

Pokémon-Go: Why Augmented Reality Games Offer Insights for Enhancing Public Health Interventions on Obesity-Related Diseases

Ming Chao WONG^{a,1} Paul TURNER^a Kate MACINTYRE^b and Kwang Chien YEE^b

^a*eHealth Services Research Group (eHSRG), School of Engineering and ICT,
University of Tasmania*

^b*School of Medicine, Faculty of Health, University of Tasmania*

Abstract. Stimulating widespread interests of the population to participate in behavioural changes through information and technology has been an aim of much health informatics research. The recent widespread participation of the augmented reality game Pokémon Go which encourages exercises, provides significant insights into the potential of information technology to improve healthcare intervention on obesity-related disease. Does Pokémon Go point to another way of achieving health benefits using mobile devices? This paper analyses the features of Pokémon Go in relation to potential health benefits. This paper suggests from the perspective of a user on changes to the game that potentially could help with obesity, mental health cardiovascular health and vitamin D deficiencies. While the impact of augmented reality games on improving exercises might be substantial, the question of sustainability and likely long-term health outcomes remain debatable. The rapid uptake of Pokémon Go by the population around the world, however, should serve as a useful lesson for information and technological design to improve outcomes obesity-related diseases in the future.

Keywords. Cardiovascular health, ehealth intervention, ehealth, Obesity related disease, auto-ethnography

Introduction

Obesity-related diseases have become an increasing burden on healthcare systems [1]. Numerous public health initiatives have been designed and deployed to promote exercise, dietary changes and self-management behaviours, as part of efforts to reduce the burden of obesity-related diseases [2]. Whilst a number of these initiatives have reported success, sustaining these over time has proven costly and difficult. Simultaneously, advocates for health technology have promoted the use of IT to reduce costs of service delivery while enhancing information access and communication for health professionals and patients [3]. Certainly, the diffusion of the mobile internet connectivity and proliferation of e-health applications and services has put 'lifestyle' information directly into the hands of consumers 24/7. Again, however, sustained behavioural change has proven challenging

¹ Corresponding Author: Ming Chao Wong. Email: mcwong@utas.edu.au

as patients/consumers discontinue use and/or lapse back into previous behaviours/habits [4]. Noticeably, most of these initiatives are based on assumptions about the importance of information, advice and rationalistic goal-setting to individual changes in behavior. While this certainly has merit, as the advertising industry, and more recently, the computer games industry are showing there are many other ways to stimulate behavioural change.

With 500 million downloads [5] and counting since July 2016 *Pokémon-Go* appears to be achieving what much health IT has failed to deliver for decades – encouraging large sections of the community to participate in physical activities that deliver positive health benefits! *Pokémon Go* has achieved popular appeal across a broad cross-section of society in more than 100 countries around the world. *Pokémon Go* continues to be marketed as a game that encourages the user to be physically active and as a result, improve their health. Features intrinsic to the game's strategy are responsible for both its broad appeal and potential health benefits. These features have been developed in the context of the second most successful video game based media franchise in the world. This creates potential opportunities to increase the impact on public health. This study therefore aims to examine features within *Pokémon Go* that may lead to increased physical activity and improved health and also to explore potential improvements to the game that could result in a greater public health impact.

1. Study design

This study was conducted over 9 months period between July 2016 and March 2017 by two of the authors. The two authors studied the game by participating in the game while maintaining their work and domestic duties. The authors downloaded the game and played the games during their free time, mainly involving weekends and afterhours. The authors went to typical sites at which *Pokémon Go* gamers would go in their local community. The authors played the game when they felt like they would like to, just like normal gamers and discussed the game with their friends and colleagues. With their IT design knowledge and health knowledge, the authors documented features within *Pokémon Go* on a computer spreadsheet and that might encourage lifestyle changes.

2. Results

Pokémon Go has undergone quite a few revisions and updates since its first released. It is also important to note that the game has a few versions to celebrate festive seasons and a second collection of Pokémons which was released in 2017, around 6 months after the release of the first collection of Pokémons. The authors therefore assess and present the features of *Pokémon Go*, including the longitudinal follow up of this game over the 9 month period.

2.1. Encouraging exercises

Pokémon Go has a number of features that encourage exercise. These include the need to obtain Poké-ball in order to catch Pokémon. Poké-balls are available at Poké-stops and these are commonly landmarks of a particular area. Quite often there are a few Poké-

stops close by and participants can walk in between Poké-stops to collect Poké-balls. Secondly, the feature of near-sighting creates an incentive for participants to walk around the area in order to find the Pokémon. This is especially relevant to rare Pokémon.

2.2. Encourage goal setting for exercises

The feature of “hatching eggs” within Pokémon Go encourages goal setting and rewards participants who complete the task. An egg can be hatched into a Pokémon if a participant walks a certain distance. This cannot be achieved by driving or cycling as the speed detector detects the speed of movement and discounts driving or cycling periods. The distance required to hatch an egg, ranges from two km to ten km, allowing the participants to set their own target and timeframe. It is the cumulative distance that hatches the egg, and this allows exercise to be accumulated in stages. Furthermore, the greater the number of kilometers walked, the more uncommon the “hatched” Pokémon is, therefore encouraging participants to achieve higher goals for exercises. In the most recent update and release of second collection Pokémons, there are quite a few Pokémons that could only be collected through “hatching”. It therefore provides incentives for participants to exercise.

2.3. Encourage socialisation

Participants can put lures in the game to increase the chance of attracting Pokémons to the area. The lure, once set, is shared by all participants. Each lure lasts for 30 minutes. During the study period, certain locations such as public parks or beach side walkways, have lures most of the time. This encourages participants to develop a sense of community. Furthermore, participants often compare and discuss tactics and location of different Pokémons with other participants (often strangers) when trying to catch Pokémons. This encourages socialisation especially among young adults and teenagers.

2.4. Encourage mobilization to different locations

Pokémon are classified into different groups, such as water Pokémons, land Pokémons and snow Pokémons. Different Pokémons appear at different types of locations based on local geo-locations. This encourages participants to travel to different sites and meet with other participants. This may have an impact on mental health as well as encouraging physical activity.

2.5. Encourage evening and afterhours activities.

Rare Pokémons tend to only appear in the evening and at night. As the population is mainly occupied during the daytime with work and study, this feature encourages outdoor activities and socialisation in the evening and at night. This also has the potential of changing the activities of the population from sedentary and other adverse risk behaviours such as alcohol consumption to Pokémons catching.

2.6. Festive seasons and celebration pokémons create momentum.

After a few months of playing Pokémons, the authors were bored playing with the same game. The exercise encouragement effect therefore wore off. The authors also observed that at public places where once filled with participants of Pokémon Go, there were very few game players remaining. It was at this time that Christmas and Birthday Hat pokémons were released as special edition. This has created sustainable and persistent interests in playing the game and therefore continues its effect on exercise.

2.7. The release of second generation of pokémons.

Despite the effort to encourage continual participation, ultimately, the game loses its attraction and the authors go back to usual activities without the game-induced exercise. At about 6 months after the release of the initial game, the second generation Pokémons were released. This has encouraged the authors to go back to exercise and achieve the Pokémon-catching goal. The authors observed that this has created a bit of enthusiasm among gamers to play the game and exercise at the same time.

3. Discussion

Pokémon Go is a successful technology that has popular appeal encouraging large and diverse sections of the global community to participate in a game that supports lifestyle changes. A recent study has shown that Pokémon Go encourages users to increase their physical activities by 1437 steps a day on average, representing a 25% increase compared with prior activity [6]. Playing Pokémon Go is likely to increase exercise levels, through the game's goal setting activities to deliver exercise health benefits to players, it is estimated that a total of 144 billion steps could be gained by the population in the USA alone, if the game is played by the whole population [6].

Secondly, the game also appears to stimulate new community ties together delivering increased socialisation, especially among certain vulnerable groups like teenagers and young adults who have often been portrayed as being socially isolated and physically inactive partly because of their interest and engagement with technology entertainment. This socialisation also has the potential to generate health benefits. It has been suggested that Pokémon Go might improve mental health of young patients with severe social withdrawal [7]. Our study provides an explanation of mechanism of how Pokémon Go can achieve this. Not only does Pokémon Go increase socialisation of players at public domain, it also serves as an "ice-breaker" to talk to friends, families and strangers.

Thirdly, we believe that there are opportunities to further optimise health benefits from this game-playing. For example, including rewards for consecutive day-time exercise to stimulate daily exercise routines; increasing the frequency of appearance of Pokémon characters at particular times or in particular places such as when its sunny to decrease the likelihood of vitamin D deficiency. From the latest, Gym-focused update from Pokémon Go's makers, it would appear that they also can see merit in targeting particular places.

On the flip-side Pokémon Go, has already been seen to pose a few challenges as well as even to increase risks of injury resulting from the locations of Poké-stops and/or

inattention of players to physical dangers from, for example motor-vehicles [8]. There are already cases of drivers crashing while playing Pokémon and pedestrians being hit by cars while playing Pokémon [9]. Like other computer games, there is also a risk of ‘gaming addiction’ and the negative side-effects that can result.

The hype around mobile augmented reality games like Pokémon Go also neatly deflects attention away from more comprehensive assessments of whether health benefits from playing are genuinely delivered over time and/or how public game-playing interacts with other behaviours such as the consumption of ‘fast foods’. Indeed, it may transpire that augmented reality mobile games such as Pokémon Go are merely a fashion that will not be sustained but the rapidity of up-take still has valuable lessons for health and e-health professionals interested in engaging the population in behavioural changes to reduce obesity-related disease. A cohort study using online survey showed that the exercise effect of Pokémon Go might not be sustainable [10]. Other studies however argue that certain characteristics among the population might predict long-term participation in Pokémon Go and its associated health benefits [11]. It appears that further research needs to be conducted to investigate long-term and sustainable benefits of AR games to achieve improvement in health.

It is evident that Pokémon Go and similar AR activity based games do highlight an alternative approach for public health initiatives to engage their target populations – rather than info-centric monitoring, measurement or advice based approaches, it seems that ‘gamifying’ interactions and advice through fun may be an additional approach to deliver exercise health benefits. As healthcare delivery is complex and context sensitive, this complexity affects the potential impact of Pokémon Go on clinical outcome. The real question of “does Pokémon Go” improve health outcome, while interesting and important, might not be easily answerable by our current research concept.

Finally, the research technique of using auto-ethnography and participatory research in AR games in healthcare is an interesting process. Invitations for participants to articulate potential health benefits based on game design might not be easily achievable given the primary goal of the AR game is entertainment. Auto-ethnography allows researchers to participate in the research and reflect on their experience through expert knowledge lens, both from the perspective of IT design and from health benefits. While it has the benefits of bringing research insights to data collection, it also brings in researcher bias that potential over-exacerbate or under report the benefits. The use of this technique in future research of AR games in healthcare warrants further thoughts and investigations.

4. Conclusion

Pokémon Go is a successful public health intervention with positive health benefits. The widespread appeal of Pokémon Go and potential health benefits to a significant proportion of the population warrant further investigation.

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