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Competition, Cooperation and Comunity: an Ethnographic Study of Gamified Persuasion with Augmented Reality Game Ingress in the Arctic Fennoscandia

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Abstract: Augmented reality (AR) games is an emerging genre of moving games. In this article we have studied the persuasive factors of Ingress that motivate the players to go out and move. Based on the qualitative ethnographical study, we have identified three distinguishable factors that increase physical activity (PA) among Ingress players: competition, cooperation and community. The study is largely based on material acquired in the Finnish Arctic region, where the climate and environmental conditions are sometimes challenging for AR gameplay. Despite the Arctic challenges — such as vast distances, darkness, cold and snow — Ingress players have demonstrated remarkable perseverance and activity while playing the game in difficult conditions.

I. Introduction

What makes an individual drive hundreds of kilometres to an unknown place? Or what causes one to ski in lousy weather to a remote birdwatching tower in an otherwise inaccessible place? What drives a pensioner to climb a few hundred meters up a snow-covered slope on a pathless route, or a group of people to rent a helicopter to reach a far-off island during the time of the year when there is no other access? To all the above questions one could simply answer "motivation." But such answer would not satisfactorily explain why thousands of people worldwide spend their time and energy achieving rewards in a digital game. The individuals above were all playing Ingress, a GPS-based augmented reality (AR) game for global geographical domination, in Arctic Fennoscandia.

The aim of this article is to analyze the persuasive properties [1] of the AR game Ingress and Ingress Prime, which encourage physical exercise and an active way of life among digital gaming enthusiasts in northern Finland and the adjacent gaming communities. The research started as part of the MOPO study, which examines the effect of gamification on PA, activity and wellbeing among a population-based sample of young men [2]. This study is an extension of the MOPO study, but instead of focusing on recruited study participants, I examined active Ingress players who have chosen to play the game based on their own preferences.

The grounding hypothesis of this paper is that participating in digital cultures does not inevitably lead to a sedentary lifestyle and obesity which can have enervating effects on wellbeing, as is presumed by many authors [3, 4] and which also seems to be a paradigmatic lay theory explaining many health problems of contemporary industrial societies [5]. In this study, the emphasis is on identifying and analysing the persuasive properties of Ingress which increase the PA of its players in a challenging geographical context. This setting enables further analysis of the possibilities and limitations of how digital technologies may or may not offer solutions to the various challenges of modern Arctic and sub-Arctic regions, such as long distances, an ageing population and imminent risks of sedentary and passive indoor work and leisure [6]. Ingress can be categorized as a "moving game," which are nowadays available on a range of devices. It requires physical movement in a real-world environment. It does not necessarily imply sports, as many playable locations are accessible with vehicles. Yet the challenging remote locations, accessible only by physical effort, offer interesting opportunities for studying the factors that move players.

By playing Ingress for more than three years, the main author has observed, documented and studied the persuasive elements of Ingress. Applying the methods of participant observation, interviews and ethnographic probes [7] we maintain that there is no single explanation answering the questions in the beginning. Rather there are multiple reasons motivating different individuals to move and exercise because of a game. We distinguished three important persuasive elements: competition, cooperation and community. There are also

other persuading factors — virtual rewards such as badges and banners — yet the first three are the most decisive for players to go for extreme locations, exercising moderate or heavy PA.

In the following paragraphs, we will introduce the game and its features, present player experiences and observations, and identify and reflect upon the reasons for increased PA due to the gamified persuasion. Our hope is that the study benefits the designers and developers of gamified interventions for physical activation.

Games, persuasion and wellbeing

Games are persuasive by their nature; they are designed to be played. Games exploits the human playfulness, something in human psychology which makes us enjoy playing. Various theories have been presented about human playfulness and its purpose in development, society and culture [8–11]. Despite the theorization and studies, the function of play has remained ambiguous [12]. Play is a universal phenomenon in human cultures. Both children and adults play, yet their motives and preferences vary.

Recent studies utilizing Functional Magnetic Resonance Imaging (fMRI) have revealed that gaming, especially winning — preferably against human opponent — stimulates brain areas, that are associated with the feelings of reward [13]. Likewise, Weinstein [14] has demonstrated that drug and game addictions shows similar brain activities, which illustrates that games have a powerful effect on motivation by rewarding. Games provoke strong feelings that can be both empowering or depressing, depending whether you win or lose.

Digital gaming is popular activity in Finland. Between 2015–2018, the amount of people playing digital games increased from 75 to 76 percent. Especially adolescents and young adults are active consumers of digital games ([15]. Considering the popularity, digital games offers a viable method to reach and affect a considerable segment of physically inactive people, namely the gamers. Excessive digital game consumption predisposes for decreased PA, while increasing the harmful sedentary time. Low PA is a global pandemic, contributing to a mortality burden as large as smoking and responsible for more than 5 million deaths per year, and is one of the United Nation's primary targets to reduce non-communicable diseases [16]. In turn, PA is one of the factors known to contribute positively on experience of wellbeing [17]. Thus, it is reasonable to study the possibilities of digital games for physical activation. So far however, only a small quantity of active video game players prefers AR-games [15]. After all, AR games are relatively new genre and *Ingress* was among the first popular ones, but more AR games are being published and worldwide they have a substantial audience.

Video games are expressive interactive media, where players make decisions and judgements considering the content of the game [1]. By being in "control of the story" has an empowering effect to the player [18]. As Bogost [1] points out, digital games utilize procedural rhetoric that can be programmed for various purposes, to tirelessly persuade the player in accordance to the purpose of the software. The effect of gamified persuasion naturally depends on various factors, such as the interests of the player, the charm of the game, the quality of programming and variety of other things. The main argument however, is that digital games are promising in persuading players to increase their PA.

Augmented reality games

Because the concepts of augmented (AR) and mixed reality (XR) games are in motion in academic discussion, it is useful to clarify the concepts. According to some authors [19, 20], both augmented and mixed reality games refer to similar types of software, played with a digital device in a real-world setting. Real-world objects are "virtualized" by digital information — or virtual objects are incorporated into a real-world environment through a digital device.

I prefer the concept of AR rather than XR, because the concept of XR is ambiguous, suggesting that reality is somehow blended with other realities. Instead, the concept of augmented reality implies that something is added to the representation of reality; it is an artificial extension of reality where potential activities with regard to reality are increased, and thus our relationship towards the reality is expanded.

AR games involve interaction with a real-world environment. For instance, in *Ingress*, many locations and sites of cultural significance — such as memorials, statues, historical places and even playgrounds — are playable objects (XM portals). Although no hint of such augmentation is relayed for a random visitor, the use of the scanner software reveals the augmentation of the place. The following images exemplify the nature of augmentation in *Ingress* (Figures 1 and 2).

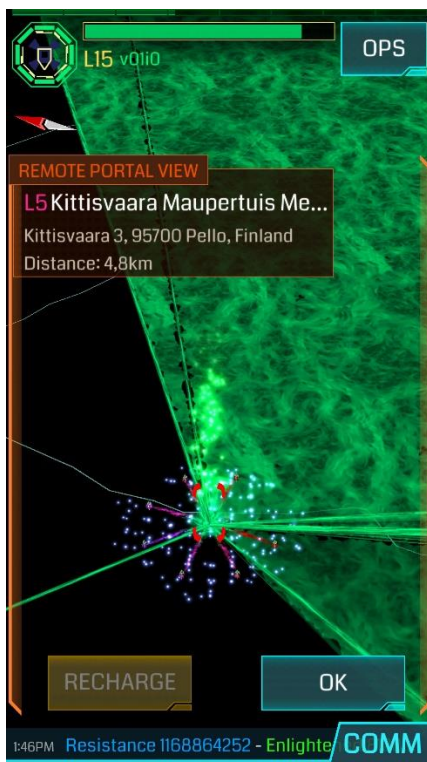Figure 1: *Maupertuis' memorial at the top of Kittisvaara in Pello, Finland.*

Figure 2: *Maupertuis' memorial in augmented reality of Ingress.*

Being present in AR creates additional value to the object or location. It is no longer simply a site or object in the physical world but an interactable object in a virtual existence. Thus, when considering AR games, they span the player experience across real and imaginary.

Ingress

Officially published in 2013 by Niantic Labs (now Niantic Inc.), *Ingress* was an AR game based on GPS tracking. While the original *Ingress* was shut down on September 30th 2019, Niantic continues to develop *Ingress Prime,* a sequel to the original game. Compared to *Ingress,* there are no significant changes in core gameplay or the mechanics on *Ingress Prime. Ingress Prime* can be downloaded on Android and iOS devices from various application stores free of charge.

The narrative of the game presents a world where mysterious, exotic material (XM) started to manifest in our reality. At the beginning of the game, players must join a faction, choosing either, the Enlightenment (ENL) or

the Resistance (RES). Regardless of the faction, the gameplay is fundamentally the same in both teams; the factions compete for control of the XM portal network (real world locations augmented by the game software) and the related Mind Unit (MU) control.

MUs are generated whenever three portals are linked to each other, constituting a triangular geographical area called a "control field". Active control fields and related MU determine the scores of teams. The image below represents the game situation in Scandinavia on October 22nd, 2019. For the sake of readability, the map shows links and fields that are more than 60 kilometers long. The red circle marks the municipality of Pello and Maupertuis' memorial, signifying the location where this study was conducted.
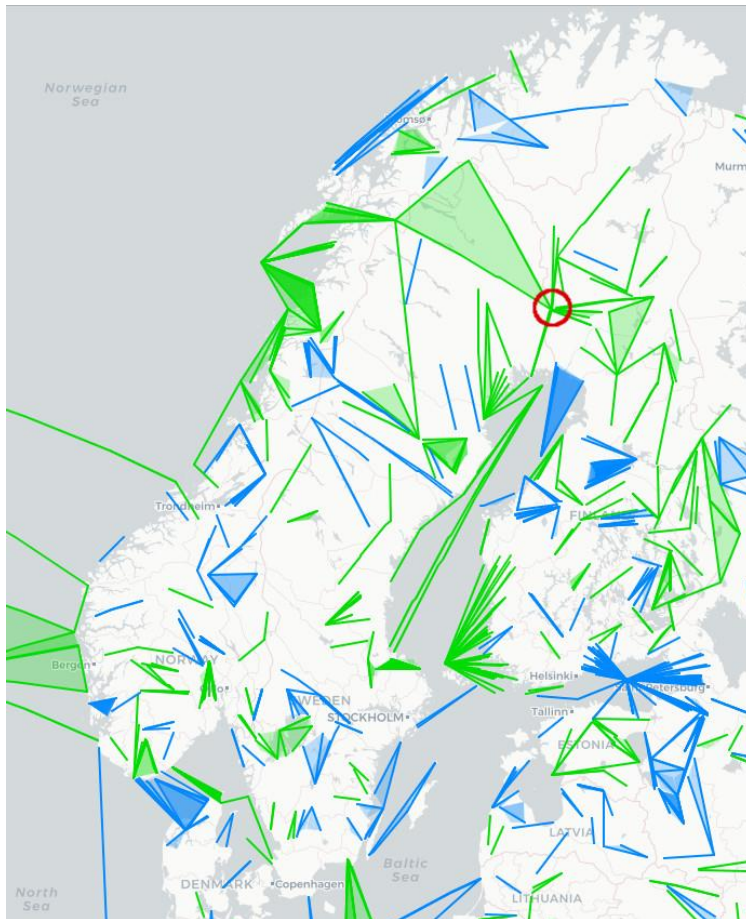

Figure 3: *Ingress fields and links (>60 km long) in Scandinavia. Green represents ENL and blue RES.*

A few rules are at the core of the game mechanics: an XM portal can be neutral or owned only by either faction. Control fields can thus be created only via portals owned by a specific faction. The player must link three fully powered portals together in a triangular shape to create a field. A partially powered portal cannot be linked, although existing links remain if a portal has at least three resonators intact. Thus, linking portals together is possible only in the following conditions: 1) Portals are fully powered with eight resonators, 2) the player has a portal key to the target portal, and 3) there are no existing crossing links between the portals. In most cases, portal keys can be acquired mainly by physically visiting the portal.

The physically activating element is that players must be in their immediate vicinity in the real world to interact with an XM portal (except remote recharging). The scanner has an approximately 40-meter range, meaning that the player must be within 40m to the portal to interact with it.

Though the game's idea is relatively simple, it yields complicated tactics and strategies. Both teams actively seek ways to improve their score while reducing that of the opponent. Since each player has their individual factors that affect their ability and motivation to play, larger scale and coordinated game operations involve some complicated arranging and scheduling. While individual players may quite easily play their local game alone, operations that cover cities and larger control areas usually require coordinated cooperation of many players, operating simultaneously in various locations between vast distances.

II. Materials and Methods

A qualitative, ethnographical study of AR games requires applied methodology [21]. For example, when considering participant observation, in this case, the researcher must be present in the game world and consider the real-world implications [7]. An event in either world can have implications in another, yet the connections between the events can sometimes be ambiguous and difficult to perceive. For instance, a seemingly random link between portals can create consequences that move many players. On the other hand, players' chores may prevent playing on otherwise obvious occasions, when game actions are necessary and expected. Such reasons exemplify why applied methods are needed when studying AR events and phenomena.

In this study, to determine and describe the persuasive properties that move Ingress players, we have applied several methods: participant observation, interviews, and probing. The application of each method is elaborated in the following chapters.

Participant observation

Participant observation is a traditional and well-established qualitative method in human sciences, particularly in ethnography [22]. It has been applied in parallel with its traditional use when studying human–technological relationships, virtual communities, and other (post-)modern phenomena [23–25]. Typical to ethnographic fieldwork, the participant observation period is usually a year-long enterprise among the studied people. In this case, however, fieldwork span over three years; when the researcher is virtually a home-anthropologist, there were occasions when the study was disturbed. I have compensated for this shortcoming by extending the observation period. As turned out later, the extension was necessary; short-term ethnography [26] would have been lucrative, but it might have omitted some important information. For example, the changes in active players, or the shifts in player activity due the variation of seasons, or even the devastating effect of cold winter on smartphone batteries (and the lengths the players went to avoid freezing their phones).

Another challenge for a balanced study was the fact that the game requires the player to choose the faction (ENL or RES) which is obviously a challenge for the neutrality of the researcher. It was more difficult to interact with RES than ENL players; I had chosen ENL initially, and naturally, RES players are more cautious with their interactions with ENL representatives. There was no way to circumvent this barrier completely, but it was alleviated it by being fair and constructive for players on both teams. Finally, a somewhat neutral reputation was achieved, and the conversations were also fruitful with RES players — in fact, some of the most informative interlocutors were the RES agent, who regularly visited Pello.

Participant observation means participating in the activity of the study subjects while observing their activities: in our study, it involved playing the game, participating in the events both within the faction and cross-faction communities, and keeping a fieldwork diary about the notions. During the observation period (2015–19), the main author lived and played in two distinct locations. (Image 4). The field study was initiated in Oulu and concluded in Pello, 200 kilometers north, just above the Arctic Circle.

Figure 4: *A map placing the areas of study.*

Regardless of the distance, the contact with communities was maintained via social media applications while participating in the game actively. In Finland, the community prefers Telegram (TG) for communications. Totally 16 Ingress-related channels in TG were observed. Most of the chats are shared by northern Finland ENL players, although I am also present in some national and international channels.

Interviews and discussions

Due to almost every Ingress player's apparent and immense hurry, it was difficult to appoint proper face-to-face interviews. Later, when the study was continued in a remote town of Pello, most players visiting here were mainly opponents. On such occasions, a proposal for an interview would have been considered inappropriate and suspicious. Again, the methods had to be applied to produce useful and legitimate material for the study. Instead of traditional interviews, TG chats were used. Asynchronous messaging permits a flexible way to communicate, reducing some limits of space and time, allowing players to react and respond when they have time and will for it. Telegram supports encryption of messages and their scheduled destruction, making it a secure tool for confidential conversations. In addition to TG's conversations, face-to-face discussions were also conducted with players whenever possible. Such discussions were written down in the fieldwork diary in cases when the discussions were relevant to the study.

Regarding the informed consent and the permission to use the acquired study material, the research position was clearly expressed, and the topic and details of the study. The majority of ENL and RES communities members were aware of my study, and any of the informants expressed no prohibitions to use the data. Some players wanted to remain anonymous and requested that identifying information would not be published.

The online communities of Ingress provide a fruitful source of information. There exist various groups and channels in TG, ranging from explicitly game-related chats to various "off-topic" channels. The main author was present on ENL groups of Oulu and Rovaniemi and on country-wide channels during the study. Considering the number of players in these groups, there were 33 members on the Lapland general ENL channel, 67 on Oulu, and 511 members on the country-wide ENL channel.

Probing

The meaning of probing varies in science. By definition, a probe (or to probe, probing) means the close investigation of something, usually aided by some device or tool [27]. In ethnography, the cultural probe is commonly understood as a package of various equipment for documentation designed and delivered to the study participants by the researchers. The participants are to document their experiences according to the instructions delivered by the researchers [28]. We applied the idea of probing for game-based actions. In this study, probe (or probing) refers to certain actions within the game that are intended to cause an observable reaction in players. For instance, creating a link between two remote portals in challenging locations probes the persuasiveness of the game to increase PA.

Probing with links requires caution, careful consideration, coordination and physical exercise: Links that are several hundred kilometres long, can easily ruin the game experience for many players by blocking their chances of play. Creating long links is neither simple nor easy and usually requires the cooperation of several players, as the "field" must be cleared from other blocking links before long links can be made. The main author usually consulted ENL communities before creating very long links. The purpose of this communication was twofold; to ensure that it will not interfere too much with ENL general play and ask help to clear the path for the links.

Applied probes were used on various occasions. Since the linked portals were on challenging locations, it took dedicated effort to remove them. For example, by making long links that were arduous to remove for opponents: The links from the municipality of Pello to the municipality of Salla, effectively blocked polar circle region of Finland from the border of Sweden to the border of Russia.

III. Results

Moving game

The following chapter is dedicated to interpreting the study material demonstrating the persuasive capability of Ingress. During one of the discussions with kpaivi (RES player) recently who was in Pello, persistently took down the blocking links that prevented possible RES operations. She mentioned that "*merely a year ago I could've not imagined walking as much as I do today*", referring to her past couple days in Pello, when she had walked — according to her and researcher's estimation based on her moves visible in scanner software — nearly 10 kilometres by visiting locations that are inaccessible by a car or other transports. Considering that she is a pensioner who did not appreciate pedestrian activities in her earlier years, it was evident that Ingress had motivated her to increase her PA. Likewise, player Ansu told us that:

> "*Due the shard-tag, I was on the move for 3 days in a row. With a car, running and walking, without a sleep. At least every five hours I was trying to move the shard onwards.*"
> — Ansu

It is hardly healthy to keep going so long without sleep, but what Ansu did is certainly an illuminating example of the persuasive capability of moving games. The shard-tag Ansu refers to was an official Ingress campaign 13MAGNUS, where shards were temporarily implemented into the gameplay. During the event, the teams tried to move their shards towards their specified goals while blocking the opposing team from being able to move theirs.

Not surprisingly, competition is definitely an important driving factor for many players. As the gameplay in Ingress is based on the rivalry of the teams, players spend their time and energy taking down opposing portals, links, and fields while building their own control areas.

> "*When I see big opportunities for fielding, or the opponent does something on my own area.*"
> — Ansu

> "*Regarding the Ingress, it usually moves me most to destroy the fields created by opponent and creation of own big fields.*"
> — Hautsi77

"*The situation on nearby areas is now rather quiet, partly because of myself too. Of course, the appearance of large enemy field nearby gives reason to start operating.*"
— Anonymous (who did not want identifiable information to be published)

Having played Ingress in two distinct locations, the main author's experience was that the motivation stems mainly from competition and cooperation. The gameplay in Pello is different when compared to Oulu. As a remote and small town, Pello offered very little local competition, whereas in Oulu, the competition was almost constant. The observation was that the PA of the main author decreased while in Pello. The main reason was the lack of opposition in the area. However, when it happened, it motivated to move, as is the case with AriMartti:

"Visiting opponent players are always noticed. And rebuilding own fields makes me hurtle, like almost everyone, regardless of the faction."
— AriMartti

The main author tried to maintain the blocking links preventing RES from expanding their control. Therefore, the visiting RES players usually tried to destroy the blocks while in Pello. When it happened, the main author usually reacted as fast as possible to re-establish the blocks as far as possible. Knowing this, the RES had to coordinate their attacks in Pello, organizing multiple players to act simultaneously: while one or few players destroyed the blocking links from Pello, other players created new links to prevent additional ENL blocks emerging from Pello. On several occasions, the RES team was persuaded to move and act in Pello with the force of multiple players.

Competition-based cooperation is generally also an important moving factor. As mentioned, large operations require the teamwork of a considerable number of players, sometimes operating in difficult environmental conditions. For example, a RES operation (Cider OP) during winter 2018 required approximately 130 RES players from Finland and Russia [30]. The operation was executed during the coldest time of the year and required some extreme activity from the key players, as they had to encounter challenging environmental conditions. Image 5 represents the resulting control area of the operation outcome as an example, demonstrating the scale of large operations that include hundreds of players collaborating.
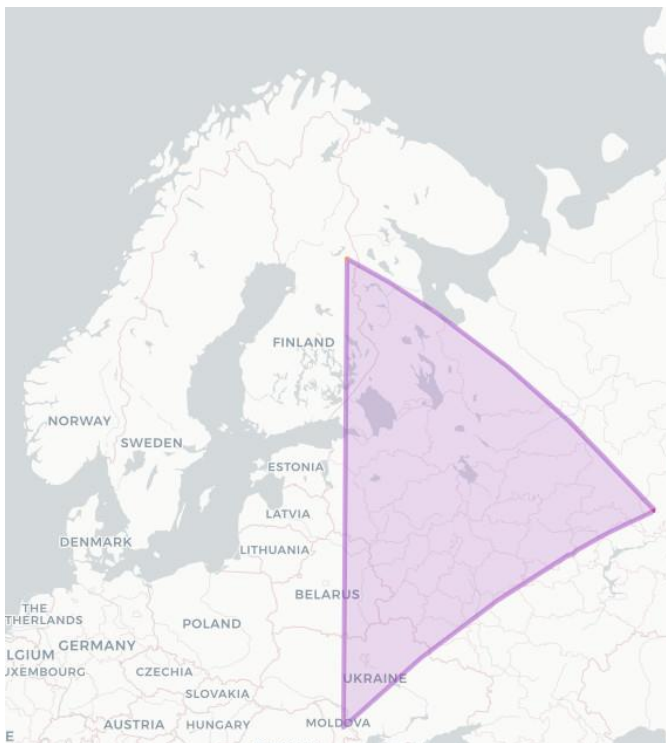

Figure 5: *Cider OP by RES on February 25th 2018. Illustrated according to the information based on Finressitrep (2018).*

The players are prepared for heavy PA and long day work (and sometimes overnight). During the winter of 2019 RES had another operation, using the link between Maakalla (Kalajoki, Finland) and Kostamus (Russia) as their base link, upon which they built more than 150 control fields.

> "Also the North participated in Blue Cities 4, and participated intensively. On Maakalla-Kostamus-baselink, over 150 fields and 8 676 482 MU were created on both sides, of which almost 4 MMU was included at the first checkpoint. The reaction of Frogs was rather faint: only a few destroyed fields before first CP and one sofa-link to birdwatching tower, where our agent trekked to dismantle it, snow reaching to his waist."
> — Kostamuspoika [31].

The sofa link mentioned in the above quote was one of the probes of the author to estimate the intensity of the player effort. On that day (March 9th, 2019), the weather was lousy, for it was windy and snowing heavily. Despite the weather, RES decided to utilize the Kostamus–Maakalla link during the OP Blue Cities (an annual RES event with the intention to cover as many cities as possible with blue fields). The main author saw an opportunity to block their operation towards north by linking from Pello to the birdwatching tower in Olvassuo (a swamp in central Finland) during their effort. The portal in Olvassuo cannot be reached by car, and considering the weather, the accessibility was poor, making it a good probe measuring the opponent activity. One of the participating RES agents was quickly dispatched to Olvasuo birdwatching tower. The probing link was mentioned in RES operation report by Kostamuspoika, and in the Oulu, Region cross-faction chat by the very agent who trekked there:

> "The nightly jog slightly prolonged, thanks [removed] for telling a little bit where to go."
> — CondFIN

Figure 6: *A screenshot from Telegram. RES agent CondFIN commented in Oulu cross-faction chat for giving him additional trouble. Translation above.*

While in Pello, the more remote portals were used for linking, as the Local Museum of Pello (Museotie 30–32) is too easy for RES to stop by a car, shoot down and continue onwards. RES has managed to recruit players who seem to have regular business (work or otherwise) near Pello, so to keep the game challenging (and persuasive) for them, links from remote places that required moderate activity were preferred.

Kpaivi, one of the key interlocutors, an elderly pensioner woman who lives in Rovaniemi but has property in Pello, therefore, has regular chores in Pello, told several times that she had never walked more during her life,

than when she began to play Ingress. Of course, she still prefers portals that are accessible with a car. However, main author's tactics forced her to step out of the car and walk on several locations that are difficult to reach, especially during the winter. For example, in one January afternoon in 2018, main author was alerted by the game, when kpaivi had neutralized one of the regular blocking portals in Kittisvaara, a hill near the town of Pello. She had hiked up there through a snowy and sinking path uphill, without proper equipment such as snowshoes. It was surprising as she had told previously that she is not very fond of climbing uphill due to the issues related to aging.

The most recent case reported in this study is an ENL operation BAF Bothnia Twin, abbreviated from commonly known Ingress jargon "Big Ass Field(s)". The aim was to create large ENL control fields from Sweden and Finland over the Gulf of Bothnia on May 18th 2019. The report of the event is "sanitized", as demanded by ENL operational security; too precise reporting may reveal tactical aspects to the opponent. Therefore, we must pardon the reader for the omissions and obscurities in the narrative because we can only write about things we are permitted to. However, we try to relate the observations relevant to the gamified persuasion.

The operation planning began months earlier by coordinating the actions, the players, the keys, and the dates. Until completion, it kept many players busy with the preparations. The original plan was much smaller, about a half of the size compared to what turned out when completed; it seems as the hunger grew while eating. The image below represents the outcome of the operation. In total, nearly 20 fields covered a geographical area of approximately 225 thousand square kilometers. The northern end of the fields was in Pello, spanning from Äänekoski near Jyväskylä on the Finnish side, ending on Örskär, an island near Gävle, Sweden. Similarly, in Sweden, the northernmost corner is in Valkeakoski, Pello and the westmost in Gäddede, Sweden, and the southern end in Hållnäs.
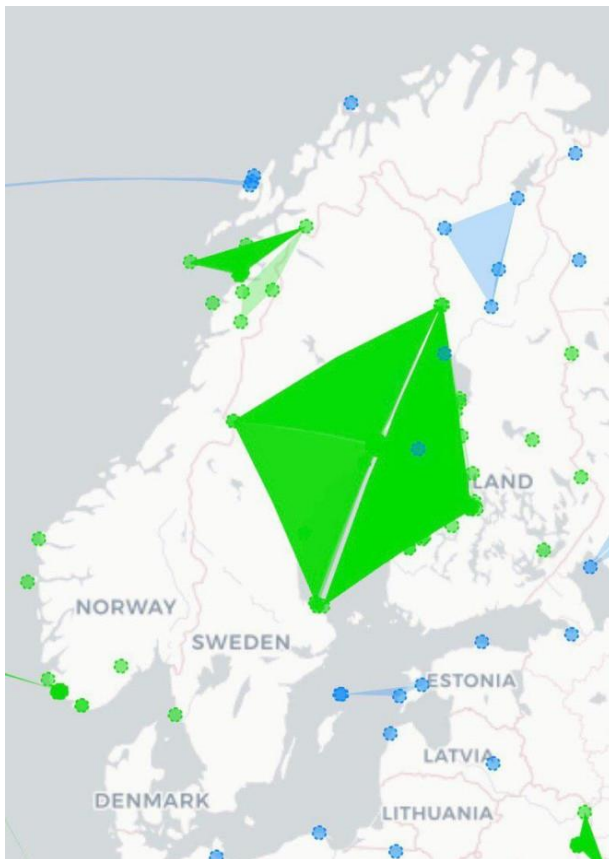

Figure 7: The results of BAF Bothnia Twin -operation by ENL on spring 2019.

Compared to the months of preparations, the fields were constructed in in few hours, starting at 21:15 local time in Finland. In both countries, agents were operating along every line visible in image 7. Alone in the Oulu region, some 20 ENL agents participated by taking down interfering links and fields, both ENL and RES ones. Estimation is that some 70 players participated in Finland alone.

For the main author, the preparation tasks included hiking trips in the wilderness of Pello. The idea was to make shielding links that are inaccessible by a car to hamper the possible deconstruction attempts. A day before

the execution, He had cycled approximately 20 kilometres and walked some five more while creating protective links for the actual operation. During the night between 18th and 19th of May 2019, four RES players arrived in Pello for counterattack after successful completion. First, kpaivi took down the main operation portal in Pello by using a specific type of weapon called ADA Refactor at 02:59 — only one minute before the game would have calculated the regional scores. Approximately an hour later, three other RES players, who traveled from Oulu to Pello by car, simultaneously took down the protective links to ensure that the fields were not easily rebuilt and blocked the operation link paths efficiently. As mentioned, the shielding links were on locations that could not be accessed by car, so the RES agents had to walk on these locations. Quite an impressive feat for a night.
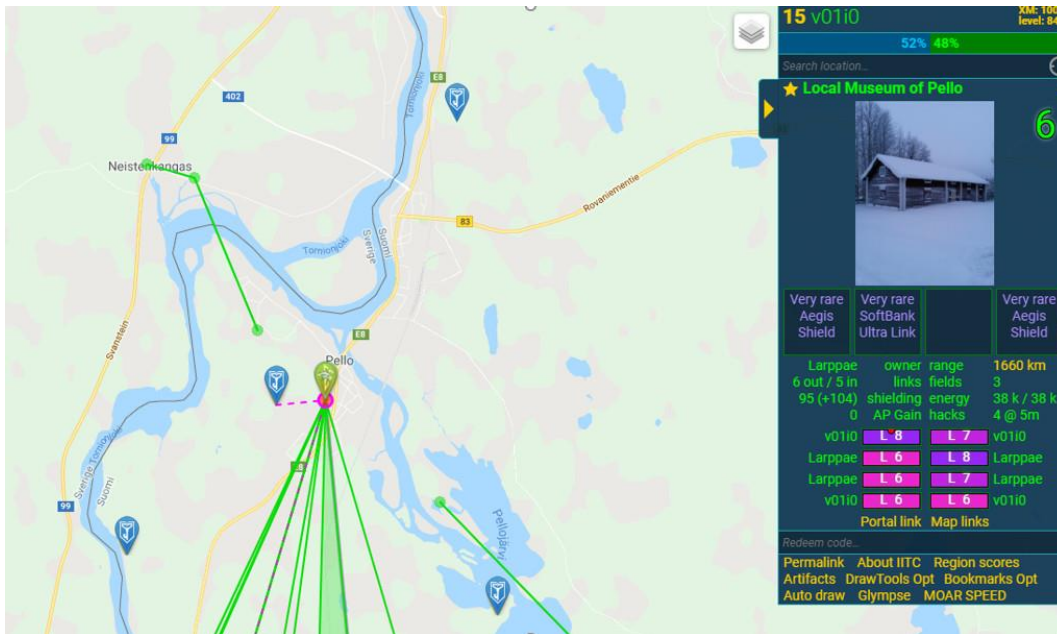

Figure 8: *A screenshot from the Ingress intel website displaying RES activity in Pello during the operation night approximately at 4 AM. Blue markers on the map are each RES players, taking down the portals in the wilderness.*

This is an example of the persuasive properties of Ingress. For example, the main author has never been very active to exercise, but Ingress has persuaded him — a non-athletic middle-aged male — to move for nearly four years now. Most of the interlocutors confirmed these observations, although play varies between the individuals. Some of them like to play the game in their own way, caring little about competitive, social, or cooperative aspects, instead focusing on doing the missions or something quite inexplainable (regarding the scope of this study) within the game.

Moving factors

Three significant factors were identified from research material, that persuade individuals to play and move: competition, cooperation and community. These categories are not exclusive — and perhaps simplified — as the reasons for individual motivation to play and move can span across several categories. There are also various unique and personal causes, but these three are the most common ones that many players share. AR games, such as Ingress, can provide a powerful motivation to increase PA.

Competition

Most games are based on competition to some extent. A well-designed game delivers the player with means and feedback that help her to estimate its success. Competition does not only imply player versus player competition; it can also be individual achievements, such as beating previous personal hi-score, winning previously overpowered AI opponents, or developing improved strategies that yield better results in game (for example, a game of Solitaire).

Regardless of whether the competition takes place against another player, game, or even player oneself, games often deliver players with a concrete means to measure their skill. Various feedback, such as scores and other statistics, helps players to estimate their success. It has been argued that the immediate feedback in games is

one of the factors in their lucrativeness [32]. Feedback in games is often instant, predictable, and obvious, contributing to the experience of development of one's skills and success, which is a prerequisite for flow experience [33].

Ingress provides players with various competitive elements. We have distinguished competitive elements into two sub-categories: player versus player (PvP) and player versus environment (PvE). PvP includes activities such as areal domination and competition over resources. On the other hand, PvE includes missions, banners, and other personal achievements, such as gaining new access levels or improving individual statistics.

Cooperation

Collaboration between Ingress agents is another clearly distinguishable factor, often increasing PA. For either team to control a large geographical area usually requires the cooperation of several — sometimes hundreds of — players. To do so, players are needed to clear the blocking links and fields before the team's own plan can be executed. Depending on the case, the blocking fields and links can sometimes be arduous to remove and may require many operation hours, including heavy exercise.

There are many ways to collaborate, from exchanging equipment and portal keys between players to the execution of game strategies and tactics to beat the opponent. One typical scenario is that few agents present a plan to the community. If the idea is deemed worthwhile of trying, it is then developed further and finally executed. It usually takes weeks or months of preparations that may include various activities depending on the case; the keys to the target portals need to be acquired and distributed to the agents operating in the field; the area of operation needs to be cleared of blocking links and fields. Depending on the accessibility of various target portals, the players might have to go to locations that may be difficult to reach. Especially on the critical moments of execution of operations, the players are highly motivated for increased physical effort in accessing difficult locations.

Cooperation is thus clearly a persuasive factor. However, it may sometimes be difficult to distinguish from community-driven persuasion and vice versa. Considering the categorization presented here, the main distinction between cooperative and community-based factors is that community-based elements do not usually involve much rewards in the game for either team but reinforce social ties between players and teams. However, cooperation usually results in achievements and scores in-game.

Community

Social aspects are important for many Ingress players. Both teams have thriving social networks constructed around the game. While most social activity happens online in social media, such as Telegram, players also organize face-to-face meetings. Naturally, "live" social events are more frequent in populated areas, but sometimes social encounters can happen unexpectedly whenever two or more players meet at the same portal. Farming can be categorized as a cooperation activity, but it is usually a social event where players familiarize with each other. Perhaps the most typical form of social activity is "farming", where players gather together to level up (to level 8 preferably) certain portals. The portal level is determined based on the average of deployed resonators: each agent can normally deploy only one level 8 resonator, and there are 8 slots for resonators in each portal. Therefore It takes 8 individuals of appropriate level to maximize portal item output.

In populated areas, players also organize frequent "first Saturday" (FS) meetings that are established and official Ingress community events, supported by Niantic Labs. In practice, registered participants in FS-events receive various bonuses such as increased score gain during the event. Niantic also organizes non-profit "augmenting reality" events that aim for the general good. A recent example of such is the "Earth day" event in Ingress and Pokemón Go, where more than 14000 players participated in cleaning the environment. Another type of social event is, for example, memorial events of deceased players, ruined cultural heritage (such as the fire of Notre dame in 2019), and remembrance of disasters and their victims.

In addition, all the above motivating categories are connected to Ingress as AR game, which requires players to go out and play, making it weather sensitive. However, this exposure strengthens the links between cooperation, community, and competition. Ingress players have demonstrated ingenious cooperative ways to be able to play even in difficult conditions. Naturally more pleasant the weather, the more it increases the motivation to play, but in a case of tough competition, or an execution of a scheduled plan, many players are willing to sacrifice their personal comfort in order to attempt to achieve virtual goals. The AR gameplay is also sensitive to the size of real-world settlements. For instance, in the city of Oulu there were many active players on both sides, and the community was thriving, whereas in the town of Pello, main author is the only active player. Such differences reduce competition and community-based reasons to play and ultimately change some aspects of the gameplay. Then again, a small-town and remote location offers some new aspects to the

gameplay that maintained the interest on Ingress, such as the possibility to use hardly accessible, competitive game locations, that strengthen the cooperation and community aspects.

IV. Discussion

This article studied the gamified, digital persuasion from increasing PA in Ingress, yet its observations could benefit any game design. While the aspects presented here are not all-encompassing solutions for a successfully persuasive game design, they are definitely part of it when the players' motivation to play the game is considered.

With sufficient persuasion utilizing these aspects, the players might play the game even they do not always feel like it. Obviously, this can also be detrimental, as the game might become addictive enough to cause a stressful obligation to play against one's will. However, such risks are marginal as most people will recognize their individual limits considering the entertainment and obligations.

Regardless, the game designers should also consider the ethical implications of the games. AR games can pose risks for the players based on environmental factors. When considering the Arctic, winter's weather and environmental conditions may contain various risks to the players. For instance, slippery weather or a snowstorm may surprise the player who might be trying to reach faraway or wilderness portals. In urban settings, there are other types of risks, when the player may stray to potentially dangerous areas amidst the game's flow. When considering Ingress (as well as most AR games), the safety of the player is considered as her own responsibility with statements such as "always remain alert of your surroundings" and "do not trespass". Yet the developers do not efficiently restrict the game content on potentially hazardous places, instead, the content control is largely left to the players. For example, in Ingress, the players are able to submit, edit and remove locations, provided that the developer deem it reasonable. Although it must be admitted that going out to exercise always includes some risk of injury or accident, it is no exception with AR games.

Another issue is the impact of the players and their actions on the environment. While Ingress does not explicitly encourage the use of transportation for gameplay, larger-scale strategic operation usually demands transportation over long distances, more so in sparsely populated Arctic. Driving a car for few hundred kilometres is not unusual. Therefore, the players who actively drive a car for long distances because of the game also contributes to emissions. However marginal the emissions of Ingress players may be, they are still unnecessary and could be reduced by better and more considerable game design.

Regardless of the safety and environmental issues as discussed above, this study shows that AR games such as Ingress can motivate and move people, even in sparsely populated arctic areas with long distances and harsh climate. While the players of Ingress represent a small portion of consumers of digital games, the constantly developing genre of the AR games may produce tittles that could move wider audiences.

While here the focus was on AR-game in regards of PA and persuasion, such aspects can be embedded to almost any game. For instance, a simple prototype PC game (Space Pioneer) was developed during the MOPO study in 2011 [34]. While the game itself was played on a desktop PC, it also used activity data used in the game to gain advantages. Players used various accelerometers during their daily activities and uploaded the accumulated activity data to the game server, which rewarded the player in the game. Such utilization of accelerometers –smartphone-based– is simple and sufficiently reliable to identify user activity [35]. If such methods could be applied to various games, a much wider population could be reached than with a rather limited player-base of AR-games.

This study also contributes to the discussion considering the health and wellbeing implications of gaming, social media, and technology in general. While many technological solutions have indeed liberated us from the burdens of heavy work, simultaneously, they have distanced us from the beneficial health impacts of work-related physical activities. Moreover, entertainment and social technologies easily tend to passivate us further physically. However, such development may be alleviated by designing systems and technologies that encourage healthier behaviors. The traditional health promotion methods, such as information sharing and public recommendations, seem to have only limited effect on the population in general. It is not necessarily the lack of information nor the time or the lack of appropriate places for exercise that leads us to the sedentary and non-healthy way of life. Instead, we would emphasize paying more attention to the lack of motivation to move and on efforts to compete for the seductions of entertaining leisure better. For instance, an interesting videogame or a favorite tv-series may capture our attention for hours at a time. How to turn this seduction of entertainment to a moving factor? We claim that the design and implementation of physically activating digital games could be one way to reduce the sedentary time of the people and by their own will. Digital technologies do not necessarily need to be physically passivating; instead, they can persuade [36] to move and socialize in

the real world. Persuasion of games and human playfulness should be used as a means for desired outcomes and for the benefit of our overall wellbeing of us as we are — playful human beings.

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V. References

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