out in New Zealand and the researcher's experience and banking contacts were in Brazil, most participants answered the questionnaire through MTurk, which made it somewhat geographically comprehensive. The groups were as follows: New Zealander/Australian/Pacific, Latin American, North American, European, African, Asian, and others. 2.1% (*N* = 8) of the respondents declared belonging from the first group, 11.9% (*N* =46) were Latin-Americans, 39.9% (*N* = 155) declared being North-Americans, 20.4% (*N* =79) Europeans, 5.2% (*N* =20) belonging to African's group, and 16.2% (*N* =63) identified closely with Asia. 4.4% (*N* =17) of the respondents marked 'Other.' This last option could mean that the respondent did not identify with any of the options, but it may also have indicated that he did not want to disclose his origin. The meaning of the question may also not have been clear, whether about nationality, where the respondent lives, or about which region he better identifies himself. By way of clarification, it was the last meaning that the question was intended to know. The majority group was from North America (39.9%), followed by Asia (16.2%). However, if observed together, Americas (Latin America and North America) takes more than half of the respondents (51.8%).

Figure 15. Where the participants are from

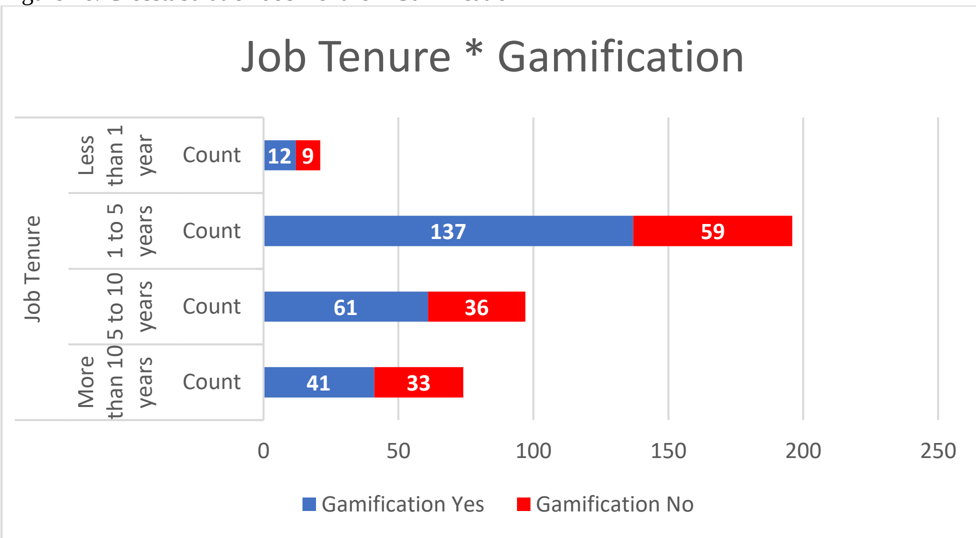


5.2.2. Crosstabulation demographics

Demographic data were investigated in conjunction with Gamification to draw more meaningful conclusions. Gamification and Age, Gamification and Gender, Gamification and Job Tenure, and Gamification and Origin were analysed together. Besides, Gender and Job Tenure were also analysed together. The expectation is that these results may help conclude the demographic profiles of the gamified participants.

Job Tenure * Gamification. Among the gamified respondents, that is, those who answered 'yes' to the question about gamification, 16.3% (N = 41) had more than ten years of experience in the banking industry, 24.3% (N = 61) belonged to the group of 5-10 years, 54.6% (N = 137) had 1 to 5 years of experience, and 4.8% (N = 12) declared to have less than one year in the sector. On the opposite side, among the non-gamified participants, 24.1% (N = 33) declared to have more than ten years of experience in banking, 26.3% (N = 36) are in the 5-10 years range, 43,1% (N = 59) have one to five years in the bank, and 6.6% (N = 9) said they have less than a year of experience in the industry.

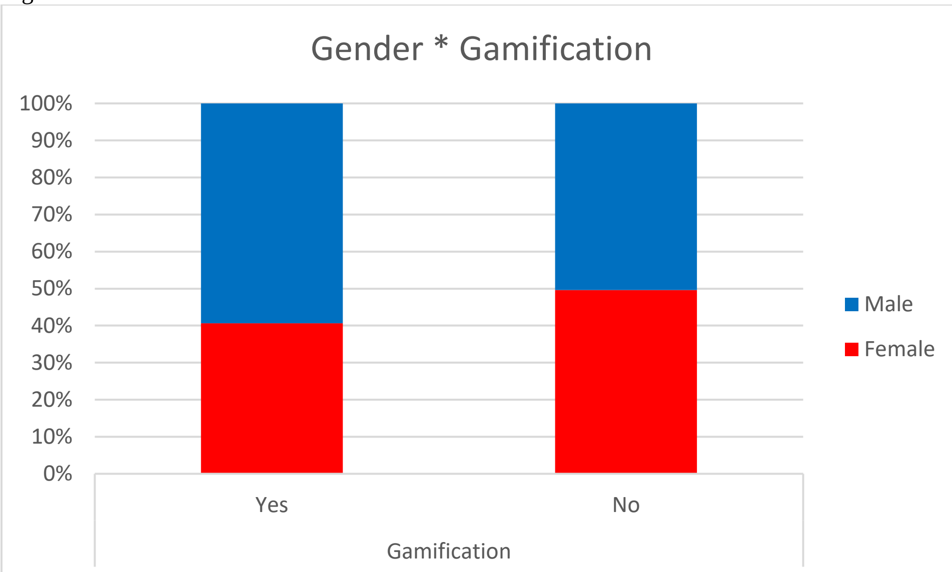
Figure 16. Crosstabulation Job Tenure * Gamification



This crosstabulation presented in Figure 16 helps to conclude that, like the Job Tenure analysis displayed, the highest percentual of gamified bank employees (54.58%) have between five and ten years of experience within the industry. Such a conclusion may mean that it would be with this average working time (1-5 years) that most bank employees have their first contact with gamified training in the work environment. This conclusion is further reinforced when considering that the participants who responded that they were in another more experienced band (e.g., 5-10 or more than ten years) declared that they had already had gamification experience, but not necessarily the first experience occurred recently. That may mean that the percentage of employees who had their first gamified training at work is even higher than 54.58%, representing a greater likelihood that a bank employee will have their first contact with gamification with one to five years in the industry.

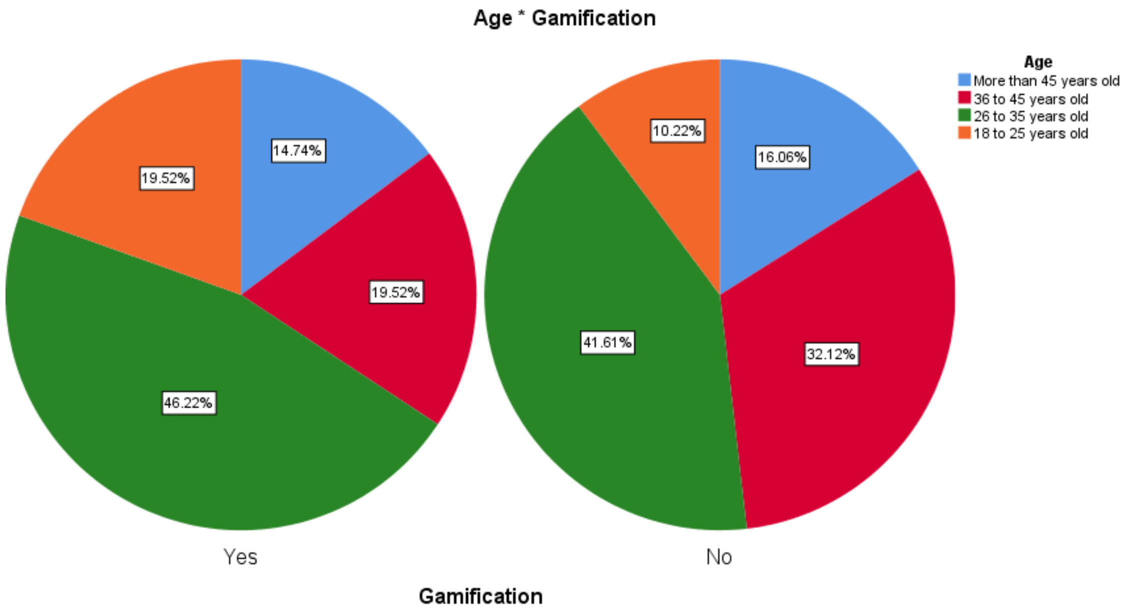
Gender * Gamification. The survey results revealed in Figure 17 that 40.6% (*N* = 102) of gamified respondents declared to be female, and 59.4% (*N* = 149) declared being male. Among the non-gamified participants, 49.6% (*N* = 68) declared themselves to be female, and 50.4% (*N* = 69) declared themselves male.

Figure 17. Crosstabulation Gender * Gamification



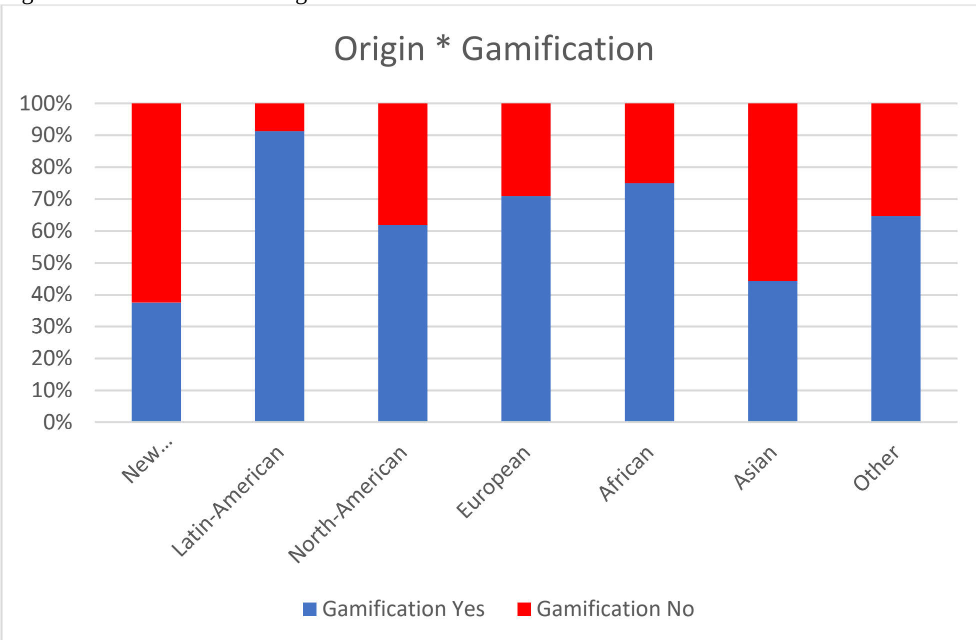
Age * Gamification. Among the gamified participants, 19.5% (*N* = 49) are between 18 and 25 years old, 46.2% (*N* = 116) declared to be between 26 and 35 years old, 19.5% (*N* = 49) declared to belong to the group of 36-45 years old, and 14.7% (*N* = 37) declared to be over 45 years old. Among the non-gamified participants, 10.2% (*N* = 14) said they were between 18 and 25 years old, 41.6% (*N* = 57) of the respondents reported being between 26 and 35 years old, 32.1% (*N* = 44) declared being between 36-45 years and 16.1% (*N* = 22) are in the age group over 45 years. The results of this crosstabulation (Figure 18) followed proportions somewhat close to those observed in the variable 'Age,' analysed in the previous section.

Figure 18. Crosstabulation Age * Gamification



Origin * Gamification. An even more significant result than the previous one was achieved by analysing gamification from the origin perspective. Among the participants from New Zealand, Australia, or the Pacific, 37.5% (N = 3) responded that they were gamified, while the remaining 62.5% (N = 5) were not gamified. Among Latin Americans, 91.3% (N = 42) answered 'yes' to the question about gamification, while only 8.7% (N = 4) answered no. North Americans were composed of 61.9% (N = 96) of gamified respondents and 38.1% (N = 59) of non-gamified respondents. 70.9% (N = 56) of Europeans answered 'yes', while 29.1% (N = 23) answered 'no'. Among those who declared themselves to be Africans, 75% (N = 15) also were gamified, against 25% (N = 5) who were not. Among Asians, 44.4% (N = 28) declared themselves gamified and 55.6% (N = 35) non-gamified. Among those who did not answer this question, 64.7% (N = 11) answered 'yes' to the question about gamification, while 35.3% (N = 6) answered 'no' (Figure 19).

Figure 19. Crosstabulation Origin * Gamification

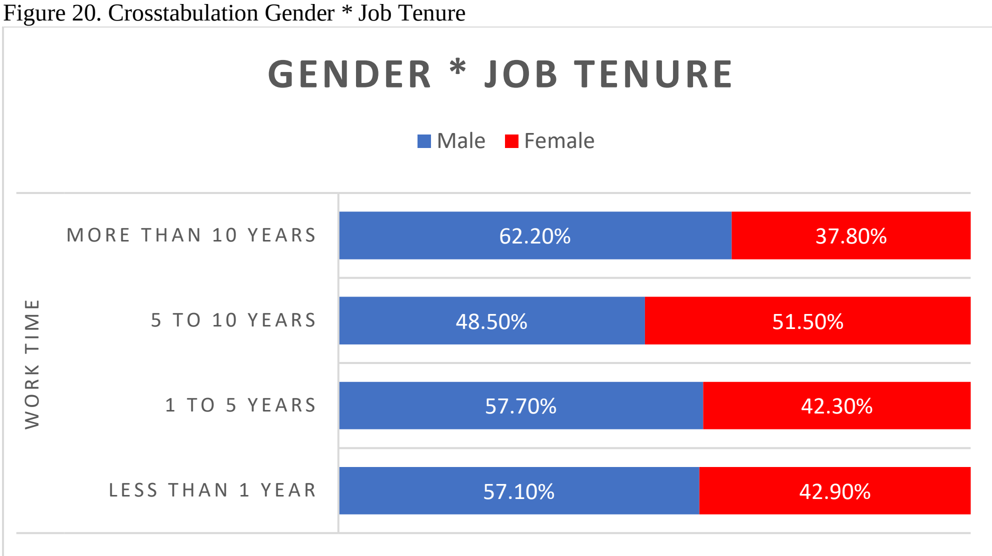


Although the group of countries in the Pacific called attention to the low proportion of gamified participants, the number of participants from these countries is not enough to make a fair generalisation. The same is valid for Africa, despite having a slightly larger number of participants. While in Asia, there is a certain balance between gamified and non-gamified, this is not the case in other regions. Although Europe, North America, and Latin America have a large proportion of participants who have already experienced gamification in the work environment, Latin America stands out with a proportion of 91.3% of respondents who declared to have participated in at least one gamified training in the bank. Such results help to reveal how gamification is widespread in the banking industry. In Table 15, it is possible to check that Gamification is positively correlated with Origin, with presents support for the results found here.

Gender *Job Tenure. This cross-tabulation was included in the analysis because it presents interesting results about the effect that the gender of the participants can exert on working time. Among bank employees with less than a year in the sector, 42.9% (*N* = 9) were women, while 57.1% (*N* = 12) were men. Those who declared they had between one to five years of experience in the bank were divided into 42.3% (*N* = 83) of women and 57.7% (*N* = 113). Among those in the 5-10-year age group, 51.5% (*N*

= 50) declared themselves women, while 48.5% (*N* = 47) declared themselves men. Finally, among participants with more than ten years of banking experience, 37.8% (*N* = 28) were women, while 62.2% (*N* = 46) were men. The result of this crosstabulation (Figure 20) allows the inference that women are less likely to have a career of more than ten years in the banking sector.

Figure 20. Crosstabulation Gender * Job Tenure



5.2.3. Factor Analysis

As already explained in Chapter 4, the factor analysis was obtained using the Principal Axis Factoring (PAF) extraction method and the Varimax rotation method with Kaiser Normalization. There were three factor analyses, for the three scales present in the study: IMI, UWES, and JSI. With the factor analysis, SPSS provides the intercorrelation matrix factor from two tests: the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Sphericity Test. Table 8 displaying the results obtained in these tests for the three scales revealed that the factor model was appropriate since the KMO index is considered adequate if the index is greater than or equal to 0.50 and the Bartlett test is significant. when Sig. <0.05. The next section will delineate the three pieces of factor analysis separately.

IMI factor analysis. PAF extracted four factors with Eigenvalues higher than 1, although the last extracted factor has a number of Eigenvalues very close to 1 (1.059). These Eigenvalues accounted for approximately 56% of the variance. The Scree Test results confirmed that the last factor extracted was very close to one, doubting its strength as a factor. With that, the researcher thought it would be more suitable to use three factors instead of four. As a result, the PAF generated the rotated factor matrix, which came to confirm the previous thought, since to be considered a factor, an item must have at least an equal or more significant result. Based on this result, the researcher decided to discard this factor, maintaining only three factors in total.

The results of the Rotated Factor Matrix for IMI can be found in Table 9. As shown in the table and following the rule of thumb of keeping values equal or above .400 together, the researcher found a discrepancy on item number 9. This item displayed a stronger value for factor #2, but this value was negative, differently from all the other values in factor #2. Also, item #9 displayed values above .400 for factor #1 and #3. Based on these findings, the researcher decided to discard this item. When analysing the three remaining factors and their items, in light of the literature, the researcher decided to name factors 1, 2 and 3 of competence, relatedness, and autonomy. Table 13 shows the three factors with their respective items.

Table 8. KMO and Bartlett's test

KMO and Bartlett's Test

IMI	Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.931
	Bartlett's Test of Sphericity	Approx. Chi-Square	8472.987945
		Df	561
		Sig.	.000
UWES	Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.942
	Bartlett's Test of Sphericity	Approx. Chi-Square	3216.781974
		Df	136
		Sig.	.000
JS	Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.920
	Bartlett's Test of Sphericity	Approx. Chi-Square	3916.508362
		Df	153
		Sig.	.000

The IMI scale manual (Ryan & Deci, n.d.) points to five subscales, namely: Interest/Enjoyment, Perceived Competence, Effort/Importance, Pressure/Tension, Perceived Choice, Value/Usefulness, and Relatedness. The authors point to the first subscale (Interest/Enjoyment) as the self-report measure of intrinsic motivation (Ryan &

Deci, n.d., p. 1). Despite this, the factors were also named as competence, relatedness, and autonomy. The decision to name IMI factors was based on the human psychological needs analysed by Deci and Ryan (2002): competence, relatedness e autonomy. The researcher noted a strong link between these concepts with the meanings underlying the items related to the factors, thus justifying the nomination.

Table 9. Rotated Factor Matrix for IMI scale

	Factor			
	1	**2**	**3**	**4**
IMI_34	.794	-.161	.265	-.026
IMI_29	.767	.103	.009	.076
IMI_5	.765	-.076	.333	-.113
IMI_30	.754	.024	.021	.081
IMI_20	.739	-.137	.113	.208
IMI_21	.726	-.097	.256	-.066
IMI_2	.711	.097	-.123	-.031
IMI_8	.703	.047	-.126	-.022
IMI_17	.701	.035	-.009	-.261
IMI_14	.683	-.123	.278	-.113
IMI_18	.669	-.304	.354	.022
IMI_25	.657	-.324	.333	-.027
IMI_26	.618	-.083	.005	.327
IMI_28	.605	.015	-.179	.002
IMI_15	.605	.011	-.160	-.084
IMI_7	.602	.050	.013	.221
IMI_32	.579	-.041	-.155	-.131
IMI_1	.565	.106	-.151	-.074
IMI_3	.476	-.168	.129	.129
IMI_13_R	-.029	.797	.137	.079
IMI_19_R	-.086	.796	.042	-.112
IMI_12_R	-.015	.780	.119	-.166
IMI_22_R	.039	.776	.176	-.285
IMI_10_R	-.072	.756	.081	.256
IMI_31_R	-.148	.753	.127	.199
IMI_24_R	-.095	.736	.098	.046
IMI_11_R	.151	.674	.411	-.105
IMI_4_R	.101	.575	.246	-.023
IMI_9	.444	-.503	.412	-.003
IMI_23_R	.127	.309	.753	.007
IMI_27_R	-.033	.166	.734	.056
IMI_6_R	.054	.190	.732	-.044
IMI_16_R	.044	.355	.629	.005
IMI_33_R	-.166	.141	.619	.011

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.[a]
[a]. Rotation converged in 6 iterations
Items ending in R mean they are reversed items

UWES Factor Analysis. PAF extracted three factors with eigenvalues greater than 1, accounting for 59.5% of the variance, indicating three loaded factors. Like the previous scale, the third factor was very close to 1; in fact, even closer (1,002). However, unlike IMI, UWES behaved differently in the Rotated Factor Matrix analysis: the items were well distributed among all the three factors. That justified continuing with the three factors as indicated by the analysis of Eigenvalues. Regarding the items, item #6 was discarded as it presented values below .400 for all three factors. Table 10 shows the result of the Rotated Factor Matrix for a UWES scale. In Table 13, the reader can observe the items' distribution on the UWES scale by factors.

Table 10. Rotated Factor Matrix for UWES Scale

	Factor		
	1	**2**	**3**
UWES_2	.686	.268	.099
UWES_7	.682	.114	.150
UWES_4	.589	.228	.294
UWES_3	.567	.389	.360
UWES_9	.435	.306	.237
UWES_5	.434	.408	.335
UWES_6	.375	.207	.320
UWES_10	.272	.760	.282
UWES_14	.380	.611	.269
UWES_1	.218	.611	.372
UWES_8	.493	.589	.253
UWES_16	.230	.559	.511
UWES_17	.205	.282	.682
UWES_11	.230	.203	.608
UWES_15	.277	.387	.554
UWES_13	.086	.138	.511
UWES_12	.337	.232	.498

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.[a]
[a]. Rotation converged in 6 iterations

From that moment on, it is necessary to point to another analysis not mentioned in the factor analysis of the previous scale because there was no relevance to the research. In conjunction with the set of analyses performed by SPSS software, the Factor Transformation Matrix investigates whether there is a correlation between the factors loaded if the displayed value is greater than or equal to .400. In UWES, there was a significant correlation between factors 1 with 2 (.592), 1 with 3 (.561), 2 with 3 (-.633), 2 with 1 (.760), and 3 with 2 (. 793) (Table 11). The loaded factors in this analysis will be named UWESF1, UWESF2, and UWESF3.

Table 11. Factor Transformation Matrix for UWES

Factor	1	2	3
1	.579	.592	.561
2	.760	-.143	-.633
3	.295	-.793	.533

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

JSI Factor Analysis. In this Scale, PAF extracted two factors, based on Eigenvalues higher than 1, and the Eigenvalues accounted for approximately 59% of the variance. Unlike the other scales, the number of Eigenvalues displayed two factors, without any factors near to 1. The Scree Plot shows how well the factors have been established for this factor (Figure 21). Based on this result, the researcher decided to use the two factors loaded in the extraction. This scale, distinctively from the others, had all the items related to the factors revealed by the analysis, with nine items in each factor, as the reader can see in Table 12. Analysing the gathered items and the shared meaning, the researcher chose two names for factors 1 and 2. Factor 1 was named Job Enjoyment, and factor 2 was called Job Interest, and it is for these names that they will be treated hereafter. Table 13 presents the list of items separated into their factors, already named.

Figure 21. JSI Scree Plot

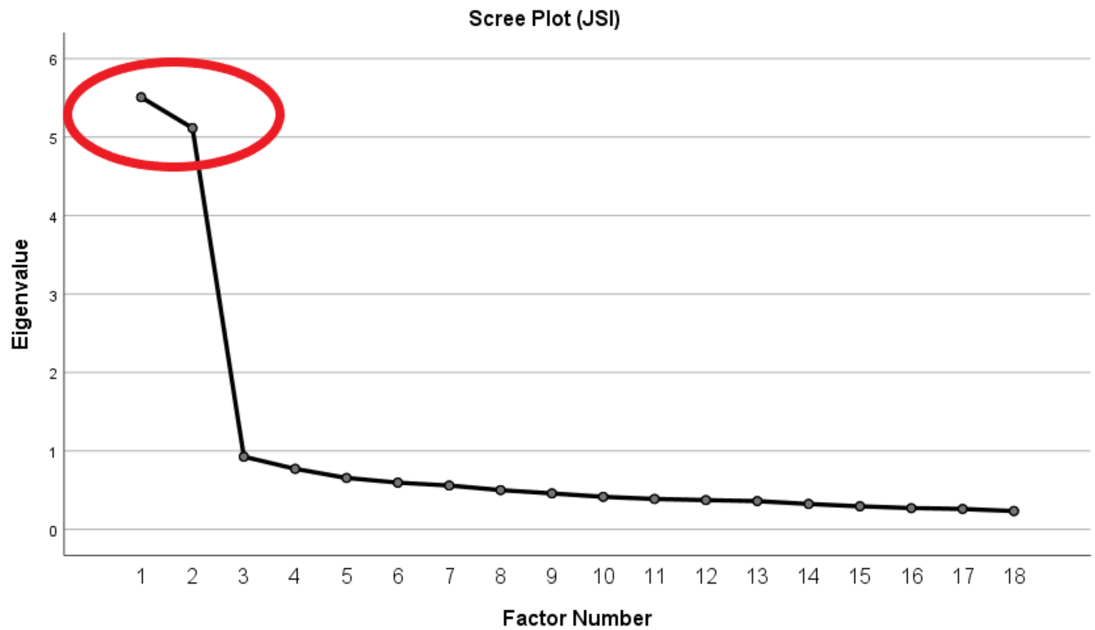


Table 12. Rotated Factor Matrix for JSI Scale

	Factor 1	Factor 2
JS_17	.843	.100
JS_15	.792	.000
JS_12	.777	-.027
JS_13	.776	.087
JS_7	.729	.028
JS_9	.705	.081
JS_2	.705	.052
JS_1	.654	-.228
JS_5	.548	-.415
JS_18_R	.126	.790
JS_11_R	.256	.780
JS_4_R	-.005	.761
JS_8_R	.023	.751
JS_6_R	.045	.746
JS_16_R	.141	.739
JS_14_R	-.130	.688
JS_3_R	-.330	.496
JS_10_R	-.200	.473

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.[a]

[a]. Rotation converged in 3 iterations

Table 13. factors loading

Motivation (IMI)			Engagement (UWES)			Job Satisfaction (JSI)	
1	2	3	1	2	3	1	2
Competence	Relatedness	Autonomy	UWESF1	UWESF2	UWESF3	Job Enjoyment	Job Interest
IMI_1	IMI_4_R	IMI_6_R	UWES_2	UWES_1	UWES_11	JS_1	JS_3_R
IMI_2	IMI_10_R	IMI_16_R	UWES_3	UWES_8	UWES_12	JS_2	JS_4_R
IMI_3	IMI_11_R	IMI_23_R	UWES_4	UWES_10	UWES_13	JS_5	JS_6_R
IMI_5	IMI_12_R	IMI_27_R	UWES_5	UWES_14	UWES_15	JS_7	JS_8_R
IMI_7	IMI_13_R	IMI_33_R	UWES_7	UWES_16	UWES_17	JS_9	JS_10_R
IMI_8	IMI_19_R		UWES_9			JS_12	JS_11_R
IMI_14	IMI_22_R					JS_13	JS_14_R
IMI_15	IMI_24_R					JS_15	JS_16_R
IMI_17	IMI_31_R					JS_17	JS_18_R
IMI_18							
IMI_20							
IMI_21							
IMI_25							
IMI_26							
IMI_28							
IMI_29							
IMI_30							
IMI_32							
IMI_34							

Notes. IMI_9 dropped
UWES_6 dropped
R = reversed item

5.2.4. Reliability Analysis

At this stage, a reliability analysis was carried out. This analysis was performed using the Alpha Coefficient (Cronbach, 1951), which measured the factors' internal consistency. The minimum sample size for a reliable Alpha Coefficient result has often been debated among scholars (Yurdugül, 2008, p. 1), with studies pointing to a minimum sample size of 300 (Kline, 1986; Nunnally & Bernstein, 1994), while others claim that the minimum must be 400 (Charter, 1999; Segall, 1994). However, Yurdugül (2008) performed an analysis using simulations based on the Monte-Carlo method with bootstrap technique, and his study indicated that a performance coefficient depends not only on the sample size but also on the largest eigenvalue of the sample data set. As found in his study, with the highest Eigenvalue greater than 3, an N = 100 is an adequate sample to an impartial estimator of the alpha coefficient (Yurdugül, 2008, p. 7). Therefore, this was not a problem in the present study, which involved 388 participants.

For a scale to be considered reliable, it must have satisfactory internal consistency. Although the .700 cutoff suggested by Nunnally and Bernstein (1994) has been widely used in several studies (McAllister & Bigley, 2002; Rothbard & Edwards, 2003; Schilling, 2002; Spector et al., 2002), there are controversies, because, as the author himself established, ”a satisfactory level of reliability depends on how a measure is being used” (Nunnally & Bernstein, 1994, p. 264). The author states that the cutoff depends on the type of research being carried out. For this research, using the principle of prudence, the researcher adopted an Alpha of at least .850 as the cutoff point. To have the most comprehensive analysis possible, the researcher investigated the reliability of all loaded factors and all scales: Motivation, Competence, Relatedness, Autonomy, Engagement, UWESF1, UWESF2, UWESF3, Job Satisfaction, Job Enjoyment and Job Interest.

As far as the use of the loaded factors is concerned and observing the results of Table 14, the researcher observed four critical facts. Firstly, despite all the scales and factors presenting alpha greater than .700, not all of them displayed values above .850, as proposed. Secondly, there was a difference in results between scale and factors: while the IMI and JSI scales presented lower alpha than the factors (except for Autonomy), the Engagement scale (UWES), differently, presented a considerably greater result than its three factors. Thirdly, the results presented in the UWES Factor Transformation Matrix (Table 11) show a strong correlation between the three factors, supporting the use of Engagement in a one-dimensional model. These last two facts confirmed the conclusions of Schaufeli and Bakker (2004, p. 17).

Fourthly, in the UWES scale manual, Schaufeli and Bakker (2004, p. 17) claim that if the research's objective is not to investigate the different work engagement dimensions, it is unnecessary to use the scale for its factors. It is not the objective of this study, and also considering the two other facts mentioned here, the researcher decided to use the Engagement scale (UWES) instead of using the loaded factors (UWESF1, UWESF2, and UWESF3). In summary, after the factor analysis and reliability were performed, the use of the following variables was defined for the continuity of the study: Competence, Relatedness, Autonomy, Engagement, Job Enjoyment, and Job Interest.

Table 14. reliability analysis of all factors and scales

Scale/factor	*Cronbach*	*N of items*
Motivation (IMI)	.892	33
Competence	.940	19
Relatedness	.921	9
Autonomy	.855	5
Engagement (UWES)	.921	16
UWESF1	.836	6
UWESF2	.883	5
UWESF3	.789	5
Job Satisfaction (JSI)	.831	18
Job Enjoyment	.905	9
Job Interest	.892	9

5.2.5. Correlation Analysis

The correlation analysis included gamification, the variables mentioned above, and all demographic variables. Appendices 7.2.1 presents all correlations, including Pearson's correlation and the significance level. Table 15 shows a summary of the significant correlations for this study, which is composed of correlations between non-obvious items (such as Job Tenure and Age, or between factors of the same scale, for example). In this table, some values stand out, such as the correlations between Engagement and Competence (.612), Job Enjoyment and Engagement (.403), and Job Interest and Relatedness (.479). All these correlations showed values above .400, indicating a substantial correlation.

These results make sense, analysing in the light of reality. An employee who feels competent in his activities tends to be more engaged in such activity, which confirms the findings of Deci and Ryan (2002). Similarly, enjoyment in the workplace is likely to be an ingredient for engagement, just as relatedness tends to yield job interest. These correlations are followed in relevance by the correlations between Relatedness and Job Tenure (.346) and Job Enjoyment and Competence (.309). Again, the results found are not strange to common sense. An employee with higher job tenure tends to feel more related to the workplace and their teammates. Likewise, the feeling of competence tends to reduce the tension related to an activity, providing more enjoyment at work.

Nevertheless, considering the objective of investigating the effects of gamification, it can be observed that although the values presented in the correlations with gamification have been significant, they do not suggest a strong correlation. It is worth highlighting that this test shows *linear* correlations and that non-linear correlations will be tested at the next level of analysis. However, the negative correlation between Gamification and Competence (-.237) is noteworthy. Such a correlation would indicate that gamification may generate a feeling of lack of competence in the employee. The data gathered here will be analysed in conjunction with all other analyses at the end of the chapter for a holistic conclusion.

Table 15. Summary of significant correlations

Correlations	***Pearson***
Engagement X Competence	.612
Job Interest X Relatedness	.479
Job Enjoyment X Engagement	.403
Relatedness X Job Tenure	.346
Job Enjoyment X Competence	.309
Job Interest X Job Tenure	.287
Gamification X Relatedness	.215
Job Interest X Autonomy	.188
Engagement X Age	.148
Gamification X Job Interest	.142
Gamification X Origin	.138
Job Interest X Age	.138
Gamification X Competence	-.237
Job Interest X Engagement	.245

Despite these impressive results, they revealed little about the differences between gamified and non-gamified training. Therefore, the researcher decided to perform two more correlation analyses: one isolating the gamified participants' responses, and the other isolating the non-gamified respondents' response. The variable gamification was not included in the two analyses because the participants' responses already isolated gamification. All these correlations can be found in Appendix C and summarized in Table 16 and Table 17.

Table 16. Summary of significant correlations for non-gamified participants

Correlations	***Pearson***
Engagement*Competence	0.580
Engagement*Motivation	0.538
Job Satisfaction*Engagement	0.486
Job Enjoyment*Engagement	0.431
Job Interest*Relatedness	0.393
Job Interest*Engagement	0.351
Job Satisfaction*Motivation	0.272
Job Satisfaction*Relatedness	0.254
Job Enjoyment*Competence	0.253
Engagement*Relatedness	0.232
Job Enjoyment * Motivation	0.228

Table 17. Summary of significant correlations for gamified participants

Correlations	***Pearson***
Engagement*Competence	0.638
Job Satisfaction*Motivation	0.512
Job Interest*Relatedness	0.492
Job Satisfaction*Engagement	0.469
Job Interest*Motivation	0.437
Job Enjoyment*Engagement	0.385
Engagement*Motivation	0.384
Job Satisfaction*Relatedness	0.344
Job Enjoyment*Competence	0.326
Job Satisfaction*Competence	0.305
Job Interest*Autonomy	0.284
Job Satisfaction*Autonomy	0.264
Job Interest*Engagement	0.219
Job Enjoyment*Motivation	0.211

5.2.6. Comparison of Means

One of the leading linear analyses performed in this study to verify a statistically significant difference between gamified training outcomes and non-gamified training was the Independent-Sample T-Test. For this test, Gamification was included as a group variable, while the other variables, whether scales or factors, were included as Test Variables. This test was performed with a 95% confidence interval. Table 19 shows the result of this analysis, revealing that there is statistical significance in the differences in the means when the value of Sig. (2-tailed) is less than or equal to 0.05. Table 19 shows the differences observed between gamified and non-gamified respondents are significant in Competence, Relatedness, and Job Interest.

With the information of which variables have a difference in the averages of gamified and non-gamified respondents, it remains to be determined which has the highest average, i.e., which training presented the best results according to the respondents. These results can be verified by Table 18, which shows the averages of each variable for gamification and for non-gamification. That is, for respondents who answered 'yes' to gamification and for those who answered 'no' to the same question. As shown in Table 18, the gamified respondents showed a higher result for Competence than the non-gamified respondents. On the other hand, they showed lower Relatedness and lower Job Interest than non-gamified ones. The differences in means found among the other variables in Table 18 are not significant, as verified in Table 19.

Table 18. Difference between gamified and non-gamified means

	Gamification	*N*	*Mean*	*Std. Deviation*	*Std. Error Mean*
Competence	Yes	251	5.1384	.88723	.05600
	No	137	4.6546	1.05948	.09052
Relatedness	Yes	251	4.2621	1.56423	.09873
	No	137	4.9457	1.34750	.11512
Autonomy	Yes	251	3.4446	1.38746	.08758
	No	137	3.2482	1.53824	.13142
Motivation	Yes	251	4.6428	.69893	.04412
	No	137	4.5209	.89730	.07666
Engagement	Yes	251	5.2998	1.02324	.06459
	No	137	5.1273	1.07123	.09152
Job Enjoyment	Yes	251	3.5471	.90566	.05716
	No	137	3.3755	.79841	.06821
Job Interest	Yes	251	3.0841	.95804	.06047
	No	137	3.3544	.78562	.06712
Job Satisfaction	Yes	251	3.3156	.59565	.03760
	No	137	3.3650	.63725	.05444

Table 19. Independent-Samples T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Competence	EVA	3.962	.047	4.786	386	.000	.48376	.10107	.28505	.68248
	EVN			4.545	240.843	.000	.48376	.10644	.27409	.69344
Relatedness	EVA	6.151	.014	-4.315	386	.000	-.68360	.15843	-.99509	-.37211
	EVN			-4.507	316.492	.000	-.68360	.15166	-.98199	-.38520
Autonomy	EVA	2.941	.087	1.282	386	.201	.19645	.15321	-.10479	.49769
	EVN			1.244	256.126	.215	.19645	.15793	-.11455	.50745
Motivation	EVA	9.083	.003	1.481	386	.139	.12186	.08228	-.03992	.28364
	EVN			1.378	227.424	.170	.12186	.08845	-.05242	.29614
Engagement	EVA	.588	.444	1.561	386	.119	.17252	.11051	-.04477	.38981
	EVN			1.540	268.905	.125	.17252	.11202	-.04802	.39306
Job Enjoyment	EVA	5.137	.024	1.859	386	.064	.17164	.09235	-.00993	.35321
	EVN			1.929	310.732	.055	.17164	.08900	-.00348	.34675
Job Interest	EVA	7.989	.005	-2.824	386	.005	-.27031	.09571	-.45850	-.08213
	EVN			-2.992	328.605	.003	-.27031	.09034	-.44804	-.09259
Job Satisfaction	EVA	.637	.425	-.761	386	.447	-.04934	.06486	-.17687	.07819
	EVN			-.746	263.982	.457	-.04934	.06616	-.17961	.08094

Note. EVA – Equal variances assumed. EVN – Equal variances not assumed

5.2.7. Fuzzy-set Analysis

For this last stage of the analysis, the researcher chose the fuzzy-sets qualitative comparative analysis. The reason for choosing this methodology was because it is a non-linear analysis, and complemented the previous analyses, providing a more comprehensive view of the current scenario. The fuzzy set analysis model has already been presented in chapter 4 and will be briefly reintroduced here. This model was presented as a compromise between quantitative and qualitative analysis, but overcoming the limitations of both (Ragin, 2008, p. 71). In this nonlinear analysis, the combinations of causal conditions that culminate in an outcome are investigated. A result is usually achieved with more than one combination of causal conditions in fuzzy set analysis. In turn, a causal condition is composed of a set of variables that, combined, result in the outcome. In this combination, a variable can be included by its statement or its negation. Ragin (2008) called these combinations as recipes.

The fuzzy-set analysis considers what is called necessity and sufficiency. For a causal condition to be considered necessary, it must be present in the recipe to result in the outcome; it is not possible to yield the outcome without it. On the other hand, although necessary, this ingredient needs other components acting together in the recipe to achieve the outcome. In this case, the ingredient is said to be necessary but not sufficient. On the other hand, the concept of sufficiency says that an ingredient alone already generates the outcome; it does not need to act in conjunction with any other ingredient to have the result. However, this ingredient is not the only one that produces the outcome; other ingredients together or alone can also produce it. In this case, the ingredient is said to be sufficient but not necessary.

In addition to these two cases, there are other combinations, such as when the ingredient is necessary and sufficient, generating the result alone, and there is no other ingredient or combination that generates the same result. Alternatively, when the ingredient is neither necessary nor sufficient, it needs to work together with other ingredients to provide the result and when other recipes generate the same result. The latter is the most common in fuzzy sets. In the fuzzy-set analysis, these recipes are considered sets, and the analysis considers the set theory. Since they are sets, researchers use Boolean algebra to test models instead of matrix algebra, often used in symmetric tests.

Preparing the analysis. The initial step in the analysis was calibration. Henceforth, the demographic variable Origin could no longer participate in the analysis. It was because the values for this variable do not follow a numerical order, unlike the others. For example, the variable Age was calibrated as follows: the higher the declared age, the closer to one was the result; oppositely, the younger the age, the closer to zero. At the end of the calibration procedure, as the value 1 means “totally part of the set” and the value 0 means “totally out of the set,” it was also necessary to change the variables’ names to make interpretation more meaningful. In the example above, Age had its name changed to maturity.

After calibration, demographic variables had their names changed: Gender for Female, Job Tenure for Worktime, and Age for Maturity. Subsequently, all variables had their names replaced by the initials. Thus, the names of the variables were coded, as shown in Table 20. The variable Origin needed to be excluded from this analysis due to how data is transformed within calibration. After calibration, the resulting values would not make sense: with a calibrated value, it is impossible to know whether a participant is ‘more’ or ‘less’ European, for example.

Table 20. Codes of variables for fuzzy-set analysis

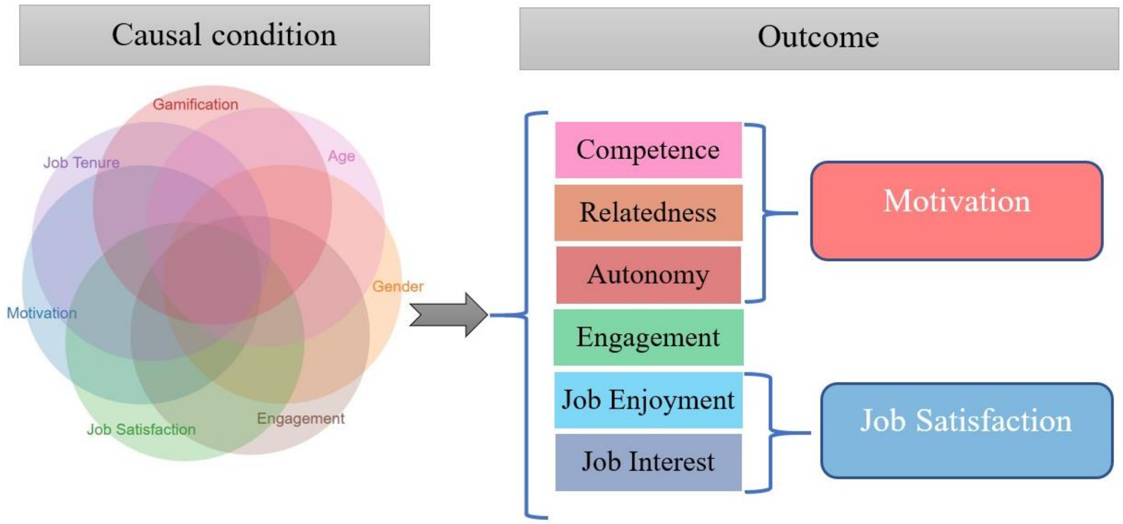
Variable	***Code***
Gamification	G
Gender (Female)	F
Job Tenure (Worktime)	W
Age (Maturity)	Ma
Motivation	Mo
Engagement	E
Job Satisfaction	JS
Competence	C
Relatedness	R
Autonomy	A
Job Enjoyment	JE
Job Interest	JI

A dilemma. As mentioned, this analysis was performed using fs/QCA, a software developed by Ragin (2018) to perform the calculations in the fuzzy-set analysis automatically. However, when analysing the data using fuzzy-sets, the researcher faced a dilemma: the fuzzy-set analysis investigates the possible combinations of causal conditions that generate outcomes, whereas this research, conversely, sought to identify which outcomes are generated in employees for the use of gamification in training applied in the banking environment are. That is, while in this study, the causal condition is known, and the outcome is unknown, the fuzzy-set analysis does the opposite: knowing the outcome, it seeks to investigate the causal conditions. Therefore, in the fs/QCA program, it is only possible to test a single outcome at a time, while it is possible to include as many causal conditions as necessary.

The solution found for this adversity was to perform several analyses, testing the outcomes separately and including Gamification as a causal condition in all tests since it is the primary variable being tested. For example, in one test the researcher used the variable Engagement as the outcome, and all the others were included to be tested as causal conditions: Gamification, Job Tenure, Age, Gender, Competence, Relatedness, Autonomy, Job Enjoyment, and Job Interest. In this way, it was possible to extract the best results from this analysis. In these tests, concerning Motivation (which originated the factors Competence, Relatedness, and Autonomy) and Job Satisfaction (which originated the factors Job Enjoyment and Job Interest), their derived factors did not compose the list of causal conditions when their scale or a factor of the same scale was as an outcome. For example, when Competence was a tested outcome, neither Relatedness, Autonomy, nor Motivation was included as causal conditions.

Variables included. Figure 22 is a visual summary of the models analysed in FS/QCA, including Gamification, Age, Job Tenure, Gender, Motivation, Competence, Relatedness Autonomy, Job satisfaction, Job Enjoyment, Job Interest, and Engagement. As can be easily seen, gamification was included in all analyses, and factors related to the same scale were not included when one of these factors or their scale was investigated as an outcome. To take full advantage of Ragin's software, the researcher chose to include the Motivation and Job Satisfaction scales in the analysis rounds, even though he had previously chosen to exclude them from this stage of the analysis. The researcher rationalized that these two scales can contribute to a more gestalt result while excluding them from the analysis would not benefit the results.

Figure 22. General configuration model



Thresholds. To perform the analysis, the researcher observed thresholds for consistency and coverage. Ragin (2008, p. 44) advises that the most critical threshold is consistency, which is the measure of how close a relationship is to a perfect subset. The author recommends a consistency of at least 0.85 for fuzzy-sets (2008, p. 136), which was the cutoff applied in this research. Only after the consistency cutoff was reached coverage was analysed. Although the two often act in a divergent manner, i.e., while the consistency is high, coverage is low, and vice versa, this research sought the highest possible coverage after reaching the minimum consistency value of 0.85 established above. The coverage threshold was defined in this way because it is a measure of importance or empirical weight (Ragin, 2006, p. 10).

Hence, low coverage may indicate insufficient relevance to establish a set-relationship (Thiem, 2010, pp. 3-4). Therefore, the greater the coverage, the greater the empirical importance of the relationship. Since Ragin (2008, p. 55) highlighted that coverage gauges only empirical importance, not theoretical importance, the researcher examined all consistent results (consistency higher than 0.85), focusing on the results with coverage above 0.20. Therefore, the thresholds applied in the analysis were 0.85 for consistency and 0.20 for raw coverage. In addition to these measures, the researcher established that only recipes belonging to solutions with at least a 0.85 solution consistency and a non-zero solution coverage would be considered. Due to space limitations, it was not possible to include all models nor all solutions. However, this study's most relevant results can be found from Table 21 to Table 27, which display the results that exceeded the thresholds established above. Table 28 displays a summary of the configurations and their outcomes.

Table 21. Testing different gamified models on Motivation

Model:Mo=f(G,E,JI,JE,Ma,F,W). Consistency cutoff 0.92.

Model	Raw coverage	Unique coverage	Consistency
1. G*E*JI*Ma*W	0.22	0.07	0.92

Solution coverage: 0.31. Solution consistency: 0.88

Model:Mo=f(G,E,JS,Ma,F,W). Consistency cutoff 0.92.

Model	Raw coverage	Unique coverage	Consistency
2. G*E*JS*Ma	0.28	0.17	0.92

Solution coverage: 0.30. Solution consistency: 0.92

Model:Mo=f(G,E,JI,JE). Consistency cutoff 0.92.

Model	Raw coverage	Unique coverage	Consistency
3. G*E*JE	0.31	0.31	0.87

Solution coverage: 0.31. Solution consistency: 0.87

Table 22. Testing different gamified models on Job Satisfaction

Model:JS=f(G,E,A,R,C,Ma,F,W). Consistency cutoff: 0.97.

Model	Raw coverage	Unique coverage	Consistency
4. G*E*~A*R*Ma*W	0.20	0.02	0.95

Solution coverage: 0.32. Solution consistency: 0.91

Model:JS=f(G,A,R,C,E). Consistency cutoff 0.93.

Model	Raw coverage	Unique coverage	Consistency
5. G*~A*C*E	0.26	0.03	0.90
6. G*R*C*E	0.29	0.06	0.92

Solution coverage: 0.33. Solution consistency: 0.88

Table 23. Testing different gamified models on Engagement

Model:E=f(G,Mo,JS,Ma,F,W). Consistency cutoff 0.96.

Model	Raw coverage	Unique coverage	Consistency
7. G*Mo*JS*Ma	0.24	0.10	0.99

Solution coverage: 0.27. Solution consistency: 0.94

Model:E=f(G,A,R,C,JS). Consistency cutoff 0.94.

Model	Raw coverage	Unique coverage	Consistency
8. G*~A*C*JS	0.21	0.01	0.99
9. G*R*C*JS	0.24	0.05	0.98

Solution coverage: 0.29. Solution consistency: 0.95

Model:E=f(G,Mo,JI,JE). Consistency cutoff 0.99.

Model	Raw coverage	Unique coverage	Consistency
10. G*Mo*JE	0.26	0.26	0.98

Solution coverage: 0.26. Solution consistency: 0.98

Table 24. Testing different gamified models on Competence

Model:C=f(G,E,JS,Ma,F,W). Consistency cutoff 0.91.

Model	Raw coverage	Unique coverage	Consistency
11. G*E*JS*Ma	0.25	0.12	0.90

Solution coverage: 0.27. Solution consistency: 0.89

Table 25. Testing different gamified models on Relatedness

Model:R=f(G,E,JS,Ma,F,W). Consistency cutoff 0.91.

Model	Raw coverage	Unique coverage	Consistency
12. G*E*JS*Ma	0.30	0.17	0.90

Solution coverage: 0.32. Solution consistency: 0.91

Model:R=f(G,E,JI,JE,Ma,F,W). Consistency cutoff 0.89.

Model	Raw coverage	Unique coverage	Consistency
13. G*E*JI*Ma*W	0.25	0.09	0.97

Solution coverage: 0.35. Solution consistency: 0.90

Table 26. Testing different gamified models on Job Enjoyment

Model:JE=f(G,E,C,R,A,Ma,F,W). Consistency cutoff 0.94.

Model	**Raw coverage**	**Unique coverage**	**Consistency**
14. G*E*C*Ma	0.26	0.02	0.89
15. G*E*R*Ma*W	0.21	0.01	0.90

Solution coverage: 0.31. Solution consistency: 0.84

Model:JE=f(G,E,Mo,Ma,F,W). Consistency cutoff 0.92.

Model	**Raw coverage**	**Unique coverage**	**Consistency**
16. G*E*Mo*~W	0.21	0.09	0.91

Solution coverage: 0.27. Solution consistency: 0.87

Table 27. Testing different gamified models on Job Interest

Model:JI=f(G,E,C,R,A,Ma,F,W). Consistency cutoff 0.89.

Model	**Raw coverage**	**Unique coverage**	**Consistency**
17. G*E*C*R*A*Ma	0.21	0.004	0.93
18. G*E*R*~A*Ma*W	0.22	0.001	0.96
19. G*E*C*R*Ma*W	0.24	0.004	0.96

Solution coverage: 0.36. Solution consistency: 0.85

Model:JI=f(G,E,Mo,Ma,F,W). Consistency cutoff 0.88.

Model	**Raw coverage**	**Unique coverage**	**Consistency**
20. G*E*Mo*~W	0.23	0.10	0.86

Solution coverage: 0.31. Solution consistency: 0.84

Table 28. Summary of configurations and outcomes for gamified participants

	Causal conditions												C^1	C^2	**Outcome**
Model	G	Mo	C	R	A	E	JS	JE	JI	Ma	F	W			
1	●					●			●	●		●	0.22	0.92	Motivation
2	●					●	●			●			0.28	0.92	Motivation
3	●					●		●					0.31	0.87	Motivation
4	●			●	~	●				●		●	0.20	0.95	Job Satisfaction
5	●		●		~	●							0.26	0.90	Job Satisfaction
6	●		●	●		●							0.29	0.92	Job Satisfaction
7	●	●					●			●			0.24	0.99	Engagement
8	●		●		~		●						0.21	0.99	Engagement
9	●		●	●			●						0.24	0.98	Engagement
10	●	●						●					0.26	0.98	Engagement
11	●					●	●			●			0.25	0.90	Competence
12	●					●	●			●			0.30	0.90	Relatedness
13	●					●			●	●		●	0.25	0.97	Relatedness
14	●		●			●				●			0.26	0.89	Job Enjoyment
15	●			●		●				●		●	0.21	0.89	Job Enjoyment
16	●	●				●						~	0.21	0.91	Job Enjoyment
17	●		●	●	●	●				●			0.21	0.93	Job Interest
18	●			●	~	●				●		●	0.22	0.96	Job Interest
19	●		●	●		●				●		●	0.24	0.96	Job Interest
20	●	●				●						~	0.23	0.86	Job Interest

Notes. Mid-level dot, "●" indicates the presence of the causal condition in the model, sideways tilde, "~" indicates the negation of the causal condition in the model; empty space indicates the absence of the antecedent condition in the model.
C^1 = raw coverage; C^2 = consistency.

A new approach. At the end of this analysis step, the researcher was faced with a new dilemma. The fuzzy sets analysis allows in-depth scrutiny of the investigated scenarios, helping the researcher discover which causes lead to a result, what intensity, and what configuration. These characteristics helped in this research, as they provided the researcher with a view of agents hitherto unknown. However, such an analysis did not help to discover the difference between gamified training and non-gamified training, regarding the results perceived by the participants. Therefore, the researcher found himself at a crossroads: either he used another (linear) analysis to make such a comparison, or he would need to reformulate the way of using fuzzy set analysis. He chose the latter option.

The approach developed to deal with this dilemma and compare the results of gamified with non-gamified respondents was as follows. In the truth table analysis (described in Section 4.3.5. Data analysis, subsection The Truth Table), the researcher isolated the gamified respondents, excluding all non-gamified respondents' data to have a more focused result. Therefore, the results presented so far refer only to gamified participants. To compare the two types of participants, the researcher performed the same procedure described above, but slightly different: instead of excluding non-gamified participants, this time, gamified participants were excluded. Thus, all the results presented in Table 29 and Table 30 are for non-gamified participants. In turn, Table 31 summarizes all the results of the non-gamified participants.

Table 29. Testing different non-gamified models on Engagement

Model:E=f(G,Mo,JS,Ma,F,W). Consistency cutoff 0.967512.

Model	Raw coverage	Unique coverage	Consistency
21. ~G*Mo	0.54	0.09	0.944145
22. ~G*~Ma*~W	0.29	0.02	0.934455
23. ~G*Ma*F	0.22	0.02	0.929267
24. ~G*JS*Ma*W	0.31	0.003	0.983216

Solution coverage: 0.58. Solution consistency: 0.91

Model:E=f(G,JS,C,R,A,Ma,F,W). Consistency cutoff 0.97.

Model	Raw coverage	Unique coverage	Consistency
25. ~G*C*~R*~W	0.31	0.002	0.982250
26. ~G*JS*C*~F	0.30	0.01	0.969170
27. ~G*C*Ma*W	0.32	0.02	0.970613
28. ~G*JS*R*Ma*W	0.27	0.002	0.989170
29. ~G*C*~A*~W	0.35	0.01	0.975696
30. ~G*JS*C*~W	0.33	0.004	0.978599
31. ~G*R*A*Ma*W	0.22	0.001	0.979861
32. ~G*C*R*A*W	0.24	0.001	0.977114

Solution coverage: 0.58. Solution consistency: 0.93

Model:E=f(G,JI,JE,Mo,Ma,F,W). Consistency cutoff 0.97.

Model	Raw coverage	Unique coverage	Consistency
33. ~G*Mo*~F	0.33	0.03	0.930262
34. ~G*JE*~W	0.36	0.04	0.948399
35. ~G*JI*Mo	0.41	0.01	0.967436
36. ~G*JE*~MA*~F	0.20	0.002	0.955668
37. ~G*JI*Ma*W	0.29	0.003	0.982781

Solution coverage: 0.60. Solution consistency: 0.91

Table 30. Testing different non-gamified models on Competence

Model:C=f(G,JE,JI,E,Ma,F,W). Consistency cutoff 0.97.

Model	**Raw coverage**	**Unique coverage**	**Consistency**
38. ~G*E*~F	0.40	0.04	0.916346
39. ~G*JE*~F	0.35	0.01	0.908847
40. ~G*Ma*F	0.23	0.02	0.906174
41. ~G*JI*Ma	0.36	0.001	0.954040
42. ~G*JI*F	0.21	0.01	0.929052
43. ~G*JE*E*~W	0.37	0.03	0.974725

Solution coverage: 0.66. Solution consistency: 0.88

Table 31. Summary of configurations and outcomes for non-gamified participants

	Causal conditions												C¹	C²	**Outcome**
Model	G	Mo	C	R	A	E	JS	JE	JI	Ma	F	W			
21	~	●											0.54	0.94	Engagement
22	~									~		~	0.29	0.93	Engagement
23	~									●	●		0.22	0.93	Engagement
24	~						●			●		●	0.31	0.98	Engagement
25	~		●	~								~	0.31	0.98	Engagement
26	~		●				●				~		0.30	0.97	Engagement
27	~		●							●		●	0.32	0.97	Engagement
28	~			●			●			●		●	0.27	0.99	Engagement
29	~		●		~							~	0.35	0.98	Engagement
30	~		●				●					~	0.33	0.98	Engagement
31	~			●	●					●		●	0.22	0.98	Engagement
32	~		●	●	●							●	0.24	0.98	Engagement
33	~	●									~		0.33	0.93	Engagement
34	~							●				~	0.36	0.95	Engagement
35	~	●							●				0.41	0.97	Engagement
36	~							●		~		~	0.20	0.96	Engagement
37	~								●	●		●	0.29	0.98	Engagement
38	~					●					~		0.40	0.92	Competence
39	~							●			~		0.35	0.91	Competence
40	~									●	●		0.23	0.91	Competence
41	~								●	●			0.36	0.95	Competence
42	~								●		●		0.21	0.93	Competence
43	~					●		●				~	0.37	0.97	Competence

Notes. Mid-level dot, "●" indicates the presence of the causal condition in the model, sideways tilde, "~" indicates the negation of the causal condition in the model; empty space indicates the absence of the antecedent condition in the model.

C¹ = raw coverage; C² = consistency.

5.3. Discussion

The several analyses carried out contributed to a more comprehensive view of the banking training scenario, both demographically and behaviourally. Demographic data were analysed using crosstabulation and played an essential role in the composition of models in the fuzzy-set analysis. The scales used and the factors found through them contributed to the entire investigation through correlation, factoring, comparing means, or culminating in the fuzzy-set analysis. The latter proved was of great use since it addresses a complex scenario in a complex way. Therefore, it proved to be the appropriate methodology for the study. Considering the analyses performed, it was possible to draw certain conclusions, which will follow next.

5.3.1. Gamified participants

The reader can follow the fuzzy-set analysis outlined here in Table 28, which summarizes the findings of gamified participants. As can be seen, the cases analysed, which exceeded the thresholds established for consistency and coverage, showed consistency ranging from 0.86 to 0.99. Regarding coverage, the values ranged from 0.20 to 0.31. The high participation rate of Engagement stands out in the table, as it was present as a causal condition in all recipes, except for those in which this variable was included as Outcome. Conversely, it is noteworthy that the demographic variable Female did not participate in any recipe from gamified participants. Although the Job Satisfaction scale had some participation (6 recipes out of 20), its factors had a modest presence (each participated in two recipes out of 20).

Another fact that could be observed was that Autonomy and Worktime were the only variables with negative participation; they composed the recipes with their negation. It is also noted that the only variable that did not result from the application of gamified training was Autonomy. Thus, all other variables were found as outcomes, with gamification combined with causal conditions. Maturity was found to be a causal condition in 12 of the 20 recipes, suggesting that gamification tends to have better results when applied to not too young employees. Interestingly, this variable only appeared in one of the four recipes that generated Engagement, as if it were not so essential for this outcome.

Observing the outcomes in isolation, it is noted that in three of the four times that engagement was generated, the variable Job Satisfaction was present, confirming the findings of the correlation analysis for gamification, as shown in Table 17. Similarly, there was either Motivation or Competence (which is the determinant of motivation) present as a causal condition, suggesting motivation as an essential ingredient for gamification to generate engagement. From the results presented, it can also be inferred that maturity is necessary for gamification to generate relatedness and competence. Its importance was also observed for Job Interest, which also shows to be strongly influenced by Relatedness. Among the findings above, the most striking was that prior engagement is necessary for gamification to be more likely to result in any outcomes tested.

5.3.2. Non-gamified Participants

To follow the sequences reported in this section, the reader can check Table 31. The outcomes found in the simulations with the absence of gamification presented consistency values ranging from 0.91 to 0.99 and coverage ranging from 0.20 to 0.54. Coverages here are higher than in non-gamified simulations. Another fact that immediately draws attention in this table is that non-gamified training results in only two of the outcomes tested: Engagement and Competence. The importance of Job Tenure for the emergence of Engagement is highlighted since Worktime contributes to several recipes, both with its affirmation and its negation. The situation is different when the outcome is Competence, where Worktime only contributes to one of the six recipes.

As with gamified training, motivation has shown importance in generating Engagement, since out of 17 recipes that result in Engagement, three had Motivation as a causal condition, and six had Competence, totalling 9 out of 17. Unlike gamification configurations, the participant's gender contributed somewhat to the result, but more strongly for the generation of the Competence, despite having balanced participation, sometimes it being necessary to be female, sometimes male to generate the tested outcome. The participant's maturity also appeared as an essential aspect in the results of a non-gamified training, suggesting a conclusion like that presented by the gamified training.

Besides, the preponderance of Engagement as an outcome is irrefutable. From the results presented, it is difficult not to conclude that non-gamified training can result in engagement and satisfaction of the need for competence. However, the absence of other outcomes as a result of non-gamified training is evident. These two outcomes, Engagement and Competence, showed a strong positive correlation in the test summarized in Table 16, which supports the results presented here. In the same table, it is possible to see Engagement's force, as it was the variable that appeared in all correlations with a value greater than 0.400. Interestingly, the comparison of averages presented in Table 18 and Table 19 suggest that non-gamified training is more likely to result in relatedness and job interest than gamified training. Both did not appear as outcomes in the non-linear analysis provided by the fuzzy-set.

5.3.3. Assessing Motivation

Before testing the hypothesis, it is worth going through the assessment of motivation due to gamified training. The reason is that although motivation is not a hypothesis to be tested, the researcher decided that it would be worth testing, and the results are as follows:

- No significant correlation was found with gamification in the correlation analysis
- In the correlation of items for gamified respondents, there was a significant positive correlation with Job Satisfaction and Job Interest
- In the correlation for non-gamified respondents, it showed a significant positive correlation with Engagement
- When comparing means in the Independent-Sample T-Test, there was no significant difference between the average of gamified respondents and non-gamified respondents.

- It was found as an outcome of the fuzzy-set analysis with gamification as a causal condition in three recipes, together with Engagement.
- It was not found as a result of non-gamified training in the fuzzy-set tests.

The positive correlation presented with Job Satisfaction and Job Interest for gamified respondents is in line with what was seen in the fuzzy-sets analysis (Table 32). In the analysis in which the Gamification component was included among the causal conditions, Motivation occurred as an outcome on three occasions. In one of them, Job Satisfaction was also in the recipe. In another, Job Interest was also a causal condition. Despite presenting a positive correlation with Engagement for non-gamified respondents, this was not revealed in the fuzzy-set analysis, where motivation did not occur as an outcome of any combination. From these results, it can be concluded that the motivation may result from gamified training, conditioned to the participant being already engaged. Therefore, the analysis results do not support the hypothesis that gamified training provides a higher level of motivation in bank employees than traditional training.

5.3.4. Assessing Hypothesis 1 – Competence

Gamified training better meets the need for competence compared to conventional training. To compare the satisfaction of the need for competence provided by gamified training with that provided by non-gamified training, the following results were collected on the variable Competency:

- presented a significant negative correlation with Gamification (-.237)
- was positively correlated with Engagement both in the analysis of the results of gamified and non-gamified participants
- presented a significantly higher average for gamified participants than for non-gamified participants
- was found as the outcome of one recipe that involves gamified training in the analysis of fuzzy sets

- was found as the outcome of five recipes that involve non-gamified training in the analysis of fuzzy sets

At first glance, it may be surprising that it correlated negatively with gamification. This result supported the findings that non-gamified application help to satisfy the need for competence. However, the nonlinear analysis provided a complimentary conclusion that gamification can indeed assist in this satisfaction, but only when the training participant is more mature and already has a high level of engagement and job satisfaction. On the other hand, the results also allow the conclusion that non-gamified training can generate competence on more occasions and with more diverse components, without depending so much on employee engagement, job satisfaction, and maturity. Therefore, the researcher concluded that gamification does not provide a greater sense of competence than traditional training.

5.3.5. Assessing Hypothesis 2 – Autonomy

Gamified training better meets the need for autonomy compared to conventional training. To test this hypothesis, the researcher investigated the following results gathered from the analyses performed concerning autonomy:

- did not show a significant correlation with Gamification, nor with other variables, when tested for gamified and non-gamified participants

- showed no significant difference between the average of gamified and non-gamified respondents

- did not occur as an outcome in the fuzzy-set analysis with both gamified and non-gamified training

- its negation (~ A) participated in some recipes containing gamified training to generate Job satisfaction, Engagement, and Job Interest

- In non-gamified training, it also generated engagement on three occasions, one of which with its negation.

- In the three times that it generated some tested outcome, both with gamification and without, Relatedness was present as a causal condition

The lack of correlation between Autonomy and gamification or any other variable, whether in gamified or non-gamified training, indicates that this variable does not have much influence and is not strongly influenced by others. The analysis of averages contributes to this conclusion, indicating that an employee who participates in gamified training has no difference in satisfying the need for autonomy than another who has participated in conventional training. For the investigation of this hypothesis, the fuzzy-set analysis confirms the non-linear conclusions by not finding any case in which Autonomy occurs as a result, in both types of training. On the contrary, lack of autonomy in specific settings can contribute to other outcomes, such as engagement, job satisfaction, and job interest. Therefore, the findings do not support hypothesis 2, so the researcher concluded that gamification does not better meet the need for autonomy than conventional training.

5.3.6. Assessing Hypothesis 3 – Relatedness

Gamified training better meets the need for relatedness compared to conventional training. To investigate the comparison of the satisfaction of the relatedness need between gamified and non-gamified training, the following findings were gathered in the analyses on Relatedness:

- correlated positively with gamification
- in the correlation analysis for gamified training, it correlated positively with Job Interest
- presented a higher average in conventional training than in gamified in the comparison of means
- in the fuzzy-sets analysis, it results from two recipes, both also depending on Engagement and Maturity, in gamified training

- proved to be important in the generation of outcomes job satisfaction and its factors Job Enjoyment and Job Interest, when acting together with gamification

In the linear analysis, competence correlates with gamification, but at the same time, it presents a superior average in non-gamified participants, which seems to be paradoxical. However, when observing that Competence in gamified participants correlated positively with Job Interest and contrast this information with the analysis of fuzzy-sets, which unveiled its importance for the generation of outcomes related to job satisfaction in gamified training, the researcher could deduce that the positive correlation with gamification does not occur in isolation. In other words, Competence does not directly participate as a result of gamification; instead, it contributes to gamified training to produce other outcomes related to job satisfaction. However, to be indeed a result of gamification, it is necessary, in addition to other configurations, that the employee is mature and already engaged in the activity. Therefore, the researcher concludes that hypothesis 3 was not supported.

5.3.7. Assessing hypothesis 4 – Engagement

Gamified training increases engagement at a higher level than non-gamified training. To compare the engagement levels perceived by employees after participating in a gamified training with that perceived by employees who participated in traditional training, the researcher gathered the following findings on the variable Engagement:

- Although it did not present a correlation with gamification alone, when analysing the responses of gamified participants, it did correlate with Competence and Job Satisfaction

- In the response of non-gamified participants, it correlated with Competence, Motivation, Job Satisfaction, and Job Enjoyment

- The item showed no difference in the means between gamified and non-gamified respondents

- In the fuzzy-set analysis of gamified training, the outcome occurred four times, each time with Motivation or its factors and Job Satisfaction or its factors contributing to the outcome

- In the fuzzy set analysis of traditional training, it appeared as an outcome 17 times; however, in almost all instances, it depended on employee characteristics to emerge as a result, with job tenure standing out first and maturity second

- It appeared as a mandatory condition for the generation of any other outcome in gamified training.

The analysis of means indicates that an employee who has participated in a gamified training will feel as engaged as the one who has participated in a non-gamified training. Nonlinear analysis confirms this conclusion, as engagement appears as an outcome in both types of training. The study also indicates that a gamified training in which the participant is already engaged is likely to generate some of the outcomes studied here, except for engagement itself, which depends on the participants already having some of their motivational needs met. In other words, the participant must already be motivated for gamified training to provide engagement or must already be engaged for the gamified training to provide job satisfaction or motivation.

Such indications endorse the lack of correlation of engagement with gamification, showing that it is less a cause-and-consequence relationship and more a dependency relationship. It is worth noting that, although non-gamified training has a great chance of resulting in more engaged employees, this will depend a lot on uncontrollable but measurable demographic conditions. On the other hand, for gamified training to result in more engaged employees, it does not depend on demographic conditions but on inter-and intrapersonal conditions, which can be induced, but hardly measured. These conditions are those derived from the employee's motivation and satisfaction with work. Although employers can encourage such feelings in employees, their measurement is difficult since feelings are not constant. Therefore, the researcher concludes that hypothesis 4 was not supported.

5.3.8. Assessing Hypothesis 5 – Job Satisfaction

Gamified training increases job satisfaction at a higher level than non-gamified training. To analyse the hypothesis of gamified training being more likely to generate JS than traditional training, the researcher also analysed Job Enjoyment and Job Interest. Such outcomes entered the study only after the hypotheses were formulated and because they are factors that make up the Job Satisfaction scale. For this analysis, the following findings on Job Satisfaction were gathered:

- Gamification correlated positively with Job Interest
- In the correlation analyses of gamified participants, Job Satisfaction showed a high correlation with motivation and Engagement, and job interest also showed a high correlation with relatedness and motivation.
- For non-gamified participants, this analysis led to a strong correlation between Job Satisfaction and Engagement
- Job Interest showed a higher average for non-gamified participants than for gamified participants
- Occurred as outcome ten times in gamified training, but not in traditional training
- In the fuzzy-set analysis for gamified training, in addition to the dependence on Engagement as a causal condition, there was an obligation to have a motivational precondition so that results related to job satisfaction could emerge from this training.
- Likewise, the researcher noted the importance of the employee's maturity for the result of Job Enjoyment or Job Interest in a gamified training
- the variable proved to be fundamental in the composition of conditions that, together with gamified training, result in engagement or motivation (or one of its factors).

In a certain way, the nonlinear analysis explains the correlation of Job Interest with gamification when observed that fuzzy-sets analysis revealed Job Interest as an outcome of gamification in four different configurations. Scrutinising these configurations, the participation of motivation and relatedness stands out, confirming the high positive correlation of Job interest with these variables in the analysis of gamified participants. Likewise, this analysis confirms the strong correlation between Job Satisfaction and Engagement, which was present in all configurations, as related previously. The high correlation of Job Satisfaction with Engagement for non-gamified participants appears in the fuzzy-set analysis, but with less importance.

The fact that Job Interest had a higher average for non-gamification than gamification indicates that traditional training increases Job Interest to greater levels than gamified training, contrary to nonlinear analysis, which reveals Job Interest as the outcome of a gamified training four times, while not once was this outcome provided by non-gamified training. Based on these results, the researcher concluded that job satisfaction results from gamified training, rather than non-gamified training, although depending on the participants' pre-existing engagement and positive motivational states to yield this outcome. This dependence on motivation and engagement that occurred in the same way as previous results support hypothesis 5. The researcher reached this conclusion since the fuzzy-set analysis for non-gamified training did not result in any outcome related to job satisfaction, unlike the analysis for gamified training.

5.4. Summary

This chapter gathered all the analyses carried out so that the researcher could draw his conclusions with a sound foundation. Therefore, several analysis methodologies were used, both linear and non-linear. The chapter began with an analysis of the background of the sample, studying each demographic data separately. These demographic data were then subjected to a crosstabulation, where they had their results crossed with gamification. Then, the factor analysis and the reliability analysis followed, when the researcher found the factors loaded of the scales and decided which ones to keep and which to discard, to serve as variables for the next stages of the research. Then, the analysis itself began.

Firstly, all demographic and behavioural variables were correlated with gamification, and then two more correlations were calculated: one with gamified participants and another with non-gamified participants. Secondly, the researcher performed a comparison of means when the average of the gamified participants' factors and scales was compared with that of the non-gamified participants. Thirdly, a fuzzy-set qualitative comparative analysis was performed, a non-linear analysis performed in two stages: isolating gamified training and isolating non-gamified training. After this last analysis, they were combined in two ways: first, by gathering gamified training analyses with non-gamified training and comparing them. Then, gathering analysis results regarding the hypotheses to be tested (competence, autonomy, relatedness, engagement, and job satisfaction). Finally, the researcher was able to conclude each tested hypothesis.

Hypotheses 1 to 4 were not supported by this research, as there was no evidence in the analyses carried out that gamified training can provide more competence, relatedness, autonomy, and engagement than traditional training. Hypothesis 5 was supported, since the study did not present evidence that job satisfaction results from non-gamified training, unlike what occurred with gamified training. Beyond hypothesis testing, this research has brought additional findings. Firstly, there is no evidence that gamified (or non-gamified) training produces satisfaction of autonomy. Perhaps because training carried out at the company is unlikely to be seen as something done autonomously, differently what happens with games. As engaging as gamified training is, the employee will know that the training is being carried out because of his status as an employee and not because of his genuine will.

Secondly, although there is no evidence that competence, relatedness, and engagement are greater after gamified training than after non-gamified training, these were indeed found to result from gamification. However, all of these variables, including job satisfaction, depend on the employee already having a high level of motivational components for gamification to provide this outcome. For example, for a gamified training to provide engagement to a banking employee, this employee must already be motivated (either by competence or relatedness) and satisfied within the workplace (either by job interest or job enjoyment). Similarly, to result in motivation, the employee must already be engaged and have job satisfaction. Such a finding shows a weakness in gamification, as the company would have to measure such parameters to ensure that the target outcome is achieved.

Thirdly, although it has been found that traditional training can result in engagement and satisfaction of the feeling of competence, such results were not found too much dependent on motivational components, instead totally dependent on the participants' demographic conditions, such as gender, job tenure, and age. Although they are non-controllable factors by the company, they are easily measurable. A company knowing this ‘recipe’ can separate classes from a particular demographic group to participate in training, aiming at a specific outcome. Interestingly, gamified and non-gamified training behave differently regarding to the profile of the employee participating in it. While gamified training is likely to result in engagement for a worker who already has motivation and job satisfaction, traditional training will require that employee to be, for example, young and with short job tenure (model # 23) or mature and female (model # 40).

These additional findings demonstrate how fsQCA proved useful, especially when looking at sections 5.3.4 to 5.3.8 when the linear analyses' findings were contrasted with those of fsQCA. Simplistic conclusions, after nonlinear analysis, turned into realistic conclusions. In the real world, an 'A cause B' type situation rarely occurs. In contrast, the most common are relationships like: 'A ● B ● ~D = C OR G ● D ● ~A = C'. When rereading the findings and conclusions, the reader can observe that the fuzzy-set analysis explains some apparently paradoxical results. In some situations, linear conclusions are explained by nonlinear ones; in others, nonlinear conclusions enrich the results, providing more detailed conclusions.

Chapter 6. Recommendations and Conclusion

6.1. Purpose of the research

After the analysis is finished, and before the conclusions can begin, it is necessary to return to the reason that ignited the research. In Chapter 1, the critical problem was addressed. The importance of employee engagement on companies' excellent development, in the case of members of the banking sector, becomes a fundamental aspect even for its continuity, given the intensity of competition in the sector. As seen in Chapter 2, this employee engagement is rooted in motivation, culminating in job satisfaction. So, the problem was outlined when contrasting this need with the emergence of gamification in companies, and how many in various sectors are using gamification in training to provide this engagement, without having established reliable criteria for the creation of an efficient gamification program, furthermore, with no guarantee of its effectiveness, nor criteria for measuring it.

Due to the interest of many companies (not only from the banking sector) in the impartial analysis of which outcomes can effectively result from gamified training and the absence of research to evaluate such outcomes, this research found justification. Although there are several surveys studying gamification outcomes, others analysing banking training results on employees' observable behaviour, no investigation was found to analyse the outcomes of gamified training in the banking sector. This study had as research objectives to compare the difference between gamified training outcomes with those of non-gamified training concerning motivation, engagement, and job satisfaction. At the beginning of the research, and before the hypotheses were formulated, the researcher found bases that provided the human motivational needs (Deci & Ryan, 2002): the satisfaction of competence, relatedness, and autonomy needs.

Based on the research objectives and these three subdivisions of motivation, the researcher established five hypotheses to be tested:

1. Gamified training better meets the need for competence compared to conventional training;

2. Gamified training better meets the need for autonomy compared to conventional training;

3. Gamified training better meets the need for relatedness compared to conventional training.

4. Gamified training increases engagement at a higher level than non-gamified training.

5. Gamified training increases job satisfaction at a higher level than non-gamified training.

To test the above hypotheses, the researcher used both linear and non-linear analyses. For linear analyses, correlation analysis and Independent-Sample T-Test were used. For the non-linear investigation, the researcher used fuzzy-sets analysis. Finally, he cross-referenced all analyses, separating gamification from non-gamification and investigating outcomes in isolation in all analyses. As the analyses above did not meet the research needs to compare two different types of results, the researcher needed to have a different analysis approach. These approaches occurred when he isolated gamified training from non-gamified in the analysis of fuzzy-sets and when necessary to make two separate correlations: one of the responses of gamified participants and another of the responses of non-gamified participants.

As a result, the researcher found support for hypotheses 1-4. However, the result was not so simple to arrive. The result of the analysis of the research carried out leads to the leading conclusions:

1. autonomy is not a result of gamified training

2. All other outcomes tested (competence, relatedness, engagement, job satisfaction, job enjoyment, and job interest) may result from gamified training

3. However, for these outcomes to result from gamified training, it is necessary that the employee already has a high level of certain motivational conditions

(such as engagement, job satisfaction, and motivation) so that the outcome is generated

4. Non-gamified training can also provide engagement and competence, but they depend a lot on employees' demographic components, such as age, gender, and job tenure.

5. Gamified training applied in the banking environment can produce a greater sense of job satisfaction than traditional training

6. There is no evidence that gamified training generates competence, relatedness, and engagement at higher levels than non-gamified training.

6.2. Relationship to previous research

Although several surveys indicate engagement (Barata et al., 2013; Brigham, 2015; De-Marcos et al., 2014; Fuchs et al., 2014; Glover, 2013; Hamari et al., 2016; Hussain et al., 2018; Iosup & Epema, 2014; McIntyre, 2018; Morschheuser et al., 2015; Muntean, 2011; Sands, 2013; Singh & Prasad, 2018), and motivation (Armstrong & Landers, 2018; Barata et al., 2013; Brigham, 2015; Deterding, 2012; Hussain et al., 2018; Iosup & Epema, 2014; Pereira et al., 2018; Silic & Back, 2017) as outcomes of gamification, all used linear techniques to reach such a conclusion. Using only linear techniques this researcher might take the same conclusions. Xi and Hamari (2019) found that gamification increases motivation through intrinsic need satisfaction: competence, relatedness, and autonomy. This study, conversely, found that autonomy is not found through gamification. On the other hand, this study confirmed the findings of Armstrong and Landers (2018) that job satisfaction can be found as an outcome of gamification. Furthermore, competence and relatedness, as well as engagement and job satisfaction, can only be achieved by gamification with a combination of components that involve the participant being already engaged and satisfied in the workplace.

The results of this research are consistent with that of Mitchell et al. (2018, p. 323), which found that the extrinsic motivation caused by gamification can reduce autonomy and competence but that it can have the opposite effect when this extrinsic motivation is internalised. Similarly, Sailer et al. (2017, p. 327) stated that “gamification is not effective per se,” concluding that gamification can generate competence and relatedness, but their research did not confirm the same for autonomy. This research concluded that, apart from Autonomy, all other outcomes tested may result from gamified training. However, all depend on the employee's pre-existing motivational conditions to emerge, such as motivation, competence, relatedness, engagement, and job satisfaction. Furthermore, the outcomes of gamified training did not show any difference when compared to non-gamified training.

6.3. Limitations of the present study

This research presented results that contribute to the research field, enabling conclusions about the object of study. The analysis of the results made it possible to address the research problems listed in Chapter 1 and test all the hypotheses listed. However, for this research’s results to be applicable in the real world, limitations in its realization must be considered. One of the main limitations of this research was the methodology: its formatting relied on the participant's memory. Although the questionnaire was the most viable option (in time and money) to provide a worldwide survey, its formatting had some limitations.

Firstly, the questionnaire did not weigh the time elapsed since the last time the employee participated in gamified training. When the respondent was asked to recall the last gamified training to answer the questions, it probably made a big difference whether that training took place two days or two years before the answer. This lapse of time causes 'holes' in the memory of those who try to recover a memory. Unconsciously, the subject fills these gaps with information and sensations that were not those of the time but that he created under the present's influence. Secondly, the methodology used did not ascertain the quality of the gamified training that the respondent reported having performed. As seen in Chapter 3, for gamified training to result in the company's desired outcomes, it must be well planned and well-executed. Without knowing exactly how the respondent's training was, truly gamified respondents were mixed with respondents who were not, in fact, gamified. Often, training is carried out with mere inclusions of badges, goals, and leaderboards, and they may be called gamification when they are far from that.

Thirdly, by deepening the previous limitation, it was not even possible to know whether the respondent participated or not in the gamified training by the methodology used. Since gamification is a new concept, it is not fully defined, and gamified training is even more challenging to have a universal concept. While some companies 'sell' to the employee the idea that they will participate in gamified training when they use the name ‘gamification’ only to promote it, others apply gamification in their training without revealing their nomenclature to employees, fearing that they feel manipulated. The researcher realised it when he contacted his former bank colleagues, and many did not even know what gamification was, despite having participated in a gamified training together with the researcher months before. A brief presentation of the concept before the question was not enough to avoid this limitation.

Fourthly, to produce even more accurate results, the questionnaire could have more questions about the participants' demographics, such as income, position level, and education level. Although the questionnaire already had enough questions, it would not be a problem to include these questions, considering the data collection method. Finally, the lack of demographic data for the population of bank employees worldwide hindered the comparison of the sample with bank employees' population. Not that it hindered the study, but certainly, these data would allow enriching the findings further.

6.4. Recommendations for future research and practice

As recommendations to complement this research and circumvent the limitations that this study faced, future researchers should conduct a mixed-method approach. First, develop two similar pieces of training: one gamified, the other with a traditional approach. Gamified training would be developed appropriately, using the best practices found in the research area. A good starting point is to read Chapter 3 of this work. Second, the researchers would apply some training sessions in two groups, with the non-gamified group as the control group. Before the sessions, the researchers would collect the participants' demographic data. After each session, the respondents would participate in a focus group and, at the end of the sessions, they would answer a questionnaire with behavioural questions, along the lines of the questionnaire used in this research.

For an even more comprehensive result, testimonials from participants' managers and performance indicators would be collected a few weeks after the training. In this way, the survey would gather managers' opinion, performance data, and the participants' opinions on engagement, motivation, and job satisfaction. Besides, the focus group would provide insights into training, enabling a rich comparison. For such a model, it would be recommended to maintain the analysis along the lines of this research, mixing linear and non-linear analysis, with an emphasis on fuzzy-set analysis. Using this recommendation, there will be control of the type of gamification used, providing a fair comparison, where the researcher will be sure that he is comparing the results of a non-gamified participant with that of a gamified participant.

As a further suggestion, this experiment would be carried out within a company, where there would be no simulative aspect weighing against research. The employee, aware that it is an experiment, would be in his work environment, participating in training like others. However, this would be part of the study. Besides having less effort on the part of employees, they would be observed in conditions very close to the workday. Furthermore, not only would the limitations of this research be resolved, but the conclusions and results of the analyses would have more excellent reliability because, with the control of the gamification applied, the results of gamified training compared to non-gamified ones would be more reliable. Likewise, the training model now applied in the survey could easily be replicated in other institutions interested in the same outcomes for their employees.

6.5. Conclusion

This research analysed gamification outcomes applied in banking training, comparing them with training results where no gamification was applied. The focus of this study was on the outcomes: competence, autonomy, relatedness, engagement, and job satisfaction. The first three outcomes are the basic psychological needs, representing motivation, according to self-determination theory. During the analysis, job satisfaction was also divided into job enjoyment and job interest. The researcher noted a gap in the literature in this area because although many papers deal with gamification outcomes and some on gamification in the banking sector, no study was found that analysed the results that gamification can provide in banking training. By comparing the outcomes of gamified with non-gamified training, this research closes that gap in the literature.

The theoretical constructs that served as the foundation for this research were carefully depicted in Chapter 2, which studied the current banking industry's scenario with the appropriate depth. This chapter prepared the reader to understand the banking sector dynamics and the theories that permeate this study. The literature review examined the current debates on the concept of gamification, the game elements that comprise it, and the scope of action contemplating the current uses of gamification in the most diverse areas. Then, scholars' findings on gamification outcomes were discussed, and other findings on best practices for proper planning and implementation of a gamified program. The chapter ended with the criticisms, limitations, problems, and ethics in gamification.

This survey was applied from New Zealand, but it was performed worldwide since the data collection, which was carried out through an online questionnaire, had participants on all continents. Its target audience was active bank workers. The survey had 388 (N = 388) valid participants, among which 2.1% declared themselves New Zealander/Australian/Pacific, 11.9% were from Latin-America, 39.9% were North-Americans, 20.4% identified themselves Europeans, 5.2% Africans, 16.2% declared Asians, and 4.4% of the participants answered ‘Other.’ Among the participants, approximately 64.7% stated that they had already participated in gamified training. In contrast, 35.3% answered had never participated in gamified training.

To investigate the hypotheses established in chapter 1, the researcher used linear and non-linear analyses. Demographic data were cross-tabulated and later used in the non-linear analysis. The linear analysis comprised the comparison of means and correlation analyses after the factor and reliability analysis helped to discover the factors of the scales to be maintained. The non-linear analysis comprised the qualitative comparative fuzzy-set analysis, which included all the variables studied. After gathering all the linear and non-linear analyses, the researcher could draw conclusions and compare them with the literature.

Among the variables used, Autonomy was the only one that was found as an outcome neither for gamified training nor non-gamified training, so hypothesis 2 was not supported. Although Engagement and Competence were found as outcomes in both training sessions, the other items that made up the recipe for the outcome were composed of very different variables. While gamified training relied heavily on participants' motivational components to generate outcomes, traditional training did not depend so much on those components. On the other hand, they were found to be totally dependent on the demographic variables Age, Gender, and Job Tenure. Job satisfaction was not found as an outcome of non-gamified training, only for gamified ones, which supported hypothesis 5. The same did not occur for hypotheses 1, 3, and 4, as there was no evidence that gamification's application provides a higher level of outcomes for gamified training participants than traditional training.

With the results of this research, managers and head of HR can have a reliable and scientific basis for making decisions about using gamification for their employees' training since they will be able to predict such training outcomes. In addition to planning what outcomes to expect from training, they will know which employee profiles will most likely achieve this result. Not only banking industry companies, but others where there is a great need for staff training can also benefit since banking training does not differ much from those applied in other service companies. Even companies specialised in training can use these findings to promote gamified training more efficiently, planning the outcomes. It is hoped that this research will bring some progress in the study of gamification applied in business training and the form of analysis used for its conclusions.

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Appendix A. Ethics Approval

SOUTHERN
INSTITUTE OF TECHNOLOGY
TE WHARE WANANGA O MURIHIKU

24 June 2020

Dr Andy Ang
Southern Institute of Technology
Andy.ang@sit.ac.nz

Student – Marcelo Rodrigues Magioli Sereno
2019005089@student.sit.ac.nz

Dear Andy and Marcelo

HUMAN RESEARCH ETHICS APPLICATION
Effects of gamification in the banking industry: a comparison analysis between gamified and non-gamified training

The SIT Human Research Ethics Committee met on 23 June 2020 to consider your application.

I am pleased to advise that the committee granted ethical approval for your research for the duration of the project.

If, for any reason you decide not to go ahead with your research or change it significantly please advise the secretary of the committee.

Congratulations and all the best with your project.

Yours sincerely

S. Bodkin-Allen

Sally Bodkin-Allen
Human Research Ethics Committee Chair

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Appendix B. Questionnaire

Effects of gamification in the banking industry

Greetings, my name is Marcelo Sereno, a master's student in Applied Management at the Southern Institute of Technology in Invercargill, New Zealand.

This questionnaire is about gamification. Gamification is the application of game elements in non-game contexts. When used in company training, it is called gamified training.

I am working on a thesis on the outcomes of gamified training in the banking industry, looking for people currently working in the banking or financial sector to complete this questionnaire to my research. It will only take a few minutes of your time, and your answers will remain confidential and anonymous. The results will be written up and presented in a thesis that is assessed as part of my programme of study. The data will be stored on a password-protected computer for a period of 5 years, after which it will be destroyed.

You do not need to participate in this study, but if you do, I appreciate it. By completing this questionnaire, you are giving your consent for your data to be included in my project.

This project is being carried out under ethical approval from the Human Research Ethics Committee. If you have any questions, please contact my supervisor, Dr Andy Ang, email Andy.Ang@sit.ac.nz (mailto:Andy.Ang@sit.ac.nz)

1. Do you currently work, or have you worked in the banking/finance sector?*

- ◯ Yes
- ◯ No

IF NO, THE SURVEY ENDS

Gamified training

2. In your workplace, have you already participated in gamified training? *

If gamification and gamified training are both unusual terms for you, the link below can help you clarify them: https://en.wikipedia.org/wiki/Gamification

◯ (https://en.wikipedia.org/wiki/Gamification)

◯ Yes

No

IF YES:

Guidance for the next section

Remember the last gamified training you attended at a bank or finance company.
In the next section, for each of the following statements about this workplace and this training, please indicate how true it is for you, using the given scale.

IF NO:

Guidance for the next section

Remember the last training you attended at a bank or finance company.
In the next section, for each of the following statements about this workplace and this training, please indicate how true it is for you, using the given scale.

3. Company training perceptions *

	Not at all	Very little	A little	Moderately	Strongly	Very strongly	Completely
I am satisfied with my performance at this training.							
It was important for me to do well at this training.							
I'd like a chance to interact with my team more often.							
This training did not hold my attention at all.							
I enjoyed doing this training very much							
I didn't really have a choice about doing this training.							
I felt like I could really trust my colleagues.							
After working at this training for a while, I felt pretty competent.							
I believe I had some choice about doing this training.							
I really doubt that I would ever be friends of one of my coworkers.							
I thought this was a boring training.							
I didn't try very hard to do well at this training.							
I felt really distant from my co-workers.							
This training was fun to do.							
I think I am pretty good at the skill that this training was designed to improve.							
I felt like it was not my own choice to do this training.							
I put much effort into this training.							
I did this training because I wanted to.							
I couldn't do this training very well.							
I feel close to my team members.							
I would describe this training as very interesting.							
I didn't put much energy into this training.							
I did this training because I had no choice.							

I don't feel like I could really trust my colleagues.	○	○	○	○	○	○	○
While I was doing this training, I was thinking about how much I enjoyed it.	○	○	○	○	○	○	○
My co-workers and I could likely become friends if we interacted a lot.	○	○	○	○	○	○	○
I did this training because I had to.	○	○	○	○	○	○	○
I think I did pretty well at this training, compared to other training.	○	○	○	○	○	○	○
I think that doing this training is useful to improve my skills.	○	○	○	○	○	○	○
I think this training was important because it prepared me to do my job better.	○	○	○	○	○	○	○
I'd really prefer not to interact with my co-workers in the future.	○	○	○	○	○	○	○
I tried very hard on this training.	○	○	○	○	○	○	○
I felt like I had to do this training.	○	○	○	○	○	○	○
I thought this training was quite enjoyable.	○	○	○	○	○	○	○

4. Work & Well-being Survey (UWES) © *

The following statements are about how you feel about your bank/finance work. Please read each sentence carefully and choose which one best describes how often you feel that way, on average.

	Never	A few times a year	Once a month	A few times a month	Once a week	A few times a week	Every day
My job inspires me.	◯	◯	◯	◯	◯	◯	◯
At my job, I am very resilient, mentally.	◯	◯	◯	◯	◯	◯	◯
At my job, I feel strong and vigorous.	◯	◯	◯	◯	◯	◯	◯
I am immersed in my work.	◯	◯	◯	◯	◯	◯	◯
I feel happy when I am working intensely.	◯	◯	◯	◯	◯	◯	◯
For me, my job is challenging.	◯	◯	◯	◯	◯	◯	◯
At my work, I always persevere, even when things do not go well.	◯	◯	◯	◯	◯	◯	◯
I am enthusiastic about my job.	◯	◯	◯	◯	◯	◯	◯
I can continue working for very long periods at a time.	◯	◯	◯	◯	◯	◯	◯
I find the work that I do full of meaning and purpose.	◯	◯	◯	◯	◯	◯	◯
I get carried away when I'm working.	◯	◯	◯	◯	◯	◯	◯
Time flies when I'm working.	◯	◯	◯	◯	◯	◯	◯
It is difficult to detach myself from my job.	◯	◯	◯	◯	◯	◯	◯
I am proud of the work that I do.	◯	◯	◯	◯	◯	◯	◯
At my work, I feel bursting with energy.	◯	◯	◯	◯	◯	◯	◯
When I get up in the morning, I feel like going to work.	◯	◯	◯	◯	◯	◯	◯
When I am working, I forget everything else around me.	◯	◯	◯	◯	◯	◯	◯

5. Job satisfaction *

Some jobs are more interesting and satisfying than others. We want to know how people feel about different jobs. Please choose the option that best describes your level of agreement with the statements below. There are no right or wrong answers. We should like your honest opinion on each one of the statements.

	Strongly agree	Agree	Neither agree nor disagree	Disagre e	Strongly disagree
My job is like a hobby for me.	◯	◯	◯	◯	◯
My job is usually interesting enough to keep me from getting bored.	◯	◯	◯	◯	◯
It seems that my friends are more interested in their jobs.	◯	◯	◯	◯	◯
I consider my job rather unpleasant.	◯	◯	◯	◯	◯
I enjoy my work more than my leisure time.	◯	◯	◯	◯	◯
I am often bored with my job.	◯	◯	◯	◯	◯
I feel fairly well satisfied with my present job.	◯	◯	◯	◯	◯
Most of the time I have to force myself to go to work.	◯	◯	◯	◯	◯
I am satisfied with my job for the time being.	◯	◯	◯	◯	◯
I feel that my job is no more interesting than others I could get.	◯	◯	◯	◯	◯
I definitely dislike my work.	◯	◯	◯	◯	◯
I feel that I am happier in my work than most other people.	◯	◯	◯	◯	◯
Most days I am enthusiastic about my work.	◯	◯	◯	◯	◯
Each day of work seems like it will never end.	◯	◯	◯	◯	◯
I like my job better than the average worker does.	◯	◯	◯	◯	◯
My job is pretty uninteresting.	◯	◯	◯	◯	◯
I find real enjoyment in my work.	◯	◯	◯	◯	◯
I am disappointed that I ever took this job.	◯	◯	◯	◯	◯

General questions

6. How long have you worked in the banking / financial sector? *

- ◯ Less than 1 year
- ◯ 1 to 5 years
- ◯ 5 to 10 years
- ◯ More than 10 years

7. What gender do you identify with? *

- ◯ Male
- ◯ Female
- ◯ Gender diverse

8. Which origin do you closely identify yourself in? *

- ◯ New Zealander/Australian/Pacific
- ◯ Latin-American
- ◯ North-American
- ◯ European
- ◯ African
- ◯ Asian
- ◯ Other

9. What is your age range? *

- ◯ Less than 18 years old
- ◯ 18 to 25 years old
- ◯ 26 to 35 years old
- ◯ 36 to 45 years old
- ◯ More than 45 years old

Appendix C. Correlations

Table C1. Correlations between all variables

		Gamification	Job Tenure	Gender	Origin	Age	Competence	Relatedness	Autonomy	Engagement	Enjoyment	Interest
Gamification	Pearson Correlation	1										
	Sig. (2-tailed)											
	N	388										
Job Tenure	Pearson Correlation	.088	1									
	Sig. (2-tailed)	.085										
	N	388	388									
Gender	Pearson Correlation	.087	-.007	1								
	Sig. (2-tailed)	.088	.892									
	N	388	388	388								
Origin	Pearson Correlation	.138**	-.077	.002	1							
	Sig. (2-tailed)	.007	.130	.976								
	N	388	388	388	388							
Age	Pearson Correlation	.126*	.468**	.090	-.047	1						
	Sig. (2-tailed)	.013	.000	.076	.354							
	N	388	388	388	388	388						
Competence	Pearson Correlation	-.237**	-.085	-.005	.041	.048	1					
	Sig. (2-tailed)	.000	.094	.916	.417	.345						
	N	388	388	388	388	388	388					
Relatedness	Pearson Correlation	.215**	.346**	.083	-.093	.081	-.085	1				
	Sig. (2-tailed)	.000	.000	.103	.066	.110	.095					
	N	388	388	388	388	388	388	388				
Autonomy	Pearson Correlation	-.065	.065	-.006	-.007	-.064	.086	.455**	1			
	Sig. (2-tailed)	.201	.199	.899	.884	.205	.093	.000				
	N	388	388	388	388	388	388	388	388			

Engagement	Pearson Correlation	-.079	.089	.019	.015	.148**	.612**	.014	-.008	1		
	Sig. (2-tailed)	.119	.079	.703	.762	.003	.000	.779	.880			
	N	388	388	388	388	388	388	388	388	388		
Enjoyment	Pearson Correlation	-.094	-.010	-.006	.025	-.001	.309**	-.062	.100*	.403**	1	
	Sig. (2-tailed)	.064	.840	.903	.625	.989	.000	.226	.048	.000		
	N	388	388	388	388	388	388	388	388	388	388	
Interest	Pearson Correlation	.142**	.287**	.016	-.065	.138**	.029	.479**	.188**	.245**	-.061	1
	Sig. (2-tailed)	.005	.000	.752	.199	.006	.574	.000	.000	.000	.228	
	N	388	388	388	388	388	388	388	388	388	388	388

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table C2. Correlations between variables from non-gamified respondents

		Competence	Relatedness	Autonomy	Motivation	Engagement	Job Enjoyment	Job Interest	Job Satisfaction
Competence	Pearson Correlation	1							
	Sig. (2-tailed)								
	N	137							
Relatedness	Pearson Correlation	.182*	1						
	Sig. (2-tailed)	.033							
	N	137	137						
Autonomy	Pearson Correlation	.368**	.335**	1					
	Sig. (2-tailed)	.000	.000						
	N	137	137	137					
Motivation	Pearson Correlation	.850**	.620**	.647**	1				
	Sig. (2-tailed)	.000	.000	.000					
	N	137	137	137	137				
Engagement	Pearson Correlation	.580**	.232**	.188*	.538**	1			
	Sig. (2-tailed)	.000	.006	.028	.000				
	N	137	137	137	137	137			
Job Enjoyment	Pearson Correlation	.253**	.018	.187*	.228**	.431**	1		
	Sig. (2-tailed)	.003	.831	.028	.007	.000			
	N	137	137	137	137	137	137		
Job Interest	Pearson Correlation	.057	.393**	.037	.209*	.351**	.295**	1	
	Sig. (2-tailed)	.509	.000	.670	.014	.000	.000		
	N	137	137	137	137	137	137	137	
Job Satisfaction	Pearson Correlation	.194*	.254**	.140	.272**	.486**	.808**	.801**	1
	Sig. (2-tailed)	.023	.003	.103	.001	.000	.000	.000	
	N	137	137	137	137	137	137	137	137

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table C3. Correlations between variables from gamified respondents

		Competence	Relatedness	Autonomy	Motivation	Engagement	Job Enjoyment	Job Interest	Job Satisfaction
Competence	Pearson Correlation	1							
	N	251							
Relatedness	Pearson Correlation	-.159*	1						
	Sig. (2-tailed)	.012							
	N	251	251						
Autonomy	Pearson Correlation	-.141*	.562**	1					
	Sig. (2-tailed)	.026	.000						
	N	251	251	251					
Motivation	Pearson Correlation	.592**	.663**	.541**	1				
	Sig. (2-tailed)	.000	.000	.000					
	N	251	251	251	251				
Engagement	Pearson Correlation	.638**	-.066	-.140*	.384**	1			
	Sig. (2-tailed)	.000	.298	.027	.000				
	N	251	251	251	251	251			
Job Enjoyment	Pearson Correlation	.326**	-.068	.046	.211**	.385**	1		
	Sig. (2-tailed)	.000	.284	.463	.001	.000			
	N	251	251	251	251	251	251		
Job Interest	Pearson Correlation	.071	.492**	.284**	.437**	.219**	-.184**	1	
	Sig. (2-tailed)	.265	.000	.000	.000	.000	.003		
	N	251	251	251	251	251	251	251	
Job Satisfaction	Pearson Correlation	.305**	.344**	.264**	.512**	.469**	.612**	.665**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	251	251	251	251	251	251	251	251

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).