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Gamification Elements in Mobile Fitness Apps: A Systematic Literature Review

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1. INTRODUCTION

The global prevalence of sedentary lifestyles and physical inactivity have caused countless chronic noncommunicable diseases. To keep physically active, more and more people are using fitness apps to motivate themselves to exercise. As of February 2021, over 780 million users in China engage in physical activity via mobile fitness apps. This presents a significant market in the mobile fitness apps industry. However, the limited efficacy of mobile fitness apps is often attributed to low utilization and engagement, which mobile developers need to address to improve user retention. Incorporation gamification could potentially resolve this issue. The term “gamification” is a new term derived from the field of digital media. It was created in 2002, The most well-known definition of gamification is proposed by Detering et al., who believe that gamification refers to the use of gamified design elements in other scenarios outside of the game context [1].

Gamification elements are an important means of supporting and motivating users to engage in physical activity. Extant literature reviews on gamification have examined the effects of gamification elements on exercisers’ physical activity in mobile eHealth apps and mHealth apps [2] [3]. Mobile fitness apps serve as the most intuitive and direct mobile apps to improve users’ physical activity. However, there is no systematic review of gamification elements in fitness apps. To fill in the gap, this research shed light on the effects of gamification elements in fitness apps by conducting a systematic review with bibliometric analysis.

This paper intends to summarize current research on gamification elements to enhance what functions of fitness apps and explore the impact that gamification elements in mobile fitness apps have on users. The research question of this study is how does gamification elements in mobile fitness apps affect users? To provide a clear answer to this question, we anatomized it into the following three sub-research questions: (1) what are the key elements of gamification in mobile fitness apps? (2) what are the users’ outcomes that these key elements can affect? (3) what factors influence these gamification elements?

2. MATERIALS

This study adopts the systematic literature review approach to avoid the well-known limitations of literature selection in narrative reviews and expert reviews [4].

To conduct a thorough and theoretically relevant analysis of the literature on gamification in fitness apps, we choose Web of Science core collections as our research database. We explore the database to seek contributions relevant to the topic. We include articles that are published as of January 2024 when the literature search is conducted. We search Web of Science core collections using the following query applied to the title, abstract and keywords: ((“gamification” or “gamified”) and (“fitness” or “physical activity” or “exercise” or “health”) and (“app” or “application”)). Meanwhile, we limited the language to “English and document type to “Article”. We do not limit the search to specific year ranges. We obtain 160 papers from the query.

Studies were eligible if they meet the following conditions: (1) population of any health status. (2) use fitness apps to promote physical activity for user. (3) empirical papers. To increase the number of papers included in this research, we go through the references and citations of the papers and add the relevant one. To ensure that the literature are relevant, we first read the title and abstract, then we screened the remaining articles

following reading the full text. After filtering out the irrelevant records, we ended up with a total sample of 20 papers in our dataset for analysis.

3. FINDINGS

Gamification elements also called game design elements refer to the design elements that can be used in gamification [1]. According to Hu et al. (2023) [5] categorized the functions of fitness apps as personal and social, so we categorized the gamification elements as personal and social. Personal gamification elements are personally oriented and enhance goal setting and recording of fitness app. Goal setting allows users to set their personal fitness goals (i.e. relaxation, weight loss or muscle building). The goal setting of fitness apps including personal gamification elements such as roles and avatars, narrative and stories. For instance, roles and avatars can represent individual character in a task [6]. In addition, narrative and stories an establish a link between the users' fitness and characters. Social gamification elements can support users' social interactions with others (i.e. collaborations among users and social exchange and user engagement). Social gamification elements are used to enhance the social support and social comparison of fitness apps. Social support of fitness apps can be achieved by connecting to social media (i.e. Facebook). Social gamification elements of social support including likes, teams, challenges, virtual rewards sent/received from others. For instance, users can like other fitness outcomes. Users can compare their fitness outcomes with others. Social comparison of fitness apps including social gamification elements such as leaderboards and competition. For instance, through leaderboards, users can easily brow others' fitness outcomes and check their rank in their social network.

Fitness experience outcomes examined in the literature on gamification elements in fitness apps include perceived concentration/understanding/control/curiosity/challenge, user satisfaction, autonomy needs, competency needs, related needs. It's noteworthy that personal gamification elements are associated with autonomy and competence needs and social gamification elements are associated with related needs. In addition, personal gamification elements can be used to increase user satisfaction. The behavior outcomes examined in the literature on gamification elements in fitness apps include real-world fitness purpose, persistent usage intentions, kept days, workouts, improvement, walking behavior, step counts, self-reported MVPA (moderate-to-vigorous physical activity), object MVPA, physical activity, body composition, exercise behavior, user engagement and self-efficacy in PA. It's noteworthy that behavior outcomes of gamification elements in fitness apps have two primary streams. The first stream of literature sheds light on use of fitness apps such as continued intention, kept days, users' engagement and real-world fitness purpose. The second stream of literature gains sight into the results on users' physical activity such as walking behavior and step counts.

We also explored the factors affecting gamification elements. There are three factors in total, which are individual heterogeneity, social influence and IT identity. Firstly, the results showed that gamification elements have a more positive impact on users' engagement at higher exercise level [6]. In addition, engagement is correlated with users' education and gender, with users in the secondary education category and men being more likely to increase engagement [7]. It was found that leaderboard had a more significant positive effect on moderate and inactive exercisers [8]. Secondly, social influence has a positive impact on how much users are willing to fitness as well as their attitudes and willingness to use gamification elements. Thirdly, IT identity is defined as the extent to which the use of IT (information technology) is saliently related to who people think they are (self-identification). The results showed that through IT identity, gamification elements can better communicate the purpose of health apps and help user identify themselves through the apps and are more likely to foster positive information sharing and continued intention to use [8].

4. CONTRIBUTIONS

This study makes two important contributions to research of gamification elements in fitness apps. First, we delve into the general factors to gamification elements research. In addition to the shared aspects such as

publication year, publication journal, research method, theoretical lens, we shed light on the factors specific to gamification elements that can enhance functions of fitness app such as personal gamification elements and social gamification elements.

Second, we identify the effects of both personal and social gamification elements to illustrate the current status of scholarly works. We obtain the focal effects by the outcome variables used in the empirical studies. The outcomes describe the effects of gamification elements on users' fitness experience and behavior outcomes. In addition, we propose factors from the literature that influence personal and social gamification elements such as individual heterogeneity, social influence and IT identity. These findings provide a clear guideline to grasp the main streams of gamification elements in fitness apps literature. Meanwhile, it offers practitioners the synthesized knowledge of the intriguing findings in gamification design in mobile fitness apps research. Designers and operators of mobile fitness apps can obtain useful enlightenment to make mobile fitness apps more engaging, effective and satisfying for users.

REFERENCES

1. Deterding, Sebastian, Dixon Dan, Khaled Rilla, Nacke Lennart. "From game design elements to gamefulness: defining" gamification". Proceedings of the 15th international academic Mind Trek Conference: Envisioning Future Media Environments. (2011):9-15.
2. Ning Yan, Jia Zehuan, Zhu Ruifang, Ding Yongxia, Wang Qian, Han Shifan. "Effect and feasibility of gamification interventions for improving physical activity and health-related outcomes in cancer survivors: An early systematic review and meta-analysis." Supportive Care in Cancer 31.1 (2023): 31-92.
3. Sardi, Lamyae, Ali Idri, José Luis Fernández-Alemán. "A systematic review of gamification in e-Health." Journal of Biomedical Informatics 71 (2017): 31-48.
4. Tranfield, David, David Denyer, Palminder Smart. "Towards a methodology for develop evidence informed management knowledge by means of systematic review." British Journal of Management 14.3 (2003): 207-222.
5. Hu Jiang, He Wei, Zhang Jie, Song Jaeki. "Examining the impacts of fitness app features on user well-being." Information & Management 60.5 (2023): 103796.
6. Yin Siqi, Cai Xianling, Wang Ziyang, Zhang Yuning, Luo Shenghui, Ma Jingdong. "Impact of gamification elements on user satisfaction in health and fit-ness applications: A comprehensive approach based on the Kano model." Computers in Human Behavior 128 (2022): 107106.
7. Feng, Wenting, Tu Rungting, Hsieh Peishan. "Can gamification increase consumers' engagement in fitness apps? The moderating role of commensurability of the game elements." Journal of Retailing and Consumer Services 57 (2020): 102229.
8. Hamari, Juho, Jonna Koivisto. "Working out for likes: An empirical study on social influence in exercise gamification." Computers in Human Behavior 50 (2015): 333-347.