



**CORRELATION OF FREE-TIME ACTIVITIES WITH GAMIFICATION  
PLAYER TYPES**

Lappeenranta–Lahti University of Technology LUT

Software Engineering and Digital Transformation, Master's Thesis

2022

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Examiner(s): Associate Professor, Antti Knutas

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## ABSTRACT

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### **Correlation of free-time activities with gamification player types**

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In this research relationship between free-time activities and gamification player types was explored. The research was conducted by building a survey to measure free-time activities of people and also measure Hexad scale player type by utilizing framework introduced by Tondello et al. (2016) in their research “The Gamification User Types Hexad Scale”. Overall, 59 responses were collected. Factor analysis was conducted to reduce free-time activity and player type data into factors. Overall, four factors were found but only two contained meaningful data to answer research question. These two were described as “Affection to sports and well-being” and “Appreciation of arts”. Linear regression was then run to confirm that the relationships that were found in factor analysis were also present in linear regression. Not all relationships within factors could be confirmed at significant level. Significant relationships were found between free-time activity variables “Active physical exerciser”, “Audience of cultural events”, and player type Philanthropist. There were other relationships that were close to being statistically significant and accepting these would have required more sample size to reach desired significance level. Overall, these results indicate that free-time activities can have correlations with player types, but the overall impact of these activities on player type score is low.

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### **Vapaa-ajan aktiviteettien ja pelillistämisen pelaajaprofiilien korrelaatio**

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Tässä tutkimuksessa tutkittiin vapaa-ajan aktiviteettien ja pelillistämisessä havaittujen pelaajaprofiilien välistä suhdetta. Tutkimus toteutettiin rakentamalla kysely mittaamaan ihmisten vapaa-ajan harrastuksia sekä Hexad-asteikon pelaajaprofiilia. Hexad-asteikon kysely perustui Tondello et al. (2016) tutkimuksessa ”The Gamification User Types Hexad Scale” rakentamaan runkoon. Kaiken kaikkiaan 59 vastausta kerättiin. Faktorianalyysi ajettiin tiivistämään vapaa-ajan aktiviteettejä ja pelaajatyyppejä tiivistettyihin faktoreihin. Yhteensä neljä faktoria löydettiin, mutta vain kaksi näistä oli olennaisia tutkimuskysymyksen kannalta. Nämä kaksi faktoria nimettiin ”Kiintymys urheiluun ja hyvinvointiin” ja ”Taiteiden arvostus”. Linearisella regressionanalyysillä varmistettiin faktorianalyysissä löytyneiden muuttujien suhdetta. Kaikkia faktorianalyysin suhteita ei voitu varmistaa lineaarisella regressiolla tilastollisesti merkitsevästi. Merkittäviä suhteita löydettiin kuitenkin liikunnan harrastamisen, kulttuurin ja filantrooppi-pelaajatyypin väliltä. Muita suhteita löydettiin mutta nämä eivät saavuttaneet haluttua tilastollista merkitsevyyttä. Nämä tulokset viittaavat vapaa-ajan aktiviteettien ja pelaajaprofiilien väliseen suhteeseen, mutta näiden vapaa-ajan aktiviteettien vaikutus pelaajatyypin määrittämiseen on pieni vaikkakin tilastollisesti merkittävä.

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## SYMBOLS AND ABBREVIATIONS

### Abbreviations

SDT	Self-Determination Theory
EFA	Exploratory Factor Analysis
KMO	Keiser-Meyer-Olkin

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# 1 Introduction

Generally, the agreed definition of gamification is defined as an act of applying gameful elements in non-gaming contexts. (Deterding, 2015) In practice, it's about motivating users to interact with systems through utilization of game design elements. Overall, the goal of applying these elements is to improve human interaction with the system and improve intrinsic motivation to complete task at hand. Lately, a lot of research revolves around finding different contexts where to apply gamification and investigating possible benefits of applying game design elements in different applications. Gamification could play significant role in helping people find intrinsic motivators in contexts where it often might be difficult such as school or work environment (Barata et al, 2013; Berkling & Thomas, 2013; Majuri et al, 2018; Reyssier et al, 2022). Utilization of game design elements in non-gaming contexts is about enhancing the experience that is being gamified. A hot topic within the research community has been finding proper use cases and even the right people that most benefit from these elements. The emergence of player types that describe how and why people enjoy certain elements has led to questioning whether these player types connect to different aspects of our lives rather than just games. In other words, could there be hints in our everyday life into what sort of game design elements we enjoy and therefore would there be correlation between our free time non-gaming activities and the game design elements that we enjoy. This thesis is about connecting real-world activities with gamification player types and seeing if there are correlations where activities could predict the type of player a person is. This should help us understand how these player types connect with our behaviour in the real world and whether there are predictivity in free-time activities and enjoyed gamification elements. Overall, the goal is to extend our knowledge of gamification and how it is related to other activities that we enjoy and find outside factors that could explain our alignment with these player types.

## 1.1 Previous studies

In theory, these game design elements should increase participation and intrinsic motivation to complete the task at hand, but research has shown that the application of gamification has

varying results in different contexts. (Hamari et al, 2014; Barata et al, 2013; Berkling & Thomas, 2013; Majuri et al, 2018) On one note, the application of gamification elements seemed to have improved motivation and activity participation in a classroom setting but at the same time, these elements did not improve grades significantly (Barata et al, 2013). Interestingly, not all groups of people are motivated by gamification elements. Gamification for some students seemed to add another layer of complexity and did not seem to support their learning (Berkling & Thomas, 2013). Conflicting results even within the same context seem to suggest that other factors could predict the successfulness of gamification. This phenomenon raises the question of whether context alone is enough to explain successfulness of gamification or whether other factors such as player types help explain why certain gamification elements seem to motivate others more. Often, applications of gamification take the one-fits-all approach, which depending on the application context may completely fail to account for differences in the way players want to experience their games (Rodriguez et al, 2022). So-called adaptive gamification considers different playing motivations and tries to explain different motivating factors by providing different gamer-profiles which try to explain why types of people enjoy certain gamification elements more. (Rodriguez et al, 2022) Previous research indicates that a correlation between gamification feature categories and video game preferences exists. This means that people who enjoy certain types of games are more susceptible to enjoying similarly working gamification features (Hassan et al, 2020). Empirical research validating and connecting player type to external attributes is quite rare. Connections between player types and personalities have been made and these comparisons try to answer how these traits play into gamification elements that people enjoy (Ferro et al, 2013). Furthermore, a less explored path is how these player types are in interaction with us in our daily lives and how they impact our preferences for finding motivation and doing activities. Many people enjoy games and the specific elements that make up these. One can reasonably wonder if player types are just one aspect of our entire personality and therefore has an impact on a larger part of our lives than previously thought.

## 1.2 Objectives & Research questions

As each human has their own set of gamification elements that they find enjoyable, the question becomes whether there is any predictability in how choices in life affect and reflect

appreciated gamification features. In the previous chapter, it was already established that video game preferences correlate with the way people enjoy gamification activities. The goal of this research is to examine this correlation further and find if the way person chooses to spend their leisure time has predictivity into what type of gamification elements they enjoy. This question stems from the fact that the application of gamification should steer people toward intrinsic motivators in the long run (Marczewski, 2018). Free-time activities are often seen as intrinsically motivating as they are often, if not always, done voluntarily. Indeed, people are often motivated by more factors than just monetary gains and in the long run, extrinsic motivators could hinder intrinsic motivation already present in a person. (Deterding, 2014) The common understanding of human motivation is that people strive towards activities that are intrinsically motivating. As hobbies and leisure time activities are intrinsically motivated there could be a correlation with these elements as both share the same motivational aspect. Therefore, the research questions reflect these hypotheses about motivating factors behind human behaviour and what use this information could provide us.

**RQ-1:** Do the free-time activities of a person correlate with gamification player types and therefore have predictivity into the game design elements that they enjoy?

### 1.3 Limitations & structure

This thesis is not meant to prove that gamification has benefits but rather just to investigate the possibility of real-life choices correlating with the types of gamification elements that people enjoy. The research question set by this thesis is largely hypothetical and serves as a stepping stone into mapping real-world attributes of people into gamification player types. As such, if the results of this research confirm the suggested relationship between free-time activities and player types, there could be an opportunity for further research that could try and extend the current way of finding out player types and catering gamification features towards this better-mapped out audience. The survey that was utilized in the making of this research was gathered from previous work and questions were originally in English and were translated into Finnish. The translation process was mainly done due to the easiness of collecting data from Finnish-speaking people. Although previous research has indicated that the distribution of player types seems somewhat consistent between languages and countries of origin (Tondello et al, 2019b; Krath & von Korflesch, 2021), there is always a chance that

results will be impacted by the demographic chosen. As such this is the first-time utilizing questions translated into Finnish. A separate analysis that discusses the standing of this research in regard to previous research is available in chapter 4. Table 4 lists out player-type determining questions and their Finnish translations.

In the first chapter, reader was introduced to the concept of gamification and the latest research revolving around that. The first chapter also set out regarding research objectives and limitations. The second chapter will introduce related works that are relevant to the research question. Most of the research introduced here is related to human motivation and how player types are determined. The third chapter introduces the reader to the research methodology and how the research was conducted. The Fourth chapter discusses the results. Results are divided into three separate subchapters where the first subchapter discusses the demographics of the survey. The second subchapter lists relevant data regarding the research question and finally third subchapter analyses where this research stands in regard to previous research. The fifth chapter is a discussion of what was found in this research and how the results could be improved. Finally, chapter six is the conclusions which conclude what was done, results, and lastly future research will be discussed, and where real-world mapping of gamification player types could be heading next.

## 2 Related Works

Gamification and its research are heavily motivated by finding reasonings behind human behaviour. As many aspects of gamification rely on basic human psychology such as intrinsic and extrinsic motivation, research is looking for enabling factors that allow humans to experience both. Early research within the field already noticed different motivations for playing video games and blamed media and researchers for oversimplifying the categorization of gamers. Each player engages with video games for completely different reasons and thus finds motivation by interacting with different game elements. Some seek social aspects while others are driven by competition and the ability to progress. (Yee, 2006)

### 2.1 Motivation for gamification

Difference in motivating factors is the basis of the entire motivation question and stems from question why people are not engaged with a particular activity and is it possible that certain gamification elements could improve motivation to interact with the activity. Gamification research and study of its effects most often base themselves on self-determination theory (SDT) that looks to fulfil three psychological needs to experience intrinsic motivation: competence, autonomy, and relatedness. It is widely understood that for human to be satisfied with themselves, all these psychological needs must be met, and humans naturally strive to fulfil these needs. (Deci et al, 2000) Research has noted that video games have both the appeal and well-being effects based on their potential to satisfy the need for these three components. In the context of gamification, SDT is utilized to understand human motivations and whether these motivations to act are intrinsic and guided by will or extrinsic where some external motivator urges them to act (Reyssier et al, 2022). However, even though most of the time willingness to play video games is autonomous and therefore intrinsically motivated, there are scenarios in which act of playing games is not intrinsically motivated. Key factor in determining whether something is intrinsically motivated is to look at voluntariness of the activity as it is the distinction between gamification and game-based training. Example of non-voluntary game-based training would be educational contexts where students are asked to play educational game. Non-voluntary activity in general has

little intrinsic motivation and often relies on external motivators such as grades in school setting. (Botte et al, 2020) In educational setting special care needs to be paid to heterogeneity of the people that are attending. Prevalence of online courses can cause hindrance to students' motivation and lead to dropouts from classes. Gamification elements may afford learners with motivational rewards that may improve their attendance and general motivation. (Bovermann & Bastiaens, 2020)

Table 1. Selection of game mechanics related to self-determination theory (Aparicio et al, 2012)

<b>Autonomy</b>	<b>Competence</b>	<b>Relation</b>
Profiles, avatars, macros, Configurable interface, alternative activities, privacy control, notification control	Positive feedback, optimal challenge, progressive information, intuitive controls, points, levels, leaderboards	Groups, messages, blogs, connection to social networks, chat

One aspect of gamification is the process of gamifying tasks. Aparicio et al. (2012) suggest that gamifying could happen through the iterative process of four different activities. First, it is essential to identify the main objective of the task that is in the process of gamification. Second, identify a transversal objective that allows users to get engaged over and something that game mechanics can improve upon. Third, selection game mechanics should match objectives and support human motivation. Mechanics that relate to three different aspects of human motivation have been listed in table 1. Finally, the fourth activity is the analysis of the effectiveness. Effectiveness is mainly measured by aspects of fun, quality indicators, and service quality.

## 2.2 Establishing player types

There is wide variety of personalities playing video games for different reasons. Gamification-related research has tried to map out these personalities and connect them with some other psychological model that would explain the willingness to play and enjoy certain

games. One of these models is called BrainHex which presents seven different archetypes of players: Seeker, Survivor, Daredevil, Mastermind, Socialiser, Conqueror, and Achiever. These archetypes are based on neurobiological findings and older player typologies such as Myer-Briggs famous personality typology test. Archetypes describe players and what sort of factors motivate them. For example, Achiever is motivated by accomplishing things. In games, this could mean earning achievements or badges for completing tasks. While Achiever may be motivated by the tangible types of rewards, this is not the case for all archetypes. Socialiser finds enjoyment in connecting and performing tasks together with other players. (Nacke et al, 2014)

Another example of mapping user personality to design elements is called the Hexad scale. This model mostly differs in the way that these player types were derived from four personifications of intrinsic motivations. These are Philanthropists, Achievers, Socialisers, and Free Spirits. Other types are driven by extrinsic motivators and divided into four distinct subtypes. These describe the type of Player or Disruptor in more detail. Four subtypes of Player are Self-seeker, Consumer, Networker, and Exploiter. For Disruptor they are Griefer, Influencer, Destroyer, and Innovator. (Marcezowski, 2018) Player types, motivations, and way of expressing their type is listed in Table 1. The Relationship between intrinsic player types and extrinsic subtypes is visualised in Figure 1.

Table 2. Hexad scale (Marcezowski, 2018)

<b>Type</b>	<b>Motivation</b>	<b>Expression</b>
<b>Socialiser</b>	Relatedness	Interaction with others
<b>Free spirits</b>	Autonomy	Self-expression and exploration
<b>Achiever</b>	Mastery	Gaining knowledge, learning new skills and mastery
<b>Philanthropists</b>	Purpose and meaning	Want to enrich lives of others in some way – with no expectation of reward
<b>Disruptors</b>	Change	Willingness to disrupt system or other users and force either positive or negative change through others
<b>Players</b>	Rewards	They do what is needed to collect rewards from the system and not much more

Identifying the user's player type is crucial as its thought that initially user is driven by extrinsic motivators such as rewards (prizes, badges, achievements, etc.) and the trick is to try and convert them into intrinsically motivated users. Figure 1 demonstrates this by having extrinsic motivations that are close to similar intrinsic motivations. For example, Networker subtype over time should aim to become an intrinsically motivated Socialiser type. This allows users to continue using the system despite no apparent reward for the user themselves. (Marcezowski, 2018)

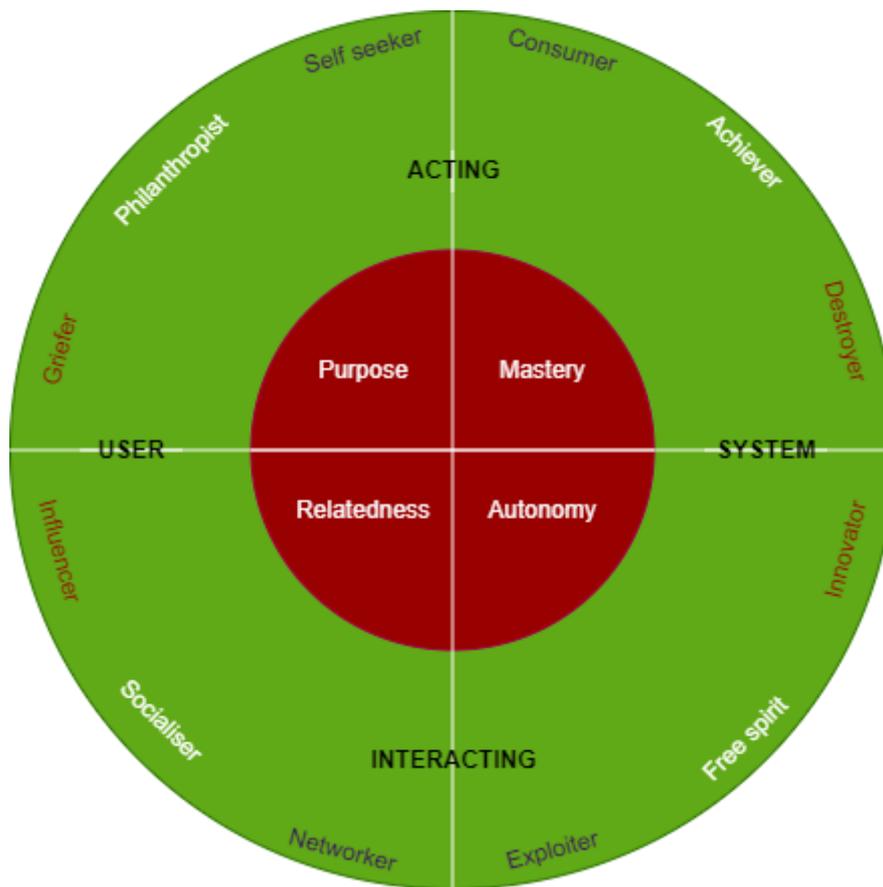


Figure 1. The Dodecad of User Types (Marcezwski, 2018 pp.110)

### 2.3 Determining player types

The user's player type is often determined through a questionnaire. Individuals may be asked to be truthful about their behaviour and while often they try to be, there can be numerous biases that impact the way they see themselves. (Marcezwski, 2018) Asking people to accurately describe themselves can be a challenging task. What often complicates matters is that the user's player type is not often discrete but rather scale that depends on the application context. Therefore, mapping users into one specific type might be applicable to one specific context only. What complicates things even further is that user player types do not fit a single type and there is overlap between different types. (Tondello et al, 2019a; Rodríguez et al, 2022) While asking people to self-assess themselves might not be the best idea, it is still commonly used as a tool to determine one's player type. Tondello et al. (2016) in their research created a 24-item survey to map out users' preferences towards these six hexad

scale user types. Overall, the results seem to suggest that there are positive correlations between expected game design elements and Hexad user types. Only the Philanthropist type was not as assumed as the game design elements suggested did not correspond with the user's preferences. In a continuation study conducted by Mora et al. (2019) the authors suggest that there might be other social attributes that explain the user's player type. It seems that women overall score slightly higher on intrinsic motivations while men are more prevalent in disruption on average. There is also the factor of age, where people of age seem to be more motivated by intrinsic motivators and the impact of extrinsic motivators seems to go down with age. Despite suggested issues in determining player types through questionnaires, there is empirical evidence that it is indeed possible. Previous research has also established that certain attributes such as age and gender might play a role in where a person settles on player type scale.

Numerous attempts have been made to validate the Hexad scale and utilize it to identify different game element preferences (Tondello et al, 2016; Tondello et al, 2019b; Krath & von Korflesch, 2016). Krath & von Korflesch 2016 thought that previous studies lacked sample size specifically and tried to resolve this issue by conducting a large empirical study to validate results reported by previous studies. They collected data from 1073 participants that originated from 59 different countries. The questionnaire used in the research was available in both English and German. Overall, their findings were in line with previous research although the correlation between Socializer and Free Spirit could not be confirmed.

## 2.4 Empirical research

Validation of gamification concepts is constantly under review within research community. Application domains vary from education (Reyssier et al, 2022; Barata et al, 2013; Berkling & Christoph, 2013; Bovermann & Bastiaens, 2020), business (Raftopoulos et al, 2015), public engagement (Tolmie et al, 2014), sports and health (Hamari & Koivisto, 2015; Johnson et al, 2016), and marketing & advertising (Huotari & Hamari, 2012). Large number of different application domains indicate that gamification has been explored extensively. Different application domains are researched to find reasons why in some circumstances gamification seems to work better than in others and how these domains could be enhanced by application of gamification. One topic of discussion has been application of gamification

in educational setting. Majuri et al. (2018) in their research did meta-analysis of empirical research on the topic of gamification and found out that majority (71,43%) of the results reported were mostly positive as in the game mechanics utilized were perceived in positive light by the users. However, there were significant number of null results (25,27%) where it was unclear if deployment of game design elements had any impact on the results. Another issue is that majority of the research that was reviewed did not utilize control groups which means it is difficult to estimate the effect of motivational affordances of these elements.

## 3 Methodology

The methodology of this research consisted of three separate phases: survey construction, data collection, and data analysis. These three components provide the basis for this research.

### 3.1 Survey construction

Surveys are used to gather generalized information about specific population. Different survey instruments are tools to conduct empirical research. Self-administered questionnaires allow people to answer survey by themselves and are ideal for quantitative research. Another tool is to interview people and often could be used to gather qualitative information. (Wohlin et al, 2012; Fink, 2003) Purpose of these surveys is to gather data from smaller population and be able to extrapolate the results into larger population. To be able to do extrapolation, sufficient sampling is needed. Essentially, this means that there needs to be enough responses to allow data to be accurate and representative of a larger population. Data needs to be from heterogenous group of people that are part of so-called representatives. These are people who belong into target demographic that are being researched. (Krosnick, 1999; Kelley et al, 2003) In total, there are three objectives for surveys. Descriptive surveys are used to enable assertions about certain population. Explanatory survey tries to explain why certain population behaves the way they do. Finally, explorative aims to assure that important issues are not foreseen during pre-study phase. (Wohlin et al, 2012) The goal of this research is to find correlations between two distinct attributes within a population, namely free-time activities and gamification player types. This research is not trying to explain why people behave in certain way but rather assert that people who enjoy certain leisure time activities are also more likely to enjoy certain gamification elements. To collect data about this relationship, a survey was built.

The process of building the survey requires three distinct components. First, a basic demographic questionnaire that asks for basic information regarding responder of the survey. This type of data is commonly collected to get an idea who is responding to the survey and in this case ensure that answers are from diverse group of people. Demographic data works as an additional analytical tool that can be used in analysis to see if different demographics

deviate from overall results. Second, some sort of categorization of hobbies is needed. There are possibly thousands of different leisure time activities, and it is not feasible to allow people to choose too specifically. In nutshell, the more options you give to people the more data will be needed to confirm any hypotheses. Increased scope might not be possible due to budgeting and scheduling constraints. Third, a framework that can accurately predict person's player type accordingly to some player type typology is needed. This framework needs to be compatible with descriptive survey type and be simple enough that it can be self-administered. These three components provide data that is necessary to conduct this research.

### 3.2 Data collection

The survey will be administrated as self-administered questionnaire hosted online. The survey will be created using Webropol survey tool, which includes data management and has possibility to export data out of the service for analysis purposes. Goal of the research is to gather data from as wide group of people as possible and as such there is no specific target demographic specifically meant for this survey. While there was no specific target group, the questionnaire questions were translated from English to Finnish. This likely limits responders to those who know Finnish, albeit online translation tools do exist which means that submission is technically possible without knowing Finnish. There is not much need for detailed demographic data. Only data that could serve some purpose in terms of this research and its questions will be gathered. For example, while it could be interesting to ask respondents for their occupation, getting that information might be redundant as its not directly related to the research question of this research. These are mainly used to get some basic understanding on who is filling out the survey and validate results against previous research. In total there are two points of data collected: age and gender. These are used to validate that not all answers came from same demographic group, but there was some diversity with survey respondents. Question about age has five categories: under 18, 18-30 years old, 31-50 years old, 51-70 years old, and those over 70. These age ranges are kept wide as more narrow ranging would likely not yield different results and this allows for more data entries per category. Question about respondent's gender included three options: male, female, and something else.

Problem with categorizing different leisure time activities is that there are thousands of different hobbies and past time activities. Difficulty stems from finding general enough hobbies that apply to most responders while not being too general that all responders share majority of the hobbies. To narrow down selection five distinct categories were chosen. These categories were collected from Finnish statistic agency Statistic Finland that collects data about different activities of Finnish people. Recreational data is one of the data groups collected by the agency. The five chosen categories were Active physical exerciser, Creative pursuit as a hobby, Audience of cultural event, Watching television programmes, and Digital gaming. Even though these are very generalized activities there might be responders who do not participate in any of these activities and therefore a sixth one was added titled “Something else”. This section also included open-text field that could be filled out by the responder. In case there would be enough responses with similar activities, these would be included in the analysis. Responders were given option to choose any number of these activities, but at minimum one had to be selected. To help responders find their hobbies from these categories, each option was given some example activities that are associated with that specific general category. For example, Creative pursuit as a hobby had examples that included cooking, dancing, or photographing. All given example activities are listed in Table 3.

Table 3. Leisure activity categorization, translations, and example activities

<b>Name of English activity</b>	<b>Name of Finnish activity</b>	<b>Example activities</b>
Active physical exerciser	Liikunnan harrastus	-
Creative pursuit as a hobby	Itsetekeminen	Writing, Dancing, Photographing, reading
Audience of cultural events	Kulttuuri	Visiting theater, cultural events, museums
Digital gaming	Pelaaminen	Video games, board games
Watching television programmes	Viihde	Watching sports, watching television, Netflix

To determine responder's player type, framework developed by Tondello et al. (2016) in their research "*The Gamification User Types Hexad Scale*" will be used. It is a 24-item survey that has four related questions for each six player types. This framework was built upon initial description of different player types that were first described in "*Even Ninja Monkeys Like to Play: Unicorn Edition*" by Marczewski (2018). Hexad scale framework was chosen mainly because there has been follow-up research that support validity of this framework. (Krath & von Korfflesch, 2021; Tondello et al, 2019b). Another factor was the simplicity of the implementation. Questions regarding player types can be understood by people who might not be aware of gamification or phenomena related to it. Survey responders will answer how well each question relates to them in a 7-point Likert scale. Total points from each category's four questions are summed together and the one with most points is responder's primary player type. Interestingly, Tondello et al. (2016) also noticed that there were some medium correlations between different player types. For example, if primary player type is Philanthropist, they are more likely to have more points in Socialiser category as well. These correlations should be present in this research as well and will be verified separately. Player type determining questions and translations are available in Table 4. The authors suggest that each item is presented without identifying the player type category they are related to. Another suggestion was to present these questions in randomized order. The approach described here is the recommended way to determine player type from this survey by the authors. Full survey is available in Appendix 1.

Table 4. Player profile determination (Tondello et al, 2016) and item translations to Finnish

USER TYPE	ITEM (EN)	ITEM (FIN)
PHILANTHROPIST 1	It makes me happy if I am able to help others	Muiden auttaminen tekee minut onnelliseksi
PHILANTHROPIST 2	I like helping others to orient themselves in new situations	Pidän muiden perehdyttämisestä uusiin tilanteisiin
PHILANTHROPIST 3	I like sharing my knowledge	Tykkään jakaa tietämystäni
PHILANTHROPIST 4	The wellbeing of other is important to me	Muiden hyvinvointi on minulle tärkeää
SOCIALISER 1	Interacting with others is important to me	Muiden kanssa vuorovaikuttaminen on tärkeää minulle
SOCIALISER 2	I like being part of a team	Haluan olla osa tiimiä
SOCIALISER 3	It is important to me to feel like I am part of a community	Minulle on tärkeää olla osa yhteisöä
SOCIALISER 4	I enjoy group activities	Nautin ryhmä aktiviteeteistä
FREE SPIRIT 1	It is important to me to follow my own path	Minulle on tärkeää seurata omaa polkua
FREE SPIRIT 2	I often let my curiosity guide me	Annan uteliasuuteni johdattaa minua
FREE SPIRIT 3	I like to try new things	Pidän uusien asioiden kokeilemisesta
FREE SPIRIT 4	Being independent is important to me	Itsenäisyys on minulle tärkeää
ACHIEVER 1	I like defeating obstacles	Nautin ongelmien ratkaisusta
ACHIEVER 2	It is important to me to always carry out my tasks completely	Minulle on tärkeää saattaa tehtävät loppuun
ACHIEVER 3	It is difficult for me to let go of a problem before I have found a solution	Minulle on vaikeaa päästää ongelmasta irti ennen kuin olen keksinyt ratkaisun
ACHIEVER 4	I like mastering difficult tasks	Haluan hallita vaikeita ongelmia
DISTRUPTOR 1	I like to provoke	Tykkään provosoida
DISTRUPTOR 2	I like to question the status quo	Tykkään kyseenalaistaa status quo:n (vallitsevan tilan)
DISTRUPTOR 3	I see myself as a rebel	Nään itseni kapinallisena
DISTRUPTOR 4	I dislike following rules	En pidä sääntöjen seuraamisesta
PLAYER 1	I like competitions where a prize can be won	Pidän kilpailuista mistä voi voittaa palkinnon
PLAYER 2	Rewards are a great way to motivate me	Palkinnot ovat hyvä tapa motivoida minua
PLAYER 3	Return of investment is important to me	Haluan saada vastinetta rahoilleni
PLAYER 4	If the reward is sufficient, I will put in the effort	Riittävä palkinto saa minut yrittämään parhaani

### 3.2.1 Data validation

Data validation is done to ensure that survey responses are both consistent and complete. In practice, any inconsistent or incomplete answers should be accounted for either during design phase of the survey or during data analysis. (Kitchenham & Pfleeger, 2003) In this research any incomplete answers should be avoided by placing mandatory fields within questionnaire. This way no responder can submit response without all necessary fields populated. Multi-select field regarding hobbies had to have minimum of one selected hobby to proceed.

### 3.2.2 Data coding

Data coding is used to convert nominal and ordinal scale data into numerical scores. This is done to make data analysis easier as programs may not be able to handle character strings. (Kitchenham & Pfleeger, 2003) For the most part this coding was done during questionnaire design as 7-point Likert scale already has numerical values and these are only given descriptive titles for usability reasons. However, question about free-time activities did not have this sort of innate numerical score. In this case the plan was to describe selected hobby as Boolean value of one and those that were not selected were treated as zero.

## 3.3 Data analysis

Data analysis is used to analyse the information provided by the survey. A good way to simplify the amount of information given by the survey is to conduct factor analysis. This is the process of reducing numerous items to a smaller set of “factors” that best explain the variability between original correlations. Another feature of factor analysis is the ability to cluster data and quickly see which variables correlate with one another. As the underlying factors are not necessarily clear, exploratory factor analysis (EFA) will be used. The output of the analysis is common explaining factors that are not measurable directly, but only through a set of variables. This method of analysis is common, especially in the construction of psychological measurement scales. (Coolican, 2018) In this case, factor analysis will be used to try and find latent variables within free-time activities and player

types. The goal of the factor analysis is to find factors that include both free-time activities and player types and therefore guide the validation process on which variables to use. After factor analysis, the results are validated by utilizing linear regression analysis. The goal of the analysis is to see if one variable is dependent on another. The output of the analysis is the overall fitness of the model and how much the selected variable impacts the dependent variable. The end result of this analysis should be a table that displays all free-time activities on one axis and player types on the other with beta-values and standard errors meeting in the middle.

## 4 Results

This chapter discusses findings from the surveys and has been divided into three subchapters. First, an analysis of survey responders where a closer look into the demographics of responders will be taken. Second, the main research question will be answered where will look at how these free-time activities correlated with these player profiles. Finally, the results of this player-type survey will be compared with previous research to see if any discrepancies emerged. This is done to validate that the small changes such as translating the questionnaire questions have not impacted the results of this research and if previous findings are present in this sample.

### 4.1 Survey respondents

Responses were gathered from friends, family, and other acquaintances. Goal was to reach diverse group of people as this research was to include people from all walks of life. In total there were 59 responses were gathered. Basic demographic data seems to indicate that 70% of the respondents were in the 18-30 age group. This young adult age group had the most respondents for both males and females. Clear majority of the responders were male. 40 out of 59 responders reported to be male. Rest were females and there were zero participants who selected other as their gender. Table 5 sorts free-time activities by age and gender. Findings regarding previous research will be analysed in chapter 4.3 further.

Question about responder's past time activities was a multi-select question where they could select any number of hobbies, but at minimum one had to be selected. In case they would not find one that fit them, or they had hobby that wasn't represented in the list, there was open-text field where they could submit their own specific hobby. Overall, clear outliers in collected hobby data were "Active physical exerciser" and "Watching television programmes". For the first one 95% of respondents said that they do physical exercise and 85% said to watch television programmes. These are high numbers and clearly common among people that were answering the survey. One explaining factor why these are so well represented could be caused by generality of the questions. There are many forms of physical

activity, and it is likely that people consider any sort of exercise to be their hobby. Also, “Watching television programmes” included watching both traditional television programmes and streaming services such as Netflix. Combining both television watching and streaming services into one hobby must have made this very popular choice. It is likely that there are people who like to watch both, but in this case, one hobby managed to reach both audiences, those who only watch either television or streaming services. Less common were “Creative pursuit as a hobby” and “Audience of cultural events” which are more specific about activities. Reason behind this relative unpopularity might lie in the hints that were given. Given hints may cause people not connect their own hobbies with these even though they would clearly belong into these categories. Some responders seem to have missed hobbies when clearly, they should have belonged into one. One example of this was one responder had answered “Something else” as their hobby and had written “books” in the open text field, even though this should have been part of “Creative pursuit as a hobby” as reading was one of the examples given. Option of “Something else” was given as an option for people who might not find their hobby in the listed categories. For data analysis purposes there would have to be significant sample of similar hobbies or hobby categories for them to be included in this analysis. As it stands, only three responders named their specific hobby, and they were not similar enough for them to be included in this analysis.

Table 5. Free-time activities by age and gender

<b>Gender</b>	<b>Age</b>	<b>Active physical exerciser</b>	<b>Creative pursuit as a hobby</b>	<b>Audience of cultural events</b>	<b>Digital gaming</b>	<b>Watching television programmes</b>	<b>N</b>
Male	Under 18	1	1	1	1	1	1
	18-30	27	5	6	25	23	29
	31-50	5	3	2	6	5	6
	51-70	4	2	3	1	3	4
Female	Under 18	1	0	0	0	1	1
	18-30	12	5	2	2	12	12
	31-50	3	1	1	1	3	3
	51-70	3	2	3	0	2	3

The survey respondents' player type was determined by summing scores of four player-type specific questions. For each question value between 1-7 could be chosen. This meant that the maximum number of points was 28 for each player type. From there player type was determined by the highest number. There were cases where respondents had the same number of points for several player types. In this case, all player types with the highest score were determined to be primary player types. This means that the total amount of different player types is larger than the number of responders to the survey.

Table 6. Survey player types

	<b>Philanthropist</b>	<b>Socialiser</b>	<b>Free spirit</b>	<b>Achiever</b>	<b>Disruptor</b>	<b>Player</b>
N	14	9	12	16	2	20
Mean	21.6	20.5	21.5	21.6	15.5	22.0
Median	22	21	21	22	15	22
Standard deviation	3.13	4.51	3.10	3.65	4.52	3.61
Minimum	14	8	15	13	6	13
Maximum	27	28	27	27	27	28

Table 6 displays different player types from the survey. In this sample the most dominant Hexad type was Player (N=20, M=22.0, SD=3.61) with Achiever (N=16, M=21.6, SD=3.65) and Philanthropist (N=14, M=21.6, SD=3.13) being the second and third most dominant types. As has been noted by previous research (Tondello et al, 2016; Tondello et al, 2019b), Disruptor (N=2, M=15.5, SD=4.52) type was the least popular of the player types. Disruptor also showed highest standard deviation, but just barely. This would indicate that people were divisive about questions related to the Disruptor type. Disruptor also has largest gap between minimum and maximum scores. Interestingly, in this sample all player types had at least one responder getting either maximum or one-off maximum points for that particular category.

## 4.2 Analysis

Factor analysis was used to reduce the data into smaller sets of variables and discover any underlying latent variables that cannot be measured directly. The first step of the process

was to submit data into IBM's statistics software SPSS which is used to perform factor analysis and linear regression in this research.

Table 7. Kaiser-Meyer-Olkin Measure of Sampling Adequacy & Bartlett's Test of Sphericity

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</b>		.563
	Approx. Chi-Square	111.604
<b>Bartlett's Test of Sphericity</b>	df	55
	Sig.	.001

Kaiser-Meyer-Olkin (KMO) test indicates the suitability of data for factor analysis. According to KMO, a value of .563 indicates that sampling adequacy is not adequate. It is recommended that for sample sizes below 100, an average value over .6 is acceptable. Bartlett's Test of Sphericity is used to validate the adequacy of the correlation matrix. (Shrestha, 2021) The test is significant at  $p < .001$  which indicates that there are high correlations between some of the variables. Any significance value below  $p < .05$  indicates that the dataset is suitable for factor analysis (Shrestha, 2021).

As was mentioned in chapter 3, factor analysis was run using all free-time activities and player type scores as variables. As is common with exploratory factor analysis, principal axis factoring was used to extract factors from the variables. Table 9 demonstrates that Philanthropist and Free Spirit were found in two factors. Appearance of variable in multiple factors is called cross-loaded variable. For cross-loaded variables, the recommended approach is to get rid of them to make the analysis of factors simpler. This is done by excluding these variables from the analysis altogether. (Shrestha, 2021) However, the number of variables used in the analysis was already low that it wouldn't make sense to remove them any further. Another way of deciding the removal of any variables is to look into the communality value of that variable. As it turns out, communality value of Digital gaming free-time activity extracted from the analysis was very low. This means that the variance of this variable is explained very little by the factors and therefore had little impact on the factors. While Philanthropist and Free Spirit were included in the analysis, Digital gaming was excluded due to the low communality score of the variable.

Table 8. Factor analysis communalities after removing “Digital gaming”

	<b>Initial</b>	<b>Extraction</b>
Philanthropist	.494	.682
Socialiser	.392	.620
Free Spirit	.430	.634
Achiever	.291	.643
Disruptor	.138	.496
Player	.220	.240
Active physical exerciser	.303	.333
Creative pursuit as a hobby	.280	.244
Audience of cultural events	.217	.330
Watching television programmes	.240	.343

Extraction Method: Principal Axis Factoring

Varimax with Kaiser Normalization was used to rotate resulting matrix and was used to ensure no correlation between factors. Factors found by the analysis are likely to have some level of correlation, but for the sake of analysis simplicity, orthogonal rotation method which eliminates correlations between factors was used. Factor analysis can provide as many factors as there are variables and therefore system is needed to only select the most meaningful factors out of the group. In this case, factors were selected based on their eigenvalues, and those with value over 1 were selected. Resulting rotated component matrix displays four factors and each factor contains combination of free-time activities and player types or just player types. Factors and their loaded variables are visible in Table 7. Due to only factor 1 and 2 having both free-time activities and player types loaded within same factor, only these were selected for further analysis. Factors 3 and 4 had only player type variables loaded and as such do not have answer to the research question of this thesis, and therefore were rejected from the analysis.

Table 9. Rotated Factor Matrix

	Factor			
	1	2	3	4
Philanthropist	.685		.380	
Active physical exerciser	.553			
Watching television programmes	.551			
Free Spirit		.615		.397
Disruptor		.497		
Creative pursuit as a hobby		.445		
Audience of cultural events		.442		
Socialiser			.739	
Player			.465	
Achiever				.775

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 4 iterations.

After identifying the factors, the next step is to give names based on the underlying trait they try to explain. Factor 1 was named “Affection to sports and wellbeing” and factor 2 as “Appreciation of arts”. Factor 1 describes a person that enjoys doing as well watching. At face value, it is difficult to find some underlying human characteristics that these variables explain. Therefore, it was chosen that these types of people are likely to enjoy sports by doing and watching as this is the common factor between the free-time activity two variables. Philanthropist is interested in well-being of others and themselves and motivated by purpose and meaning (Marcezwski, 2018). As such, additional description of “and well-being” was given to factor 1 to highlight purpose and meaning aspect of the factor. Naming factor 2 was a little easier as these people are fond of cultural activities and like to partake in some themselves. Player types Free Spirit and Disruptor have already been found to positively correlate (Tondello et al, 2016; Krath & von Korflesch, 2021; Manzano-León et al, 2020) It is likely that this type of person enjoys artistic expression while being interested in finding their own path.

The purposes of factor analysis were to cluster data into factors that at first glance display relationships between player types and free-time activities. This exploratory method was

used to give advice on what free-time activity variables to test against player type variables. The next step is to validate the results by conducting linear regression analysis where closer look will be taken into how these free-time activities impacted player type scores. Free-time activity variables that constituted the two relevant factors were used as independent variables to try and explain dependent player type variables. For this analysis the numerical variable of player type was used. Additionally, some relationships were investigated based on the description of player type and how one could assume that these player types enjoy some particular free-time activities. The results of this analysis have been listed in Table 10. R-squared values were listed only for results with statistical significance.

Table 10. Regression matrix between free-time activity variables as independent variables and player type scores as dependent

	<b>Philanthropist</b>	<b>Socialiser</b>	<b>Free Spirit</b>	<b>Achiever</b>	<b>Disruptor</b>	<b>Player</b>
Active physical exerciser	4.988** <sup>1</sup> (1.784)	1.905 (2.683)		1.696 (2.169)		
Watching television programmes	1.638 <sup>1</sup> (1.090)					
Creative pursuit as a hobby	1,009 (.883)		1.631 (.871)	1.840 (1.012)	2.048 (1.294)	-1.839 (.999)
Audience of cultural events	1.835* <sup>2</sup> (.875)		1.007 (.886)		.899 (1.316)	
Digital gaming		-613 (1.221)				

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , Standard errors in parentheses. Factor analysis variables are indicated by border. Bordered variable groups were all included as independent variables for the player type. Other scores were independently run based on assumption on how player types are motivated.

<sup>1</sup>)  $R^2 = .177$  <sup>2</sup>)  $R^2 = .061$

Free-time activity scores as independent variables and player types scores as dependent variables.

From Table 10 we can see that there were in total two relationships that had statistical significance between independent free-time activity variables and dependent player types. Both were present in the Philanthropist player type. First run, which was based on the factor “Affection of sports and well-being” contained both “Active physical exerciser” and

“Watching television programmes” as independent variables. The results of this indicate that “Active physical exerciser” has statistically significant relationship and moderate strength relationship with Philanthropist. However, the role of “Watching television programmes” did not reach the required significance level of at least  $p < .05$ , which means that the null hypothesis which expects zero impact cannot be rejected based on these results. The combined impact of these variables on the Philanthropist type was modest at best. “Affection to sports and well-being” free-time activity variables together had an  $R^2$ -value of .177 which means that these variables explain 17.7% of the variance within the dependent variable. Based on the factor analysis, two more linear regressions were run. Factor “Appreciation of arts” had four loaded variables and two of those were player types. For both Free Spirit and Distractor, the analysis was run with the same free-time activity variables “Creative pursuit as a hobby” and “Audience of cultural events”. Neither of these relationships displayed statistical significance and therefore null hypothesis cannot be rejected. The Relationship between “Creative pursuit as a hobby” and Free Spirit is close to being statistically significant. With more sample size this relationship would have been likely accepted. Other analyses were handpicked based on descriptions of player types provided by Marcewski (2018) and how one could expect these free-time activities to relate to those descriptions. For example, both “Creative pursuit as a hobby” and “Audience of cultural events” were picked for linear regression based on the premise of the Philanthropist being motivated by purpose and meaning. The assumption here is that Philanthropist would likely enjoy these two categories as one could find purpose and meaning through either of these categories. Out of these independent tests, only “Audience of cultural events” and Philanthropist had a relationship that had statistical significance. Other variables and player types did not display any significant relationships. With higher sample size some new relationships might have been found. Some relationships were on the border of being significant at  $p < .05$  level. For example, the relationship between “Creative pursuit as a hobby” and Player. The beta value of that relationship is also negative, meaning that people selecting the “Creative pursuit as a hobby” category would likely score lower in the Player type. However, the chance for the null hypothesis to be true is too high to accept this relationship as significant.

What this analysis confirms is that there are some indications of free-time activities correlating with player types. Especially Philanthropists in this sample seemed to have two free-time activity variables that had a positive correlation with the player type. Simply put, a person who selects any of the “Active physical exerciser” or “Audience of cultural events”

is likely to score higher in the Philanthropist type. As was mentioned in the previous chapter, these relationships are not strong, but they are significant. In this sample, other tests did not signify statistical significance.

### 4.3 Relation to previous research

Comparing results to previous research is a good way to validate that there were no problems with survey design and small changes made to the survey. Especially utilization of Hexad scale framework originally developed by Tondello et al. (2016) means that the results of survey run in this research should be very similar to the original. Key factor in this research was the translation of Hexad scale framework questions to Finnish and prerequisite of knowing the language to be able to submit an answer. This might have caused results to differentiate from the original findings. Table 6 reveals that mean score for each player type is very similar to results reported by Tondello et al. (2016). Highest difference in mean score was 1.01 in Player type, where in this sample the number was higher (22.0 vs. 20.99). Interestingly, standard deviations in this research seem to be lower all around than in the original research. On average 0.7 points lower. Pinpointing mechanism behind these differences is difficult. A lot of it could be due to simple variance within sample. Number of variables could also be at play like age or nationality of the responders. Other research that tried to validate Hexad scale framework with Spanish speaking people noticed similar differences (Tondello et al, 2019b). What was reported in that research was that mean player type scores were higher except for Player type when compared to this research. Overall, the mean player type score was 1.04 points higher on average than in this sample. Standard deviation of those results was very similar but again Player type differed quite substantially by being significantly higher (SD=3.61 vs SD=5.20). Overall, it seems that Player type in this sample seems to be outlier and somewhat overrepresented when compared to these other two research. Mora et al. (2019) also noticed that young people score higher in Player type. Overrepresentation of young people in this survey could be one explanation why Player type is so prevalent in this sample. To test for this theory, a linear regression analysis was run where age of the respondents was used as independent variable and Player type as the dependent variable. Beta value of -.856 indicates that as age gets higher the Player type points lower. However, this relationship did not have enough significance to be accepted as the explanation of this phenomenon.

Another measured aspect is the relationships between different Hexad types. Previous research and literature have reported a positive correlation between Philanthropist and Socialiser, Free spirit and Achiever, and Disruptor and Free spirit (Tondello et al, 2016; Krath & von Korflesch, 2021; Manzano-León et al, 2020). As shown in Table 11, the results of this survey seem to be in line with previous research. Only the significance of Disruptor and Free Spirit was not that high in this sample likely due sample size issues, but overall results are still very similar.

Table 11. Bivariate correlation coefficients between the Hexad types (N=59)

	<b>Philanthropist</b>	<b>Socialiser</b>	<b>Free spirit</b>	<b>Achiever</b>	<b>Disruptor</b>	<b>Player</b>
Philanthropist	—					
Socialiser	0.509 ***	—				
Free spirit	0.381 **	0.293 *	—			
Achiever	0.249	0.090	0.421 ***	—		
Disruptor	-0.042	-0.109	0.308 *	0.021	—	
Player	0.037	0.316 *	0.099	0.045	-0.048	—

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## 5 Discussion

The results of this thesis indicate that free-time activities can play minor role in person's player type alignment. Free-time activity variables "Active physical exerciser" and "Watching television programmes" were loaded with Philanthropist player type in factor 1. This result is rather unexpected as it is difficult to pinpoint underlying reason why Philanthropist would be interested in these activities specifically. Philanthropist type finds motivation in purpose and meaning. However, these results could not be fully confirmed in linear regression analysis as the relationship between "Watching television programmes" and Philanthropist was not statistically significant. Interestingly, in linear regression analysis it was discovered that "Audience of cultural events" had significant relationship with Philanthropist as well. This would seem more in line with expectations what this player type finds motivating. It is possible that both physical activity and watching television programmes could provide both purpose and meaning through some mechanism, but how this happens is unclear. Vagueness of these free-time activities do not provide much insight into this relationship. Further research into this topic would be interesting as Tondello et al. (2016) noticed that Philanthropist type in particular did not match the expected motivational game design elements. It seems that predicting what exactly motivates Philanthropist types is difficult and this research likely demonstrated that difficulty again. Other relationships were not statistically significant and therefore not impactful.

As was noted in chapter 4.3, young adults were the largest demographic group in the survey. This is not that surprising considering the way this survey was distributed among people that author was familiar with. Core group of responders consisted of mainly friends, family, and colleagues. Overrepresentation of young adults is unlikely to have skewed results in a way that would invalidate any findings in a way that they would not be applicable to the general population. However, in this type of research where the goal is to reach general population, it would be good to have more evenly distributed responder demographics. Also, another issue was that most of the free-time activities were too general and as a result responders picked certain activities a lot. This was very evident with "Active physical exerciser" and "Watching television programmes" as these were picked by 95% and 85% respectively. As was reported in Chapter 4.2, these two categories appeared in factor 1 "Affection to sports and well-being". What made analysis of this factor specifically difficult was the lack of detail

of what these categories represented. Physical activity could include plethora of different sports or activities. Furthermore, the relationship with Philanthropist added more confusion to the analysis. Philanthropist is known to be motivated by purpose and meaning, but it is unknown how television shows allow them to experience these. From this data alone it is impossible to tell if responders with some specific type of sporting activity in mind had this relationship with Philanthropist. If the premise of Philanthropist looking for social interaction holds true, then it is likely that team sports would have been more popular amongst these responders. As it stands, it is impossible to confirm this hypothesis with the data available.

Due to budgeting and scheduling constraints the sample size of this research was severely lacking. Low KMO score undermines legitimacy of factor analysis and the results of the research as a whole. Results have weak statistical power and therefore reaching any meaningful conclusion becomes difficult. Even no correlation is a result, but with large standard of error this cannot be stated with confidence. These problems are mainly due to small sample size. Similarly, the role of factor analysis was to quickly cluster data and through factor matrix visualize relationships between free-time categories and player types. Benefits of factor analysis is the ability to reduce large amount of information into more manageable factors that are described by loaded variables. Results of the analysis are different based on chosen parameters and therefore validating found factors is important. For the validation linear regression analysis was used where each free-time activity is used as independent variable against each player type. The results of that analysis are somewhat similar to factor analysis and that is expected as the same dataset was utilized for both analyses. However, many of the relationships could not be confirmed due to lack of statistical power. In “real” research, one should run the validation for different dataset and then compare the results. In this thesis, linear regression analysis was used mainly for demonstration purposes. Another problem with current implementation of the survey was too few free-time activity variables and the ones present were already aggregated and therefore not that likely to show high correlation values. Despite all issues in survey design, some correlations between free-time activity variables and player types were found and those could be clustered into factors, but it is likely that with better categorization and with more options the results of factor analysis could have been very different and more meaningful, even if the actual results with these changes would signal no impact on player types. If this topic was to be researched further, the recommended changes to the survey design would be

to increase the number of included free-time activities and let people provide more meaningful data by utilizing Likert-scale in free-time activities. For example, to increase the number of categories, physical activity category could have included set of individual sports and set of team sports. This way another avenue of data could have been added and would have made explaining impacts easier. Implementation of Likert-scale in free-time activity questions would have let responders decide how often they do listed activities. While that information might slightly differ from what was measured in this research, it still gives more insight to how people view these activities.

Another problem with the analysis is the difficulty to mirror these results into real life in any meaningful way. Looking at the relationship between “Active physical exerciser” and Philanthropist reveals that selecting “Active physical exerciser” increases the points of Philanthropist by 4.988 on average. What this means is simply that people who are active exercisers are more likely to score higher on Philanthropist type. Another way of analysing this data would have been to normalize player types based on the responder’s primary player type. This way instead of difficult to interpret numerical score, we would have had a beta coefficient between zero and one which would have described the chance to belong to that specific player type by increasing the value of that free-time activity factor. However, the author of this thesis believes that numerical score is better representative to answer the research question of this thesis and thus the approach presented was chosen.

Overall, the results of this thesis are promising. The relationship between different human characteristics and gamification player types is an interesting topic. Rarely is it possible for game designers or advertisers to be able to measure the player type of a person directly but finding relationships through other forms of data could help these people to tailor game mechanics to those who appreciate them the most. Tailored gamification is already a huge topic and finding these relationships between real-world categorizations and gamification player types enables them to tailor mechanics for target-audience specifically. Result of tailored gamification would likely be more motivated users that want to continue interacting with the system and find it intrinsically motivating to do so. Using the survey as presented in this thesis would likely not give much information for gamified system development. However, there is potential to iterate and improve survey design to find more meaningful relationships that could possibly be utilized to figure out target audiences’ player types through other means.

## 6 Conclusions and Future Work

The purposes of this thesis were to investigate whether free-time activities had any correlation with the player type of a person and therefore could be used to predict game design elements that they enjoy. The results of this thesis indicated that there are relationships between free-time activities and gamification player types. While the found relationships were not strong, they were still statistically significant. However, the overall number of relationships was quite small and therefore it is unclear whether all player types could be predicted this way. All of the significant relationships were tied to the Philanthropist player type specifically. The mechanism or specific likings of a person that caused this is still unclear. As the research was conducted in an exploratory way where you could not be certain of what type of results would emerge, these results were somewhat surprising and would require further investigation to find out the root cause behind found relationships.

This thesis and the results on itself are not likely to bring large number of benefits. But rather, the implication of being able to use free-time activities to predict player types could have big potential with several stakeholders such as game designers or advertisers. It is this potential that could act as a motivator to find more relationships between real-world categorizations of people and gamification player types and encourage further research into this topic.

What previous research (Tondello et al. 2016) noticed was that it is difficult to predict game design elements that are enjoyed by Philanthropist in particular. This thesis did not directly address difficulty to predict game design elements, but the results indicate that Philanthropist type could be predicted by three separate free-time activities. The level of prediction by these variables was not high, but still it is interesting that some what unexpected relationships were found. Philanthropist type overall seems to have very surprising interactions with other attributes. The mechanism that allows Philanthropist to experience purpose and meaning through physical activity or watching television is unclear and further research into this topic would be needed.

The results of this thesis were limited by budget and schedule. For this type of quantitative research, it is paramount that the sample size is adequate so that any results get proper statistical significance. Simply put, more time and resources should have been allocated to

gathering responses. Another limitation was that no control group was used and is closely related to the budgeting and scheduling issues. The lack of control group increases the risk of some external variable impacting the results and the relationships found were not due to independent variable manipulation (Allen, 2017). Furthermore, the overall survey design left many of the found relationships unexplained. While the research question of this thesis was to strictly look for correlations between free-time activities and player types, any conclusions that could be drawn from the data were shrouded in vagueness. Any underlying mechanics that could explain found interactions could not be investigated in detail and therefore no real explanations could be determined for the found results. Future work could expand on this idea of trying to find real-world categorizations of people to predict to which player type these people belong. It is an interesting topic because advertisers or game designers rarely can measure player types directly. Often, they have generalized data such as demographic data, free-time activities, or types of content they enjoy online. Therefore, investigating these relationships could help design content that is better suited for the intended audience. This research specifically was the first try at finding these correlations and now this concept can be investigated more in-depth with better survey design and more meaningful data. The initial results of this research are promising but the simplicity of the survey design makes it difficult to draw meaningful conclusions that are applicable in real life. Future work should focus on this aspect of making the results applicable and try to find even more specific categories that can be used to predict the player type of a person.

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## Appendix 1. Published survey

### Tutkimuskysely

 Pakolliset kysymykset merkitty tähdellä (\*)

#### Purpose of the research and data collection

-----

Thank you for opening the survey. This survey is part of research where we investigate if free-time activities correlate with gamification player types. The research is conducted by Semi Rantanen as a part of Master's programme. If you decide to participate to the survey, please read the carefully before proceeding and then "seuraava" to indicate your agreement.

You may ask for more information about the research by contacting Semi Rantanen (semi.rantanen@student.lut.fi) or withdraw your participation at any time without providing any reason or justification for withdrawing. For withdrawing, please record the exact time of submitting the form.

All collected data, including personal data where its collection cannot be avoided, is handled confidentially and stored securely. The data will be used for no other goal than for analysis in the context of this research project. Data will be stored only as anonymized summaries. When results of this research project are shared (for example in publications or presentations), no data will be shared that would identify participants.

#### Rights of the participant

-----

Participation is voluntary, which means that at any moment participants can decide to cease participation without providing any account for their decision.

Participants have the right to withdraw consent for use of their data at any later date, after which time their data will no longer be included in ongoing research activities or publications.

Questionnaire questions are in Finnish.

Tämän tutkimuksen tarkoitus ja datan kerääminen

-----

Kiitos tämän kyselyn avaamisesta. Tämä kysely on luotu osana tutkimusta jossa tutkitaan vapaa-ajan aktiviteettien korrelaatiota pelillistämistutkimuksista löydettyihin pelaajaprofiileihin. Tämän tutkimuksen toteuttaa Semi Rantanen. Jos haluat osallistua kyselyyn, luethan tämän sivun huolellisesti ennen jatkamista ja sitten paina "seuraava" vahvistaaksesi osallistumisesi.

Voit kysyä lisää tietoa tutkimuksesta ottamalla yhteyttä Semi Rantaseen (semi.rantanen@student.lut.fi) tai voit peruuttaa osallistumisesi tähän tutkimukseen missä tahansa tilanteessa ilman perusteluita. Jotta tämä olisi mahdollista, otathan tarkan ajan ylös jolloin palautit kyselyn.

Kaikki kerätty data, mukaanlukien henkilökohtainen, missä sen keräämistä ei voida välttää, käsitellään luottamuksellisesti ja tallennetaan turvallisesti. Dataa ei käytetä muuhun tarkoitukseen kuin analyysiin tämän tutkimuksen kontekstissa. Data tallennetaan vain anonyymeina yhteenvetoina. Kun tämän tutkimuksen tulokset julkaistaan (esimerkiksi julkaisuissa tai esityksissä), niin mitään dataa ei jaeta josta osallistujan voisi tunnistaa.

Osallistujan oikeudet

-----

Osallistuminen on vapaaehtoista, mikä tarkoittaa sitä että osallistajat voivat lopettaa osallistumisen ilmoittamatta mitään tiettyä syytä.

Osallistujilla on oikeus peruuttaa suostumus heidän datan käyttöönsä myöhemmällä hetkellä, jonka jälkeen heidän tietojansa ei tulla käyttämään käynnissä oleviin tutkimuksiin tai julkaisuihin.

Kysymykset ovat suomeksi.

Tämän kyselyn täyttäminen vie noin 5 minuuttia.

Seuraava



# Tutkimuskysely

 Pakolliset kysymykset merkitty tähdellä (\*)

## 1. Ikäsi \*

- Alle 18-vuotias
- 18-30-vuotias
- 31-50-vuotias
- 51-70-vuotias
- Yli 70-vuotias

## 2. Sukupuolesi \*

- Mies
- Nainen
- Muu

## 3. Harrastuksesi (voit valita monta) \*

- Liikunnan harrastaminen
- Itsetekeminen (mm. käsityöt, kirjoittaminen, tanssi, valokuvaaminen, lukeminen)
- Kulttuuri (mm. teatterissa käynti, kulttuuritapahtumat, museot)
- Pelaaminen (videopelit, lautapelit)
- Viihde (urheilun katsominen, television katsominen, Netflix)
- Jokin muu, mikä?

#### 4. Pelaajaprofiilin määrittäminen

- 1 = Täysin eri mieltä,  
2 = Eri mieltä,  
3 = Jotseenkin eri mieltä,  
4 = En samaa enkä eri mieltä  
5 = Jotseenkin samaa mieltä,  
6 = Samaa mieltä,  
7 = Täysin samaa mieltä \*

	1	2	3	4	5	6	7
Tykkään provosoida	<input type="radio"/>						
Nautin ryhmäaktiiviteeteistä	<input type="radio"/>						
Nautin ongelmanratkaisusta	<input type="radio"/>						
Minulle on tärkeää olla osa yhteisöä	<input type="radio"/>						
Muiden auttaminen tekee minut onnelliseksi	<input type="radio"/>						
Muiden hyvinvointi on minulle tärkeää	<input type="radio"/>						
Haluan hallita vaikeita tehtäviä	<input type="radio"/>						
Minulle on tärkeää saattaa aloitetut tehtävät loppuun	<input type="radio"/>						
Haluan saada vastinetta rahoilleni	<input type="radio"/>						
Tykkään kysenalaistaa status quon (asioiden vallitsevan tilan)	<input type="radio"/>						
Itsenäisyys on minulle tärkeää	<input type="radio"/>						
Pidän muiden perehdyttämisestä uusiin tilanteisiin	<input type="radio"/>						
Haluan olla osa ryhmää/täimiä	<input type="radio"/>						
Tykkään jakaa tietämystäni	<input type="radio"/>						
Pidän uusien asioiden kokeilemisesta	<input type="radio"/>						
Näen itseni kapinallisena	<input type="radio"/>						
Annan uteliaisuuteni johdattaa minua	<input type="radio"/>						
Pidän kilpailuista joista voi voittaa palkinnon	<input type="radio"/>						
En pidä sääntöjen noudattamisesta	<input type="radio"/>						
Muiden kanssa vuorovaikutuksessa oleminen on minulle tärkeää	<input type="radio"/>						
Minulle on vaikeaa päästää ongelmasta irti ennen kuin olen keksinyt ratkaisun	<input type="radio"/>						
Palkinnot ovat hyvä tapa motivoida minua	<input type="radio"/>						
Minulle on tärkeää saada seurata omaa polkua	<input type="radio"/>						
Riittävä palkinto saa minut yrittämään parhaani	<input type="radio"/>						

Edellinen

Lähetä