Internal motivation in Gamification

An intervention study in an exercise context

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Abstract

In this paper Gamification have been explored in the context of intrinsic and extrinsic motivations through an empirical intervention study. Gamification have got the criticism that it does not aim itself towards people’s intrinsic motivation and instead focus on external motivators that doesn’t mean anything to the user. This paper aims to try that out by answering the question, how can a more personalized and internally motivating approach influence people’s engagement in a Gamification process? To do this, two groups of five were formed and everyone got a Fitbit (step counter) to wear for thirty days. One of the groups got a personalized gamification process aimed at reaching a more internal motivation. The study concluded in tendencies toward more engagement and a more positive attitude towards the process with successful participants leaning on their own internal motivators. This study has further demonstrated the need for further research in this area.

1. Introduction

Gamification is a subject that for the last few years have been more thoroughly researched and interest in the subject has remained high. Gamification is the act of using game design elements in non-game contexts (Deterding, 2011). Gamification is not limited to a specific context and has consequently been used in many types of places. For example in companies trying to motivate their employees, schools trying to motivate their students to study, to motivate people to exercise and many more areas (Hamari, Koivisto & Sarsa, 2014) (Kapp, 2012). There does, however, seem to be a lack of real world testing or at least there is a need to increase the amount of test studies.

The use of point systems and earning badges has been the most used version of gamification but the results of these have been questioned and the need of a more internally rewarding approach have been highlighted by Nicholson and others (Nicholson, 2012) (Zuckerman & Ga-Oz, 2013l). Putting up badges and points on every single area in life for every person does create reason for doubt for the simple reason that everyone is unique and therefore it is not very likely that everyone would respond the same way to the same actions. It can be rewarding for some to get a badge for getting a task done, but for another person that might not mean anything and therefore not affect their motivation positively or even have a negative effect in some cases. Some even go so far as to call the point based gamification techniques as meaningless and suggest this approach to be called pointsification instead (Bogost, 2011). The sense of being able to choose your own way of completing a task is more internally rewarding than being forced to use one option chosen by another actor (Ryan & Deci, 2000). So how would the result differ between a person given options based on his/her own interests and needs in contrast to a person given only one option loosely based on people’s general interests? Zuckerman and Gal-Oz made an effort to evaluate the effectiveness of using point and leaderboards and the results indicate that if the rewards does not mean anything internally, the users will not care more about the process and it will not affect their motivation (Zuckerman & Gal-Oz, 2013). The results from what they actually did somewhat contradict what they said afterwards which indicate that there is a difficulty in finding out what people actually want.

A group of people will receive a Fitbit one, which is a device that you can have with you everywhere and the main use of it is to count the steps taken. The participants will be divided in two groups where one of those will get a more personalized, internally motivating, gamified experience and the others a more general and common approach using points,
badges and leaderboards and it will be in an exercise context. A social media group will be set up where they have the possibility to interact with each other as well as receive challenges of various difference. This will demonstrate how the different types of challenges affect them and which of these are most influential, if any, or if they work best in combination with each other.

The influence social media can have should not be underestimated and how and if the use of social media influences gamification should be kept in mind.

1.2 Problem
Even though Gamification has shown potential and some benefits seem to exist, there are still question marks and doubts about the effectiveness. Much of the complaints about it are that most of the gamification elements used are the least intriguing parts of a game and they are not applied to increase the user’s internal motivation which is the strongest motivation. A reason for this is of course that it is not as easy and requires more work, than to simply use a generic gamification element like a point system to apply for a vast group. For Gamification to reach higher effectiveness, this has to be explored to see if greater value can be achieved with a more refined and internally motivating Gamification approach.

The purpose of this research will be to shed some light on these problem areas by developing more personalized gamification elements in a search to reach more intrinsic motivation.

1.3 Research question
How can a more personalized and internally motivating approach influence people’s engagement in a Gamification process?

2. Related research
This section brings up related research in different areas of Gamification, starting off with studies about Gamification in general to then focus on internal and external motivation, Gamification and exercise and Gamification and social media. This is done in an effort to display what has been done in the area of Gamification within the areas important for this thesis.

2.1 Gamification
Gamification have been used in a wide variety of contexts like commercial, health, education and much more. For that reason it is to be expected that numerous researchers have an input and something to say about the use and value of it. Deterding gathers the voices on this topic of a few researchers in his paper and one of them is, social psychologist and social designer of incentive systems, Judd Antin who discusses Gamification and how and why it may be seen as a bad word. Faulty techniques and too much focus on money and power can damage the value of gamification. To make valuable gamification it is important to use the right techniques in the right context because what works in one context might be completely wrong for another one. Gamification has still a long way to go but if the future bring Judd Antin’s thoughts into account, namely, the context, meanings and individual differences, then the real potential of gamification can be found (Deterding, 2012).
Another person in this paper is Rajat Paharia, who have started hundreds of gamification processes and the first two steps are always the same. First to find out and understand the business goals. After that a deep understanding of the users and what makes them motivated to engage with the business. Users always wonder about, what is in it for them, and if there is nothing they will not do it, even if they get points and badges for it and maybe even if they receive money. Those who successfully meets and amplifies intrinsic motivations of all the stakeholders will have great success with Gamification (Deterding, 2012).

Gamification can be used to motivate people for all kinds of circumstances and there are also a wide variety of game elements included. A context that has been tested a lot is that of education and learning and the most commonly used game elements have been to make use of points, leaderboards and badges (Hamari, 2014). It also showed that Gamification does provide positive effects in at least some way, but that also depends on the context and the users. Another finding in the article was that users are not the same as each other, but instead often varies a lot from person to person and for that reason it is not easy to know what suits a particular person. And depending on the context, the outcome can differ as well. (Hamari, 2014). A gamification technique can work perfectly in a commerce context for a person but when tested in an educational context the result of it may possibly well be completely different. But for another person that same gamification technique is very well suited in an educational context but not at all in a commerce context. The problem of finding the right gamification element for the right person and context is certainly evident when looking at it from this perspective.

Varying interpretations and not enough testing has led to uncertainty of how well gamification is working. There are several areas that needs to be covered, including effects of intrinsic and extrinsic motivations, before clear conclusions can be drawn (Seaborn & Fels, 2014). Based on a collection of definitions and uses of Gamification, a standard definition is emerging and they define it as: “the intentional use of game elements for a gameful experience of non-game tasks and contexts” (Seaborn & Fels, 2014). Some believe that using points, leaderboards and badges are a perfectly fine gamification technique while others only see it as, as they call it, pointsification (Bogost, 2011). And by this they mean that advocates of Gamification utilizes the most boring areas of games and therefore should not be an okay approach. Seaborn and Fels also brings up that some even go so far as to saying that gamification is a sham and only a way for companies and marketing firms to earn money. In contradiction to that, Seaborn and Fels pointed out that the strongest opponents against Gamification focus almost exclusively on a marketing context. This is highly different from Gamification in education and other areas that does not have the same possibilities and prospects of earning money and therefore it should mean that their objective is made with other goals in mind than simply earning money which somewhat rescinds the arguments of the opponents (Seaborn & Fels, 2014).

Including points, badges and leaderboard often works at some level and for some time. It does not however affect perceived autonomy, competence or intrinsic motivation which are all important areas for a person’s deep internal motivations. But since it doesn’t damage it either, this can still be a viable and effective option. (Mekler, 2013). Even though Mekler came to the conclusion that points, leaderboards and badges does not damage the user’s
intrinsic motivations, not all are in agreement. Gamification have its roots coming from games and therefore it is important to reflect about the difference between games and gamification. The main reason people play games is because it is intrinsically motivating. They do it voluntarily which gives them a strong feeling of autonomy. The importance of voluntariness and the lack of consequences in games cannot be underestimated but it is also difficult to capture. If game elements are inserted into a company that is supposed to intrigue competition and social comparison then the voluntariness is gone and it is no longer free of consequences either. This can lessen the sense of autonomy and in correlation the intrinsic motivation for a user (Deterding, 2011).

Zichermann talks about using a mixture of intrinsic and extrinsic motivations because intrinsic motivations are hard to capture because those are feelings of pure enjoyment. Instead extrinsic motivators can be used in a way that they are perceived as intrinsic by the user (Zichermann, 2010). He also talks about the differences between intrinsic and extrinsic motivations and discusses which one is better. In his opinion, intrinsic motivation is not necessarily better because an extrinsic motivator can provide structure and help getting closer to the goal. If a person only have intrinsic goals there may never be anything done to capture it and in that case, an extrinsic motivator can help that person get there. Gamification thus works best when intrinsic motivations and extrinsic rewards can align (Zichermann & Cunningham, 2011).

2.2 Internal and external motivation
Zuckerman and Gal-Oz conducted a research to evaluate the effectiveness of continuous measurement to engage physical activity. They used the most common aspects of Gamification, namely points, badges and leaderboards. Points showed to be more or less useless because it did not really mean anything to the users, it was just an arbitrary number. Leaderboards either had low effect or a great positive effect and it all had to do with the preference of the user. Those who liked competition and wanted to see their name rise on a leaderboard got motivated by it but others who doesn’t care about that sort of thing did not get anything out from it (Zuckerman & Gal-Oz, 2013). This once again indicate the importance of the user’s internal motivation for a successful result. A leaderboard has shown to be motivating for a lot of people, but that has more to do with a large number of people being competitive and feeling the importance of comparing well to others socially. The leaderboard itself does not always work as it is because non-competitive people won’t respond to it at all, or even negatively.

Another study was conducted to see the effects of gamification in the classroom. The outcome of this study presented the perils of using ordinary gamification techniques since it turned out to decrease the student’s internal motivations and they also produced a lower result on the final exams than those who had a non-gamified process (Hanuz, 2015). This invokes the question if this could be a problem in more areas than just in school or if this is particularly troublesome in a learning environment. Since the effect can vary depending on the context it can’t just be assumed that it will the same with exercising for example but it opens up the question and should not be ignored.
2.3 Gamification and exercise

Exercising keeps on being viewed as highly important but it is also something many people have trouble motivating themselves for. Gamification has been used in this effort as well with mixed results. Stepcity was a research focusing on how gamification could encourage physical activity. Three conditions where set up, a control, a social interaction experience and a social game in which steps would be counted to see in which condition most steps would be taken. In the control condition, the participants would only wear their fitbits with no further interaction. In the social interaction experience, the participants could see the other participant’s steps and had the possibility for interaction with each other. In the game, the steps were seen as currency and the participants could build a city with their steps. The game led to more steps among newer users but did not have as much of an impact on the experienced ones (Walsh & Golbeck, 2014). The social interaction condition did not give clear results though and their suggestions for future results included a deeper analysis of that area.

Goh & Razikin (2015) wanted to figure out if gamifying exercise works. Their findings indicated that it does positively affect the exercising level as well as the behavior towards it. They finish of by proposing a personalized process to be something to research in future work because of the shifting motivations by individuals (Goh & Razikin, 2015). Several users does not like the competitive side that often is a part of a gamified process. With a personalized process that could potentially be taken care of.

Foster et al, made an effort to promote physical activity with a social influence. Two sides were monitored where the first one gave them an opportunity to monitor their own step count and another where they could monitor each other’s and interact between themselves. The second version with social interaction proved to be the most effective one in their study (Foster et al, 2010). These people did work together and whether or not the fact that they knew each other impacted the result is something that should be looked in to. For people who does not know each other the outcome could be the opposite because it can be more harmful to feel the pressure of being compared with people they don’t know. But that can change depending on the individual and some may even like that.

Thorsteinsen (2014) conducted a three month long study to see if physical activity could be increased. This was made by setting up two groups with two separate conditions, a control condition and an intervention condition. Both groups had to fill in report cards to show what they had done. The intervention group got feedback via text message as well as some graphical representation of their accomplishments and guidelines of what was recommended. To make it more fun, a game component was introduces which gave points for completed tasks, and with the points collected the participants could climb a status ladder. Two other game components were available. The first one a social contract were two participants had the chance to agree on a workout to finish in order to earn bonus point. The other was a competition where participants could challenge each other to get bonus points and medals depending on how they did. The intervention gave an immediate impact but over time the difference between the control and intervention group became less significant but it still showed signs of improvement (Thorsteinsen, 2014).
2.4 Gamification and social media
As mentioned above, social media and gamification was tested in Stepcity but more work is needed. Hamari and Koivisto made an empirical study about social motivations to use Gamification and also displayed that social factors does indeed have a positive influence on the attitude of gamification as well as intention to recommend related services. The question that remains is how different kinds of gaming elements can change the effects on the use of social media. This study also only made use of a survey so other ways of gathering the data could be utilized. By instead observing closely as well as interviewing all the participants, a more deep analysis can be made about intentions and attitudes (Hamari & Koivisto, 2013).

There are many different types of people using social media in contrasting ways depending on their personality where some are highly active, while others are more passive in their use (Romero & Galuba, 2010). With social media being as influential as it is, there is a need to find out how social media can influence the results of gamification in a positive or a negative way. One user can feel empowered and motivated when interacting and comparing and commenting on a social media platform while another one feels pressured and get less motivated by it.

2.5 Summation of related research
To summarize the findings in the related research, studies have shown that Gamification can work and has at some capacity but there have been heavy discussions about how it should be conducted and if it is effective at the moment. What several researchers are leaning towards is that gamification nowadays lack a focus on the people involved in the gamification process. What they want, need and respond to is often not taken into account. The need to personalize the gamification process to find the users internal motivations are highlighted and proposed as a solution to enhance the advantages of Gamification.

The context of exercise is the main focus on this thesis and for that reason research in that area were looked in to. The differences of individuals were once again brought up as a factor to consider. Finally the use and influence of social media was touched upon because of the use of a social media platform in this study to point out the potential of that being a factor in the results.

3. Theory
To gain a deeper understanding of the main concepts of Gamification and internal and external motivations, a short theory section is made to present them further.

3.1 Gamification
Life is full of chores and things to do on a daily basis. At home, at work and even in the free time for grocery shopping, working out and more. Some of these are in itself engaging but others just has to be done. In the last few years, a concept has been researched and tested in an effort to motivate people in doing these kind of daily routines. The concept is called Gamification and the idea is to take inspiration from video games which motivates millions of people to play day after day, so why can it not do the same for other areas? The term
Gamification, have also been challenged, mainly by the game industry for its oversimplification. In an effort to shed some light into what Gamification really is as well as making sure everyone would be on the same page, Deterding et al. created a definition of Gamification to be the use of game design elements in none-game contexts (Deterding, 2011). This definition has since been widely used and accepted.

Different views of it does exist though and Houtari et. Al. did define gamification in a service marketing perspective as “a process of enhancing a service with affordances for gameful experiences in order to support user’s overall value creation” (Houtari, 2012). Deterdings definition is still the most widely used and accepted one though.

Yo-kai-chou is a gamification expert that has developed what he calls an “Octalysis”. The Octalysis captures the core motivating elements to be used in Gamification and these eight elements are: Meaning, empowerment, social influence, unpredictability, avoidance, scarcity, ownership and accomplishment. These are supposed to capture different elements appropriate for different people’s interests. The thought is that with all these eight sides in mind, almost every motivator a person can have could be captured by using either one of these eight parts on the octalysis (Chou, 2015)

3.2 Internal and external motivations
Criticism have been made about how Gamification is conducted where the main focus being laid on giving the users points and badges and achievements. This approach generates an external motivation that can have effects in the short run but not necessarily all the way through. More meaningful Gamification would put the emphasis on elements of play instead of elements of scoring (Nicholson, 2012). To really make the process meaningful it has to be personalized since everyone won’t be motivated by the same thing. Either an open template can be provided for self-made personalization, with the downside of demanding more of the user. Another way is to offer several diverse game-based activities to be chosen from depending on their liking (Nicholson, 2012). For the best result, at least some consideration should be taken into the user’s interest, backgrounds and needs.

What motivates a person varies a lot from one individual to another. Intrinsic motivation comes from feeling that something is inherently interesting and enjoyable (Ryan & Deci, 2000). For that reason it is hard to find one generic motivational tool for a big group of people. Either you have to figure out what motivates a person before or otherwise at least offer them more choices to pick the one that fit them best. To create intrinsic motivation is then, of course, very difficult since it is not easy to know what someone will perceive as enjoyable and interesting. Events that conduce towards feelings of competence can enhance intrinsic motivation (Ryan & Deci, 2000). So even if it in its core is an extrinsic motivation it can still affect intrinsic motivation. Choice and the opportunity of self-direction enhance intrinsic motivation (Ryan & Deci, 2000). This once again highlights the positive side of giving people several options to choose from. Sense of autonomy is important for the intrinsic feeling. Feelings of being controlled have the opposite effect and might lead to a more extrinsic feeling.

Organismic integration theory (OIT) is a theory that looks at to what extent the motivation for a behavior emanates from the self, in other words, how autonomous it is. From a scale it
goes from non-self-determined to self-determined. It places activities and feelings on a scale from amotivation, meaning there is no inner intention to act upon it, to intrinsic motivation, meaning you have every intention of doing it because it is enjoyable and satisfying. Four other extrinsic motivators lie in between, moving closer to intrinsic motivation in order, external regulation, and introjected motivation, identified motivation and integrated regulation (Ryan & Deci, 2002). This means that even though complete intrinsic motivation haven’t been found, it can still be close to it or far away. Since an intrinsic motivation is seen as the best and most effective one, at least being close to that side of the scale makes it more probable for users to feel motivated.

4. Research methodology
This section is divided in three main areas which have its own under categories. These three areas discuss the research methods used in the study, the participants involved and finishes up with explaining the procedure.

4.1 Participants
The participants in this study were as many men as there were women and both groups had either two or three of each. They were though young, as seven of them were 24 years or younger and the other three between 25 and 34. As a group, they enjoyed training and did also train fairly regularly.

With this information it can be concluded that some bias towards young and physically active people is present. However, it is not leaned towards any specific gender since there were equally many of both.

Below here is an overview of the participants in this study to make it easier to follow as they will be mentioned by their identifier in the text.

<table>
<thead>
<tr>
<th>IDENTIFIER</th>
<th>GENDER</th>
<th>AGE SPAN</th>
<th>TRAINING HABITS</th>
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<td>Every week</td>
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<td>Female</td>
<td>25-34</td>
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<td>Female</td>
<td>24 or less</td>
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<tr>
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<td>PARTICIPANT 10</td>
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4.1.1 Group One
Two groups of five were formed and two different approaches were set for these groups. The first group had a fairly simplified and common Gamification approach used most widely with points, leaderboards and badges. This group of five participants were placed together in a Facebook group to make it easy to hand out challenges as well as conveying messages to the entire group. This group answered the entire questionnaire, including the part about motivators, but those answers were not used to personalize the process.

4.1.2 Group two
The second group got a more personalized experience aimed to reach and conduct a feeling toward intrinsic motivation with challenges constructed, depending on their specific motivators. This group were placed in another Facebook group for the same reason as stated above. This group got their challenges and feedback in a chat window in order to not express them to social pressure.

4.2 Research methods
In this section, the methods used are explained and reasoned for.

4.2.1 Intervention study
An intervention study is when the researcher intervenes with the process by changing the environment or the dynamics of the setting. Since there will be challenges presented throughout the process this is certainly the case and so the benefits and risks involved must be taken into account.

An intervention study can be used and conducted in different ways. One research had two groups, a control group and an experimental group. They also had some time monitoring before the intervention and then after intervention (Stratton, 2010). In the study conducted here, the use of two groups was prioritized to be able to compare the process aiming at internally motivational factors with the more general and common Gamification approach. Since there is only ten participants the groups consist of merely five people, but the possibility of comparing these two varying approaches is seen to be more important than having one larger group because if there is nothing to compare with, it is harder to see the effects. Having a monitor time were not prioritized because it was deemed more important to have the 30 days focused on the real process. However, there were a few days in the beginning of the study to get some sense of their walking habits but it was all included in the results.

Intervention studies are also closely connected to action research where you as a researcher is trying something out, while closely working with the participants. The process of action research is diagnosing the problem, planning actions that could alleviate the situation, conduct the intervention in agreed area of application, evaluate if the theoretical effect where realized and if they did relieve the problem and lastly to reflect on what has been achieved (Oates, 2006). All of these steps have been made in this research.

As a researcher, you always have to be aware that everything you do or say can influence their behavior. This can of course be the point at some moments and then it is not a problem.
But sometimes, the intent is not to influence them at all. In that case you have to be careful not to unintentionally steer them in a specific direction.

Intervening with the participants is in itself an external trigger because the researcher is giving the participants challenges and feedback and overall are very involved. The participant’s motivation is then in a way produced by the researcher and does not come from a strict internal level. To gain complete internal motivation the participants must have a feeling that exercise is inherently interesting and enjoyable. There are, however, different methods to reach a higher sense of internal motivation and that is the difference between the two approaches in this study. If the participants are given an opportunity of self-direction the intrinsic motivation can be enhanced (Ryan & Deci, 2000).

4.2.2 Questionnaire
A questionnaire was constructed which contained two parts, one with more general questions and one about their motivations.

4.2.2.1 General Questionnaire
In order to get some background information about the participants, the first part of the questionnaire were to be answered by every participant about training habits, age and gender. This information is useful to detect if a high activity is based on how active they are before this study. Also to see if there is any difference between gender and age or if there are any bias because of an over representation by a specific gender or age group.

4.2.2.2 Questionnaire about motivations
The second part of the questionnaire is constructed in an effort to capture the participants motivators, what keep and make them more willing to perform tasks in order to be able to create challenges aimed specifically for a specified user. Yu-Kai-Chou’s Octalysis is used as a base ground for the questions to capture different sides of Gamification.

After the answers were collected, challenges and gamification elements were constructed for a personalized experience for the second group. There were some limitations mainly connected to the use of Fitbit to collect the data. Every challenge had to be made in a way that the results could be gathered via the Fitbit. That means it had to be limited to something that could be calculated in steps, stairs, kilometers and active minutes. For example, it is difficult to create a challenge based on a weight lifting workout or other workout sessions with these limitations.

To give an example of a challenge, a participant that thinks it is very important to do things together with other people, got the chance to take a certain amount of steps together with another participant. Another one may have thought that it was very important to improve their results each time and an alternative could then be added with the aim to take 20% more steps than last week.

A person who thinks it is very important to see change and progress from one week to another could get extensive feedback on differences in activity from one week to another and what that means for the body and their health, while someone who did not care either way only got a quick overview every other week.
There is of course a risk that a challenge they get does not fit into what they want even though it is somehow connected to their answer.

4.2.3 Survey
The survey were made after the research to gather information about what they thought about the process, which parts interested them the most, the least, their strategies and more. The answers to these questions will then later be related to the research.

The reason for making a survey with open-ended questions was that it provides in depth answers without having to conduct interviews, which was not possible to do with all of them due to lack of time and unavailability.

With this survey some clarity can be established of how group two felt about the process, if it suited them personally and if they liked that. It will also give an insight to what group one felt about their process. If it was to controlling, too focused on the leaderboard or if they found it motivating as it was.

4.3 Procedure

4.3.1 Fitbit
Every participant got a Fitbit, which is a step counter with a few more usages, which they were to have for 30 days. The demands were to wear it every day and sync it with the computer or phone, preferably, every day as well. The measurable numbers (Steps, kilometers, floors and active minutes) were gathered in an excel document to have an easy overview and to be able to see differences. All of the data were collected through their Fitbits, since there was control over all the log ins. The participants were told to sync their Fitbit preferably every day and got a reminder if two or three days had passed since the last sync.

4.3.2 Facebook
The choice of Facebook as a gathering place for the two groups were made for its simplicity in creating groups and inviting people. There are perils in using Facebook for the reason that not everyone uses Facebook and how frequently they used it can also differ a lot. Before the study it was made sure that every participant at least had a Facebook account. And because the social side was not the main objective in the study it was not deemed a severe problem for this particular research to use Facebook.

4.3.3 Overview of Point system and challenges
The first group were given a more general approach to Gamification and that usually involves points, badges and leaderboards. Challenges were created and handed out to this group of people. Feedback was given with the steps taken as well as points gathered with a weekly leaderboard.

The second group were given individual challenges that are dependent on their answer. They were also given three options to choose from to pick the challenge that fitted them the best and at times they had the opportunity to create their own goals. The last difference was that they will be given some information instead of only points or steps. For example, they could get information about how that completed goal affect their body and health or their life.
in general. All of this is made in an effort to generate a higher degree of autonomy and to not make them feel controlled which is the basis for enhancing the feeling of intrinsic motivation and to not feel externally controlled.

In an effort to make the gamification more meaningful in the second group, an attempt was made to deemphasize the focus on points gained or badges earned. This will however depend on what they answer in the questionnaire, if points are motivating, then that should be involved. A leaderboard is part of the general approach since it is broadly used within Gamification and this often works really well depending on the person’s interest in such things. This could also be used to the second group if it turns out they are interested and motivated by it.

If Gamification wants to become truly meaningful, it has to be a match for every individual person. This is hard to accomplish because people are very different from each other. One way of doing it though, is to make it possible to reach the goal with different gamification elements so everyone can choose the one that makes it most meaningful to them (Nicholson, 2012). In this research, challenges were presented several times and to make them as meaningful and internally motivating as possible there was three options to choose from, for the second group, in order to complete the challenge. The challenges were also created with the participant’s interest in consideration to make the gamified elements feel more rewarding.

5. Study
In this section the study conducted is explained to show what happened from the start of it until the end.

5.1 Timeline
To start of the participants were placed in two groups as mentioned with a short introduction to the process. The participants answered the questionnaire, placed in both groups, and everyone answered within five days. Both groups get the same questionnaire but only the second group will make use of it.

It took a week to collect all the answers and one Fitbit had to be replaced as well as one group member who late on realized she did not have time. The replacement were found quickly though. After everyone got their introduction, were placed in the correct group, had received their Fitbit and answered the questionnaire, it was time to start the 30 day study. For the first few days it was done without any specific instructions or challenges mostly to make them ease in to it and also to get some sense of their walking habits to see how many steps is reasonable for challenges in the beginning. Through the study a total of five challenges were created and submitted. The participants got feedback after every week and sometimes after challenges. When the 30 days were over a survey with concluding questions about the process were given to everyone.

5.2 Challenges
Group one got one challenge for everyone and a challenge that could be calculated by the Fitbit. If they completed the challenge 100 points were given, this was later raised to 200 point. They also got points for every 10 000 steps taken. After every week a leaderboard were updated and put in the group in the form of a podium. The podium can be seen in appendix A.

Group two does have three aspects involved that is not included for group one in order to create a more meaningful and internally motivating Gamification experience. First off, they are getting personalized challenges and feedback constructed from the answers they give in the questionnaire. Secondly, they always get three choices to pick from in order to utilize the
challenge that fit them the best in an effort to make them feel less controlled and having a greater sense of autonomy. Lastly, the feedback will not only be in numbers but in information. Providing information instead of only a score makes it feel less externally controlling and creates more meaning to the process (Nicholson, 2012).

The answers are collected and for the participants in group two the answer are personally connected to challenges and feedback for that particular person. An example of the creation of a challenge is listed below.

5.2.1 Forming of a personalized challenge
Three examples of questions and answers from participant 6 is as follows. She answered that it was not important at all to compare with other people. She also answered that it is very important for her to help others. And as the third example she answered that it is very important for her to be able to set her own goals.

From these answers it was decided that a leaderboard would not fit her at all and were thus excluded. Because it is very important for her to help other people, an alternative for a challenge were to take an amount of steps with another participant and further to take more steps to make it easier for the other person. The high importance for her to be able to set her own goals gave her the alternative to do just that.

Since she stated that it is very important to feel that is was her and no one else who completed something challenging, affirmative feedback were given to point out what she had accomplished over the challenge or week. She also thought it was important to get a reminder when time were about to expire for a challenge and therefore got reminders when only a short time remained.

The questionnaire with the questions about motivations as well as examples of challenges can be found in appendix B and C.

5.2.2 Challenge one
The first challenge was distributed on the evening of day four with the starting point of the challenge on day five. It is a three day challenge set over the weekend, Friday to Sunday. Group one did not get to make a choice of challenge, it was instead handed to them. The challenge was to take 18 000 steps during these three days which is 6 000 steps on average. This was lower than the group’s average over the first days but on the other hand, there were some days for some specific people that increased the average. The second group got their three options to choose from, with every option created with the answers of the participants in mind. The number of steps could also differ depending on the amount of steps they took on average in the first few days to give them reasonable goals to reach.

In order to not show everyone the other person’s goals, the challenges were posted in a closed chat for each and every person in the second group. Only general information were displayed on the group site.

5.2.3 Challenge two
For the second challenge there were more data to go on which meant that more reasonable challenges could be handed out. One person in group two, for example, got a challenge he greatly exceeded but that could be corrected to the second challenge for a more rewarding goal to chase.

Group one got information that points for completed challenges had been doubled to make it more worthwhile to complete them because of the realization that the points gathered for a completed challenge were too insignificant with the current point system.
5.2.3 Challenge three to five
These challenges were constructed and conducted in the same manner as the first two challenges and does not need a deeper explanation.

The only clarification needed is that group one, for their last challenge had an increase in the points allocated for steps taken to make it more interesting.

5.3 Problems
Overall it went well and the participants regularly synced their Fitbits almost every day and mostly had it on them every day as well. There were some misses though. For example, one participant in group one, forgot to wear the Fitbit the first two days and also forgot it a couple of times after but it got better with time. A few others also had a day or two missed during the process but it was at an acceptable level and worked a little better than expected.

6. Data analysis/Results

6.1 Statistical changes for group one
In this section the results of the study are conveyed. First, they are presented one week at a time because that was how the study were conducted with information normally displayed at the end of each week. A presentation is also done in three parts with 10 days at a time for the 30 days.

Week 1
The first week were the best week for participant 3 along with week three which was almost identical apart from four steps. For participant 4 it was the third best week and for the rest of them it was the worst week of them all. This is a sign of a slow start for most of them with really only one exception.

Week 2
The largest upsurge happened from week one to week two where all but participant 3 increased their results and participant 3 did not drop much but stayed at a close level. From week one to week two the increase was 19%, but it was one participant, participant 5, that increased it far and above more than everyone else, and without that participant the increase got to 6% which is not as substantial. This second number may be more correct in a group perspective.

Week 3
From week two to three there was once again one person, participant 1, who changed the results a great deal with a 100% increase. The increase was 23% with that participant, but only 3% without the same. And with a 100% increase it makes more sense to get the group average without that participant because it is an obvious outlier, but it should still be noted. This was still one of the highest achieving weeks with it being either the best one or a close second for every participant.

Week 4
Participant 1 had to leave town and therefore end his participation five days early. Statistically group one declined 8% from week three, but comparing it with all weeks this changes a lot from person to person. For participant 1 and 4 it was the best week, for participant 3 the worst week and for 2 and 5 the third best. It is hard to draw conclusion from that and even harder when participant one had to get the last three days of the week
calculated on the average because that participant didn’t participate the last three days. Without those days, participant one had 54,989 steps the four first days of the week, but with the added average on the last three days that rose to 96,075.

So to sum up, without the outlier, group one increased 6% from the first, to the second week and 3% from the second to the third week. This is not a significant change.

![Diagram 1 – Amount of steps by participants in group 1 by week](image)

What can be seen in diagram 1, is that the middle weeks overall had the best results. Participant 2 and 4 had pretty similar results week one and four with the middle weeks as their best. Participant 1 started off slow but ended with a remarkable upswing the last two weeks and participant 3 and 4 had pretty even result with participant 4 climbing a little each week.

**Challenges**
The challenges were mostly completed except in week three when the challenge was about active minutes. Only two out of five completed the challenge that week and it seems to have been some problem with the calculation of the active minutes and how reliable it is. The last challenge were good except for the one not finishing the entire study and missed the last challenge.
Changes over 10 day periods

Diagram 2 – Amount of steps taken by participant in group 1 in 10 day spans

In diagram 2, the result is now shown in three periods of ten days. The result is still fairly similar as when broken down into four weeks.

6.2 Statistical changes for group two

Week 1
This was the first week which started off without any demands and there were no results to compare it with initially. But with a comparison of the other four weeks this was the third most active week for all of them indicating a slow start also for group two.

Week 2
From week one to week two, the second group had a 12% decrease in amount of steps. However, the average were dragged down heavily by participant 7 who had a decrease of about 30%. If you take that participant away the decrease was only 1%, so more or less unchanged. As can be seen in the diagram (diagram 2a) the numbers are very equal to week one without the one exception.

Week 3
Three of them, participant 6, 7 and 8, gained noticeably in week three compared to the two previous weeks with a 33, 110 and 56 percent increase for them respectively. Participant 10 gained a little and participant 9 stayed at the same, very high, level.

From week two to week three there was, as a group, a 42% increase. This time, the group average was due to the same participant, number 7, who was the outlier last week as well and who now increased with over 100%. If that participant is scratched, the increase is 25% which still is noteworthy. Everyone was healthy and the attitude towards the challenges and the
Week four was a bit more troublesome for several reasons. It started off well, the first three days over the fourth challenge but after that it was a bit mixed. Participant 8 were sick for several days and did not take any steps at all in the end and participant 7 could not sync the last three days which makes it difficult to ensure the results even though the numbers could be seen on the actual Fitbit.

Because of this, some results may only be collected from a few days, or the average of a few days which leads to less certain conclusions. This is especially evident for participant 8 who did not record any steps the last four days of the week and only got a total of 27 204 steps. What is seen in the diagram is the total steps if the first three days average are put in for the rest of the week which of course leads to numbers that are hard to take any conclusions from. Either it is a 63 percent decrease or a 15 percent decrease for her, which is not a minor difference. What you could see though is a lack of interest since it was evident several people forgot to wear their Fitbit or forgot to sync more than usual, and that was true for both groups as a whole, not group two. It could also be noted in their answers when the challenges were handed out because it was a lot more enthusiasm in the beginning than in the end. Not true for all though, two participant from group 2 had high spirits and motivation to the end and their results showed that as well.

As a group, they declined 17%. It should however be mentioned that the highest achiever for group 2, participant 9, were sick a couple of days which could of lead to his big decline which was far above the rest. Without him their average decline was 13%. As stated earlier, these statistics are hard to ensure and a few of them got their result based on their average that week before the problems arose. One important note is that even though there were a decrease from week three this was still a fairly good week when looking at the overall numbers. For two of them this was the worst week but for the three others week 4 were the next highest week of them all.

Challenges
The challenges were mostly completed well or at least almost completed. The worst one were the last one where only one completed the challenge, even though two others were close. This may have been a consequence of a couple of participants being sick but that is not a certainty. Challenge one, two and four saw four out of five participants completing the challenge with it almost being five in week four.
Evident by diagram 3 is that the tendencies looked pretty similar for participant 6, 7 and 8 and that participant 9 and 10 were similar to each other. Participant 6, 7 and 8 had week three as their best week, then four, then one and lastly week two as the worst one. Apart from an 8.5 percent increase for participant ten in week three, both participant 9 and 10 had fairly equal results week one to three and a big drop off to the last week. One aspect needed to mention is that every participant did, before week three get the question if they wanted to set a main goal for the rest of the study. Participant 6, 7 and 8 all had clear goals related to steps that they worked towards the rest of the way, while participant 9 and 10 did not have anything particular in mind other than exercising a little more than usual.

**Changes over 10 day periods**

*Diagram 4 – Amount of steps taken by participants in group 2 in 10 day spans*
When looking at it in a ten day span like in diagram 4, it becomes a bit more evenly distributed. For participant 6 and 7, the last period now becomes the best one and the next best one for participant 8. For participant 9 and 10 it looks quite similar. This does not really change the conclusion from it but still sees the second half of the study as the strongest for participant 6, 7 and 8 while the finish were the weakest part for participant 9 and 10.

6.3 Differences between groups one and two

Group 1 did not change that much over time and after their initial 6% rise they decreased a little. In comparison to group 2, it was kept on a pretty steady level while group 2, apart from the first week took both major leaps and falls. But if you look at all the participants in group 2, there is a clear decline for the majority in week two and a clear rise to week three. And even though it declines again to the last week it is still, for most of them, a stronger week than the first two. For two of them it was still the worst week but it still does not look as bad as when comparing to only week three. It could be as easy as a few of them reaching their top potential in week three which makes it hard to keep increasing and the only way from there is down. The drop in week two is still interesting though.

Diagram 5, shows the changes between weeks in percentage for both group 1 in blue and group 2 in red. The great shifts for group two is noticeable but the increase from week two to three should be made more of than the drop to week four because the drop in percentage looks worse when compared to week three.

![Diagram 5 – Changes from week to week in percentages](image)

It went a bit up and down in both groups and the changes were on a more individual level than on a group level. Participant 6 in group two did keep an even high level through the entire process with the only real big change between week three and four with a 33,6% increase. That increase came short after a personal goal was set and then kept throughout.

Participant 5 in group 1 started with a 58% increase, then an 11% decrease followed by a 26% decrease. Participant 9 group two stayed at the same level until the last week that showed a 35% decrease. It did demonstrate a great difference on a personal level with a wide variety of results.
6.5 Concluding survey
With a quick overview, group two seemed a bit more optimistic in the survey but overall they both gave the impression of being positive about the process.

**Group one**
One participant in group 1 did not like the focus on comparing to others in a leaderboard. That participant did set the lowest grade on both the importance of being the best and on comparing with others. This was also told directly to the researcher with a clarification that setting inner goals and seeing an own self-improvement was the only motivating factor taken into account. This participant did perform well though and increased every single week despite these comments.

The reactions on the leaderboard were mixed and either it was motivating, fun but not motivating or even less motivating. Challenges, amount of steps and restlessness when not moving where seen as motivating factors and the biggest reason for using the Fitbit was the ability to show how much they moved each day. The only non-motivating factor mentioned was that one participant experienced group pressure.

The presence of challenge were seen as positive to keep the motivation and as a reminder to wear the Fitbit.

To make it more motivating the comments received mentioned more demanding challenges, more alternatives and more participants for higher competition. Everyone said that they moved more than before the study.

**Group two**
Motivating factors were the simple way to see steps taken, see result when trying hard, to know that others used it and the chase to take more steps than earlier. The two comments about the least motivating factors where when the Fitbit did not calculate correctly and another that though the challenges were okay but not more and that the real training were more motivating.

They used it because it was fun, and one more specifically because it was fun to measure the everyday walking and another to see the results. One participant did it because it was fun in the beginning but later one mostly just tried to remember it.

More challenging and fun exercises and group training were mentioned for a more motivating process. Most of them wanted even more alternatives. One thought the challenges helped a little for the motivation and the others liked it.

One particular comment were pushing for more exciting and fun challenges because of a lack of motivation towards the end. The example were thrown out that some kind of workout would make it a lot more interesting and a little less focus on steps. Another one wanted more specific challenges, like run 5 km today and the others liked it as it was and thought the challenge fitted them.

Except from one who didn’t move more or less, all the others said that they moved more than before the study.

7. Discussion

7.1 Internal and external motivations
Earlier research have shown that using points, leaderboards and badges can work and often does, however, it is rarely shown to be suitable for all and the results tend to diminish with time. What have seen to be missing is to make the process of Gamification more fitting for each person and their personality and inner motivations. This need has also been highlighted by some but not often tested in real life.
There is a difficulty of finding pure intrinsic motivation because that lies within what the person finds internally motivating without any extrinsic motivators. So there must be some part of a person that enjoys exercise and that makes the person motivated just by the thought of exercising. If not, an internal motivation is not possible. Many people does have an internal motivation towards exercise because they know how important training is for your body, and the thing to do then, as a researcher, is to enhance that motivation with external motivators. This study is made thus, that the second group is supposed to feel like it is an internal motivation because they, for instance, have the opportunity to set their own goals. It is also made an attempt to increase their sense of autonomy by giving them more choices and giving feedback that is not points or a grading system. Acquiring data with the steps taken may lessen that sense of autonomy though if they feel it is restricting, but that is individual.

The increase for group one from week two to week three could indicate that the personalized gamification approach is better in the long run than the more general approach. On the other hand, that group showed a decrease the last week and while the other group also had a decrease it was not as big. In an overview, group one’s results did not change that much but kept a similar result throughout the entire process where the increases and decreases where fairly small. Group two had more of a roller coaster ride with a substantial rise in the middle and a fairly steep fall in the end.

This could mean that while group ones experience may not have been that eventful, it didn’t really lift or ruin the results through time. Group two’s more rapidly changing results could simply be a product of how interesting and well made the challenges are and how well they fitted at that exact time. Coincidences cannot be ruled out either because participants in that particular group may have all been healthy that week and not the next one, which seemed to have been the case. Other external factors may have contributed to the results as well.

There is a difficulty in knowing what to make of the numbers when viewed as a group, but because of the great differences on an individual level it is further displayed how important it is to look at this from a more individual view point.

One interesting area of discussion though is the fact that three of the participants in group two had their strongest two weeks the last two weeks and followed a similar pattern to each other. They had two things in common. One, they were all females, and two, before the third week they set up clear goals they wanted to reach the rest of the way through. It is hard to draw a conclusion from the fact that they all were female since that may just have been a coincidence. It is, however, interesting that they kept such a high level after a long term, internal goal was set. Because they set the goal themselves it did come from an internal motivation that they created themselves and did not come from an external party. This will empower their sense of autonomy, they will feel less controlled and feel an internal motivation. The other two in the group did not set a specific goal and both of them dropped in week four. This could potentially be a result of them continuously relying on externally received challenges. They still had their three choices and could also choose an own challenge but what they did not have was an internal goal for the rest of the study which they could feed with a strict internal motivation and that could have led to lesser results in the end.

Zichermann discussed how internal motivations works best in relation with external because the external can bring structure to the internal goal. In this specific area, the external trigger was the researchers question about any milestones the particular participant had for the rest of the study. That brought forward the internal goals which now had it written out and a deadline for it. The other two did not really take the opportunity and the question is if it would have been better to push them a little or if that would make them feel externally controlled.

An important note that has to be considered is the fact that this study was made in an exercising context. As earlier research have made known, not only the particular person’s
internal motivations matter but also the context it is made in. The results and indications in this study can reveal tendencies in Gamification in general, but specifically for an exercise context but other contexts need to be researched as well.

The answers from the survey at the end of the study did also provide something to think about and discuss. The participant that brought up that the leaderboard made him/her less motivated and also set the lowest possible score on the need to be the best as well as comparing to others did perform well anyway, with better results every week. This can seem contradictory and maybe as a sign that some part of him/her actually did get motivated by the comparison and competition but it is too frivolous to make that assumption. What has more weight is the fact that the participant specifically said that the motivator was the own self-improvement and the satisfactory feeling of taking a lot of steps each day. In short, that participant, more or less ignored to competition and focused on the inner goals and the inner motivation to keep going.

The negative comments from the second group were about a lack of really fun challenges, too much focus on steps and a wish for a different kind of exercise, like a special workout. The obstacles with creating challenges like that have been discussed, and will be discussed further below, but if that would have been possible, that may have been a lot more internally motivating for that person because it’s what that particular participant finds enjoyable. A falling activity and lesser motivation does not have to mean that seeking their internal motivation is not working but perhaps that another sort of motivator is needed to capture it. Most of them were positive though and felt that the challenges were suitable for how they work.

7.2 Choice of motivation gathering and data collecting
This section is made to discuss the implications of the motivation gathering technique used as well as the data collection tool.

7.2.1 Gathering motivation
In this thesis, the decision was made to let the second groups answers determine their Gamification process. There are some concerns with this approach and mainly that people does not always know what they want or feel until it is actually happening. For example, a person might think that he or she does not want to compare their results with others, but if they are involved in a leaderboard it could actually motivate them more than they thought.

Despite this, the chosen path was kept. A few alternatives were explored, including psychological questionnaires, which aimed to find people’s underlying wants and needs. At the moment it did not seem feasible but it is an area that could be explored further. Ryan and Deci talked a lot about the autonomy of motivations and how there was a scale that went from non-self-determined to self-determined. With that scale in mind another way of collecting the participant’s motivators could have been caught but for this study the path of letting their answer be the ground were deemed to be the best for this particular study even though ideas were kept from their research.

They did not always act as they said in the questionnaire which was always a concern from the beginning. For instance one person thought it was very important to both do things with other people and to help other people. Yet, that participant never chose an alternative to work with someone else or to help another person. It can be argued if it depends on that the participant did not really believe what that person thought they believed when answering the questions, or if the challenges was not constructed well enough.

7.2.2 Collecting data
As mentioned, the Fitbit on had its limitations in that it were difficult to calculate on other criteria’s than steps, distance, floors and active minutes. Active minutes also displayed signs
of problems with how they were calculated with results that did not match what the participants said they did. When looking at the challenges, the week were most people failed in group two, were when the challenge was about completing a certain number of active minutes. In group one where they had more choices, the choice containing active minutes were often avoided.

Since internal motivation is much about sense of autonomy and that having more alternatives to choose from also helps the feeling of internal motivation, it is troublesome that the data gathering gadget they used so limits the number of options available. By week four there were hardly any new challenges, just different numbers and mixes of those already used or suggested. That could of course be a factor that possibly made it less motivating to complete since they already did something similar before.

The reason for the choice of a Fitbit one was the easy way to collect data without much effort from either the researcher or the participants. Without it, the results would lie with the participants and what they said they did without any chance to control it and it would also take more time for them to record that by hand every day. In a paper researching similar areas as this paper, they used the latter variant where the participants submitted their results themselves and in that case the correctness can always be discussed as some can alter their numbers to win a competition.

7.2.3 Summation
Both the choice of way to find out the participants internal motivations and the choice of data collecting tool is seen as working well for this study. Neither one was perfect and they both have their limitations but it did still give an insight into their motivations which made it possible to create the challenges and feedback for everyone and the Fitbit made it easy to collect the data and also easy for the participants to gather their own data without having to put too much energy into it. If there is a better version of a Fitbit available then that would be ideal because, as said, the easiness of it is truly an advantage. If there was a version that can collect data from different sort of workouts and other similar areas, an upgrade like that together with the easiness of a Fitbit one would be ideal. Other ways could and probably should be tested to see if different or better results can be gathered but these used in this study are well enough to conduct a study of this sort.

What should be mentioned is that there is a lack of statistical analysis on the quantitative results gathered in this study. This makes it more difficult to establish the significance of the results collected.

8.1 Conclusion and future work
This study aimed at researching connections between internal motivations and gamification through an intervention study. It was set up to answer the question: How can a more personalized and internally motivating approach influence people’s engagement in a Gamification process? The conclusions to be drawn are explained below.

This study indicated that personalizing and creating a more internally motivating approach have some promise, most clearly shown by the vast improvement in week three by the personalized and internally motivated group two. But since those numbers declined a bit to the last week, it became more difficult to see the connection until a closer look circled in the fact that the decline mostly depended on the great results in week three and not because of a bad results in week four. Judging from comments and responses from participants in both groups, there seemed to be higher interest in the personalized process.

Since the participants in group two, who halfway through the study set up their own goals for the rest of the time, had increased numbers in the other half of the study compared to the
other two who decreased, the importance of finding an internal goal is further highlighted. If the users can be convinced to set their own realistic goals that they really want to manage, a strict internal motivation can be captured. The problem is to make them find that inner goal without forcing them to choose one, because that would only lead to them feeling externally controlled and even their chosen goal would feel externally set. But if this can be reached on a natural level, a big step would be taken towards a better process.

Finally, to improve the study there should be a search for the best way possible to capture people’s inner motivations as well as the best way capturing the results in a way that does not diminish the sense of inner control. The connection between internal motivation and Gamification becomes stronger when the limitations are as few and trivial as possible because a higher freedom and less sense of being controlled leads to higher sense of autonomy which leads to greater motivation. The apparent downfall of this process may have been the restrictions posed by using Fitbits which only lent itself to exercise easily captured by the device. Creating better and more fun challenges could also have helped but this is somewhat also connected to the restrictions of the Fitbit. The restrictions posed by the use of a Fitbit inherently restricted the different types of challenges that could possibly be constructed. This is a topic that requires much more research because a lot is pointing to a need for a more personalized and internally motivating experience within gamification.

Future work include trying different ways of collecting people’s internal motivations and another way of collecting the data needed. There is also a need to make another study like this with more participants as there were a limited amount of participants present in this study. It would also be of great value to conduct researches in other contexts as well to get a broader result and to see the differences created by dissimilar contexts.
References


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Appendix A – Leaderboard and badge group 1

High achiever!
10 000 steps in a day!
Appendix B – questionnaire about motivations

1. Hur viktigt är det för dig att kunna jämföra resultat med dina vänner eller bekanta?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

2. Hur viktigt är det för dig att vara bäst?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

3. Hur viktigt är det för dig att hjälpa andra
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

4. Föredrar du att göra saker ensam eller med andra?
   Alltid ensam, 1 – 2 – 3 – 4 – 5, Alltid med andra

5. Hur viktigt är det för dig att få någon sorts belöning eller pris för en prestation?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

6. Hur viktigt är det för dig att förbättra och höja din mål?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

7. Hur viktigt är det för dig att känna att det är DU och ingen annan som klarat av något utmanande?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

8. Hur viktigt är det för dig att se vilken förändring/förbättring som skett över tid?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

9. Hur viktigt är det för dig att känna att det du gör är något betydelsefullt?
   Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

10. Är det mer eller mindre motiverande att utföra något som du vet att de flesta andra gör?
    Mycket mindre motiverande, 1 – 2 – 3 – 4 – 5, Mycket mer motiverande

11. Blir du mer eller mindre motiverad att utföra något om du känner att du gör det för en grupp du tillhör?
    Mycket mindre motiverande, 1 – 2 – 3 – 4 – 5, Mycket mer motiverande
12. Hur viktigt är det att få omedelbar feedback?
Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

13. Hur viktigt är det att nå milstolpar?
Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

14. Hur viktigt är det att få sätta dina egna mål?
Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

15. Anser du det vara motiverande med problemlösning och få möjligheten att hitta kreativa lösningar på problem?
Nej, aldrig, 1 – 2 – 3 – 4 – 5, Ja, alltid

16. Hur viktigt är det med oförutsägbarhet för att hålla dig motiverad?
Inte alls viktigt. 1 – 2 – 3 – 4 – 5, Väldigt viktigt

17. Skulle det vara motiverande att få veta vad du går miste om ifall du INTE gör en uppgift?
Nej, aldrig, 1 – 2 – 3 – 4 – 5, Ja, alltid

18. Hur motiverande skulle det vara med påminnelser om hur kort tid det är kvar att klara av en uppgift?
Inte alls motiverande, 1 - 2 - 3 - 4 - 5, Väldigt motiverande
Appendix C – Example of challenges for group 2

Group 2

Participant 9
Challenge 2 – During the Friday you should finish
Alternative 1) **15 000 steps** which is an increase of about 80% from the average of the last challenge. If you want to be the best, you need to raise your goals.
Alternative 2) **Be active for 100 minutes.** To be active and get active minutes means that you do something more strenuous and intense than walking at a calm tempo. You have to be active for more than ten minutes for it to count.
Alternative 3) Choose an own goal to complete during the Friday.

Participant 7
Challenge 2 – During the Friday you should finish
Alternative 1) **5000 steps**
Alternative 2) **Be active for 30 minutes.** To be active and get active minutes means that you do something more strenuous and intense than walking at a calm tempo. You have to be active for more than ten minutes for it to count.
Alternative 3) **14 000 steps** with someone else in the group who you agree with. Doesn’t matter who does what.

Participant 6
Challenge 2 – During the Friday you should finish
Alternative 1) **8500 steps** which is a 15% increase on your average every day.
Alternative 2) **Be active for 30 minutes.** To be active and get active minutes means that you do something more strenuous and intense than walking at a calm tempo. You have to be active for more than ten minutes for it to count.
Alternative 3) Choose an own goal to complete during the Friday.

Participant 8
Challenge 2 – During the Friday you should finish
Alternative 1) A lot of other participant will have the alternative to be **active for 30 minutes.** You can also choose that goal. To be active and get active minutes means that you do something more strenuous and intense than walking at a calm tempo. You have to be active for more than ten minutes for it to count.
Alternative 2) **6 000 steps**
Alternative 3) **14 000 steps** with someone else in the group who you agree with. Doesn’t matter who does what.
Participant 10
Challenge 2 – During the Friday you should finish
Alternative 1) **8400 steps** which is an increase of 25% from the average of the last challenge.
Alternative 2) **5000 steps and 60 active minutes**
Alternative 3) **7500 steps and 30 active minutes**
To be active and get active minutes means that you do something more strenuous and intense than walking at a calm tempo. You have to be active for more than ten minutes for it to count.