MASTER THESIS

Gamified Surveys: what game mechanics are driving people's motivation?

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ABSTRACT

Gamification, which is the inclusion of game elements in tedious processes in order to increase the user's motivation, has proven to be a useful tool in different contexts, such as administration, health, sports, finance, and education, among others. Gamified surveys, which is the inclusion of game elements in surveys, has been created with the objective of increasing the motivation and response rate of the respondents, which has been detected as the biggest problem when dealing with online surveys. Aiming to discover whether these game elements indeed increase the motivation of respondents and if so, which of them are the most relevant when designing gamified surveys, a thorough analysis of the existing literature and an empirical study have been conducted. This study was executed through an online non-gamified survey answered by 124 respondents, which consisted of displayed images of gamified surveys in which one game element per image was highlighted. The objective was to analyze the influence on respondent's motivation of each game element separately. By developing a framework combining existing literature and the results of the data collection, this study adds value to the existing literature by confirming that the inclusion of game elements in surveys increases the motivation of respondents and by detecting that interaction concepts, goals and achievements are the game elements that are perceived as the most attractive in terms of increased motivation of respondents. The results of this research should motivate academics, survey designers and game developers to further study and develop framework based gamified surveys in order to improve respondent's motivation for said surveys.

1. Introduction

In a world that is increasingly influenced by technology, games are an important topic to discuss. During the last two decades it has been possible to observe how the development of games is increasing for all types of demographic groups. Popular examples such as CandyCrush or FarmVille show that age or gender does not matter anymore when it comes to video games. The monthly earnings of CandyCrush are close to 128 million dollars per month with approximately 293 million of active users per month, of which 59% are women and 66% of all users were born between the early-to-mid 1960s and the early 1980s[1].

The growth of the industry and its approach to all types of demographics has allowed the creation of new techniques when looking to motivate users to perform a specific task or process. One of these techniques is gamification, which is basically the use of games elements in tedious processes, with the aim of increasing user's motivation (Thiebes, Lins & Basten, 2014). This technique is relatively new. In Scopus, a website with a vast database of scientific publications, articles about gamification cannot be found for years before 2011. Gamification is used in different contexts such as marketing, healthcare, education, among many others[2]. Huotari and Hamari (2012) defined gamification in a marketing context as a process that supports user's value creation. One of the first examples of gamification in the field of health was the gamified platform for exercise called Wii Fit, presented by Nintendo in 2007, which proved to improve the health and well-being of the users (Nitz, Kuys, Isles & Fu, 2010). In the educational field, gamifying learning processes may increase the commitment and motivation of students (Buckley & Doyle, 2016). In a previous study conducted by Vesselinov and Grego (2012), it is demonstrated that the use of Duolingo, a free gamified application to learn languages, implies a statistically significant improvement in the learning process compared with traditional language education. These and many more cases can be found in different fields. However, there are still many fields in which the gamification has not been integrated or it is in the process of integration.

One of the processes that is lacking motivation of its users is the collection of data for studies, specifically regarding online surveys. Response rates to online surveys are decreasing (Wenemark, Vernby & Norberg, 2010). Bailey, Pritchard and Kernohan (2015) state that the

[1] Retrieved from: https://expandedramblings.com/index.php/candy-crush-facts-statistics/
Gamification examples: the fully comprehensive list (2018). Retrieved from: https://yukaichou.com/gamification-examples/

question of how to improve response rates and quality of data has become an important topic to investigate for scientists and researchers. The response rate and the quality of responses are important for the result to be as accurate as possible, otherwise it may represent a false scenario, possibly leading to wrong conclusions and/or decisions (Nulty, 2008). One of the possible solutions that some researchers have proposed has been the inclusion of game elements in surveys, also called gamified surveys. Nevertheless, when considering the use of gamification when designing and conducting surveys, the literature that can be found about this specific subject is extremely limited, sometimes even vague and contradictory. The main problem that has been observed is that existing studies in which gamified surveys have been applied to collect data, do not provide enough theoretical and empirical information to accurately design gamified surveys. This fact can be associated with the lack of literature about gamified surveys. However, Harms et al. (2014) proposed that gamification frameworks based on mechanics and dynamics (M&D) are useful when designing a gamified survey. Through an extensive analysis of gamification literature, Scott Thiebes et al. (2014) designed a framework based on M&D in which they recognized five clusters of game mechanics affecting gamified processes in an information system environment: system design, challenges, rewards, social influences and user specifics, as can be seen in Table 1.

Table 1. Clusters of Master-M&D.

Cluster	**Definition**
System Design	Master-M&D describing how a gamified application has to be designed and developed to motivate a user. A typical example is the use of feedback mechanisms.
Challenges	Master-M&D attempting to motivate users by providing challenges. In addition, all Master-M&D were assigned to this cluster, which support the development or accomplishment of challenges, such as the formulation of clear goals.
Rewards	Master-M&D aiming to motivate the users by providing rewards (e.g., point systems or the awarding of badges) after certain actions were successfully taken.
Social Influences	Master-M&D aiming to motivate users or a group of users by social dynamics and influences, such as altruism, competition, gaining status or user high scores.
User Specifics	Master-M&D motivating users by directly influencing the individual personality by, for example, promoting self-expression.

Note: Reprinted from "Gamifying Information Systems – A synthesis of gamification mechanics and dynamics" by S. Thiebes et al. (2014), Twenty Second European Conference on Information Systems.

Another problem that has been detected when studying the literature of gamified surveys, is that most of the studies analyzed the gamified surveys as a whole and not each game element separately in order to better understand the weight each of them has in user motivation. Therefore,

in this research, game mechanics will be separately analyzed. Considering the evidence mentioned above, this study tries to find an answer to the following research question:

What game mechanics are driving respondent's motivation in a context of gamified surveys?

The purpose of this research is to fill the gap in the literature about the design of gamified surveys by performing an empirical research analyzing each game element separately. As stated above, an M&D based framework can help to design a gamified survey, but there is still no empirical evidence to prove it. Therefore, in the process of answering the main research question, it will also be necessary to look for an answer to the following sub-question: (1) *can an M&D gamification framework be used to design a gamified survey?* By complementing this framework with survey guidelines, conducting an online (non-gamified) survey will be performed to bring answers to the research and sub questions. The practical propose of this research is to recognize which game elements are relevant when answering gamified surveys to better understand how to design them trying to help not only academic researchers, but also marketing researchers and survey designers. For this, it has been considered necessary to also give an answer to the following sub-questions: *(2) What is the main reason for leaving incomplete surveys (3) Which gamified survey design is preferred by the respondents?*. In the literature of gamified surveys, one of the frequent doubts or criticisms that can be found is if the user is being biased by the game elements added. Therefore, this study also seeks to find answers to the next sub-question: *(4) Do survey respondents think that gamifying surveys could cause biased responses?*

In the first section the theory about surveys, gamification and gamified surveys will be discussed. In the second section, the methodology used to execute this research will be presented. In the third section, the results of the information collected will be discussed. In the fourth section, an analysis of the results will be presented. Finally, this research will end with a conclusion and recommendation for future researchers.

2. Theoretical Background

2.1.Literature Selection Approach

At the beginning of the research, Scopus (Elsevier's abstract and citation database) has been used to conduct all the searches for scientific articles. This tool has been selected because this research is expected to work exclusively with peer reviewed articles. Falagas, Pitsouni, Malietzis and Pappas (2008) studied that this data base is the one that contains the largest number of peer reviewed articles (excluding Google Scholar due to the difficulty to quantify its articles because it theoretically includes all electronic resources). For all searches, the Boolean method has been used. The survey literature was derived by using forward citation from the gamified surveys literature. Subsequently, performing forward citation of the items obtained was necessary, making this an iterative process. The search and selection of articles about Gamification has been done by using the literature presented by influent authors on the topic such as: Huotari, Hamari, Deterding and Thiebes as a starting point and then using forward citation of its more influential articles (measured by citations). Finally, for gamified surveys literature, no filter or limitation has been applied since it is extremely limited with only 11 publications in Scopus. For this term, forward citation has also been used. It is worth mentioning that to search for articles obtained by forward citation, in addition to Scopus, Google Scholar has been used.

2.2.Surveys

Since 200 years, surveys have been part of human history. These were created with the main objective of collecting information about the population, the first survey that is registered is the census in the United States in the year 1790[3], which has been done every ten years since then. However, it is not always possible to collect information from the entire population due to the amount of resources that is needed, especially money and time. Therefore, it is common to collect data from different samples, which allows researchers to infer about the population making this process cheaper and faster. In the beginning, due to the lack of technology, the surveys were conducted face-to-face. Then, without neglecting their origins, they began to be made through physical mail and telephone. In the last decades the most common method has been online surveys. Nowadays, surveys are the standard tool for empirical research in social sciences. Nevertheless,

[3]1790 Overview. Retrieved from: https://www.census.gov/history/www/through_the_decades/overview/1790.html

one of the main problems of this quantitative tool is the response rate (engagement) and the validity of the data (Granello & Wheaton, 2004). In recent years, this process has been modified numerous times seeking to solve these problems. Krysan, Schuman, Scott and Beatty (1994) concluded that mail surveys have higher levels of validity compared to face-to-face surveys, probably because when surveying someone face-to-face the participants seek to give an acceptable response to the community. Van Selm and Jankowski (2006) argue that online surveys require less time and money and can potentially reach a larger number of respondents. This implies that despite having low response rates, a greater audience can be reached to achieve the desired sample size.

The focus over the last few years, regarding online surveys, has been on improving the respondent's engagement. Techniques to improve the effectiveness of the online surveys depend on the context in which surveys are created and distributed.

Regarding the enhancement of interface design of online surveys, previous research (Lazar & Preece, 1999) suggests the eight golden rules of interface design presented by Scheiderman (1998) for improving the engagement on respondents. The eight golden rules are: (1) strive for consistency, (2) enable frequent users to use shortcuts, (3) offer informative feedback, (4) design dialogs to yield closure, (5) offer error prevention and simple error handling, (6) permit easy reversal of actions, (7) support internal locus of control, and (8) reduce short-term memory load (Shneiderman, 1998).

Adding to this, Handwerk, Garson and Blackwell (2000) proposed that surveys should not last more than thirteen minutes. Rosenblum (2001) states that *"the shorter the better"*, where online survey, preferably, should not exceed twenty questions. Another factor that has been added to the formula that seeks to increase respondents' motivation is to offer prizes, which have proven to be beneficial for the response rate, but it is still unclear if they increase the quality of the information (Singer & Ye, 2013). Lately, the incorporation of game elements, more known as gamification, in surveys is being discussed and studied.

2.3. Gamification

The term gamification was used for the first time in 2008, however it became popular in 2011 after becoming the main subject of different conferences and presentations (Thiebes et al. 2014). Deterding (2011) defined gamification as "*the use of game design elements in non-game context*" (p.2). Huotari and Hamari (2012) argue that the goal of gamification is not

just to increase the customer relationship metrics, but to create gameful experiences which, if applied correctly, is translated into an increase in customer relationship metrics. For this very reason, criticizing the systemic approach of the definition delivered by Deterding (2011), Huotari and Hamari (2012) define gamification as "*a process of providing affordances for gameful experiences which support the customers' overall value creation*" (p.3). Gameful experience is a psychological state derived from the interaction between three other psychological states: the perception of goals, feeling motivated to achieve these goals and having a volitional or free will aptitude (Landers, Tondello, Kappen, Collmus, Mekler & Nacke, 2018). The rapid growth and popularity of gamification was mainly due to its focus on motivating desired behaviors in popular sectors such as education, health, management, sustainability, among others (Deterding, 2012). Along with its rapid growth, empirical research began, which demonstrate that gamification increases the motivation and engagement of users in tedious processes (Law, Kasirun & Gan, 2011; Muntean, 2011). Nevertheless, its popularity and application grew at a higher speed than its empirical research and theoretical bases. In a major advance in 2015, Seaborn and Fels surveyed 31 gamification papers where they observed that the studies carried out in the field did not have enough theoretical bases (e.g. the use of frameworks) and that they did not use a control group to analyze the collected data. Only one study, out of the 31, presented a control group when doing the research. This causes that many organizations implemented gamification in some of their processes without a positive result. A study conducted by Knaving and Bjork (2013) revealed that some gamified processes failed to motivate their audience because the added game elements were not integrated with the content or focus of the process itself. Another study revealed that the success of applying gamification to a process is context-dependent, because each activity or process influences its users and its motivations in different ways (Hamari 2014). Gamification is a useful technique to motivate and engage users, but its study is still in a stage of maturity where it is still necessary to perform empirical studies in order to build theory, frameworks and gamification designs. In many articles on this subject, it is recommended to future researchers to separately analyze the effect of adding game elements to processes in order to be clear about the strength and effect of adding each one of them.

Despite the scarcity of frameworks on the topic, when gamification is being studied it is common to find the framework proposed by Yu-Kai Chou (2015) in his book "Actionable Gamification" called Octalysis Gamification Framework, which has already been used by other

researchers (this framework can be found in Appendix I). However, the lack of theoretical and empirical background prevents it from being used for scientific purposes. On the other hand, through an arduous analysis of existing literature, Scott Thiebes et al. (2014) presented a theoretical framework that provides enough well-founded information to consider when designing the gamification of a process. They focus in two game design elements that are primarily used in gamification: game mechanics (also known as game elements) and dynamics. Sicart (2008) defined game mechanics as "*methods invoked by agents for interacting with the game world*" (p.13). In gamification, the most common game mechanics are point systems, leaderboard, levels and challenges (Zicherman & Cunningham 2011). The game dynamics are the result of how the user reacts and behaves with respect to a set of game mechanics. In simple words, when a process is gamified, game mechanics have been added (e.g. badges, progress bar, among others), with the aim of increasing the users' motivation and engagement (game dynamics). Thiebes et al. (2014) synthesized mechanics and dynamics present in gamified processes into five clusters: system design, challenges, rewards, social influences, and user specifics.

System Design: Thiebes et al. (2014) recognized seven game mechanics that affect the system design: feedback, audible feedback, reminder, meaning, interaction concepts, visually resembling of existing games and fantasy. Feedback mechanics seek to stimulate the relationship between user-interface, with the ultimate goal of motivating the user to stay and finish the process (Whitson 2013). Passos et al. (2011) stress that the feedback must be immediate, in order to keep the user aware of their progress. A common example of instant feedback is the progress bars used in successful gamified applications such as LinkedIn (Huotari & Hamari, 2012). Reminder refers to to remind the user about their past behavior. Meaning mechanics refer to the fact that the gamified process must be meaningful for the users (Gnauk et al., 2012), in other words, that users feel that they are doing something for a greater good. User interaction refers to the user interface, its usability and stimulating visuals (Gnauk et al., 2012). Visually resembling of existing games is self-explanatory, it refers to designing the platform in a way that resembling existing games such as Tetris, Pacman, Super Mario, etc. Finally, fantasy refers to the use of fantasy objects, characters or situations when designing the gamified process (i.e. magic swords, wizards and dragons respectively).

Challenges: In this cluster, the authors recognized three game mechanics: goals, time pressure and progressive disclosure. The first refers to the fact that there must be a clear goal in

order to motivate users through the completion of objectives (Bandura 1993). Adding time pressure to tasks has proven to raise more emotional feedback and improve participation of users (Hsu, Chang & Lee, 2013). Finally, progressive disclosure refers to the sense of progress (either knowledge or skills) by the users (Liu, Alexandrova & Nakajima, 2011).

Rewards: Ownership, achievement, point system, badges, bonus and loss aversions have been recognized in this cluster. This cluster refers to the effectiveness of giving rewards for achievements. In gamification these rewards provoke a sense of ownership in which its users may be motivated to keep or expand it, and at the same time they may be motivated not to losing them (Hiltbrand & Burke, 2011).

Social Influences: status, collaboration, reputation, competition, envy, shadowing, social facilitation, conforming behavior, leaderboards, altruism and virtual goods are the game mechanics presented in this cluster. This cluster refers mainly to the importance of relationships with other users when motivating people. People seek recognition and feedback of peers in gamified processes (Hamari & Koivisto, 2015).

User Specifics: User levels, ideological incentives, virtual character and self-expression are the mechanics recognized in this cluster. In this cluster, Thiebes et al. (2015) focused on the personality of the users and how understanding it can improve motivation.

As it can be appreciated, the framework based exclusively on scientific articles of gamification by Scott Thiebes does not differ on many aspects with the framework created by Yu-Kai Chou that presents a more practical look of topic. It has been found that some game mechanisms belongs to different clusters, for example virtual character (or avatar) is part of the User Specifics cluster in the M&D framework, whilst in Yu-Kai Chou it is part of ownership. The biggest difference is that the System Design and User Specific clusters are not found in the Octalysis framework. However, most of the game mechanics present in these two clusters are also present in the Octalysis framework. Another difference between the two frameworks is the language used by each one. The language used in the Octalysis Gamification Framework can be considered more gamer-oriented (since its author is considered a gamer). On the contrary, the M&D framework uses only scientific terms, since it has been based on other scientific articles.

2.4. Gamified Surveys

The main problem with online surveys is the low level of motivation of the respondents (Puleston 2011). Looking for a solution to this problem, several researchers propose to add game elements to online surveys to increase respondent's motivation. A study conducted by Guin, Baker, Mechling and Ruyle, (2012) showed that adding game elements to surveys results in enhancement of the respondent's experience, making it a more enjoyable process. Nevertheless, it was not possible in this study to verify whether adding these elements implies an increase in the commitment or improvement of the quality of the information. Although these authors used a control group, they failed to design the gamified survey since in some cases it took the respondents more than two minutes to load it, causing extremely high levels of abandonment and probably biasing the results. An article by Cechanowicz, Gutwin, Brownell and Goodfellow (2013) concluded that gamified surveys increase the participation of users and that the motivational benefits of the games increase with the gamification level of the survey. In other words, the more gamified the survey is, the more motivated the respondents are. Gamified surveys have also proven to provide richer data since more detailed answers are obtained (Baker & Theodore, 2011). However, it is not a stand-alone term, at the time of designing gamified surveys it is crucial to follow the same principles for designing traditional online surveys (Baker & Theodore 2011).

Two problems have been identified in the scant literature about gamified surveys. The first concern is the fact that respondents can be biased by the content and context of the gamified survey. On the other hand, Bailey, Pritchard and Kernohan (2015) argue that *"the gamification may allow participants to better reflect the context in which a decision/choice is made, hence providing more valid data than in a standard survey"* (p.19). Regarding this first problem, some authors have proposed that the fact of making a survey 'fun' by adding game elements, automatically provokes a positive bias for the respondents (Keusch & Zhang, 2017). However, there is no empirical evidence to prove it. Given that researchers start to investigate that relationship, considering that a 'boring survey' could also lead to a bias should also be considered. The second and most mentioned problem found in the literature is the one mentioned above, the lack of empirical studies in the area, despite being a growing topic (Seaborn & Fels, 2015). This also causing the lack of gamified surveys frameworks with enough empirical and theoretical background to its implementation. However, gamification frameworks based on M&D can assist in designing a gamified survey (Harms et al., 2014).

As mentioned above, Thiebes (2014) recognized five clusters in his gamification framework based on M&D. Nevertheless, by surveying the literature of gamified surveys it has been found that the social influences and user interactions clusters do not have enough presence to be considered when gamifying surveys (see Table 2). In this and the following tables a number has been assigned to each scientific article. To see which article corresponds to each number, please refer to Appendix II. It is believed that social influences have been left out because the process of answering surveys is completely personal and could be affected if it becomes a process with social interactions. By definition, the cluster user interactions seek to modify the personality of the user, therefore it is believed that this cluster has been excluded when designing gamified surveys because it may be strongly related to giving biased answers. Therefore, in this study only system design, challenges and rewards clusters will be considered.

Table 2. Presence of clusters in the literature of gamified surveys. (1= present, 0= not present).

Cluster	System Design	Challenges	Rewards	Social Influences	User Specifics
Article					
1	1	1	1	0	0
2	1	1	1	0	0
3	1	1	1	0	0
4	1	1	1	0	0
5	1	1	1	0	0
6	1	1	0	0	0
7	1	1	1	0	0
8	1	1	1	0	0
9	1	1	1	1	0
10	1	1	1	1	0
11	1	1	1	1	0
% Presence	**100%**	**100%**	**91%**	**27%**	**0%**

When analyzing the gamified survey literature, only one article has been found that analyzes each game element separately (Verzosa, Greaves, Ellison, Ellison and Davis, 2018). Nevertheless, they did not provide a visual representation of them. This may be caused by the scarcity of tools to create gamified surveys, which has been recognized as one of the biggest barriers to study this topic (Harteveld, Snodgrass, Mohaddesi, Hart, Corwin & Romera Rodriguez, 2018). Therefore, in this study each game element will be analyzed separately. In order to not extend the data collection method to be carried out at levels higher than those recommended, only

the three most relevant game elements of each cluster according to the analysis carried out by Thiebes (2014) will be analyzed. These nine game elements can be found in Table 3**.**

Table 3. The three most relevant game elements of the clusters selected. The relevance has been measured according to the literature survey conducted by Thiebes et al. (2014).

Cluster	Game elements
System Design	Feedback, Meaning and Interaction concepts
Challenges	Goals, Time pressure and Progressive disclosure
Rewards	Achievement, Point system and Badges

Because several studies and many years have passed after the Scott Thiebes framework was created, verifying the present relevance of the chosen elements on the literature available has been considered crucial. By analyzing the scarce literature of gamified surveys, each game element is present in at least one article and eight of them are present in the majority of the articles (see Table 4). The only one that is present in less than 50% is the game element 'badges'.

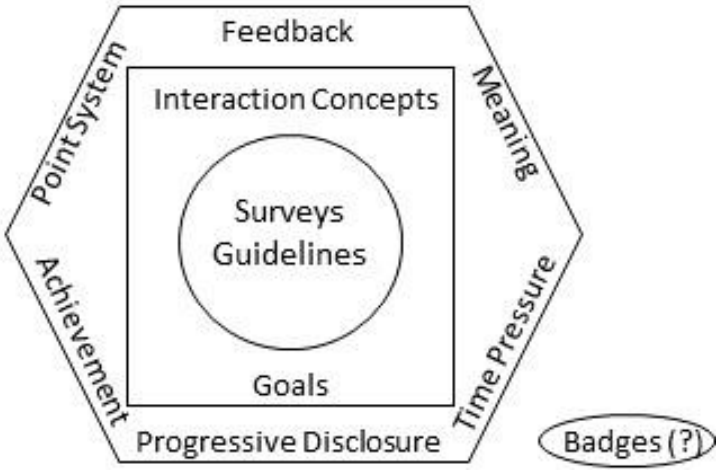
Table 4. Presence of the selected game elements in the literature of gamified surveys. (1= present, 0= not present)

Game Element	Feedback	Meaning	Interaction Concepts	Goals	Time Pressure	Progressive Disclosure	Achievement	Point System	Badges
Articles									
1	1	1	1	1	1	1	1	0	0
2	1	1	1	1	1	0	1	1	1
3	0	0	1	1	1	0	0	0	0
4	1	1	1	1	0	1	1	1	0
5	1	0	1	1	1	1	1	1	1
6	0	0	1	0	1	0	0	0	0
7	1	1	1	1	0	1	1	1	0
8	1	0	0	1	0	0	1	1	1
9	0	1	1	1	0	0	1	1	0
10	0	1	1	1	0	1	0	0	0
11	0	1	1	1	1	1	1	1	0
% Presence	**55%**	**64%**	**91%**	**91%**	**55%**	**55%**	**73%**	**64%**	**27%**

For greater clarity on how it has been decided if there is a presence of these game elements in the existing literature, a table has been created that can be found in Appendix III, which shows each game element with an example of how it was present in one of the selected articles.

In conclusion, the gamified surveys literature first of allsuggests that it is not a stand alone term and that it has to follow the same rules as other surveys. Secondly, it can be inferred that the most relevant game elements are interaction concepts and goals due to their higher presence in existing articles. These are followed by the rest of game elements: achievement, progressive disclosure, meaning, point system, feedback and time pressure, which are still present in the majority of the analized articles. Badges, however, has shown to have a low prescence, so it may be necessary to check whether to include it or not. Based on this, Figure 1 has been created, which represents a gamified survey design framework based on the theory.

Figure 1. Gamified survey design framework from theory.



3. Methodology

In this section, the methodology used for this research will be presented. The method used has been the critical incidents technique as proposed by Flanagan (1954). This method consists of five stages: (1) formulate general aims, (2) specifications, (3) data collection, (4) data analysis, and finally, (5) reporting and interpreting the results. The first four stages will be elaborated in this section. The last stage, reporting and interpreting, will be discussed in the results and analysis sections, respectively.

3.1. General Aims

The aim of this research is to analyze how respondent's motivation is affected by separately adding game elements to gamified surveys by answering the research question. For this, an online (non-gamified) survey showing images of simulated gamified surveys has been developed. The game elements to analyze will be those already mentioned above: feedback, meaning, interaction concepts, goals, time pressure, progressive disclosure, achievement, point system and badges.

3.2. Specifications

This research is both deductive and inductive: it has a deductive approach since existing concepts as presented in theory are used to design the survey, and it has an inductive approach since the aim is to gain knowledge and new insights based on the collected information – working from data to theory. Specifications has the following four categories: respondents, instruments, reliability test and factor analysis.

3.2.1. Respondents

The survey has, at first, been designed in English. However, since the author of this research could reach more Spanish-speaking people, it has been translated into the Spanish language, this being the final version to distribute among respondents. Therefore, the first requirement has been to speak Spanish as a native language. Because there are already studies of gamified surveys for children and adolescents, this study will focus on adults. Therefore, the second and last requirement was to be an adult.

The average age of the respondents was close to 30 ($M = 32.33$, $SD = 10.86$). 63 women (50.8%) and 60 men (48.4%) have answered this survey, while only one person has decided not to

specify it (0.8%). Regarding the education of the respondents, the vast majority (90.3%) have completed university studies, either bachelor, master or doctorate. When analyzing gaming habits, nothing worth mentioning has been found, however, in the results section it will be analyzed if the responses were influenced by this variable (e.g. being more, or less motivated because of being a gamer).

3.2.2. Instruments

As mentioned above, the survey has been designed on the Qualtrics platform. This survey has been made based on the 10 practices (guideline) proposed by the renowned site SurveyMonkey, which seek to increase the effectiveness and quality of collecting information: (1) define a clear, attainable goal for your survey; (2) keep the more personal questions to the end; (3) do not let the survey get too long; (4) focus on using closed-ended questions; (5) consider a survey incentive; (6) do not ask leading questions; (7) keep the answer choices balanced; (8) avoid absolute words; (9) avoid asking double-barreled questions; (10) preview and test the survey.

The survey consists of 18 questions and it was divided into three parts:

First part: Since the term gamified surveys is relatively new, the first part of the survey was focused on finding out if respondents know this term. Otherwise, the necessary information was provided so that they can continue. However, if respondents did not understand the term after two explanations, the survey was terminated for those respondents.

Second part: In this part analysing the effect on user's motivation of the nine game elements presented above was intended. Pittman (1998) defined motivation as the reasons underlying people's behavior, thoughts, and actions. For each of the nine game elements an image simulating a gamified survey has been designed, each of these images emphasizing on only one game element. To design these images, the StudyCrafter website has been used. This is a free online tool that allows you to create and share projects to understand human behaviour (Harteveld, Manning, Abu-Arja, Menasce, Thurston, Smith & Sutherland, 2017). This tool has already been used previously in a gamified survey article made by Harteveld, Snodgrass, Mohaddesi, Hart, Corwin and Romera Rodriguez (2018). This tool proved to be somewhat limited when offering designs, therefore, in terms of this research, it worked only as a starting point. Subsequently, a licensed version of Power Point has been used to add different designs and images. Figure 1 shows an example of one of the designs presented in the survey. Likert scale questionnaires are common

when measuring motivation of the respondents, therefore, each question in this part was designed using this scale. Respondents had to choose between the next seven options: strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree, strongly agree. The first part also consisted of direct questions about how they perceive this term, specifically if it would increase their motivation and if their answers would be biased. At the end of the first part, participants were asked if they have ever left an incomplete survey, in order to identify the most common reason among them.

Third part: The third and final part consisted of demographic questions such as age, gender, educational level and gaming habits. The survey was ended with a gratitude message and another message providing the email address of the researcher in case the participants wanted more information about this study.

In order to be as transparent as possible, the full version in English of the survey has been added to Appendix IV. The raw data extracted from Qualtrics can be requested from the author of this study. Finally, a table showing the sources of copyrighted images used to design the images simulating gamified surveys can be found in Appendix V.

Figure 2. Example of the game element 'goals' shown in the conducted survey.

3.2.3. Reliability

The reliability of ‘motivation when adding game elements to survey’ compromising nine elements was acceptable: α = .722. Only by eliminating the item ‘time pressure’, the alpha would have been higher: α = .742. Nevertheless, this increase was not deemed significant, therefore, the next parts of the study were conducted with the nine original items.

3.2.4. Factor analysis

A principal component analysis with oblimin rotation revealed a three-factor solution, explaining 61.41% of the variance. However, only the item 'interaction concepts' loaded high enough (>.4) on factor 3. Nevertheless, this item had a higher load on factor 1. Therefore, only 2 factors were considered in this study: A (feedback, meaning, interaction concepts, goals, progressive disclosure, achievement, badges) and B (time pressure, point system). Factor A was found reliable (α = .723) and factor B close to be reliable (α = .635), nevertheless, factors with two items tend to have little reliability. This suggests that the game elements have been perceived differently when they are numerical as in factor B as when they are not numerical as in factor A.

Independent of the outcome of performing a factor analysis, these results were not considered for the next parts of the analysis, since by theory, this study sought to analyze each game element separately, which by its nature goes against the factor analysis.

3.3.Data Collection

The procedure consisted of distributing the survey through sharing the URL on social media (WhatsApp, Instagram, Facebook and LinkedIn). This has been considered the most efficient way to remotely reach a wider audience by the author. There has not been any kind of reward for completing the survey, however, it has been specified that by filling it, they would be helping the researcher to graduate. The survey took approximately ten minutes (*M= 9.12, SD= 20.68*) to complete. Each respondent was asked to be as honest as possible, along with answering the survey individually. The participants were not informed about the aim of the study beforehand nor during the experiment in order to avoid biases. The survey was open for six days, from Friday to Wednesday.

3.4.Data Analysis

There is a discussion in which it is mainly debated whether variables obtained through a study carried out with a Likert Scale can be treated as continuous variables or not, since these are considered categorical. Through a profound analysis, Rhemtulla, Brosseau-Liard and Savalei (2012) have concluded that having seven or more categories, the variables can be treated as continuous. As mentioned above, in this study a fixed Likert Scale of seven categories has been used, due to this, the variables could be analyzed as continuous. Due to the use of this scale, the absence of outliers is assumed. No missing values were found.

Results under 3.5 were assumed as a negative value, in this case, that did not increase the motivation of the users. On the other hand, a higher number than 4.5 proposes that the motivation of the people is positively affected by adding game mechanics. Values greater than 3.5 and lower than 4.5 have been considered as "indifferent", proposing that the respondents are indifferent to the inclusion of a game element regarding their motivation.

The data analysis in this study has been carried out by using SPSS and Microsoft Excel softwares tools. The statistical tests performed were factor analysis, frequency analysis, descriptive analysis, Kruskal-Wallis Test and Mann-Whitney U Test. These last two have been used to study the possible existence of control variables affecting the answer of the repsondents. Both are used as an alternative to t-test and one way anova (respectively), when normality cannot be assumed which is the case with Likert Scale data. Kruskal-Wallis Test is used when there is more than two categories and Mann-Whitney U Test is used when there is only two categories (dummy variables). The assumptions for these are the following: (1) continuous dependent variable, (2) independency, (3) no normal distribution (4) the null hypothesis is assumed.

4. Results

In this section, the results of the research will be presented. The first part is related to the research questions, the second is linked to the sub questions. The final part of this section shows the results in the search for possible variables that are acting as a control variable in relation to the perceptions of motivation of the respondents.

4.1. User's motivation by adding game elements to surveys

Since the objective of this study is to analyze these elements separately but also to analyze which are the most effective in increasing users motivation, the results are presented in a ranking from 1 to 9, where the first is the one that has obtained the highest score of motivation and the last is the one that has obtained the lowest score of motivation (see Table 5). At first glance, it can be observed how all the game elements except for 'time pressure' have higher values than 4.5, averaging 5.06 (*SD= 1.62*) all together.

Table 5. Means and standard deviation of the perception of the respondents with respect to whether their motivation would be increased by adding each game element

	Mean	*Std. Deviation*	*Ranking*
Interaction Concepts	5.77	1.32	1
Goals	5.56	1.39	2
Achievement	5.55	1.47	3
Progressive Disclosure	5.17	1.49	4
Meaning	5.10	1.70	5
Point System	4.90	1.78	6
Feedback	4.77	1.85	7
Badges	4.68	1.63	8
Time Pressure	4.06	2.02	9
E{X}	**5.06**	**1.63**	

Note: 1= strongly disagree, 7= strongly agree. This table has been sorted from highest to lowest (mean).

In this table it can be seen how the three elements that have obtained the highest score are interaction concepts, goals and achievements with an average of 5.77 (*SD= 1.32*), 5.56 (*SD= 1.38*) and 5.55 (*SD= 1.47*), respectively. This can also be better observed when analyzing the percentage of people who have selected values greater than four (5, 6 or 7). As it can be seen in Table 6, 86.3% of people have selected values greater than 4 when analyzing interaction concepts, being 6 the

preferred option (41.9%). The same goes for goals and achievement with 81.5% and 79.8% respectively, in which 6 was also the preferred option (39.5% and 38.7%, respectively).

Progressive disclosure (*M= 5.17, SD= 1.49*), meaning (*M= 5.10, SD= 1.70*), point system (*M= 4.90, SD= 1.78*), feedback (*M= 4.77, SD= 1.85*), and badges (*M= 4.68, SD= 1.63*), are the game mechanics that have shown an average close to 5 ('somewhat agree', regarding motivation). These five game mechanics have also shown to accumulate the selection of the majority of people with values higher than 4 with 73.4%, 72.6%, 67.7%, 59.7% and 52.4%, respectively. Something that is worth mentioning, is that in the first four game elements in this range, the most selected option was 6 ('agree'), however, in the game element 'badges', the most selected has been 4 ('indifference'). Despite not being close to 'agree' or 'strongly agree', these five elements still have a positive value greater than 4.5.

Table 6. Percentage of respondents corresponding to each category (Likert Scale) for each game element.

	1	*2*	*3*	*4*	*5*	*6*	*7*	*%*
Interaction Concepts	1.6	2.4	3.2	6.5	13.7	41.9	30.6	100.00
Goals	1.6	4.0	2.4	10.5	16.9	39.5	25.0	100.00
Achievement	2.4	3.2	4.8	9.7	13.7	38.7	27.4	100.00
Progressive Disclosure	4.0	3.2	4.0	15.3	23.4	33.9	16.1	100.00
Meaning	6.5	4.8	6.5	9.7	16.9	38.7	16.9	100.00
Point System	8.1	5.6	6.5	12.1	20.2	31.5	16.1	100.00
Feedback	7.26	10.5	4.8	17.7	10.5	33.1	16.1	100.00
Badges	5.6	4.8	8.1	29.0	16.1	22.6	13.7	100.00
Time Pressure	12.9	16.9	14.5	7.3	16.1	20.2	12.1	100.00

As mentioned above, time pressure was the only element that had no positive influence on the motivation of the respondents. Despite not having a positive reaction, it did not have a negative influence either. The average 4.06 (*SD= 2.02*) places it very close to 4, which represents indifference on the Likert Scale used. Another factor to note is that it has obtained a markedly high standard deviation. This is because people were very divided at the time of deciding on whether this element increases or not the motivation at the time of answering gamified surveys (see Table 6).

After asking the respondents how their motivation would be influenced by adding game elements separately, they were asked in general if their motivation would be increased with

gamified surveys. The results yielded a mean of 5.35 (*SD= 1.42*). A strong 81.5% of the respondents chose between ‘somewhat agree’ and ‘strongly agree’, while 18.5% selected between ‘somewhat disagree’ and ‘strongly agree’ (8.9%) and ‘neither agree nor disagree’ (9.7%).

4.2. Quitting reasons, gamified survey design preference and feelings about being biased regarding gamified surveys

Considering the scarcity of empirical studies and of scientific articles in general on gamified surveys, in this study the opportunity has been taken to investigate three related topics. In this section, the results of main reasons for quitting surveys, the preferred gamified survey design and respondents’ feeling about being biased or not when answering gamified surveys will be presented, respectively.

4.2.1. Main reason of quitting surveys

Of the total of 124 respondents, the vast majority (102 respondents, representing 82.2% of the total) claimed to have left some survey incomplete. From these 102 respondents, the most common reasons for dropping out were that the survey was long (70 times selected) and/or very boring (73 times selected) (see Table 7). Complexity of the survey was not frequently selected (only 16 times selected). The answers were of multiple choice, for that reason there are more than 124 selections. Finally, only 4 people selected the alternative open box to write 'another(s) reason(s)'. One participant stated that they found it unnecessary to fill it out. Another participant expressed lacking commitment with the survey, saying that *"I was not committed to the survey (example: the survey that appears in the internet browser, like those in YouTube videos)"*.

Table 7. Selected reasons of leaving surveys incomplete. (multiple-choice)

		It was long	*It was complex*	*It was boring*	*Other reason(s)*
N	Valid	70	16	73	4

4.2.2. Gamified survey design of preference

When asking about the preferred design, participants preferred the design ‘visually resembling an existing game’ (46 participants, representing 37.1%). The next most chosen option has been the 'neutral' design with 39 respondents, representing 31.5%. With a lower frequency, 'fantasy' and 'other design' can be found with 13 (10.5%) and 1 (0.8%) representatives, respectively. In this item, the option of choosing the non-gamified design has been given, since it

was assumed that some respondents would not be motivated or attracted by gamified surveys. The number of people who have chosen the non-gamified design (25 respondents, representing 20.2%) is similar to the sum of people who think that gamified surveys do not increase the motivation to answer them or are indifferent (23 people, representing 18.5%).

Table 8. Gamified survey design preferred by respondents.

	Frequency	*Valid Percent*
Non gamified	25	20.2
Neutral	39	31.5
Visually resembling an existing game	46	37.1
Fantasy	13	10.5
Other	1	0.8
Total	124	100.0

4.2.3. Respondents feeling about being biased in gamified surveys

By directly asking the respondents if their answers would be influenced in a gamified survey compared to their responses in a non-gamified survey, the average mean answer has been 4.98 (*SD= 1.75*). The most selected option has been "Agree" with 30.6%. The positive values in this case (5, 6 and 7) represent 65.3%, negative values (1.2 and 3) 27.4%, indifferent people accounted for 7.3%.

Table 9. Frequency table of the answers given by the respondents with respect to whether their responses would be the same in a gamified survey as in a normal one.

	Frequency	*Valid Percent*
Strongly disagree	1	0.8
Disagree	15	12.1
Somewhat disagree	18	14.5
Neither agree nor disagree	9	7.3
Somewhat agree	16	12.9
Agree	38	30.6
Strongly agree	27	21.8
Total	124	100.0

4.3. Checking for control variables

Finally, in the search for some variables that were affecting the response of the respondents, Kruskal-Wallis Test and Mann-Whitney U Test have been performed in which it has been analyzed whether the variables age, gender or game habits were affecting the variable motivation by adding each game element.

4.3.1. Genre

For this analysis, only female and male have been taken into account, since only one participant of the 124 has decided not to specify it. Although some differences can be found between how motivated women and men are with respect to certain game elements as can be seen in Table 10, a Mann-Whitney U test has shown that this difference is not statistically significant for any of the game elements nor the average (see Appendix VI).

Table 10. Motivation levels by genre.

	Female		*Male*	
N	63		60	
M(SD)	M	SD	M	SD
Feedback	5.05	1.76	4.50	1.93
Meaning	5.00	1.84	5.18	1.57
Interaction Concepts	5.94	1.20	5.57	1.42
Goals	5.59	1.23	5.50	1.55
Time Pressure	4.27	2.10	3.80	1.92
Progressive Disclosure	4.97	1.57	5.35	1.39
Achievement	5.54	1.40	5.53	1.56
Point System	4.98	1.70	4.77	1.85
Badges	4.71	1.38	4.60	1.84
E{X}	**5.12**	**1.58**	**4.98**	**1.67**

4.3.2. Age

To evaluate the variable age as a possible control variable, it has been necessary to group the ages into categories. Five categories were created: (1) 18-27, (2) 28-37, (3) 38-47, (4) 48-57, (5) 58-67. The maximum age for filling this survey was limited to 99 years, however, 67 was the highest age collected. Although some differences can be seen in how the motivation of the

participants is influenced depending on their age (Table 11), when conducting a Kruskal-Wallis test they have not proven to be statistically significant (see Appendix VI).

Table 11. Motivation levels by categorized age.

	18-27		*28-37*		*38-47*		*48-57*		*58-67*	
N	55		48		5		7		9	
M(SD)	M	SD	M	SD	M	SD	M	SD	M	SD
Feedback	4.62	1.75	4.85	2.00	5.00	2.24	4.29	2.29	5.56	1.01
Meaning	5.16	1.57	4.83	1.91	6.00	0.00	5.71	1.70	5.11	1.76
Interaction Concepts	5.75	1.28	5.83	1.46	5.00	1.41	5.86	0.69	5.89	1.17
Goals	5.82	1.22	5.33	1.51	4.80	2.17	5.29	1.11	5.78	1.30
Time Pressure	4.16	2.16	4.15	1.99	3.60	1.34	2.71	1.50	4.22	1.86
Progressive Disclosure	4.89	1.73	5.48	1.35	5.00	1.00	5.00	0.82	5.44	1.01
Achievement	5.53	1.64	5.48	1.50	6.00	0.71	5.57	0.98	5.78	0.83
Point System	4.84	1.84	4.98	1.78	3.80	1.92	5.00	1.41	5.33	1.58
Badges	4.78	1.67	4.52	1.61	4.40	2.19	4.57	1.62	5.11	1.27
E{X}	**5.06**	**1.65**	**5.05**	**1.68**	**4.84**	**1.44**	**4.89**	**1.35**	**5.36**	**1.31**

4.3.1. Gaming Habits

To evaluate the possibility of gaming habits acting as a control variable, the results have been similar to those presented for gender and age. Differences can be seen in motivation levels depending on how much the participants play (Table 12), however, no relationship has proven to be statistically significant (see Appendix VI).

Table 12. Motivation levels by gaming habits

Gaming Habits	*(1)*		*(2)*		*(3)*		*(4)*		*(5)*		*(6)*		*(7)*	
N	19		24		8		19		10		19		25	
M(SD)	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Feedback	5.32	1.34	4.58	1.77	5.50	1.51	4.26	2.08	5.70	1.57	4.00	2.36	4.92	1.66
Meaning	5.16	1.74	5.04	1.78	5.25	1.39	5.53	1.07	6.00	1.63	4.32	2.16	4.96	1.62
Interaction Concepts	5.58	1.50	5.88	1.42	6.50	0.53	5.47	1.07	5.70	1.34	5.89	1.33	5.72	1.43
Goals	5.63	1.34	5.67	1.40	5.38	1.51	5.63	1.50	6.00	1.05	5.68	1.20	5.12	1.56
Time Pressure	3.53	2.04	4.08	2.04	4.00	2.07	4.00	2.08	3.30	1.77	4.37	2.24	4.56	1.87
Progressive Disclosure	5.37	1.67	5.46	1.53	5.25	1.28	5.26	1.33	4.50	1.51	5.05	1.54	5.00	1.50
Achievement	5.63	1.67	5.29	1.65	5.13	1.13	5.74	1.10	5.90	1.29	5.74	1.79	5.44	1.36
Point System	5.11	1.76	4.88	1.60	4.75	1.16	4.79	2.02	4.30	2.36	5.00	2.08	5.04	1.54
Badges	5.26	1.41	4.17	1.81	4.38	0.52	4.37	1.67	5.10	1.45	4.95	1.96	4.68	1.52
E{X}	**5.18**	**1.61**	**5.00**	**1.67**	**5.13**	**1.23**	**5.01**	**1.55**	**5.17**	**1.55**	**5.00**	**1.85**	**5.05**	**1.56**

Note: (1)I play every day, (2)I play a few times per week, (3)I play once a week, (4)I play a few times per month, (5)I play once per month, (6)I play less than once per month, (7)I do not play.

5. Analysis of the results

In this section, the results presented in the previous section will be interpreted. To do this, the results will be contrasted with the literature presented above (to the extent possible). Like the results section, this section is divided into three: interpretation of the results given the motivation of the users by adding game elements to the surveys, interpretation of the results with respect to the sub-questions and finally interpretation of the results of testing the possible existence of control variables.

5.1. User's motivation by adding game elements to surveys

For a more profound and clear way to present the interpretation of the results, the analysis of the game elements has been divided in the following way: first, the game elements of which averages are closer to six (six representing 'agree', according to the Likert scale used) will be presented. Secondly, all those game elements of which averages are close to 5 (five representing 'somewhat agree', according to the Likert scale used) will be analyzed. Thirdly, 'time pressure' which has been the only value close to 4 (4 representing indifference, according to the Likert scale used) will be discussed.

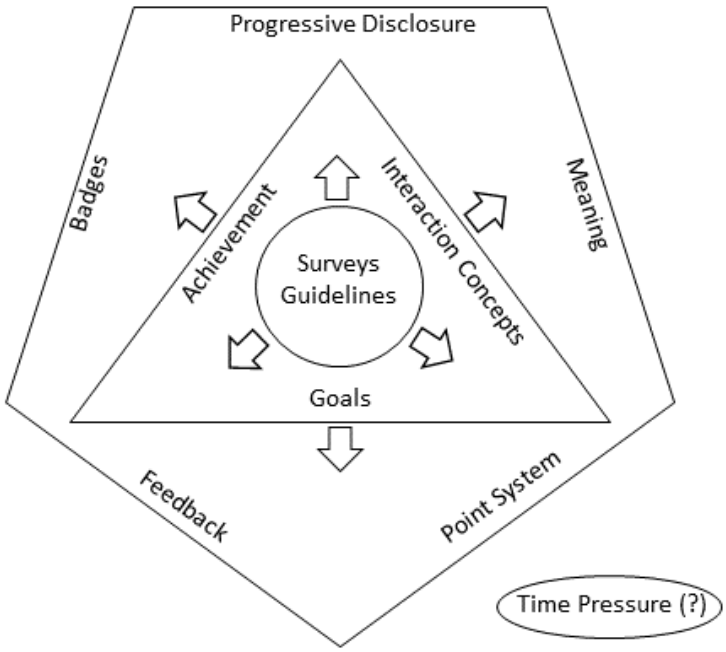
In the results section, it has been possible to observe how interaction concepts, goals and achievements have been the game elements that have proven to be perceived as the most positively influential in terms of user motivation when adding game elements to surveys. This fitted perfectly with the presence of the nine game elements in the literature, in which these same elements were the ones that showed the greatest presence in the articles of gamified surveys, as shown previously in Table 4. Another important factor to mention is that these same game elements are the ones with the lowest standard deviation. This lower degree of dispersion can be translated to the fact that the perception of people is less divided with respect to how their motivation is affected when interacting with these game elements. All this is suggesting that these three mechanics are a must when designing gamified surveys and more resources should be dedicated to them in the designing process.

After the three elements already mentioned, progressive disclosure, meaning, point system, feedback, and badges are the game mechanics can be found, which still have a positive value regarding motivation perception. This suggests that these five elements should also be included in the development and design of a gamified survey. It should be noted that here the first difference has been found with the presence of these elements in the gamified survey literature, where a swap between time pressure and badges has occurred. According to the literature, it could be inferred that it was not clear if badges mechanics should be included in a gamified survey, because it was only named and/or used in three of the eleven articles analyzed. However, when analyzing the data, badges should be considered since, despite having a value lower than average, it continues to yield a positive value. The opposite has happened with time pressure, that according to the literature should be recognized (present in the majority of the selected articles), but according to the analysis of the results people have an average indifferent feeling with respect to this mechanic. Time pressure requires a deeper analysis to decide whether to add it or not, therefore, it will be classified as a situational mechanism, in which it will depend on the context and objective of the survey whether it is added or not.

As mentioned above, Baker and Theodore (2011) proposed that when designing a gamified survey, it is necessary to follow the same principles as for a non-gamified online survey. Therefore, it is suggested that the design of a gamified survey should first be based on these principles, then focus on the design of interaction concepts, goals, and achievements, and then focus on the rest of the game elements. Time pressure has been left as a situational mechanic. For

a visual conceptualization see Figure 3. In simple words this figure means: once the survey guidelines have been clarified, gamified survey designers should prioritize resources into designing the interaction concepts and clear and obtainable goals that users want to achieve. All this should be done without neglecting the mechanics: progressive disclosure, meaning, point system, feedback and badges.

Figure 3. Gamified survey design framework constructed with theory and empirical data.



5.2. M&D gamification framework for gamifiying surveys, quitting reasons, gamified survey design preference and feelings about being biased regarding gamified surveys

In this study it has been confirmed that gamified surveys increase the motivation of people when answering them. However, it has also been found that literature on this topic is extremely scarce. Due to the scarcity of frameworks and literature in general on gamified surveys, it has been proposed that an M&D based gamification framework is useful when designing gamified surveys (Harms, 2014). In the development of this research, it has been possible to confirm this assertion through an extensive analysis of the scarce literature and through the analysis of the empirical study itself. However, after surveying the literature, it has been detected that social factors of competition and user specifics should not be considered when designing gamified surveys, since the process of answering surveys should be private and as unbiased as possible. Therefore, the use

of a gamification framework based on M&D when designing gamified surveys, is recommended only as a guide and without considering elements or mechanics that attempt against the nature of the surveys.

In the data collection from 124 people, it has been confirmed that the vast majority has abandoned some or more surveys with the main reason of the survey being long or boring. This is possibly the main reason for the decrease in response rate and validity of the data proposed by Granello and Wheaton (2004).

With respect to the design of the surveys, the respondents preferred the version that resembles existing games, followed closely by a neutral design such as the one used to carry out this study. Therefore, when creating gamified surveys, it is advisable to develop designs that resemble popular games when it is possible (SuperMario, PacMan, Tetris, etc.) and neutral designs when deemed convenient. It all depends on the context of the survey. The context of the survey to be developed should be an indicator of which design to choose. For example, to create a survey that requires many interaction concepts, a neutral design is probably more suitable. This is because the designs resembling an existing game have their own interaction concepts by default, and many modifications would probably harm the essence of the original game.

As mentioned above, there is a discussion of whether gamified surveys would affect respondent's response by causing a bias because of being ‘fun’. With respect to this, the respondents of this study have expressed (on average) that their responses would be the same regardless of the type of survey.

5.3.Checking for control variables

When analyzing the possible existence of variables that were acting as a control variables, there were small differences in the perception of motivation regarding the gender, age or gaming habits of the respondents, but, surprisingly, no relationships were found that were statistically significant. However, it should also be born in mind that unlike the gender and gaming habits variables, the age variable was highly concentrated in two age ranges, leaving three ranks without much representation.

6. Conclusion

This study aimed mainly to find out what the game elements driving the motivation of the users in gamified surveys are. Based on the perception of motivation by the respondents of the survey, a framework has been developed which proposes that the game elements interaction concepts, goals and achivement are the main drivers of motivation in a context of gamified surveys. The framework also proposes that progressive disclosure, meaning, point system, feedback and badges should also be included when designing gamified surveys, while time pressure can be considered as an element that can be added situationally.

In this study, it has also been possible to demonstrate that the use of M&D based frameworks can only be used as a base and partially, since discrepancies have been found when including social and user specifics factors. It has also been confirmed that the most common reasons for abandonment are the surveys being boring or long. People have chosen a design that resembles classic games (Super Mario, Tetris, Pac Man, among others) as the most attractive in a context of gamified surveys. The respondents have stated that their responses would not be influenced by being a gamified or entertaining survey.

Surprisingly, when it comes to adults, the variables gender, age and gaming habits have not shown to have a statistically significant effect on the perception of motivation by respondents, what should facilitate the development of gamified survey for larger audiences.

Finally, regarding the results and conclusions of this study, despite being able to give some directions on how to create gamified surveys, should only be taken as a first step since, after all, a mini video game is being created, for which creativity and consistency should be of the utmost importance.

7. Limitations

As mentioned by Harteveld et al. (2018), there are still no tools that have been designed exclusively for the creation of gamified surveys. This, together with the scarce literature (and empirical studies), has been the main limitation of this study. The outcome framework of this research should motivate game designer and researchers to join forces and create a tool to facilitate the design of gamified surveys by using the created framework.

Despite detecting that gamified surveys increase the motivation of the respondents, it has not been possible to detect if the quality of the data is also modified.

8. Future Research

Given the results of this study, the creation of a tool that facilitates the process of creating gamified surveys should be seriously considered. Game developers and researchers should partner to continue studying this tool and find the most accurate results.

By asking the respondents if their answers would be influenced depending on whether the survey is gamified or not, most have claimed not to be biased by one or the other. However, previous studies have stated that the answers are biased because the respondents are ‘entertained’. This opens a new debate that should be studied. Future researchers should study how the honesty of the respondents is influenced according to their state of mind with respect to how entertained (or bored) they are.

Another factor that should be studied by future researchers, once the necessary tools exist, is how data quality is influenced. This can be done simply by comparing results from two similar groups, one responding to gamified surveys and the other a traditional one.

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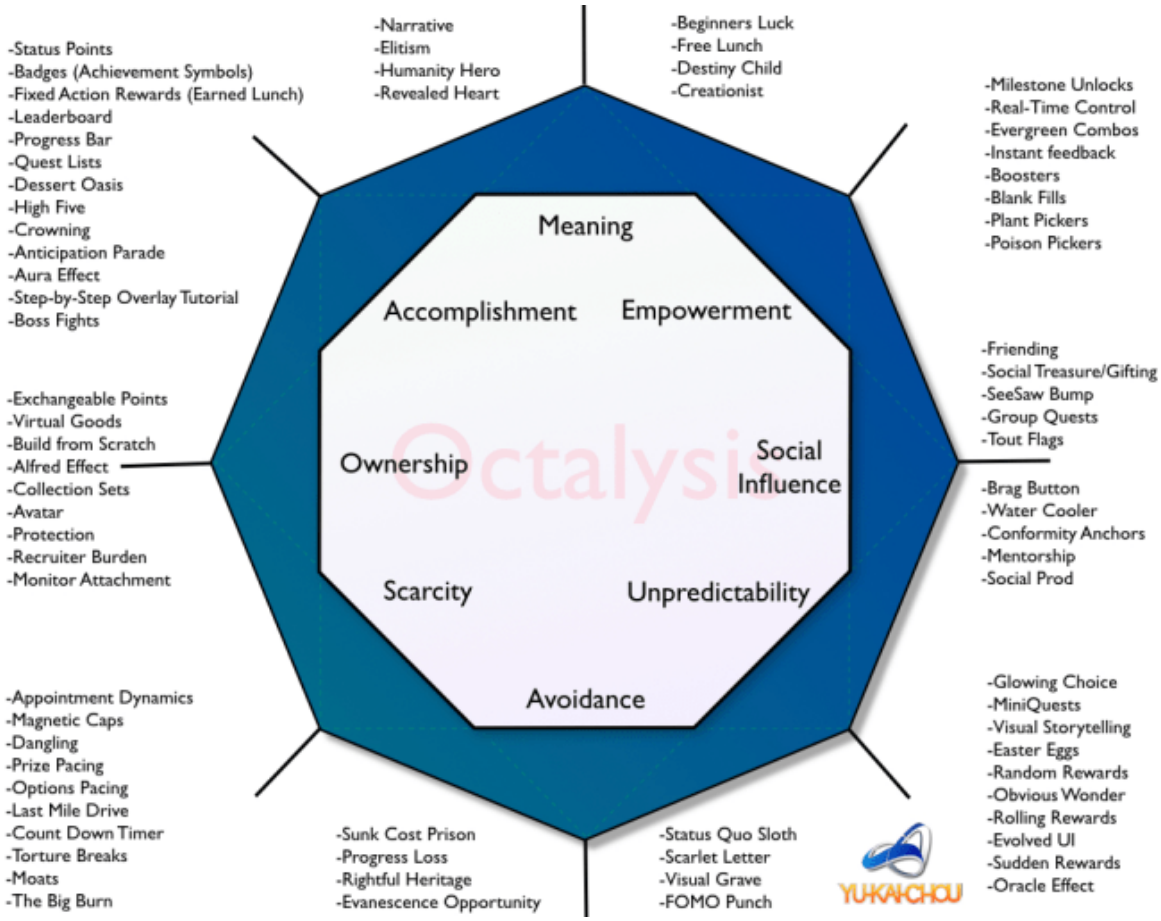
Appendix I. Yu-Kai Chou's Gamification Framework.



Appendix II. Gamification literature with its given numbers.

Given Number	Authors	Article name
1	Puleston, J. (2011).	Online research – game on!: a look at how gaming techniques can transform your online research
2	Cechanowicz, J., Gutwin, C., Brownell, B., & Goodfellow, L. (2013, October).	Effects of gamification on participation and data quality in a real-world market research domain
3	Harms, J., Wimmer, C., Kappel, K., & Grechenig, T. (2014, October).	Gamification of Online Surveys: Conceptual Foundations and a Design Process based on the MDA Framework
4	Mavletova, A. (2015)	Web Surveys Among Children and Adolescents: Is There a Gamification Effect?
5	Harms, J., Biegler, S., Wimmer, C., Kappel, K., & Grechenig, T. (2015, September).	Gamification of Online Surveys: Design Process, Case Study, and Evaluation
6	Bailey, P., Pritchard, G., & Kernohan, H. (2015).	Gamification in market research: increasing enjoyment, participant engagement and richness of data, but what of data validity?
7	Mavletova, A. (2015)	A gamification effect in longitudinal web surveys among children and adolescents
8	Verzosa, N., Greaves, S., Ellison, R., Ellison, A., & Davis, M. (2018).	Eliciting preferences for 'gamified' travel surveys: a best-worst approach
9	Dorcec, L., Pevec, D., Vdovic, H., Babic, J., & Podobnik, V. (2019).	How do people value electric vehicle charging service? A gamified survey approach
10	Harteveld, C., Snodgrass, S., Mohaddesi, O., Hart, J., Corwin, T., & Romera Rodriguez, G. (2018, October)	The Development of a Methodology for Gamifying Surveys
11	Mavlanova-Triantoro, T., Gopal, R., & Benbunan-Fich, R. (2017).	To Gamify or Not? The Development of a Gamified Data Collection Instrument for User Self-Reported Data

Appendix III. Examples of game elements present in the literature.

Game element	Article	Example
Feedback	Cechanowicz, J., Gutwin, C., Brownell, B., & Goodfellow, L. (2013, October).	*"Providing feedback on the respondent's progress (levels, number of questions left, etc.) and responses (badges for long responses, achievements for sections completed) can provide motivation to complete the survey […]."*
Meaning	Mavletova, A. (2015)	*"Narrative—traveling in the Antarctic and helping penguins" (referring to the designed gamified survey)*
Interaction Concepts	Harms, J., Wimmer, C., Kappel, K., & Grechenig, T. (2014, October).	*"The overall theme of the gamified survey was designed to reflect the survey's topic of sports. The graphical appearance was designed to remind of jump'n'run games (such as Super Mario) [...] radio buttons were re-designed to include the respondent's avatar along with pictures that each represent one possible answer [...] All survey areas maintain a similar visual style but feature different interactions [...]"*
Goals	Dorcec, L., Pevec, D., Vdovic, H., Babic, J., & Podobnik, V. (2019).	*"The main goal of the game is to collect all lightnings, while navigating a car through obstacles, as quickly as possible."*
Time Pressure	Bailey, P., Pritchard, G., & Kernohan, H. (2015).	*[…] the application of rules in responding (e.g. imposing a time limit or asking someone to state their response in a set number of words) […]*
Progressive Disclosure	Mavlanova-Triantoro, T., Gopal, R., & Benbunan-Fich, R. (2017).	*"To satisfy this, our game had a progressive scenario with a set of choices on each screen of the game."*
Achievement	Harteveld, C., Snodgrass, S., Mohaddesi, O., Hart, J., Corwin, T., & Romera Rodriguez, G. (2018, October)	*Achievement: The participant enjoys a completionist playstyle, being a high level, completing all tasks, and collecting all items in the game.*
Point System	Harms, J., Wimmer, C., Kappel, K., & Grechenig, T. (2014, October).	*"For example, designers may choose to employ the mechanics of points and badges to implement the dynamic of feedback, which in turn can produce the aesthetic of challenge."*
Badges	Mavletova, A. (2015)	*"Though virtual badges were positively evaluated, especially by younger participants, getting the badges did not motivate respondents to complete the primary tasks."*

Appendix IV. English version of the survey.

Introduction:

Thank you very much for participating in this study. It takes me a step closer to obtain my master's degree!

Completing the questionnaire will take approximately 10 minutes. Your answers will be processed completely anonymously and stored securely in accordance with University of Twente guidelines.

There are no incorrect answers in this study. In addition, you can stop your participation at any time and exit the questionnaire. For more information about this experiment, you can contact p.a.nanjariwyss@student.utwente.nl.

By clicking on the button below you indicate that:

• You have read the above information.

• Spanish is your native language.

• Voluntarily participates in the study.

• You are 18 or older.

Thanks again for participating!

Best regards,

Pablo Nanjari Wyss

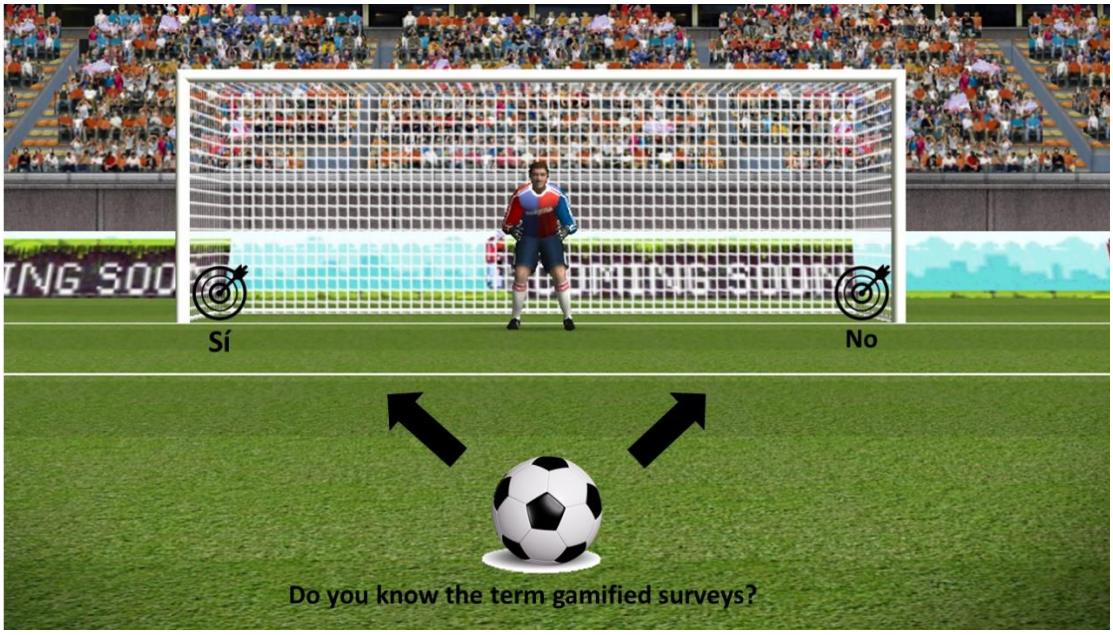
Conceptualization:

To complete this survey, it is crucial to understand the term gamified surveys. Below you can find a brief explanation:

To understand what gamified surveys are, it is first necessary to understand the term gamification. Gamification is the use of games elements in tedious process, with the aim of increase user's motivation (Thiebes, S., Lins, S., Basten D., 2014). Similar to this, gamified surveys are surveys that include game elements looking to increase the motivation and engagement of the respondents.

1. Do you understand the term gamified surveys?
    a. Yes (go to question 2)
    b. No, please show me a visual representation (go to 1.1.)

1.1. Visual representation:



What about now, do you understand it?

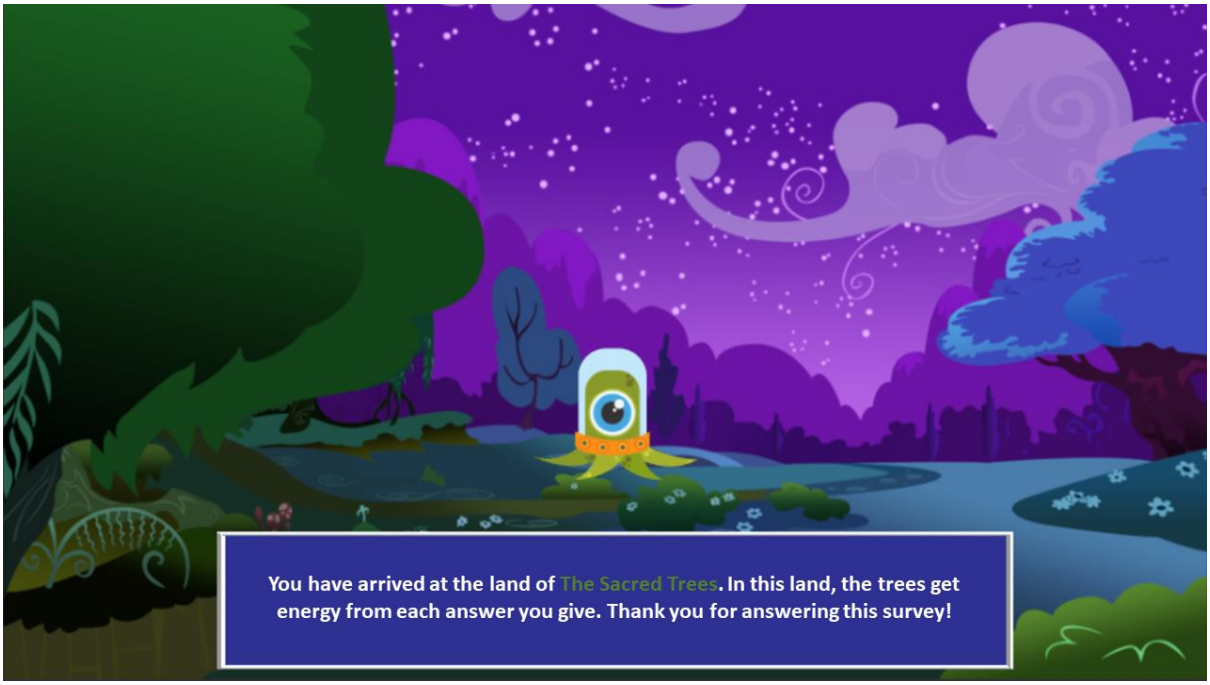
i. Yes (go to question 2)
ii. No, (thank you for participating…)

Next, you will see a series of examples of game elements that have been added to surveys. If you do not understand the terms in bold, simply analyze the image to answer the question.

2. Adding **feedback** would increase my motivation when answering surveys.\

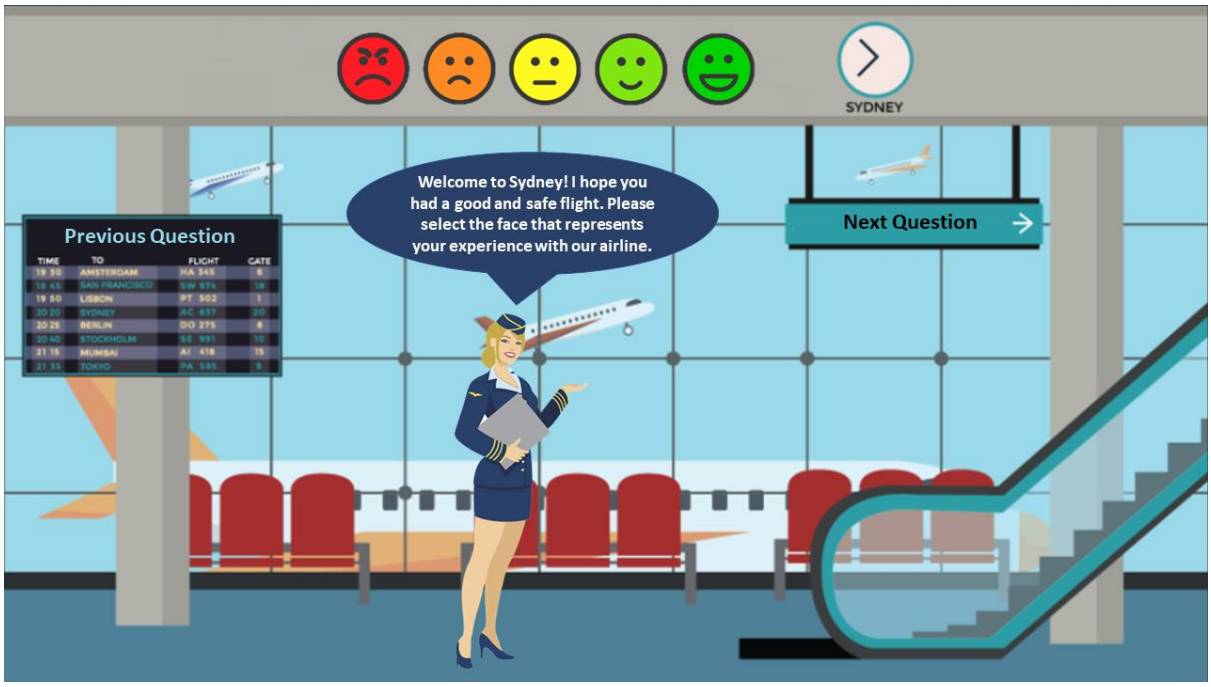
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

3. Adding **meaning** would increase my motivation when answering surveys.



Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

4. Adding **interaction concepts** would increase my motivation when answering surveys.



Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

5. Adding **goals** would increase my motivation when answering surveys.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

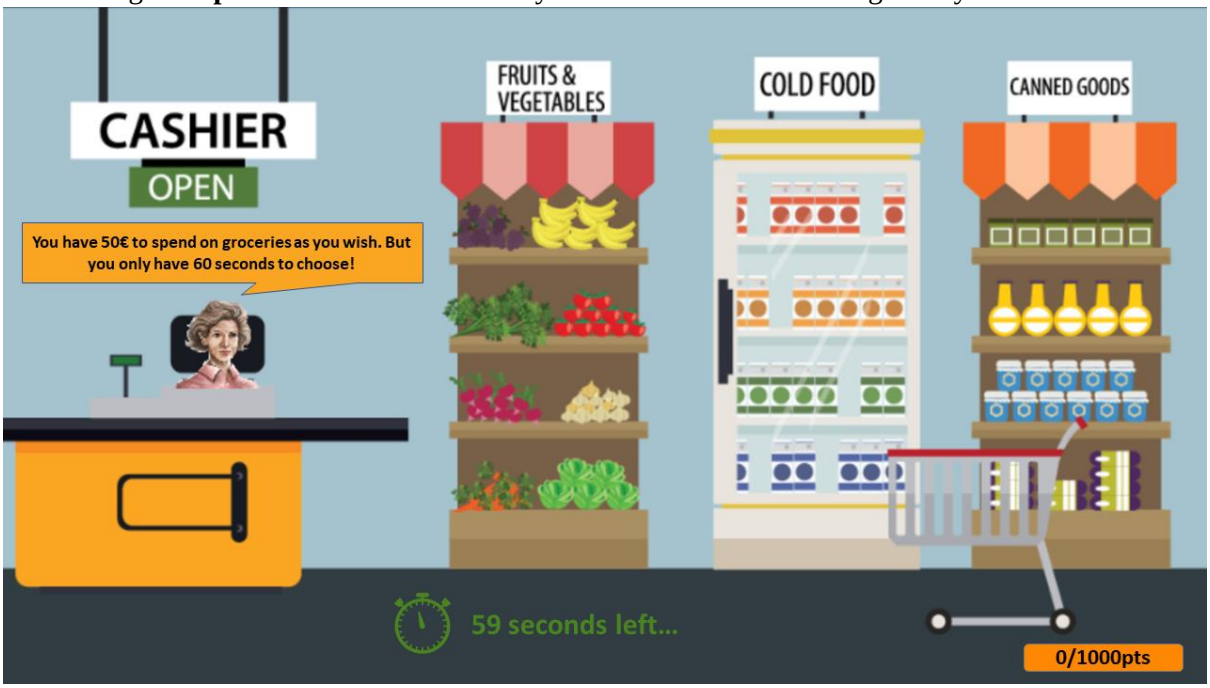
6. Adding **achievements** would increase my motivation when answering surveys.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

7. Adding **badges** would increase my motivation when answering surveys.

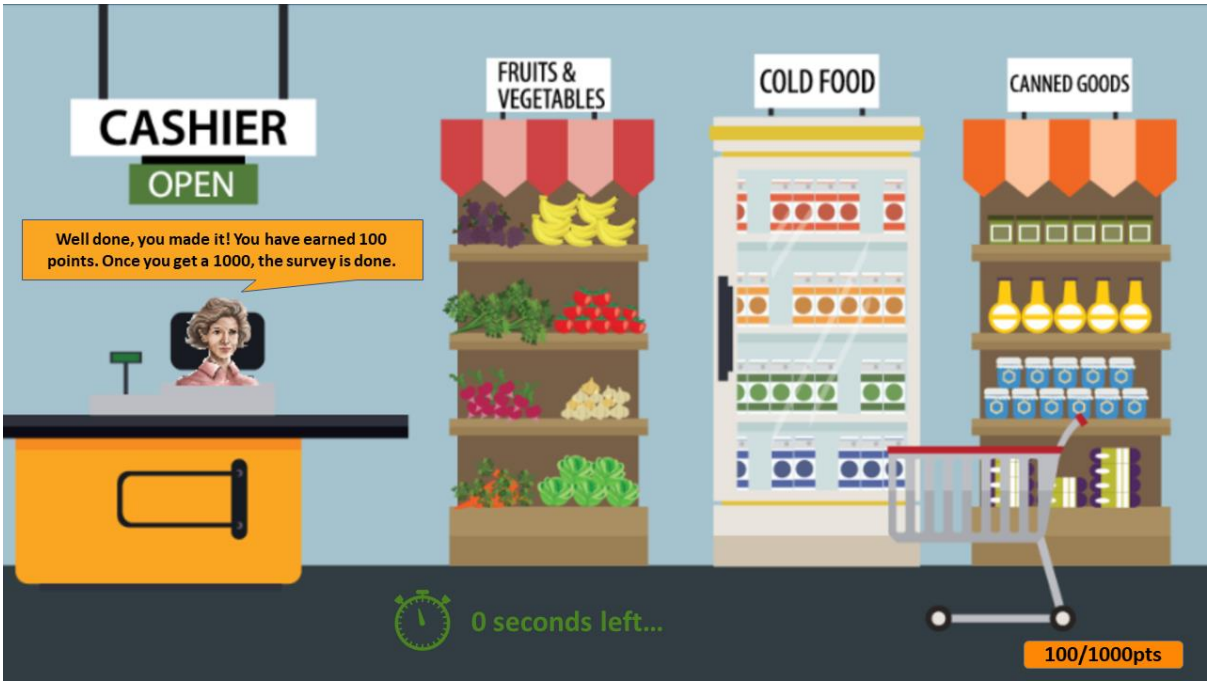
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

8. Adding **time pressure** would increase my motivation when answering surveys



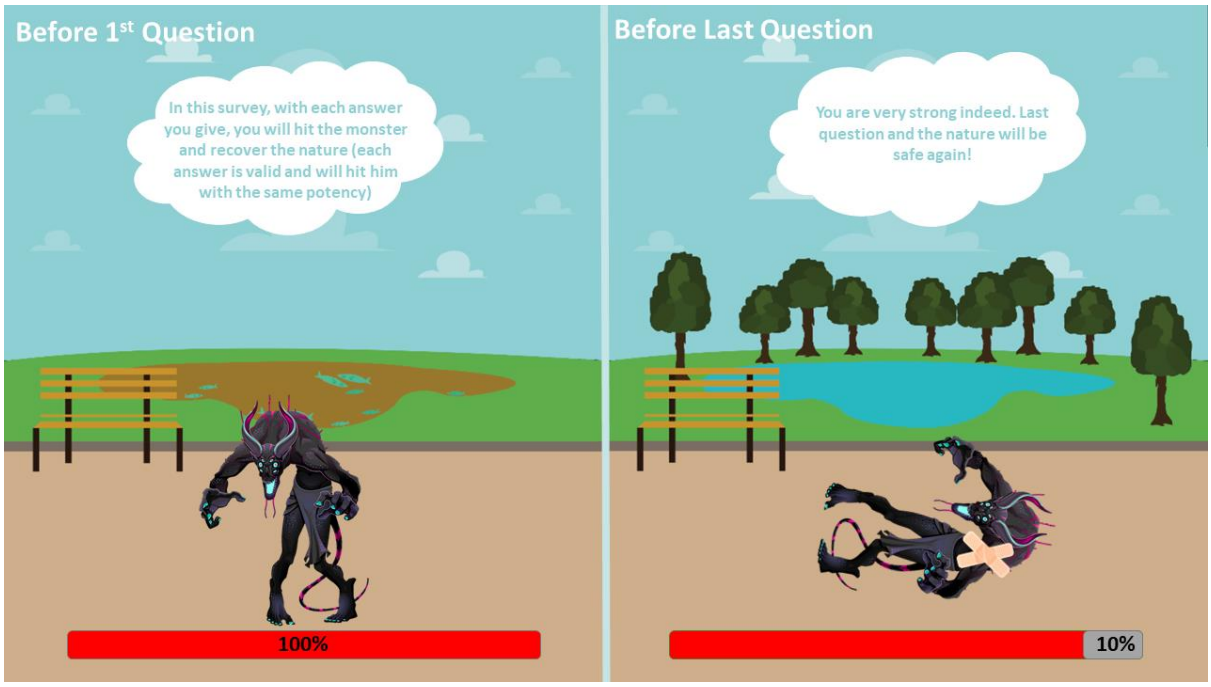
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

9. Adding **points system** would increase my motivation when answering surveys



Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

10. Adding **progressive disclosure** would increase my motivation when answering surveys



Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

11. Please choose the survey design of your preference:

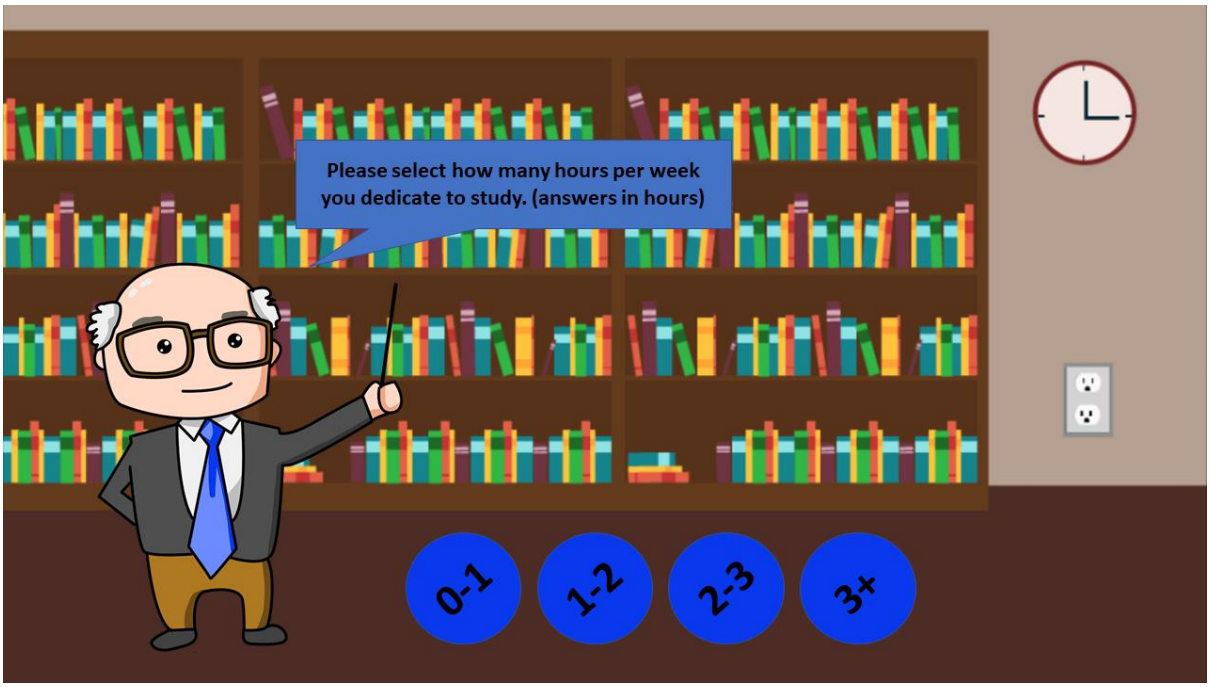
Non-gamified

1. Please select how many hours per week you dedicate to study. (answers in hours)

- ◯ 0-1
- ◯ 1-2
- ◯ 2-3
- ◯ 3+

DONE

Neutral



Visually resembling an existing game

Fantasy

Other (open text box)

12. Gamifying surveys would increase my motivation when answering them.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

13. My answers will be same in a gamified survey compared to my answers in a normal survey.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

14. Have you ever left a survey (any kind of survey) half-way or unanswered?
    a. Yes (Go to 4.1)

b. No

14.1. Why? (multiple selections)

a. It was long.
b. It was complex.
c. It was boring.
d. Other reason(s) (text box)

15. Please indicate your age
→ open number box

16. Please indicate your genre
    - Male
    - Female
    - I prefer not to say/other

17. What is your highest level of education? *(if you are still studying, choose your current education)* **The educational has not been translated since some of them do not have a direct translation into English, nor to the Dutch educational system.*

Ninguno
Nivel Pre-básico
Nivel Básico (primaria)
Nivel Medio (secundaria)
Nivel Superior - Centro de Formación Técnica
Nivel Superior - Instituto Profesional
Nivel Superior - Fuerzas Armadas
Nivel Superior - Universidad Licenciatura
Nivel Superior - Universidad Profesional
Nivel Superior - Universidad Master
Nivel Superior - Universidad Doctorado

18. How much time do you spend playing games (video games, boardgames or card games) per week?
    - I play every day
    - I play a few times per week
    - I play once per week
    - I play a few times per month
    - I play once per month
    - I play less than once per month
    - I do not play

You have finished!
Remember, if you have any comments you can send me an email to p.a.nanjariwyss@student.utwente.nl
Thank you very much for answering this survey!

Appendix V. List of images requiring citation.

Present on	Image	Link	Details
Interaction Concepts	Stewardess	https://pngimg.com/download/65950	Not modified
Goals	Detective	https://pngtree.com/freepng/cartoon-character-little-detective_702074.html	Not modified
Achievements	Badge	http://pngimg.com/download/57827	Modified
Badges	Badges	http://pngimg.com/download/57827	Modified
Progressive Disclosure	Monster	https://www.freepik.com/free-photos-vectors/halloween	The second was modified
Progressive Disclosure	Bandits	https://www.freepik.com/free-photos-vectors/medical	Modified
Neutral Design	Professor	https://pngtree.com/freepng/an-old-professor-in-a-suit_3409187.html	Not modified
Visually resembling existing games design	Background	https://supermariomaker.nintendo.com/	Modified screenshot of "Mario Maker"
Fantasy design	Everything	http://www.rpgmakerweb.com/	Using the software RPG Maker

Appendix VI. Controlling variables hypothesis testing summaries.

Genre:

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Feedback is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.110	Retain the null hypothesis.
2	The distribution of Meaning is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.871	Retain the null hypothesis.
3	The distribution of Interaction Concepts is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.122	Retain the null hypothesis.
4	The distribution of Goals is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.804	Retain the null hypothesis.
5	The distribution of Time Pressure is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.165	Retain the null hypothesis.
6	The distribution of Progressive Disclosure is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.181	Retain the null hypothesis.
7	The distribution of Achievement is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.725	Retain the null hypothesis.
8	The distribution of Point System is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.574	Retain the null hypothesis.
9	The distribution of Badges is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.994	Retain the null hypothesis.
10	The distribution of Gamified Surveys is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.676	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Age:

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Feedback is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.627	Retain the null hypothesis.
2	The distribution of Meaning is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.482	Retain the null hypothesis.
3	The distribution of Interaction Concepts is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.522	Retain the null hypothesis.
4	The distribution of Goals is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.284	Retain the null hypothesis.
5	The distribution of Time Pressure is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.442	Retain the null hypothesis.
6	The distribution of Progressive Disclosure is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.357	Retain the null hypothesis.
7	The distribution of Achievement is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.971	Retain the null hypothesis.
8	The distribution of Point System is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.579	Retain the null hypothesis.
9	The distribution of Badges is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.883	Retain the null hypothesis.
10	The distribution of Gamified Surveys is the same across categories of AgeBC.	Independent-Samples Kruskal-Wallis Test	.741	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Gaming Habits:

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Feedback is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.184	Retain the null hypothesis.
2	The distribution of Meaning is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.250	Retain the null hypothesis.
3	The distribution of Interaction Concepts is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.317	Retain the null hypothesis.
4	The distribution of Goals is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.672	Retain the null hypothesis.
5	The distribution of Time Pressure is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.548	Retain the null hypothesis.
6	The distribution of Progressive Disclosure is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.491	Retain the null hypothesis.
7	The distribution of Achievement is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.533	Retain the null hypothesis.
8	The distribution of Point System is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.908	Retain the null hypothesis.
9	The distribution of Badges is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.268	Retain the null hypothesis.
10	The distribution of Gamified Surveys is the same across categories of Gaming Habits.	Independent-Samples Kruskal-Wallis Test	.980	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.