



User Preferences for Gamification Elements in Smartwatch Fitness Applications

Di Song and Jie Yao^(✉)

School of Humanities and Social Sciences, Harbin Institute of Technology (Shenzhen),
Shenzhen, China

yaojiejulie@hit.edu.cn

Abstract. Smartwatches, which can monitor users' health data and encourage healthy habits, have gained great popularity in recent years. Meanwhile, as a useful design method to improve user engagement and motivation, gamification has been widely used in fitness applications on smartwatches. While existing gamification research suggests that users have different preferences for gamification elements in different contexts, few studies have examined users' preferences for gamification design on smartwatches. Therefore, this study sought to obtain detailed opinions and suggestions on smartwatches and gamification through semi-structured interviews of sixteen current users. User preferences for sixteen different gamification elements related to the development of fitness applications on smartwatches were investigated. This study concludes that users prefer overviews, goals, challenges and rewards, and dislike time pressure. Our results also show that different users have different preferences for gamification elements. This qualitative study has formed an important basis for an ongoing quantitative study on tailored gamification, which further proves the need to classify smartwatch users based on their preferences and characteristics, for designing more effective gamified fitness applications on smartwatches.

Keywords: Smartwatch · Gamification Design · User Preferences · Gamified Wearables

1 Introduction

The rapid development of the Internet of Things has gradually brought smartwatches into our lives in recent years. One of the main functions of smartwatches is to monitor users' health data, so lots of health applications are starting to be ported to smartwatches. At the same time, as a practical design method to improve user engagement and motivation, gamification has been widely applied in mobile health applications with remarkable results. In particular, in the context of fitness, excellent mobile applications such as Keep and Nike + have flexibly adopted gamification to improve users' motivation to exercise and product engagement. Popular smartwatches such as the Apple Watch have also adopted gamification in their fitness applications. However, smartwatches are portable wearables with smaller display screens and less information than mobile phones. Designers should not blindly copy gamification elements commonly used on mobile phones

© The Author(s) 2023

K. Subramanian et al. (Eds.): CTMCD 2022, ACSR 99, pp. 178–185, 2023.

https://doi.org/10.2991/978-94-6463-046-6_22

onto smartwatches. Moreover, users have different preferences for gamification elements in different contexts [1]. Therefore, how should designers better apply gamification to fitness applications on smartwatches and what gamification elements should be adopted to attract different kinds of users? In this study, we investigated users' preferences for gamification elements in the context of smartwatch fitness applications, which could both enrich the theory of gamification on smartwatches, and contribute to design practices that incorporate different gamification elements for different users.

2 Literature Review

2.1 Definition of Smartwatch

A smartwatch is a wearable device that can track activities and help users with their daily tasks through mobile applications [4]. Attached to the skin and with a variety of sensors, a smartwatch can effectively monitor and collect body temperature, heart rate, steps, sleep patterns, and other data. The outbreak of COVID-19 since 2020 has aroused people's awareness of health, and more and more attention has been paid to the role of health monitoring and exercise management. Therefore, smartwatches with fitness as their core function are expected to attract more consumers.

2.2 Gamification and Smartwatch

As an emerging design method in recent years, gamification is most commonly defined as using game design elements in a non-game environment [3]. Applying gamification to product design can significantly improve user experience, motivate and maintain user motivation, and thus increase user engagement. At the same time, gamification has a low commercial cost and is relatively simple to implement, opening new ideas for the design of smartwatch fitness applications. Vooris et al. [9] proposed that gamification plays an essential role in purchasing and using of fitness wearables. Therefore, for the application context of smartwatches, making more effective gamification to arouse users' interest in using smartwatches for health monitoring or exercises is worth further study.

2.3 Gamification Elements

Gamification elements are fundamental components of gamification, which can be extracted and utilized in games. They are functional modules that can be realized through computer technology and programming languages [8]. De-marcos et al. [2] emphasized the importance of studying users' preferences for gamification elements. Meanwhile, Nacke et al. [5] believed that the effectiveness of gamification and the use of gamification elements are highly dependent on their application contexts. Therefore, we need to clearly understand users' preferences for gamification elements in different contexts to design products more suitable for specific groups. After analysing and synthesizing relevant studies on gamification wearables [7], sixteen gamification elements commonly used in prior studies are summarized: Goal, Progress, Feedback, Overview, Point, Level, Leaderboard, Achievement, Task, Challenge, Reward, Avatar, Narrative, Badge, Social Interaction, and Time Pressure. These elements were adjusted and categorized to be used in the current research.

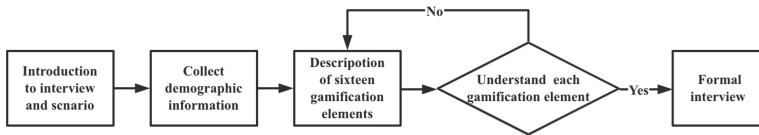


Fig. 1. Overview of the interview process.

3 Methods

3.1 Interview Design

Given the exploratory nature of our research questions, the qualitative research method of semi-structured interview is adopted. We collected users' opinions and suggestions on smartwatches, gamification, and other related issues through in-depth, one-on-one interviews. We also obtained users' preferences on the sixteen gamification elements of smartwatches in the fitness context.

The overview of the interview process is shown in Fig. 1. Before the interview, we asked the interviewees to view a document agreeing to the interview, which emphasized that there were no right or wrong answers to the questions in the interview. To obtain the demographic information of the interviewees, we asked the interviewees some general questions such as gender, age, occupation, and exercise habits. Before the interview, we also asked participants to read materials that introduced the definition of gamification. Through the cases of Keep and Apple Watch Fitness, we have explained the meaning of sixteen gamification elements in detail. In the formal interview, we adopted the semi-structured interview protocol, which mainly includes three parts:

- (1) Questions related to smartwatches: Which brand of smartwatch are you using? How often do you use your smartwatch? What are your main reasons for buying and using a smartwatch? What are your favourite features? What are your suggestions for improving the design of smartwatches?
- (2) Questions related to gamification: Do you like playing games? What is it about the game that appeals to you? What do you think about gamification? Have you ever used a gamified application? What do you feel about it? What features in gamified applications have impressed you the most? What do you think about gamified fitness applications on smartwatches?
- (3) User preferences for gamification elements of smartwatch fitness applications: In the context of smartwatch fitness application, which gamification elements in these sixteen do you prefer? Why do you like these elements? What gamification elements do you dislike? Why do not you like these elements?

3.2 Sample and Data Collection

This study focused on smartwatch users aged 20 to 40, and therefore invited sixteen smartwatch users to participate who were born between 1981 and 2001. All participants were from China and recruited through the Internet. They were evenly split in terms of

gender and age groups. We conducted detailed one-on-one interviews with the software Wechat, each of which lasted between 30 and 60 min. With interviewees' consent, we have recorded these interviews and converted them into written records for data analysis.

3.3 Data Analysis

We analyzed the qualitative results by the software Atlas.ti., including encoding the transcripts of interviews and then sorting the number of codes for each part. We specifically analyzed the clustering speeches of participants under the overlapping codes.

4 Results and Discussion

4.1 Usage of Smartwatches

Participants' use of smartwatches was relatively active, with most of them wore smartwatches every day. For the users participating in this interview, the most crucial function of smartwatches was the health function, especially the function of exercise recording.

Some participants praised the interface design of the current smartwatches, such as explicit content. But they also mentioned some design drawbacks of smartwatches, such as the small screens that were inconvenient to operate, the simple interfaces, and the lack of style choices. In particular, several participants suggested that the operation design needed to be simplified to improve the user experience.

4.2 Attitudes and Usage of Gamified Applications

Participants were found to be relatively familiar with the concept of gamification and the definition of gamification elements. They could quickly understand the meaning of gamification design after reading the material, because most of them had used gamified applications such as Ant Forest and Wechat Sports. What's more, three quarters of participants enjoyed playing games. The researchers also found three main factors attracted participants to the games: (1) the sense of accomplishment, (2) the entertainment, and (3) the social interaction with friends. The relevant results are presented in Fig. 2.

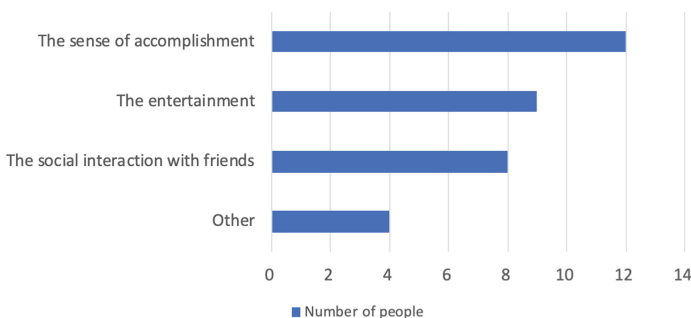


Fig. 2. Factors that attracted participants to the games (N = 16).

Most participants were optimistic about gamification, saying it would arouse their curiosity and motivate them to do something beneficial to themselves. It should be noted that most participants valued the sense of mission when using gamified applications. They mentioned that their favorite part of using gamified applications, such as Ant Forest, was participating in the commonweal activities. Participants also focused on the entertainment of gamified applications, with fun forms (like planting trees) attracting them rather than simple numbers and leaderboards. Almost all participants thought it was a good idea to apply gamification design to fitness applications on smartwatches. Some participants suggested that interfaces of gamified fitness applications on smartwatches needed to be simple, not too complex, but limited to the main features.

4.3 Preferences for Gamification Elements of Smartwatch Fitness Applications

Participants' preferences for gamification elements were scattered. Each participant liked and disliked gamification elements differently. Among the sixteen gamification elements, fourteen gamification elements were mentioned as preferred by participants, and ten gamification elements were mentioned as being disliked by the participants. The number of likes and dislikes of each gamification element is shown in Fig. 3. It is worth noting that some participants wanted to compare and compete with friends in gamified products, while others especially disliked comparison features such as social interaction and leaderboards. The same was true for badges and narrative plots, which some participants enjoyed very much, but others found boring and useless. Our results showed that users' preferences for certain gamification elements were quite different and even polarized.

Of the gamification elements that participants liked, the most popular one was the overview, with seven participants liking it. Other gamification elements favored by five or more participants were goals, challenges and rewards. Participants liked gamification elements for four main reasons: (1) the sense of accomplishment, (2) the motivation, (3) the direction and control, and (4) the entertainment. Participants believed that overviews, points, rewards, achievements and challenges could make them feel a sense of accomplishment. Multiplayer gamification elements, such as social interaction and leaderboards, could greatly motivate some users, making them more motivated so that they were less likely to lose their enthusiasm. Goals and tasks gave users a sense of direction, offered a better guide for them to meet expectations. Progresses and feedbacks offered participants the sense of control over telling them the current status. Some participants emphasized that gamification had to be fun to appeal to them. One of them noted that "If the gamified application's background story is well written and interesting, it will be very attractive to me."

The least popular gamification element was the time pressure, which six participants disliked. The reasons why participants did not like gamification elements could be summed up in four points: (1) the uselessness, (2) the lack of fun, (3) the stress, and (4) the lack of control. The main reason participants did not like badges was that they thought badges were frivolous. Similarly, participants considered points and levels futile and boring. One participant suggested that "Levels are particularly utilitarian. You can design it in a fun way, but you just use numbers." Participants who disliked narratives also mentioned that current background stories of gamified applications were mostly

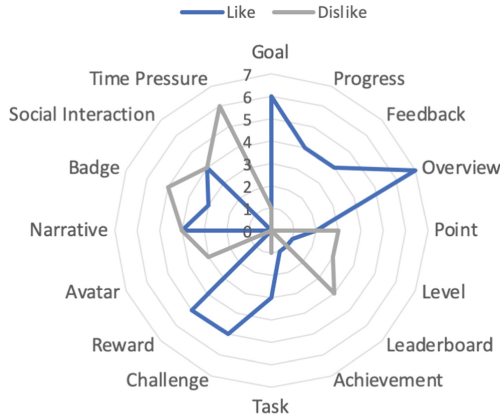


Fig. 3. The number of likes and dislikes of each gamification element (N = 16).

Table 1. The main reasons why users liked or disliked gamification elements.

Like/Dislike	Main reasons
Like	The sense of accomplishment
	The motivation
	The direction and control
	The entertainment
Dislike	The uselessness
	The lack of fun
	The stress
	The lack of control

silly, superficial, and reading it was a waste of time. They believed that the lack of fun made gamification unattractive. Participants were not interested in time pressure because they thought they should control of their own time, but time pressure made them felt less in control and stressed them out. Some participants did not like gamification elements such as social interaction and leaderboards because these elements put a lot of pressure on them.

The main reasons why users liked or disliked gamification elements are summarized in Table 1.

In general, when the gamification context is refined to smartwatch fitness applications, users’ preference for gamification elements is different from previous studies [6]. The result indicates that although the user’s attitude and preference for game design elements in smartphone applications can be used for reference, the user’s preference will change when focusing on the healthy usage contexts of smartwatches, which is worthy of further research.

5 Conclusion

In this study, in-depth opinions and suggestions on smartwatches and gamification were obtained and synthesized from sixteen smartwatch users through semi-structured interviews. Preferences of these users for sixteen different gamification elements in the fitness context of smartwatches were also evaluated for the first time in this research area. The results of this interview indicated that users prefer overviews, goals, challenges and rewards, and dislike time pressure. Our results were partially different from past research for gamification elements preferences in other contexts, which can inform designers of user differences in preferences for gamification elements in different contexts, and will help improve the design practices of smartwatch fitness applications. We summarized the sense of accomplishment, the motivation, the direction and control, and the entertainment as four main reasons why participants liked gamification elements. We also concluded four main reasons why participants did not like gamification elements: the uselessness, the lack of fun, the stress, and the lack of control. Thus, designers should pay attention to the design of these aspects when selecting and improving gamification elements to enhance the degree of user preference and improve user engagement. Moreover, the preliminary findings show that users' preferences for gamification elements were scattered, and there were significant differences among users. Users' likes and dislikes of social interaction, leaderboards, narratives and badges were particularly different. It has laid a foundation for further quantitative research on dividing users into different groups based on gamification preferences and developing design strategies accordingly.

Acknowledgments. This study was funded by the National Social Science Fund of China (General Grant 20BTY120).

References

1. Berger, M., & Jung, C. (2021). Gamification in nutrition apps - Users' gamification element preferences: A best-worst-scaling approach. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 2020-January, 1335–1344.
2. De-Marcos, L., Garcia-Lopez, E., & Garcia-Cabot, A. (2016). On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification & social networking. *Computers & Education*, 95, 99–113.
3. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, MindTrek 2011, March 2011, 9–15.
4. Hsiao, K. L., & Chen, C. C. (2018). What drives smartwatch purchase intention? Perspectives from hardware, software, design, and value. *Telematics and Informatics*, 35(1), 103–113.
5. Nacke, L. E., & Deterding, S. (2017). The maturing of gamification research. In *Computers in Human Behavior* (Vol. 71, pp. 450–454).
6. Schmidt-Kraepelin, M., Thiebes, S., Schöbel, S., & Sunyaev, A. (2019). Users' game design element preferences in health behavior change support systems for physical activity: A best-worst-scaling approach. *40th International Conference on Information Systems, ICIS 2019*, December.

7. Schulz, L., Ton Spil, A. A. ., & Sjored de Vries, S. . (2017). Gamified wearables in obesity therapy for youth - Successful Fundamental app design guidelines. In Twenty-fourth Americas Conference on Information Systems, New Orleans, 2018 (Vol. 420, Issue 13).
8. Shang, M. tian. (2020). Research on the Influencing Factors of Gamification Elements on Learning Engagement in Interactive Learning Environment. In Sichuan Normal University.
9. Vooris, R., Blaszkka, M., & Purrington, S. (2019). Understanding the wearable fitness tracker revolution. *International Journal of the Sociology of Leisure*, 2(4), 421–437.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

