Pokémon Go – an Empirical User Experience Study

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Abstract. Pokémon Go™ is an augmented reality game for iOS™ and Android™ released in July 2016. It is one of the most played augmented reality exergames in 2016. News programs all over the world reported about the high level of physical activity of people playing Pokémon Go™. Further medical and public health communities discussed the potential of this mobile game due to its potential influence on higher levels of sustainable physical activity for health benefits. We present results of an empirical study conducted 14 weeks after the official release of Pokémon Go™ in Germany. We investigated the effect of augmented reality on initial contact and user behavior within this augmented reality exergame. Participants were therefore divided in three groups (active, former and non-gamers) based on personal statement. The results present insights into the initial contact, experienced critical situations and user behavior including use of augmented reality and in-app purchases.

Keywords: Mobile games · Augmented reality · Pokémon Go

1 Introduction

In this online survey we investigated the effect of augmented reality on initial contact and user behaviour within the mobile game Pokémon Go™. This game is an augmented reality game and one of the most downloaded mobile games in 2016 [1]. Within the scientific community its influence on physical activity is well discussed [2–4]. In this context we wanted to explore whether the augmented reality function has an influence on the motivation to perform physical activity and intention to play this game.

2 Method

2.1 Data Collection

Data was collected by an online survey, as it permits to reach individuals with particular characteristics or interests, i.e. the group of potential game users, best [5, 6]. The survey was introduced as a study about the incorporation of modern games like Pokémon Go™ to support western healthcare systems and was hosted on Unipark. Participants identified themselves as active, former, potential or non-Pokémon Go™ gamers. Based on this self-description further topics were investigated such as initial contact including use of the introduction tutorial within Pokémon Go™ and the source of information used to retrieve information about the functions and features of Pokémon Go™. Further the user behavior was evaluated including the time gamers spend playing Pokémon Go and whether they used the augmented reality function or performed in-app purchases. Also the experience of critical situations like crossing the street without paying attention to traffic was investigated. In the end demographics were queried. Closed-ended and open-ended questions were applied.

2.2 Recruitment

Recruitment was done by a Facebook™ advertisement. Further this online survey was promoted in two private groups named 'RWTH Aachen University' and 'Pokémon Go Deutschland'. In total the ad reached 12,516 persons via Facebook™. Additionally the survey was promoted in an online community called 'Pokémon Go forum' and distributed by a mailing list for students at the University of Cologne. In total, n = 210 individuals participated in this online survey.

2.3 Data Exclusion

Due to the special scope of this paper we focused on active and former Pokémon Go™ users in our analysis. Therefore a sample of n = 73 participants was excluded as these participants had no experience with Pokémon Go™.

2.4 Statistical Analysis

Data was analyzed using SPSS statistics software, version SPSS 22 (IBM, USA). Several one-factorial analyses of variance (ANOVA) at a significance level of .05 were conducted. Further multivariate analyses of variance (MANOVA) with a significance level of .05 were conducted.

2.5 Ethics Statement

The Ethics Committee at RWTH Aachen Faculty of Medicine authorized this study and its ethical and legal implications in its statement EK236/16 in 2016.

3   Results

First we present demographics for the two types of Pokémon Go™ gamers (active and former) analyzed in this work. Afterwards results regarding initial contact, experienced critical situations and intention to play Pokémon Go™.

3.1   Participants

The sample included two user groups. One with n = 81 active players and a second with n = 56 former players. On average, participants' age within the group of active players was higher (M = 34.94, SD = 9.847) than within the group of former players (M = 25.59, SD = 8.433). This difference was significant t (135) = 5.786, p < .001. 66.7% of all participants within the group of active players were male. Within the group of former players 60.7% of all participants were male. There was no significant association between the user group and gender χ^2 (1) = .511, p > .05. 75.3% of the active players have a higher education, followed by 19.8% with medium education and 4.9% with lower education. Within in the group of former players 92.9% have a higher education, followed by 1.8% with medium education and 5.4% who are still pupils. There was a significant association between the user group and the level of education χ^2 (3) = .034, p < .001. Asked about their fan status regarding Pokémon Go™ the mean value was within the group of active players 3.05 points (SD = 1.331) and within the group of former players 2.68 (SD = 1.252) on a five-point Likert scale ranging from 1 = 'I am no fan' to 5 = 'I am a total fan'. The difference between these two groups was not significant t (135) = 1.642, p > .05. On average, active players had a longer time of use (M = 116.296 days, SD = 24.821) than former players (M = 47.04 days, SD = 38.43). This difference was significant t (135) = 12.817, p < .001.

3.2   Augmented Reality

Pokémon Go™ is the most downloaded augmented reality game ever [1, 3]. Our study revealed that 16.1% (n = 9) former gamers always used the combination of virtual and augmented reality. Further, 23.2% (n = 13) used the augmented reality depending on their real life environment. There is a different picture within the group of active gamers. Just 4.7% (n = 4) of these constantly used the combination of virtual and augmented reality. Further 3.7% (n = 3) stated to use the augmented reality function dependent on their real life environment. There was a significant association between the user group and the use of augmented reality χ^2 (2) = 19.061, p < .001. The augmented reality feature of Pokémon Go is rarely used within the group of active users. Just former users stated to have used this feature of the game.

3.3   Tutorial

66.7% (n = 54) of the active players and 62.5% (n = 35) of the former players stated to have not used the short introduction tutorial actively. Nevertheless 25.9% (n = 21) of

the active players and 23.2% (n = 13) of the former players stated to be unsatisfied with the tutorial. The only given reason within the group of former and active players was the too short content of the tutorial. It was criticized that main features and important functions of the game are not explained and need to be explored by talking to friends or searching the internet. A univariate analysis of variance (ANOVA) investigating the effect of 'tutorial quality' on 'time of use' within the subsample of former users revealed no significant effect, $F(2, 53) = .344$, $p > .05$. Although the tutorial is criticized to be too short, no indication was found that the use of the tutorial influenced the time of use.

3.4   Critical Situations

Participants were asked about experienced dangerous situations while playing Pokémon Go™. 4.9% (n = 4) of active and 10.7% (n = 6) of former Pokémon Go players stated to have crossed the street without paying attention to possible traffic. Also 8.6% (n = 7) of the active and 7.1% (n = 4) of the former ones stated to have collided with a person or object while playing the game. This is not dangerous but a sign for engagement with the game. In addition, participants were questioned about losing the sense of time while playing Pokémon Go™. Within the group of active players 8.6% (n = 7) and within the group of former ones 5.4% (n = 3) stated to have experienced such a situation. If the number of experienced critical situations per user is calculated, the results show that users experienced between zero and up to 4 different types of critical situations. A comparison between the group of active and former users showed no significant difference χ^2 (3) = 1.600, $p > .05$. A univariate analysis of variance (ANOVA) investigating the effect of 'number of experienced types of critical situations' on 'duration of use' within the whole sample revealed no significant effect, $F(3, 133) = .834$, $p > .05$. Further, visualization mode in relation to experienced critical situations was analyzed; hence a univariate analysis of variance (ANOVA) was performed. The results show no significant effect $F(2, 134) = 2.904$, $p > .05$. Pokémon Go users are distracted by the game and behave in a dangerous manner. Nevertheless no significant effect was found linking the number of experienced types of critical situations and duration of use as well as visualization mode used.

3.5   Information Sources

Due to the too short tutorial users retrieved information from different source to get to know the game. The most used source chosen by active players within this multiple choice questions were internet communities with 79% (n = 64), followed by friends and family with about 33.3% (n = 27) and social media like Facebook with 25.9% (n = 21). Within the group of former players we found a different situation. 33.9% (n = 19) stated to have never searched for further information, followed by 28.6% (n = 16) who mentioned family and friends as source of information. The third most stated source were internet communities with about 27% (n = 15) and finally the less used source were social media with about 8.9% (n = 5). In both groups YouTube, a major source of so called 'Let's play' videos [7], was mentioned once as information

source. Due to the 'trail and error concept' of this game it was interesting to investigate whether the information retrieval influences the duration of use. Do novice or experienced users search for information more likely? How does information retrieval link to this sort of initial contact? A multivariate analysis of variance (MAONVA) investigating the effect of 'duration of use' on 'use of external information sources' revealed, using Pillai's trace, a significant effect, $V = 1.357$, $F(95, 585) = 2.295$, $p < .05$. Descriptive analysis shows an increased use of information sources as the duration of use increased. Main source of information were internet communities (meaning not social media) followed by friends and family.

3.6   User Behavior

Pokémon Go™ integrates real life physical activity into a virtual game context. Therefore, participants of this study were asked where and when they play this game. Answers were rated on four-point Likert scales ranging from 1 = 'I totally agree' to 4 = 'I totally disagree'. The mean value for rating whether the gamer takes time out to play Pokémon Go™ is 1.84 points (SD = .813) within the group of active gamers and 2.46 points (SD = 1.078) within the group of former gamers. Thereby active players take time out to play the game whereas former players preferred to play on the way. Regarding the question whether the gamer plays Pokémon Go™ while he or she is on the way, is rated 2.31 points (SD = .831) for active gamers and 2.00 points (SD = .894) for former gamers. This supports the findings of the first question as former players preferred to play on the way. Finally, participants were asked to rate whether they play Pokémon Go™ just together with their family and friends or without. The mean value was 2.96 points (SD = .928) for active gamers and 2.52 points (SD = 1.062) for former gamers on four-point Likert scales ranging from 1 = 'I totally agree' to 4 = 'I totally disagree'. Thereby active players prefer to play the game alone whereas former players showed a slight tendency for playing with friends and family. A multivariate analysis of variance (MANOVA) investigating the effect of 'player status' on the described user behavior revealed a significant effect, using Pillai's Trace, $F(3, 133) = 7.566$, $p < .001$. Thereby active and former players differ in their user behavior.

3.7   In-App Purchase

The analyzed sample of n = 137 active and former gamers spent €58.84 EUR (SD = €68.69 EUR) on average. The amount invested by active gamers ranges from €2 EUR up to €300 EUR with an average amount of €66.15 EUR (SD = €71.78 EUR). The invested amount by former gamers ranges from €1EUR up to €100 EUR with an average amount of €21.44 EUR (SD = €31.45 EUR). Interesting in this context is the question whether the amount of money spent within Pokémon influences the duration of use. Are users investing money to reach higher levels more quickly or do they increase invest money due to the duration of use? A univariate analysis of variance (ANOVA) investigated the effect of 'duration of use' on 'amount spent in Pokémon Go'. The ANOVA revealed no significant effect of 'duration of use' on 'amount spend'

$F_{(7, 47)} = .744$, $p > .05$. Further a ANOVA was performed to investigate the effect of 'level' on 'amount spent in Pokémon Go' and revealed no significant effect $F_{(18, 36)} = 1.641$, $p > .05$, too.

4 Discussion

Already published studies discussed the effect of Pokémon Go™ on physical activity and its potential to increase social contact [2, 3, 8, 9]. By our best knowledge, this is the first study, which tries to characterize Pokémon Go™ users and their experience of critical situations based on a comparison of active and former users.

Our results show that active users prefer the virtual reality visualization. Former users stated to use the augmented reality function rarely. The choice of visualization mode was independent from experienced critical situations. Future work should investigate other reasons like energy consumption or the poor augmented reality implementation (a picture is laid over the live view of the camera without a stereoscopic adaption) [1].

Pokémon Go is based on a 'trial and error concept' with a short initial tutorial. Asked about their experiences during initial contact no negative influence was determined of the perceived quality of the initial contact regarding duration of use. Nevertheless, active as well as former gamers commented the tutorial to be 'too short'. Both compensated this by retrieving information from internet communities, family and friends as well as social media. This process is independent from playing, as active as well as former users stated to prefer to play this game alone. Results show no indication for this hypothesis. Furthermore, former gamers stated to play Pokémon Go™ in cases they were already physical active. Active gamers stated to take time out and play it consciously. Further analysis of our data will reveal whether more detailed user types exist within Pokémon Go.

About 10% of this sample experienced a critical situation during playing. Therefore playing Pokémon Go™ could be dangerous. However, it is an underestimated risk, as the experience of critical situations had no influence on the duration of use. Due to the non-representative sample future research and a more detailed analysis of our data might find deeper insights.

5 Limitations

There are some limitations worth noting. Due to the recruitment method, no random sample of German Pokémon Go™ users is included. Subjects were interested in Pokémon or at least willing to support this online survey. Also due to the non-stereoscopic augmented reality in this game a transfer of our results on future more complex augmented reality functions is questionable.

6   Conclusion

To our best knowledge, this is the first study explicitly investigating the user adherence to Pokémon Go™ based on a comparison between active and former users. In our analysis, we found first hints for different user groups. There are for example differences relating to the use of augmented reality and information sources or possible in-app purchases. The game should be investigated more detailed to determine further user types beyond the determined active and former users. At this moment, our results indicate that the augmented reality function is rarely used.

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