

# Shared Achievements: Exploring the Design of Gameful Collaborative Elements and Fostering Social Relatedness Through Team Effort Contributions in a Social Physical Activity Application

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**Abstract.** Background: This paper explores the viable design of collaborative game elements to promote physical activity in the context of digital health interventions. Objectives: We investigate the role of social relatedness in motivating users to engage in achieving step-count goals. Methods: The study utilised a minimalist multiplayer step counter game called Shared Achievements, implementing group-based “collaborative effort” mechanics. Participants used the application with acquainted team members for two weeks. Results: Outcomes highlight the importance of communication and shared goals in fostering motivation and adherence. While group dynamics and social support enhanced engagement, challenges such as unequal contributions and competitive pressures were identified. Conclusion: The study underscores the need for careful design considerations to balance competition and collaboration, suggesting digital health tools can benefit from social achievement mechanics and incorporating motivational strategies tailored to different user preferences.

**Keywords.** digital health, motivation, physical activity, social dynamics, achievements, game design, player experience, gamification, collaboration

## 1. Introduction

Unhealthy behaviours such as a sedentary lifestyle and inadequate diet are prevalent today and present a societal issue [1]. To prevent avoidable medical conditions, health research suggests that adults should practice regular physical activity (PA) [2]. Encouraging PA through digital health interventions remains challenging, with many gamified approaches suffering from high dropout rates [3]. Self-Determination Theory (SDT) [4] suggests that relatedness, competence, and autonomy are key to intrinsic motivation, making social collaboration a promising design strategy [5]. Games are known for their motivational potential, leading to the rise of gamification and serious games in HCI research [6, 7]. These approaches integrate game elements into non-game contexts to engage users [8]. Collaborative mechanics have been shown to be more effective in motivating long-term engagement, as they enhance trust and social

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relationships [9]. This study investigates how collaborative game elements influence motivation and engagement in PA, particularly in differentiating between absolute and relative step-count (percentage of individual goal) contributions.

## 2. Methods

We developed Shared Achievements, a mobile step-counter game where teams of 3-4 players work together to reach a virtual mountain summit by contributing their steps to a shared goal. The study compared two conditions: (1) absolute step counts and (2) percentage-based contributions. Participants (N=10) used it for two weeks, switching conditions mid-study. A post-study workshop was conducted, and data was analysed using thematic analysis. A full description of the study protocol and results can be found at <https://arxiv.org/abs/2503.13041v1>.

## 3. Results

*Communication & Camaraderie:* Communication was key to motivation and team cohesion. In-app messaging enabled encouragement and accountability, though some found explaining missed goals cumbersome. *Collaborative & Competitive Tensions:* Teamwork and comparison motivated participants, who described the experience as both cooperative and competitive. Some thrived on the challenge, while others felt guilt when unable to meet goals. *Social Relationships & Team Dynamics:* Team size and familiarity influenced engagement. Social bonds boosted motivation, but unequal contributions discouraged less active participants. *Representation Preferences:* The absolute step-count display was transparent but sometimes discouraging. The percentage-based system fostered a sense of community but lacked clarity for some users.

## 4. Discussion & Conclusion

The findings emphasise the need to consider social sensitivities in PA-focused digital health interventions. While both collaboration and competition boosted engagement, balancing them is crucial to prevent pressure or disengagement from unequal contributions. Social bonds played a key motivational role, reinforcing research on the importance of relatedness in gamified interventions [9]. A major challenge was ensuring fair contribution dynamics—some thrived on the challenge, while others felt discouraged by unbalanced efforts. Future designs should explore adaptive goal-setting and personalised incentives to address this. Enhancing communication features could further strengthen team support and motivation, ultimately improving long-term PA adherence and well-being. By addressing these considerations, digital health interventions can be better optimised to sustain PA adherence and improve overall well-being.

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