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Elizaveta Kozlovskaia

Adapting a new game mechanic in an instant lottery game, positively influencing its immersion and flow

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Elizaveta Kozlovskaia

Adapting a new game mechanic in an instant lottery game, positively influencing its immersion and flow

Currently, the Finnish online gambling market is estimated to generate an annual gross revenue of €1.135 million. A large proportion of this market centers on instant lottery games that typically include basic digital scratch cards, merge, match three, or solitaire-based game mechanics. These types of games rely almost exclusively on extrinsic motivation (the hope of winning money) for their popularity. The aim of this thesis was to design and develop a proof of concept instant lottery game with an adapted (from entertainment gaming) game mechanic that would positively influence its immersion and flow, thereby, shifting the popularity of such instant lottery games toward intrinsic motivation.

Twenty participants tested the proof of concept in a mixed-method approach. The User Experience Questionnaire quantitatively measured the user experience and flow, while two focus group discussions (with seven participants each) were conducted to qualify the questionnaire data.

The mean values of the six scales of the User Experience Questionnaire were all measured between 0 and 1 (min = -3 and max = +3). The Novelty scale was the highest (0.685), while Perspicuity was the lowest (0.065). Novelty also had the smallest variance (0.33), while Perspicuity variance was the greatest (1.30). The feedback from the focus group discussions helped to validate the data collected from the questionnaire and draw qualitative conclusions.

In conclusion, the results show that the game mechanic adapted for a potential instant lottery game is innovative, has a hook, and has the potential to draw a player’s attention away from an extrinsic goal (winning money) toward the intrinsic goal (engaging with gameplay), which is the premise of good flow.

Keywords:

gambling games, game design, user experience, flow

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Appendix 1. User Experience Questionnaire

List of abbreviations

AI	Artificial Intelligence
HP	Health Point
PoC	Proof of concept
UEQ	User Experience Questionnaire
UX	User Experience

1 Introduction

The first digital instant lottery game was a computer-generated version of a scratch card, produced by the American company Scientific Games Corporation in 1974 (Scientific Games). Currently, the Finnish online gambling market is estimated to generate an annual gross revenue of €1.135 million (H2 Gambling Capital 2021). Although one would imagine that such a large market could offer games with an elaborate flow and more complex mechanics than a simple scratching out of numbers, it is not so. The modern instant lottery games are heavily influenced by the popular mobile puzzle game mechanics. The prevailing ones are match-three, merge, including merge-two and merge-three, and a pyramid or solitaire. The respective examples of the instant lottery games with such mechanics released by Veikkaus are Kulta Jaska (match-three), Meri Koru (merge-two), and Nokka Pokka (solitaire). Most of the modern online lottery game mechanics are either simple scratch card simulations or iterations of either of the same three types of mechanics described above.

Currently, there is a lack of innovative game mechanics for instant lottery games. Furthermore, the flow of the currently available instant lottery games could be improved, as their players are mostly driven by an extrinsic motivation (winning money) rather than intrinsic (engaging with the gameplay). In pursuit of finding a solution, this thesis aims to design and develop a proof of concept (PoC) instant lottery game with an innovative game mechanic adapted from entertainment gaming that would positively influence its immersion and flow, thereby, shifting the popularity of such instant lottery games toward intrinsic motivation.

During the design process, a document was created that included a description of the flow and mockup images of the key game layouts. This design document was followed during the implementation phase with a few reasonable changes that appeared during internal testing and resulted in an improved flow. This proof of concept was written in TypeScript and runs on a browser. A senior programmer assigned to work on the project by the commissioner was

responsible for the base and user interface of this project, while the author oversaw the game's algorithm and made sure that the implementation follows the design.

Twenty participants were found through means of online communication for testing the proof of concept and measuring its user experience (UX) and flow. A User Experience Questionnaire (UEQ) digitalized as a Google form questionnaire was utilized as a data collection method, as its scales cover both user experience and flow measurement (Schrepp 2017, Appendix 1). To validate the data collected from the questionnaire, two focus group discussions including a group of 7 out of 20 participants each were held. During these focus group discussions, the participants were asked three basic questions related to the game mechanic, flow, and overall experience playing the proof of concept. The feedback from the focus group discussions helped to validate the data collected from the questionnaire and draw qualitative conclusions.

In Chapter 2, the thesis provides a theoretical framework surrounding the psychology of intrinsic and extrinsic motivation, as well as the notions of immersion and flow and how they could be related to gambling games. Chapter 3 provides clarification about the problem this thesis aimed to solve and is followed by Chapter 4 where the PoC is described in detail. In Chapter 5, the design and development process of the PoC is reported, followed by the test protocol description in Chapter 6, explaining the mixed method data analysis approach that uses the UEQ and the focus group discussions. Chapter 7 presents results acquired from the UEQ and focus groups, followed by Chapter 8 where the results were discussed, based on which further hypotheses were deduced. Chapter 9 draws the overall conclusion from what was discussed in the previous chapter.

2 Literature review

2.1 Motivation

Various studies have been conducted aiming to understand people's motivation for gambling. According to some, gamblers consider winning money as their primary motivation. A good example is an American study that explored gambling motivation among college students (Neighbors et al. 2002). In other words, they are driven by extrinsic motivation. However, the same study states that the second-highest motivation factor for the participants was enjoyment and fun, which is in the line with intrinsic motivation. Additionally, there are studies that argue intrinsic motivation to be as important as extrinsic, or even the driving factor for many gamblers. The results of a Canadian study on motivation and gambling involvement have shown that the participants of that study who were driven by the extrinsic motivation of a possible monetary reward were less involved in gambling and less likely to continue to gamble, than the participants engaged in gambling for excitement, a sense of accomplishment and an opportunity to learn something new, in other words, who were driven by intrinsic motivation (Chantal 1995).

2.2 Gamification in gambling

Typically, research that is related to gambling and gambling games focuses on some sort of classification of products, a link between gambling and the level of income, or behavioral issues. For instance, a study on a consumer perspective on online gambling and gaming products done by the collaboration of researchers from Germany and Australia attempts to classify the different types of the existing gambling games on the market (Teichert et al. 2017). An example of a study that considers the level of income in gambling is a Canadian study that profiles socioeconomic status in relation to three different types of lottery gambling (Fu et al. 2020). A good case in point of a paper that tries to classify at-risk gambling behaviors is a French study on early gambling behavior

(Challet-Bouju et al. 2020). According to one psychological research that attempts to classify structural characteristics of video games, "there have been few rigorous attempts to classify and organise the psycho-structural elements of video games in a similar way to gambling" (King et al. 2009). As can be seen from these examples, it is not commonplace to research what has been done on what mechanics different gambling games use and how they affect their immersion and flow.

In fact, there are papers that focus on certain mechanics related to gambling. For example, there is a study on how harmful are loot boxes used as gambling-like elements in video games (von Meduna et al. 2020). Following on the topic of the loot box mechanic, there is research that evaluates the relationship of loot box engagement to gender and disordered gaming in massively multiplayer online role-playing games (Evren et al. 2021). However, the author could not find any references that have attempted to study the possibility of other types of mechanics that could be adapted in instant lottery games. That includes the mechanic that was selected by the author for this thesis, which aims to measure its effect on immersion and flow of an instant lottery game that would use this mechanic.

2.3 Flow theory

Flow theory or optimal experience theory was first recognized and defined by a Hungarian-American psychologist Mihaly Csikszentmihalyi in 1975 in his publication *Beyond Boredom and Anxiety,* where he presented a detailed examination of motivation based on a study of a half-dozen groups of people involved in recreational pursuits: rock climbers, composers, dancers, chess players, and basketball players. These groups were selected to understand more fully what motivates people to engage in activities that are extremely challenging or offer few external rewards. Mihaly Csikszentmihalyi concluded: " . . . they concentrate their attention on a limited stimulus field, forget personal problems, lose their sense of time and of themselves, feel competent and in control, and have a sense of harmony and union with their surroundings . . . they cease to worry about whether the activity will be productive or whether it will be rewarded . . . they have entered a state of flow". (Csikszentmihalyi 1975/2000). Since then, the flow has been one of the key aspects of his research and further work.

According to Mihaly Csikszentmihalyi, the flow seems to consist of the following key characteristics: a clear goal, immediate feedback, and a good balance between the skills of a person and the challenge of the activity. (Csikszentmihalyi et al., 1988). The goal of the activity should be meaningful, not too difficult and not too easy, and adequately match to an individual's skills. The activity should provide immediate feedback after each significant step to let an individual understand how they are doing and give them a chance to regulate their performance accordingly. The experience of the flow begins with an increase in concentration on the activity, in other words, once an individual steps out of their everyday reality into a medium that is defined and restricted to their activity.

The flow theory further argues that while participating in an activity, an individual may enter one of the three channels: the boredom channel, the flow channel, and the frustration channel (Sharek & Wiebe 2011). Figure 1 illustrates the

diagram of these three channels. While performing an activity, an individual's state of mind may fall into the boredom channel if the activity does not introduce any challenges for the individual. Alternatively, an individual's state of mind may fall into the frustration channel if the activity becomes so challenging that they lose motivation in their endeavors to succeed. The goal is for the activity to stay between these channels so that the interest and the challenge are maintained over time (Csikszentmihalyi 1991).

These key characteristics and criteria were the base for the measurement of the immersion and flow of the PoC.

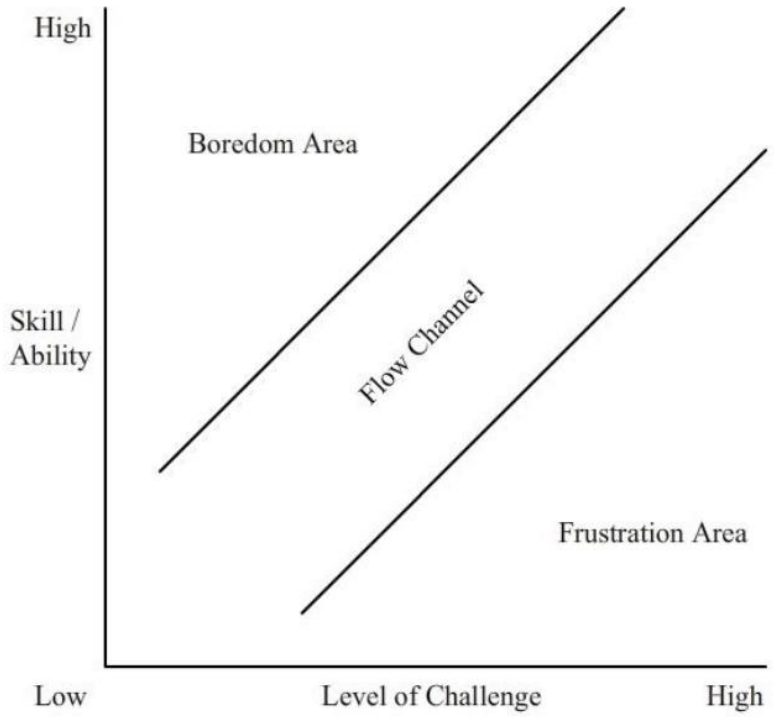

Figure 1. Flow Theory's Interaction between Challenge and Skill – Adapted from Csikszentmihalyi (1990).

3 Problem statement with aims and objectives

The currently present problem in the online gambling market is that there is a lack of innovative mechanics and flow for instant lottery games. After extensive research and consulting industry professionals on the matter, the author could not find any online instant lottery games that would utilize the kind of mechanic that the author anticipated to include in the PoC. The aim of this thesis was to adapt a new game mechanic for an instant lottery game that would positively influence its immersion and flow. The objectives of this thesis were to design the PoC of an instant lottery game, implement the PoC and measure its UX and flow.

4 Prototype description

The mechanic and flow of this PoC were inspired by the turn-based puzzle battle game Clash Quest by Supercell.

Since the goal of this PoC is to test a game mechanic, it does not use any specific theme or style. The assets are simple geometrical objects. Colour is used for the player to easily identify each object. This allowed test participants to fully experience the mechanics without distraction from overwhelming graphics and sound. In turn, ensuring that participant feedback only reflected their impressions of the game mechanics.

4.1 Game flow and mechanic

As demonstrated in figure 1, there are two opposing 3x3 game fields, representing the player’s side and the opposing artificial intelligence (AI) side. The AI side is the target field and the player’s side is the attacking field. Above the target field is the overall number of reserved targets (thirty-nine), and below the player's field are reserves of each of the three types of player units (ten units of each type). Different types of player units represent different types of attack ranges, while different types of target units represent different amounts of wins a player can get from attacking a certain number of certain unit types.

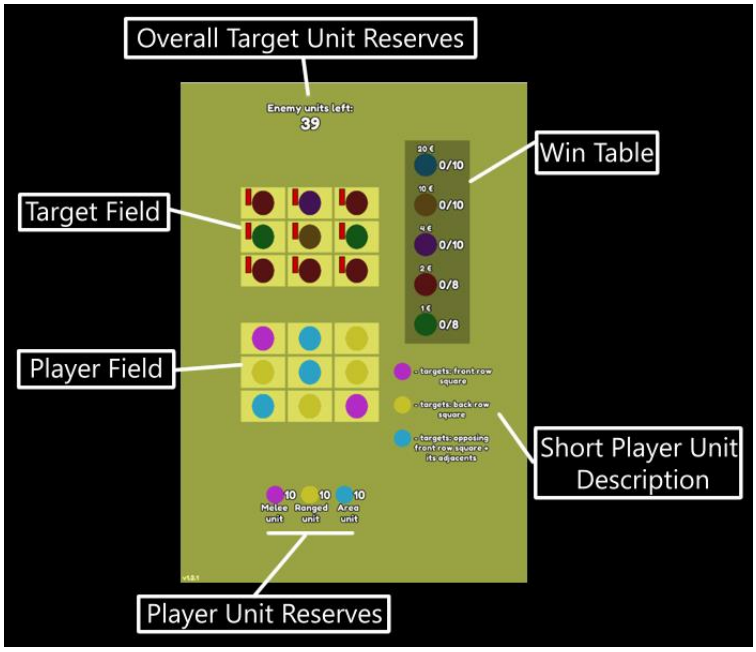

Figure 1. Main screen of the PoC.

The player has three unit types: a single-target melee unit, a ranged unit, and a melee unit with an area attack. A single-target melee unit attacks the front row square from the same column, a ranged unit attacks the back row square from the same column, and an area attack unit targets the opposing front row square and the squares that are adjacent to it. The adjacent player units of one type form a combo. The number of each type stored in reserves is ten.

There are five target unit types, which differ according to color. They do not attack as their only purpose is to be attacked by the player for the wins. From one to five, the respective extents of wins are 1€, 2€, 4€, 10€, and 20€. There are thirty-nine units in target reserves overall from the start. The player can check the counter for how many target units are left in the reserve overall, but they do not know what type of units are in there until they are let on the game field. This allows algorithms to control the flow and ultimately the outcome of gambling games. Hiding the number of specific target unit reserves and replacing it with the overall reserve count was considered an admissible approach that does not affect the playing experience negatively.

The game starts with a tutorial, which prompts the player to press and hold on any of the unit or unit combo to see in advance, where it would hit, and click to use that unit or unit combo (figure 2). The tutorial layer disappears once the player interacts with the game and appears back after ten seconds of player inactivity.

Figure 2. Game tutorial.

Below the win table, there is a short description of what each player unit does that is present on the screen for the whole duration. In addition to that, there is a dynamic attack description that appears between the two fields when a player is pressing and holding a unit or a unit combo. Figure 3 shows an example of what the player sees when they press and hold a combo of melee units.

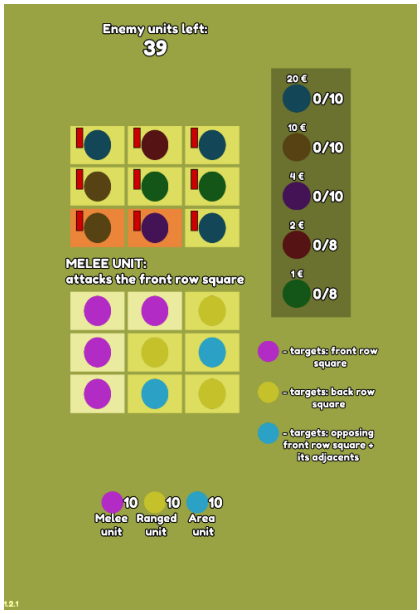

Figure 3. Dynamic attack description.

For an additional challenge, the target units have health points (HP), making it not possible for a player to cover a unit with just one hit. Both fields are constantly refilled with reserves throughout the whole game. The game ends once the player is out of their reserves or once there are no target units left to target.

The average duration of one round of the game is approximately one and a half minutes.

4.2 Win mechanic

The game includes a win table, based on target unit types. The win table is located on the side of the game field and is constructed from five win classes,

from 1€ to 20€. A player interprets them as five types of target units, each having the required number of units that needs to be collected in order to win that class. To collect a unit of a certain type, a player must keep hitting a unit until its HP is at zero.

4.3 Algorithm

The outcome of any instant lottery game is pre-determined by the algorithm from the start. For this reason, the algorithms in instant lottery games cover every scenario for both winning and losing games. For this prototype, the commissioner and the author decided to cover only the losing game scenario to put the development focus on the concept demonstration. However, even in a losing game, the author aimed to allow the player to get close to winning. The actual algorithm may not be shared in this thesis due to NDA.

5 Development journaling

5.1 Design

The author spent about a week thinking through, creating mock-ups, and producing the design document for the PoC. That included discussions and a feedback session with the commissioner.

5.2 Implementation

The implementation started when the design document was approved by the commissioner. A senior programmer was assigned to work on the core of the project and review the author’s contributions, due to the author’s juniority in the used technologies. The author’s part was to design and implement the algorithm, do minor fixes in the code and make sure, that the project follows the design document.

The project was written in TypeScript. The game itself is web-based and runs on the browser. Visual Studio Code was used for the code editing, and git was used for the version control.

Overall, the development took approximately five months, including internal testing and quality control, done by the author and the commissioner.

Prior to the practical part of the development, the author had a discussion with the programmer about what data should be passed to the algorithm, and what code structure would be most suitable for the project. After that, it took about a day for the author to set up the development environment.

The first phase of development was creating an outline of the project, that included classes, interfaces, and the layout of the lottery game. After the base was done, the author and the programmer proceeded to discuss the behavior of the animations and the movement of the units in more detail with the

programmer. After about three months of development, that aspect was resolved.

The design left space for identifying how far the unit attacks would go. Initially, if a combo of units cleared the targeting area of that unit completely, the remaining units would not have been used to attack the further rows. For instance, if three units in a combo of seven melee units cleared the targeting area of melee units, i.e. the entire first row that includes only three targets, the remaining four melee units would have not been used at all and gone to waste. The author wanted to test whether reducing the HP by tiny amounts would be enough to eliminate the issue of wasted player units. During the internal testing, it was revealed that this approach not only did not resolve the issue but also affected the experience of the game negatively and felt like a bug. The solution was to spread the attacks to further rows until either there are no target units left or until all the player units in a combo had been used. That approach significantly improved the experience and solved the issue of unused units.

While the programmer was working on the base and UI, the author was working on implementing the algorithm. As stated earlier, the author was focusing on covering only a losing scenario of the lottery game. It was important to assure that no matter what strategy a player chooses, the game would always end with the result determined by the algorithm. At the same time, the author attempted to keep the illusion that it was possible to win and not to make it too obvious to a player that the game is set to lose. Overall, working on the algorithm and implementing it in code took about three months for the author.

5.2.1 Changes from the initial design

The initial design implied that the targeting of the units would be randomized within the targeting area. For example, if a player used a single melee unit, it would be possible for it to target any unit in the front row, and the player would only see where it would go once, they have clicked that unit. During the testing, it became clear that this approach almost completely outweighed the strategic

aspect of the game, which was important for this specific game mechanic and ultimately for the flow. Therefore, it was decided against the randomization, and for stricter targeting rules, where any unit's attack would be pre-determined: a single melee unit always attacks the opposing, i.e. from the same column, front row square, a single ranged unit always attacks the opposing back row square, and a single area attack unit always attacks the opposing front row square and the squares adjacent to it. The same rules apply for the combos of the same unit of any size. This small change has significantly improved the overall flow of the game.

6 Test protocol

Before the main part of the study, the PoC was dry-run by the thesis supervisor to make sure it is ready for testing.

As evident from figure 4, the pool of testers was revealed to be pretty diverse in terms of gender and age.

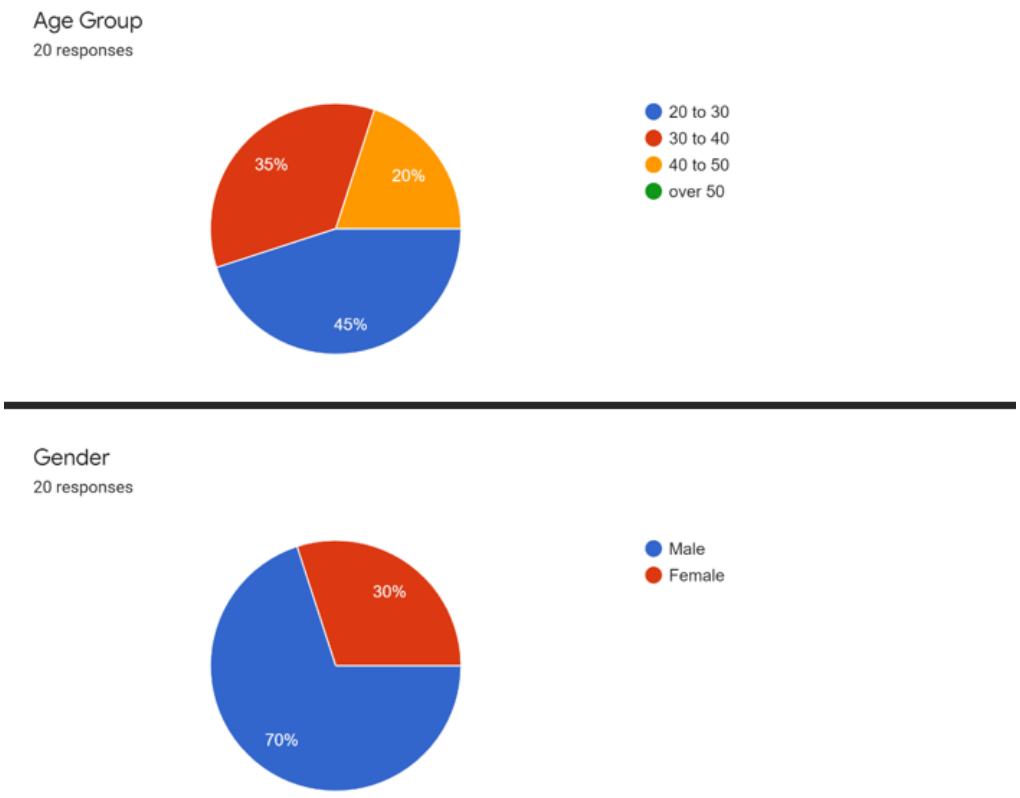

Figure 4. Charts for the age and gender of the respondents.

6.1 Data collection

The decided data collection method was utilizing the UEQ (Schrepp 2017, appendix 1), which the author digitalized as a Google form questionnaire. Every participant filled out the questionnaire after playing and two focus group discussions, held via video call, followed the questionnaire phase. The focus group discussions were meant for the general feedback, which helped in

making qualitative conclusions. The participants (n = 20) of the study were independent anonymous individuals, who agreed to test the PoC and take part in answering the UEQ and the focus group discussion. They were found through means of web-based communication.

6.2 UEQ

The UEQ checks 6 scales:

1. *Attractiveness:* Overall impression of the product. Do users like or dislike the product?
2. *Perspicuity:* Is it easy to get familiar with the product? Is it easy to learn how to use the product?
3. *Efficiency:* Can users solve their tasks without unnecessary effort?
4. *Dependability:* Does the user feel in control of the interaction?
5. *Stimulation:* Is it exciting and motivating to use the product?
6. *Novelty:* Is the product innovative and creative? Does the product catch the interest of users?

As per the UEQ handbook," *Attractiveness* is a pure valence dimension. *Perspicuity*, *Efficiency,* and *Dependability* are pragmatic quality aspects (goal-directed), while *Stimulation* and *Novelty* are hedonic quality aspects (not goal-directed)". Figure 5 is an assumed scale structure of the UEQ.

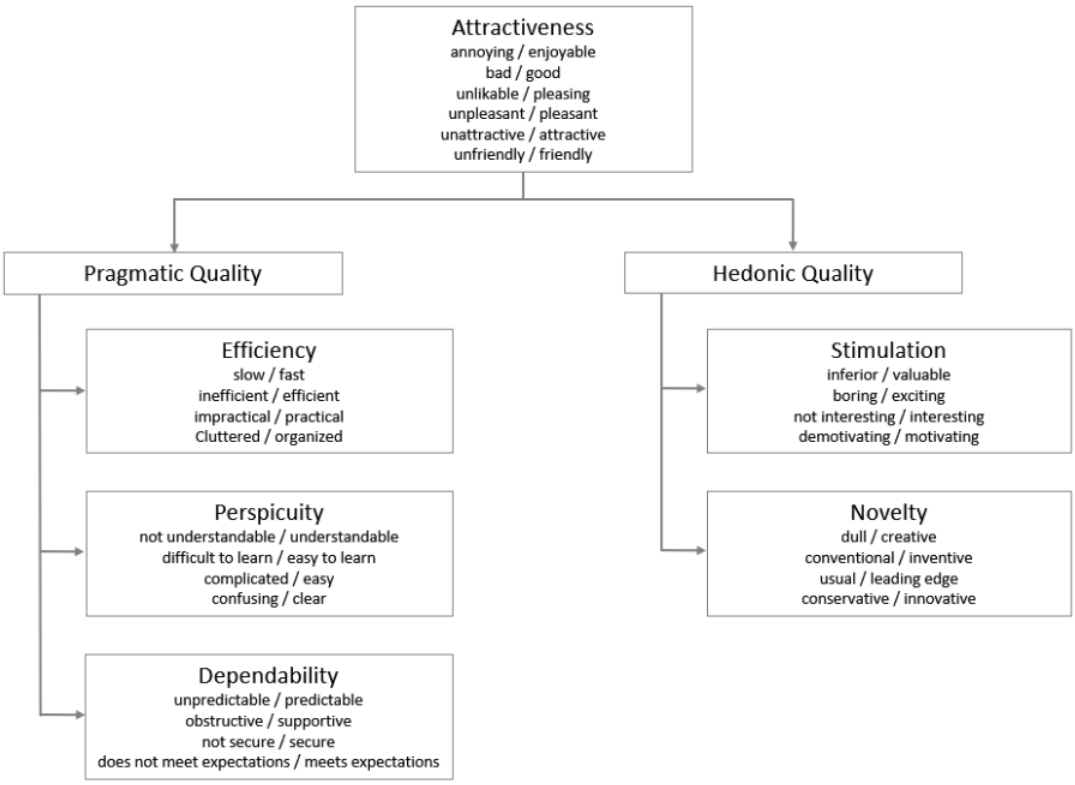

Figure 5. Assumed scale structure of the UEQ (Schrepp 2017).

One of the objectives of this thesis was to measure the UX and flow of the PoC. All the scales of the UEQ cover both UX and flow measurement, which is the reason it was considered suitable for the study.

6.3 Testing

Once the PoC was ready for testing, each participant received an email, including a short description of the PoC, a link to the build of the PoC, a link to the UEQ Google Form, and a short instruction on how to proceed with the testing. The instructions stated the following order: first, playing the game several times, as much as needed to form a judgment, then proceeding to the UEQ, getting familiar with its own short instruction before filling it out. It was stated that the purpose of this study was to estimate the UX and flow of the PoC

based on its mechanic, and not on visuals. Participants were given a week to go through the testing.

After a week, the first focus group discussion was conducted, including 7 participants. A day later, the second focus group discussion was conducted, including 13 participants. Each focus group was asked three basic questions about their experience with playing the PoC:

1) What did you like about the PoC flow and mechanics?

2) What did you not like about the PoC flow and mechanics?

3) What would you change and how?

No individual-specific data was collected from the participants during the focus group discussions.

6.4 Data analysis

For the UEQ data analysis, the UEQ excel tool was used. The tool is an excel sheet with formulas and data visualization, where the raw data needs to be entered. The information collected from the focus groups was written down and grouped into tables by the author.

7 Results

This study used a mixed-method approach, where quantitative results were collected from the UEQ and qualitative results were collected from the focus group discussions.

7.1 UEQ results

Once the participants had tested the PoC and filled out the UEQ, the next step was to input the raw data into the UEQ data analysis tool and get the results.

The author followed an inductive order in tracking the results.

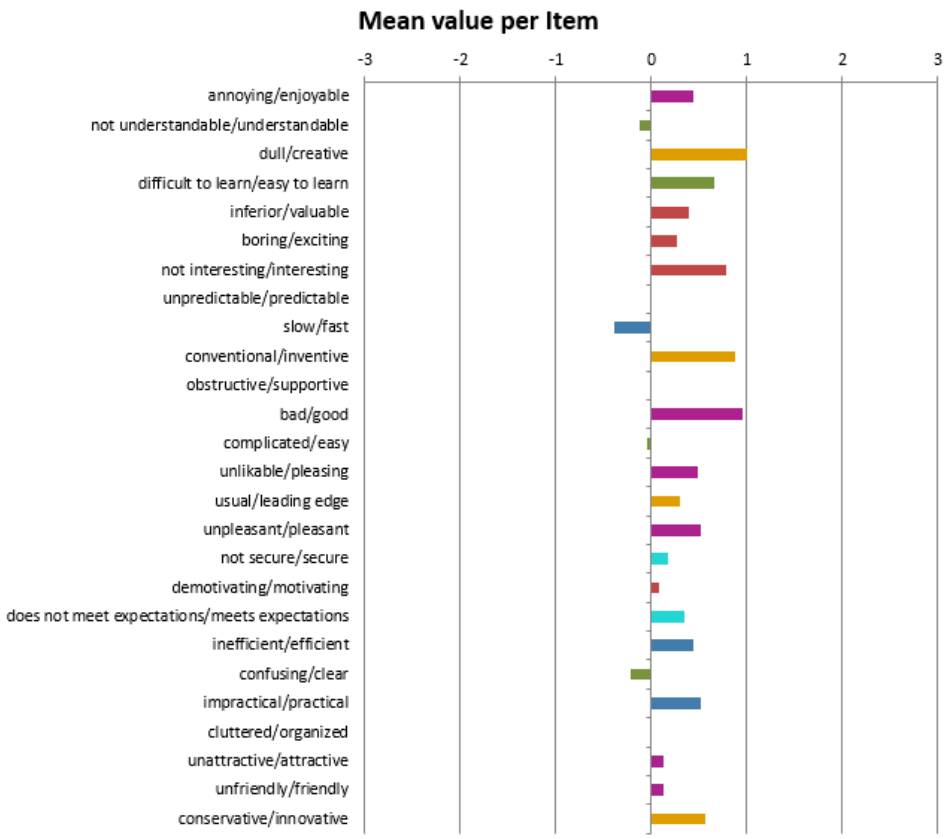

Figure 6. Mean value per item.

From figure 6 it is evident that the negative results revealed to be for the following characteristics: *complicated/easy*, *not understandable/understandable*,

confusing/clear, and *slow/fast*. The first three characteristics are related to the Perspicuity scale, while the last one is related to the Efficiency scale.

In table 1, the mean value can be interpreted as an approximate evaluation of the scale. According to the UEQ instructions: ”Values between -0.8 and 0.8 represent a more or less neutral evaluation of the corresponding scale, values > 0,8 represent a positive evaluation, and values < -0,8 represent a negative evaluation.” The variance value represents how big is the deviation to the evaluation. From this table, it can be observed that Attractiveness and Novelty were estimated as the highest scales (0,442 and 0,685 respectively), while Perspicuity turned out to be the lowest (0,065). At the same time, Perspicuity’s variance value is much higher (1,30) compared to the variance values of other scales.

Table 1. UEQ Scales.

UEQ Scales (Mean and Variance)		
Attractiveness	0,442	0,72
Perspicuity	0,065	1,30
Efficiency	0,141	0,68
Dependability	0,130	0,54
Stimulation	0,380	0,89
Novelty	0,685	0,33

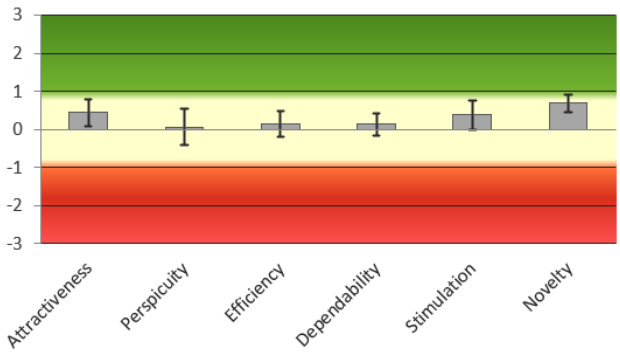

Figure 7. UEQ scales evaluation graph with error bars.

7.2 Focus groups

This chapter presents answers to the three questions that were asked during focus group discussions. The answers are grouped into two separate tables for each focus group respectively.

Table 2. Answers of the first focus group.

Question 1: What did you like about the game mechanic, flow and overall experience?
- Comment 1: Illusion of having control over the game through strategy really worked, and there is something interesting for the player to do. Not just a simple scratch card mechanic. - Comment 2: The feeling of combat. - Comment 3: There was a hook. - Comment 4: It has potential to be developed into an interesting product. - Comment 5: Apart from winning, trying to clear the board is by itself a clear goal that the player is motivated to achieve.
Question 2: What did you not like about the game mechanic, flow and overall experience?
- Comment 1: The impact of the attacks felt too weak and therefore dissatisfying. - Comment 2: Inconsistency in the HP system felt bad. - Comment 3: Towards the end it felt too obvious that the game does not give you a chance to win, the game is missing a cliffhanger.
Question 3: What would you change and how would you propose to change it?
- Comment 1: As clearing the board is a clear goal by itself, the game flow could benefit from somehow rewarding the player each time they clear the board.

- Comment 2: Either remove the HP system entirely, or completely change it to have no randomization and take more damage, so that the attacks feel more impactful and powerful. - Comment 3: Improve the algorithm by allowing the player to get even closer to win. Work towards a good cliffhanger, where the player's last action determines whether they will win or lose.

Table 3. Answers of the second focus group.

Question 1: What did you like about the game mechanic, flow and overall experience?
- Comment 1: There is a matter of scripted experience, no true randomness. - Comment 2: Fairly solid and good core, the flow is pretty nice as a player doesn't feel stuck at any point. Nice speed. - Comment 3: Aspect, that can be highlighted: replayability. Wanting to keep trying to play, finding different strategies. - Comment 4: Pretty easy to understand how to play. - Comment 5: At first felt a little boring, but the interest kept growing with a constant motivation to clear the board.
Question 2: What did you not like about the game mechanic, flow and overall experience?
- Comment 1: The HP system is not perfect, felt cheated. - Comment 2: The combos felt strange, too little targeting options. - Comment 3: Not the most helpful tutorial, confusing UI, information all over the place on the screen.
Question 3: What would you change and how would you propose to change it?
- Comment 1: Organize the information on the screen and tutorial better. - Comment 2: Add more targeting options for different units and combos. - Comment 3: Improve the HP system

8 Discussion

It is worth noting that even though the UEQ scales were not estimated too high overall, none of them were estimated negatively. This can be counted as an appropriate burden of proof for this PoC, as "…the burden of proof in an exploratory prototype is much lower than in a pilot project where the stakes and risks are higher" (Cabaj 2016). Considering that this was a PoC with no music, sounds, thought-through graphic design, or special effects involved, that may indicate that the mechanic and the flow on their own were viewed and perceived as pleasant and worth engaging in by the study participants. Furthermore, that may be the reason for the Attractiveness scale to be estimated as the second-highest of the scales (0,442) of the UEQ.

On the contrary, Novelty was estimated to be the highest (0,685) of all the scales. Meaning, that it is possible that the higher interest and attention span to a product may be attributed to the novelty effect. The increased attention may result in increased endeavors and persistence of subjects engaging with the product, yielding achievement gains. If this is because of the novelty effect, these gains, persistence, and, consequently, attention tend to decrease as subjects familiarize themselves further and further with the new medium. (Clark & Sugrue 1988).

To clarify the above statements, it is ought to appeal to what was acquired from the focus group discussions. As described in the previous chapter, there were no comments directly discussing the novelty aspect of the game, however, there were some comments that targeted the appeal of this PoC. It was mentioned that "there was a hook", and the replayability aspect was highlighted: "... Wanting to keep trying to play, finding different strategies". Rephrasing this, these participants were hooked by something in the gameplay, that drove them to keep trying to play it in different ways. In addition, it is worth noting this comment: "At first felt a little boring, but the interest kept growing with a constant motivation to clear the board". In other words, the interest of these participants grew as they were getting more and more familiar with the

gameplay and medium of this PoC. From these comments, it can be deduced that if the novelty effect took place, it was not or was not the sole thing that drove the interest and prolonged the attention span of the participants.

During both focus groups, some participants pointed out the feeling of having an influence on the game: ”There is a matter of scripted experience, no true randomness”, ”Illusion of having control over the game through strategy really worked, and there is something interesting for the player to do. Not just a simple scratch card mechanic”. These comments can be interpreted as that this PoC achieved to move away from a simple scratch and reveal the type of a lottery game flow that purely relies on chance toward an illusion of control that is already to some degree believable to players. According to the author of the flow theory Mihaly Csikszentmihalyi, feeling ”competent and in control” during an activity is an important step toward entering ”a state of flow” (Csikszentmihalyi 1975). In other words, there was an adequate balance between the skills of the participants and the challenge this PoC imposed upon them.

The flow theory states that besides a good balance between the skills of the actors and the challenge of the activity, the other two characteristics of a flow are having a clear goal and constant feedback. In this regard, it makes sense to once again cite the comment that was mentioned previously in this chapter: ”At first felt a little boring, but the interest kept growing with a constant motivation to clear the board”. In addition to that, another comment stated that ”Apart from winning, trying to clear the board is by itself a clear goal that the player is motivated to achieve”. From these comments, it can be argued that not only did this PoC succeed in having a clear goal, but also that this goal was attributed to intrinsic motivation.

In the UEQ, the Perspicuity scale measures how easy it is to get familiar with the product and if it is easy to learn how to use the product, which is directly related to the feedback the PoC is giving to a player throughout a game. This scale was estimated to have the lowest result (0,065) among all the UEQ scales. With that, it is important to consider that this scale also had the highest

variance (1,30), which means that its measurement may not have been very accurate and should be interpreted carefully. Nevertheless, it is still reasonable to compare that measurement to what was said during the focus group discussions to form a potential hypothesis for the future. On the one hand, there was one positive comment regarding how easy it is to learn how to play the PoC: ”Pretty easy to understand how to play”. On the other hand, a large proportion of the critical comments of both focus groups targeted the feedback aspect of the PoC. Firstly, several participants agreed that the tutorial was ”not the most helpful” and that the user interface was confusing with the ”information all over the place on the screen”. Secondly, quite many participants criticized the HP system and the impact of the attacks (”The impact of the attacks felt too weak and therefore dissatisfying”, ”Inconsistency in the HP system felt bad”, ” The HP system is not perfect, felt cheated”). Lastly, one comment stated that toward the end of playing, ”...it felt too obvious that the game does not give you a chance to win” and that ”the game is missing a cliffhanger”. In other words, too early during playing a player sees that there is no chance left for them to win: that final cliffhanger moment that determines whether the player will win or lose is missing. To sum up, starting from the tutorial and user interface, following with the unbalanced HP system that confuses players, and ending with a missing cliffhanger, the participants felt that the weak point of this PoC is providing players with helpful and adequate feedback.

An overall observation that was made during focus groups, was that there was a correlation between different aspects the participants were pointing out and their gender and age group. Male participants between the ages of twenty and forty were mostly highlighting the feeling of being in control as a positive aspect of the PoC, while female participants within the same age range were pointing out the replayability aspect and being hooked. While the male participants were mostly criticizing the HP system, the female participants were paying attention to the user interface flaws. More or less all the groups in an equal manner expressed that the PoC should have a cliffhanger to improve the flow. Another aspect that every group agreed on was that even though the balance between their skills and the challenges of the PoC was adequate, they felt limited by the

target options of the units and combos of units, as there were only three player units and subsequently only three targeting options (front row, back row, field area). To eliminate the possibility of players feeling limited in their actions and, therefore, entering either a “boredom channel” because the options are too simple, or a “frustration channel” because with this limit of options they feel like they cannot complete the challenge, the units and their targeting options could be somehow diversified (Csikszentmihalyi 1991).

In addition to positive and critical feedback, the focus groups made helpful suggestions for changes that would improve the PoC. To highlight the intrinsic goal of clearing the board, the game could provide a player with a small reward, that could be, for example, a cool visual effect or gimmick or a small monetary win for each time a player clears the board. To improve the feedback characteristic of the PoC, firstly, the tutorial and the user interface need to be organized better for clearer perception. Secondly, the HP system should either be removed or completely changed to have no randomization and cause more damage, so the attacks feel powerful and adequate to players. Finally, improve the algorithm to drive the game toward an exciting cliffhanger.

9 Conclusion

The objectives of this thesis were to design a PoC of an instant lottery game, implement it and measure its UX and flow.

The results obtained from the UEQ were overall positive, with the Novelty scale estimated the highest and the Perspicuity scale estimated the lowest (although with the highest variance). The focus group discussions gave important context for these results and allowed the author to make further judgement and hypotheses.

Firstly, while the game mechanic of the PoC was certainly perceived as novel, it was not the novelty effect that drove the interest of the participants. The participants mentioned being “hooked” while playing and feeling that they were in control to a certain degree. This means that the PoC succeeded in achieving an adequate balance between the participants’ skills and the challenges imposed by the PoC, which is one of the key characteristics of a good flow.

Secondly, the PoC fulfilled another key characteristic of a good flow by giving the participants a clear goal to try to clear the board. Furthermore, that goal drove the participants away from the extrinsic goal (winning money) toward the intrinsic goal.

Lastly, the weakest point of the PoC was giving the participants clear and helpful feedback, which is another key characteristic of a good flow, and which partly explains the low result of the Perspicuity scale.

In conclusion, this PoC instant lottery game has adapted an innovative mechanic that positively affected its immersion and flow, but the feedback characteristic needs to be improved.

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Please make your evaluation now.

For the assessment of the product, please fill out the following questionnaire. The questionnaire consists of pairs of contrasting attributes that may apply to the product. The circles between the attributes represent gradations between the opposites. You can express your agreement with the attributes by ticking the circle that most closely reflects your impression.

Example:

attractive	○	⊗	○	○	○	○	○	unattractive

This response would mean that you rate the application as more attractive than unattractive.

Please decide spontaneously. Don't think too long about your decision to make sure that you convey your original impression.

Sometimes you may not be completely sure about your agreement with a particular attribute or you may find that the attribute does not apply completely to the particular product. Nevertheless, please tick a circle in every line.

It is your personal opinion that counts. Please remember: there is no wrong or right answer!

Please assess the product now by ticking one circle per line.

	1	2	3	4	5	6	7		
annoying	O	O	O	O	O	O	O	enjoyable	1
not understandable	O	O	O	O	O	O	O	understandable	2
creative	O	O	O	O	O	O	O	dull	3
easy to learn	O	O	O	O	O	O	O	difficult to learn	4
valuable	O	O	O	O	O	O	O	inferior	5
boring	O	O	O	O	O	O	O	exciting	6
not interesting	O	O	O	O	O	O	O	interesting	7
unpredictable	O	O	O	O	O	O	O	predictable	8
fast	O	O	O	O	O	O	O	slow	9
inventive	O	O	O	O	O	O	O	conventional	10
obstructive	O	O	O	O	O	O	O	supportive	11
good	O	O	O	O	O	O	O	bad	12
complicated	O	O	O	O	O	O	O	easy	13
unlikable	O	O	O	O	O	O	O	pleasing	14
usual	O	O	O	O	O	O	O	leading edge	15
unpleasant	O	O	O	O	O	O	O	pleasant	16
secure	O	O	O	O	O	O	O	not secure	17
motivating	O	O	O	O	O	O	O	demotivating	18
meets expectations	O	O	O	O	O	O	O	does not meet expectations	19
inefficient	O	O	O	O	O	O	O	efficient	20
clear	O	O	O	O	O	O	O	confusing	21
impractical	O	O	O	O	O	O	O	practical	22
organized	O	O	O	O	O	O	O	cluttered	23
attractive	O	O	O	O	O	O	O	unattractive	24
friendly	O	O	O	O	O	O	O	unfriendly	25
conservative	O	O	O	O	O	O	O	innovative	26