RAIKUMA: Task management smartphone app aimed at improving team and personal well-being

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Abstract. This study explores the effect of team-based mutual support, facilitated by a task management smartphone app called "RAIKUMA", on the well-being of team members. To investigate the impact of positive team relationships, we focused on encouragement provided for both work tasks and private goals.
The experimental results suggest three key implications. Firstly, self-assessment was found to be correlated with well-being. Secondly, while the count of encouragement received showed no correlation with well-being, encouragement provided count suggested a positive correlation with participants' own Subjective Well-being. Finally, analysis of the operation logs revealed a significant negative correlation: teams whose usage time extended into late-night hours reported lower collective well-being.
This study contributes to HCI by demonstrating the potential for technology-mediated support in well-being-oriented systems.

Keywords. HCI · well-being · Positive Psychology ·Task Management

1 Introduction

While well-being is a long-standing concept that has recently led to new research and development fields within HCI, such as "Positive Technology" [1] and "Positive Computing" [2], influenced by Positive Psychology [3]. The motivation for these fields is "the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" [4], which is said to have paved the way for a scientific approach to environments that promote happiness.

Our well-being and effectiveness, whether concerning work or not, are significantly influenced by our emotional experiences. The emotional atmosphere a team generates affects individual well-being and team performance. Positive teams work more effectively; they are also more productive and innovative. Taking an interest and showing concern for the lives of team members is an easy yet symbolic way to strengthen relationships and affection [5].

This study attempted to enhance team members' well-being through team-based support facilitated by a smartphone application. We focused on support among members to investigate the impact of good interpersonal relationships within a team, not only on

work performance but also on individual well-being. Specifically, we examined the effect of offering support for both work-related and private goals on well-being.

2 RAIKUMA

RAIKUMA is a smartphone web application, developed to experimentally demonstrate that mutual support within a team, such as in a workplace, has a positive effect on work performance and well-being. RAIKUMA is intended for use by teams and is comprised of three main functions: "Task Registration," "Daily Self-Assessment," and "Team Member Encouragement."

2.1 Task Registration

In RAIKUMA, users register two types of tasks: work-related tasks and private goals. Work tasks are those performed for the user's team. Private goals can be anything unrelated to work, such as "walking from the next station for weight loss" or "studying English for 10 minutes." The ability to freely define private tasks during registration is expected to leverage the effects of Self-Determination Theory [6], which suggests a positive impact on motivation and well-being.

Tasks are shared in the team. Users perform a three-level self-assessment of their tasks daily. This assessment is shared with the entire team in real-time, enabling team members can take actions, such as offering encouragement, in response to the task's assessment.

2.2 Daily self-assessment

For all registered tasks, users perform a three-level self-assessment (e.g., Sunny, Cloudy, or Rainy) daily after the end of their work. This self-assessment is shared in the team. The self-assessment is displayed on the dashboard and is also shared among the team members.

2.3 Team Member Encouragement

When a team member's self-assessment is displayed, other members react (or offer encouragement) to that assessment. These reactions use emojis, and we intentionally provide icons other than the typical "Like" button. This choice was made based on Guy's research on the "Like" button [7], which found that its precise meaning is not always clear, leading some participants to request icons like 'Agree,' 'Helpful,' 'Worth reading,' or 'Fun' to avoid ambiguity.

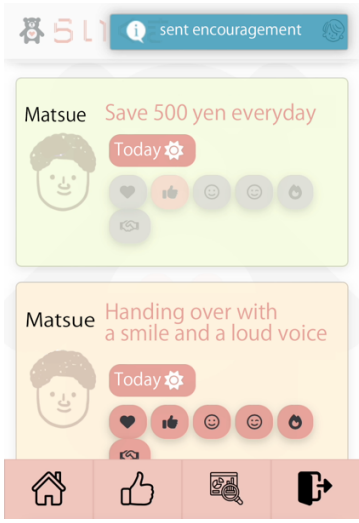

Fig. 1. RAIKUMA Encouragement (English translated)

3 Experiment

In the experiment, three teams, totaling 10 participants, were recruited as teams via crowdsourcing. The study involved using RAIKUMA for five consecutive days, during which team members provided mutual support to each other, and changes in the team members' well-being and outcomes were observed.

In this research, Subjective Well-being (SWB) was measured from both cognitive and affective perspectives. The Japanese version of the Satisfaction with Life Scale (SWLS) [8] was adopted for the cognitive measure, and the Japanese version of the Positive and Negative Affect Schedule (PANAS) [9] was adopted for the affective measure.

4 Result

Fig. 2 (Work Tasks) and 3 (Private Goals Tasks) show the cumulative number of task encouragements and the changes in the three-level self-assessments over the five-day experiment across the three teams. Conversely, no significant correlation was found between the number of times encouragement was received and the participant's PANAS: Positive Affect or SWLS. However, the results (Table 1) suggested a tendency for individuals who provided more support to report higher SWLS ($r=0.472$). Table 2 suggested the average score of the Private Self-Assessment may have a moderate-to-strong correlation with Subjective Well-being and PANAS: Positive Affect.

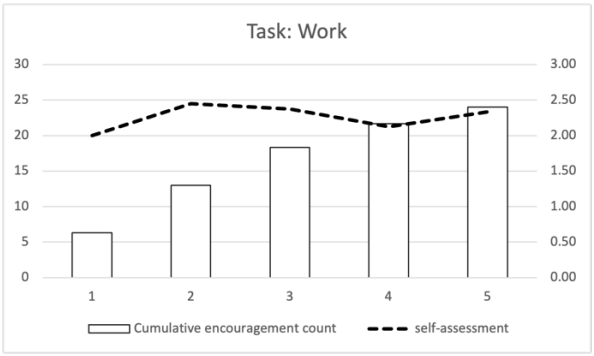

Fig. 2. Five-day change in cumulative encouragement count and self-assessment of work tasks

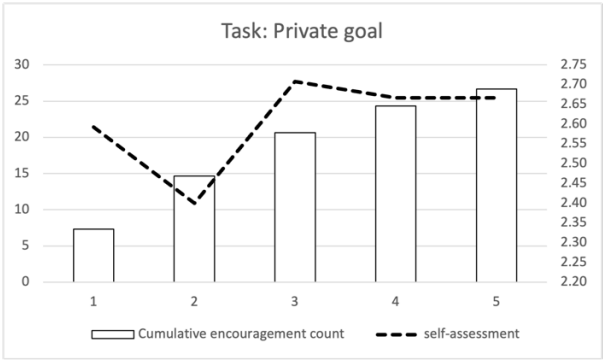

Fig. 3. Five-day change in cumulative encouragement count and self-assessment of private goal tasks

Type	PANAS: Positive Affect	SWLS
Encouragement received count	-0.112	0.417
Encouragement provided count	0.355	0.472

Table 1. Correlation between encouragement count and well-being scales

Type	PANAS: Positive Affect	SWLS
Mean self-assessment score for work	0.493	0.484
Mean self-assessment score for private goals	0.663	0.703

Table 2. Correlation between self-assessment and well-being scales

Fig. 4 shows the usage hour for the three teams, indicating a tendency for teams to have different usage patterns—for example, Team 1 is observed to be using the app during late-night hours. Analysis of the correlation between the time of day of operation and well-being (Table 3) suggested that later and more late-night usage times were associated with lower well-being. Notably, the team average showed a strong correlation, indicating a tendency for teams operating during late-night hours to have lower collective well-being.

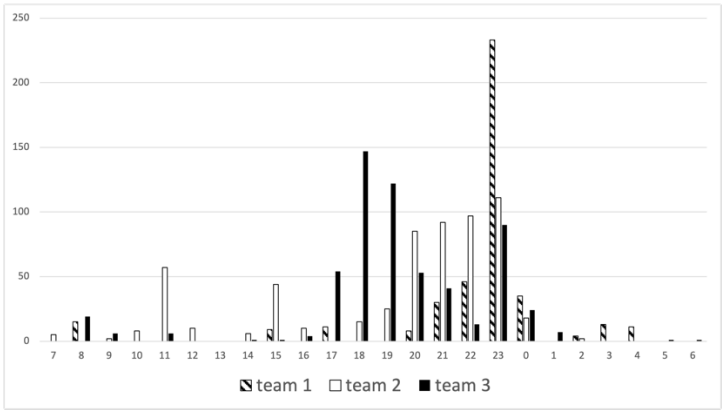

Fig. 4. Distribution of usage hour

Type	Team average			Team member (individual)		
	PANAS: Positive Affect	PANAS: Negative Affect	SWLS	PANAS: Positive Affect	PANAS: Negative Affect	SWLS
Median usage hour	-0.915	0.914	-0.813	-0.372	0.459	-0.682

Table 3. Correlation between usage hour and PANAS, SWLS

5 Conclusion

Through the exploratory experiment, the following trends were identified:

- The count of encouragement received is not related to the individual's self-assessment.
- Self-assessment is related to well-being.
- Teams whose operation hour extends into late-night hours tend to have lower well-being.

The asynchronous nature of the RAIKUMA experimental environment, which permits operation at any time, allowed for the log analysis to reveal trends undetectable by

surveys alone. The finding that teams operating during late-night hours exhibit lower collective well-being is a prime example of such an insight. We expect that conducting longer-term experiments and capturing more detailed logs will enable a wider range of analysis, including metrics beyond support and well-being.

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