Abstract

Nowadays gamification is used in some form or another in most applications in order to boost engagement and loyalty. However, we know gamification has an impact on other aspects as well, like motivation, performance and habit forming. While there are many articles on the impact of gamification on motivation or performance, the way gamified systems affect habit forming is not studied as widely. We will try to start a discussion, although minimal, about the effects of gamification on long term habit forming. While a positive effect might open up applications to new ways of using game elements, we should also take into consideration that a negative effect might mean gamification is detrimental to some types of software systems. Improving habit forming can be helpful from both an individual wellness point of view, being able to more easily form habits that bring value to a person’s life, and also from a business point of view, we can strive to form the habit of using our application to users. On the other side, finding that gamification is detrimental to habit forming might have an impact on the way we use this technique. Gamification is often used to boost performance. If that is at the cost of this performance going down below the initial baseline after the removal of game elements, we might want to rethink our strategy. We designed an experiment based on the journaling habit. The goal of the experiment is to track the use of the application before adding the game elements, while having the game elements active and after their removal, on a period of time long enough to get some conclusions about long-term habit forming. We also offer a method of interpreting the results of the experiment based on a set of metrics.

Introduction

First of all let’s define gamification in the scope of this article. While the term doesn’t yet have a standardized definition, we will choose to define it as Detterding did in his article ([1]) as “the use of game design elements in non-game contexts.” . While this is not necessarily a standardized definition, it is the most widely accepted one in the academic field.

Gamification is a very debated topic that first appeared in 2008 in the industry of digital media. It didn’t get much attention until 2011 – 2012. This might be because smart phones became popular in this period, and therefore people understood how well this practice goes with mobile phones.(see [4] – Synthesis of a few mobile application that use gamification in m-Health and Lifestyle) While it was highly debated through the years, lately, the study of gamification slowed down significantly. This doesn’t necessarily mean gamification is not important anymore or that it would be a fad, but it is nowadays so highly adopted and used in the industry that we might think we already mastered it.

While there are many studies on the effects of gamification on productivity and user motivation (see [1] – Experiment to show the effect of points in user motivation and performance, [2] – Effect of game elements on water intake (performance), [3] – The effect of game elements on motivation from a psychological point of view), not many of them focus on long term effects (might be from lack of participants / funds). When designing an application, we can be tempted to only think of ways to attract users in this moment, but not think as much about what happens after our users don’t use our app anymore. This is a reasonable way to do things if we put ourselves in the position of a product owner that needs to get profit quickly. This is probably why the research in this field slowed down, because we knew how to get what we needed from gamification already (user performance, motivation, engagement, loyalty). An article that focused specifically on intrinsic motivation is [5]. Intrinsic motivation is closely related to habit formation, in that it is independent of the external factors (i.e. game elements), so it might be present even after the removal of the application. One of the few articles that touch on user performance after the removal of game elements is Blue Bottle [4] , where water intake was similarly measured before the introduction of game elements, while they were present and after their removal, but the timeframe of the experiment was not long enough to bring valuable answers about long term habit formation. Their result showed a slight decrease after the removal of game design elements, but the overall water consumption was better after the use of their application than before. This brings some hope that gamification might be used for habit formation.

Let’s try to frame ourselves in a different role. Gamification is not useful only to product owners. If gamification is used to temporarily enhance performance, we might want to find out if it can improve performance in the long term, even after the removal of our application. This might not be so useful to understand from an industry point of view, but a tool that can improve habit formation would be valuable in the fields of education, raising children, helping criminals to fit into society again. In fact, gamification is already widely used in the education field and in many mobile apps targeting health, fitness, studying, so on and so forth. We should also be mindful to the possibility that gamification might have a bad impact on habit formation. For example, let’s say that a child goes through a mathematics course that is heavily based on gamification (as many of them are). Will the child maintain the good habits on the long term, after the course is finished? Will coming back to the traditional form of learning be an easy task, or will the child never accommodate back to a regular process?

In this article we propose an experiment, trying to answer the following questions (or at least mildly helping in answering them):

Does gamification have an impact on habit forming on the long term?

And if the first question gets a positive result, then:  
Is this impact a positive one or a negative one?

Experiment

In order to investigate the effects of gamification on forming habits, we implemented a web app that allows users to journal. Because of lack of time and resources we will limit our research to the formation of the journaling habit.

The application

Our application will be web based and will present a user-friendly text editor. This text editor serves as a journal interface for the user. The text editor will have a series of functionalities like writing bold text, underlining text, highlighting and others. The role of these elements is to create a comfortable user experience to our participants and to give them the possibility to personalize their journal, so the application resembles a physical journal as much as possible. The user has to first log in our web app. At that moment his writing session begins. Afterwards, he starts writing his thoughts in the text editor. When he is done with his current session, he will press a button in order to end the writing session. The logging in and terminating the session will give us important insight about the way our users interact with the application. These two functionalities already add some effort to using our application(compared to the act of writing in a physical journal). To minimize this effort, we will not have a register functionality, the users will be given already existing accounts.

The game elements

As an addition to our application, we will use a set of game elements to introduce gamification to the app. We will use a progress bar that will fill in as the user spends more time in front of the application.

The progress bar will fill in multiple times during the experiment and each time it will take gradually longer to do so. We will also introduce another game element, achievements. After each progress bar filled we will award the user a badge that serves as an achievement. The awarded badges will be permanently visible to the user above the text editor.

We will also use unlockable features as a game design element. The unlockable feature will be a color for the text. Another color will be unlocked every time the user fills a progress bar.

We choose to base our game elements around time instead of character number because we find it to be a better indicator of how much a participant uses our app. This is because the journaling habit itself is based on the time spent in front of a journal rather than how much you write in it.

We mainly opted for progress bars, badges and unlockable features because they fit well with the journaling application. They not only fit well in terms of functionality, but they frequently remind the user of his progress, which might create the sensation that progress in the app is important. Through this mechanism we hope to create some level of intrinsic motivation. Intrinsic motivation is an important factor because it will not disappear when the game elements are no longer used, and as such there is a bigger chance we create a long-term habit.

The population

We will separate our participants in two groups. The first group will be a set of X people that confirmed they want to form a journaling habit. This group will be comprised of A men and B women of different age groups ( C females between 21-30, D males between 21-30, E females between 31-40, F males between 31-40, G females between 41-50, H males between 41-50 ). The second set of Y people confirmed that they didn’t necessarily want to start journaling, but they are not against it either. This group will be comprised of A men and B women of different age groups ( C females between 21-30, D males between 21-30, E females between 31-40, F males between 31-40, G females between 41-50, H males between 41-50 ).

Periods

We will split our experiment in 3 different periods which will take a total of 56 days. The first period will serve as our control phase. In this phase the participants will be given the application with no gamification applied. This phase will take 7 days. Our next phase will be our gamification phase. In this phase we will add the game elements to our application. This phase will take 14 days. The third phase will be called the “post-gamification” phase. Gamification elements will be taken out but the application will still be usable and we will continue to collect data of our users behaviors for the next 35 days. This third phase will be split in 2 shorter phases, the first 14 days will be called “early post-gamification” phase, and the last 21 days will be called “late post-gamification” phase.

This experiment is trying to find the benefits of gamification on long-term habit formation, so as long of an experiment as possible is needed. With the time and effort we currently possess, 56 days is the maximum we can achieve.

Metrics

We will consider 3 metrics for analyzing the result of our experiment: frequency of writing, average time spent in front of the journal per day, quantity of writing. Frequency of writing will be calculated as days of using the application at least once (at least one session). Average time spent in front of the journal per day will take into consideration the length of each writing session, assuming that the participants use the application for the entire writing session (this will be communicated to them before starting the experiment). Quantity of writing will be calculated as the absolute number of characters written.

Other interesting metrics would be the average length of a writing session, the average number of sessions per day, the average quantity of writing per session and so on and so forth. We will not discuss these in the scope of our experiment because they are not correlated to habit forming through gamification, but they might yield interesting results in other articles (analyzing journaling patters for example).

Frequency of writing and average time spent in front of the journal per day are the main metrics, because they are the most related to habit forming. Quantity of writing is not as important, but it will help us understand the effect of our game elements better.

Results

We will compare the data between all three of our phases.

Control phase – Gamification phase

The overall tendency of our data here will show the effects of adding the gamification to our app. If our metrics go up we can conclude that our game elements are pushing the participants towards using the journal more. If we see no difference between the two phases we can either conclude that gamification did not make a difference, or that gamification kept the participants using the app but it did not increase the use of it. If our metrics suddenly go down we can conclude that the addition of game elements had a negative impact on the will of the participants to use the app. Another scenario that would yield an interesting result is the possibility that frequency of writing and average time spent in front of the journal per day go up, but the quantity of writing goes down. This would show that the users wanted to get the rewards from the gamified system without actually using the journal more. If such a phenomenon occurs we could conclude that the use of gamification yielded extrinsic motivation only and that there is a decoupling between the gamification and the app functionality.

Gamification phase – Post-gamification phase

What we want to see here is what effect the removal of game elements will have on the way our participants use the app. If our metrics go down we can assume that the game elements are not effective in forming long term habits, but they are effective in increasing the use of an application while present. If our metrics go up or stay relatively the same after the removal, we would assume that the game elements did a good job in forming the habit.

Control phase – Post-gamification phase

This is the most important comparison to make in our experiment. What we hope to see is an increase in the metrics in the post-gamification phase. This would result in gamification being effective in forming habits. Another interesting possible result would be to see an overall decrease in the metrics, which would show that game elements are actually detrimental to forming a habit.

Future work

Depending on the result of the proposed experiment, future work can go in 3 different directions.

If we find no correlation between the use of game elements and habit formation, we might want to reduce the use of gamification in some fields. For example, the use of game elements in rehabilitating criminals would make no sense if it only works temporarily. The research that might come is in which fields is it still a viable option to use gamification.

If we find that gamification has a destructive effect on habit forming, we might want to make further research in why that happens from a psychological point of view. Also, in terms of industry, gamification should only be used in applications for the enhancement of the experience, but acknowledging it has no long term effects. This means that gamification is no longer suitable for applications in the domains of health, wellness and habit forming (obviously enough).

If gamification is found to be useful for habit forming, then there is a lot we don’t know yet. Research should be made on specific game design elements and specific game design element combinations and their effect on habit forming. Also, we need to research which fields might benefit most from gamification.

References:

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Anexa:

<https://github.com/AblajoaieiEduard/ResearchProject>

