DEVOTION
Journal of Research and Community Service
Volume 7, Number 3, March 2026
e-ISSN: 2797-6068 and p-ISSN: 2777-0915

Evaluating the Effectiveness of Gamification on Employee Engagement and Consistency in a Weight Loss Challenge Program at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta

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KEYWORDS
Gamification; Weight Loss Challenge; Body Mass Index (BMI); PT Kereta Api Indonesia (Persero).

ABSTRACT
PT Kereta Api Indonesia (*Persero*) views its employees as strategic assets, whose well-being directly affects organizational performance. Rising rates of overweight and obesity pose health and productivity challenges, increasing risks of fatigue and chronic disease. This study aims to evaluate the effectiveness of gamification in improving employee engagement and consistency during the Weight Loss Challenge program at PT Kereta Api Indonesia (*Persero*) *DAOP* 1 Jakarta. A total of 98 employees with a Body Mass Index (BMI) of ≥30 kg/m² participated in the program over a three-month period. Health indicators were measured using BMI and the percentage of weight loss, while engagement was evaluated through a point system, sharing activities, and webinar participation. Analysis using paired-sample t-tests and cross-tabulation with chi-square tests revealed a significant decrease in average BMI by 1.79 kg/m² and an average weight loss percentage of 6.16%, both statistically significant ($p < 0.001$). Outcome-oriented and behavior-intensive components, such as weight loss and activity points, showed a very strong relationship with the participants' final scores, while supportive components like sharing activities and webinar participation showed moderate influence. The findings suggest that gamification effectively promotes healthy behavior changes through increased employee engagement and consistency. Programs with measurable, intensive activities boost participation and support sustainable workplace health and productivity.

INTRODUCTION

Employee health is a fundamental aspect of organizational sustainability and productivity. PT Kereta Api Indonesia (Persero), Operational Region 1 Jakarta faces significant challenges concerning employee health, particularly regarding obesity. Obesity not only increases the risk of chronic diseases such as diabetes and hypertension but also directly impacts performance, workplace safety, and corporate healthcare costs (Alzghoul, 2024; Kirk et al., 2021; Pourabbasi et al., 2024).

According to the Medical Check-Up results of employees in Operational Region 1 Jakarta, obesity ranks fourth among the top ten most common diagnoses. Out of 2,915 employees, 340 individuals (approximately 11.7%) had a Body Mass Index (BMI) above 30 kg/m². Functional doctors' assessments in the region further revealed that employees with obesity also frequently presented with comorbidities, including diabetes in 42 employees and hypertension in 9 employees. Given these conditions, workplace health interventions are necessary, particularly regarding the Weight Loss Challenge for employees with obesity as part

of the company's Employee Well-being Program, which aims not only to enhance organizational performance but also to promote employee health and welfare (Balk-Møller et al., 2017; Chang, 2024).

Weight loss programs for employees are not merely oriented toward achieving an ideal body weight but have a more comprehensive objective: fostering sustainable healthy lifestyle habits. This approach emphasizes fundamental behavioral changes, including balanced nutrition, increased physical activity, and stress management, as integral components of daily employee life (Abbo Bacia, 2024; Syed, 2020).

PT Kereta Api Indonesia (Persero), Operational Region 1 Jakarta implements a gamification-based Weight Loss Challenge program that incorporates game elements such as points, challenges, and rewards to enhance employee engagement and consistency in maintaining healthy behaviors. According to Deterding, Dixon, Khaled, and Nacke (2011), gamification is described as the use of game elements in non-game contexts. Bunchball.com (2010) defines gamification as the application of game mechanics in non-game activities to influence behavior. Zichermann and Cunningham (2011) further describe gamification as a process that applies game-thinking and game mechanics to engage audiences and solve problems.

Through this approach, the present study aims to evaluate the effectiveness of gamification in enhancing employee engagement and consistency in participating in the Weight Loss Challenge program at PT Kereta Api Indonesia (Persero), Operational Region 1 Jakarta. Additionally, this study seeks to determine the extent to which gamification can holistically support the improvement of employee well-being.

Peñalvo et al. (2021) conducted a systematic review and meta-analysis that examined the effectiveness of workplace wellness programs in improving dietary habits, reducing rates of overweight, and promoting cardiometabolic health. Their study found that such programs, especially those integrating physical activity, nutrition education, and behavior monitoring, achieve more significant and consistent results than single-component interventions. Sardi et al. (2017) performed a systematic review on the use of gamification in e-health applications. Their findings emphasize that gamification mechanisms, such as points systems, feedback, and rewards, significantly enhance user engagement, motivation, and behavior change in health-related interventions, aligning well with this study's focus on using gamification to foster healthy behavior in employees.

This study contributes new insights by applying gamification in the context of a weight loss program for employees at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta. Unlike previous research that typically focuses on gamification-based health programs in general, this study explores the impact of gamification on enhancing employee engagement and consistency in achieving specific weight loss goals. Additionally, this study offers a quasi-experimental approach with more comprehensive measurements of gamification components (such as points, challenges, and rewards) in relation to changes in health indicators, providing new perspectives on the long-term effects of gamification in the context of employee health.

This study aims to analyze the impact of gamification on enhancing employee engagement in the weight loss program at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta. Additionally, the study seeks to assess the effect of gamification on increasing employee consistency in maintaining healthy behaviors throughout the weight loss program and to

measure the changes in health indicators, such as Body Mass Index (BMI) and weight loss percentage, after implementing gamification in the program.

This research is expected to provide insights to the company, specifically PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta, on the effectiveness of using gamification to enhance employee engagement and consistency in participating in health programs. Moreover, the findings are anticipated to provide empirical evidence regarding the positive impact of gamification on employee health, which can be used to design more effective and sustainable health programs in the future. This study also aims to serve as a reference for further research in the development of gamification as a health intervention strategy that can be applied in various organizations to improve employee well-being.

METHOD

The passage is already largely written in the past tense and is well-structured. Below is the proofread version with corrections applied:

The study employed a quantitative approach using a one-group post-test quasi-experimental design. A total of 98 employees with a body mass index (BMI) ≥30 kg/m² participated in the Weight Loss Challenge program for a duration of three months. The program comprised structured exercise activities, daily healthy menu reporting via an application, a participation-based point system, and rewards for participants demonstrating the highest consistency. BMI and weight loss percentage were measured over two time points. Data were collected through questionnaires assessing motivation, perception of gamification, engagement level, and behavioral consistency, as well as objective data including weight reduction obtained from medical check-ups (MCU), reporting activity via Google Sheets, sharing activity in WhatsApp groups, and webinar participation.

The resulting assessment variables were subsequently categorized. The weight loss percentage obtained from MCU data, ranging from 0 to 7, was classified as low (≤2.33), medium (>2.33–≤4.66), and high (>4.66–≤7.00). The sharing activity score, ranging from 0 to 0.50, was categorized as low (≤0.17), medium (>0.17–≤0.33), and high (>0.33–≤0.50). Webinar participation scores, ranging from 0 to 1.00, were classified as low (≤0.33), medium (>0.33–≤0.67), and high (>0.67–≤1.00). Furthermore, reporting activity via Google Sheets, with a range of 0–1.50, was categorized as low (≤0.50), medium (>0.50–≤1.00), and high (>1.00–≤1.50). The total score, which represented the aggregate of all assessment components and ranged from 0 to 10, was converted into ordinal categories as low (≤3.33), medium (>3.33–≤6.67), and high (>6.67–≤10.00).

To evaluate changes in health indicators before and after the intervention, paired-sample t-tests were conducted. This analysis was applied to BMI measured at two observation points (pre- and post-intervention) and to weight loss percentage, comparing initial and final values. Subsequently, cross-tabulation analysis was performed to examine relationships between variables categorized on an ordinal scale. These categorical variables included weight loss percentage categories, activity scores (including activity points, sharing activity, and webinar participation), and total final point categories. Associations between variables were tested using the Pearson chi-square test, while the strength of the relationships among categorical variables was measured using Cramér's V. Cramér's V values indicate the degree of association without implying directionality or causal relationships.

RESULT AND DISCUSSION

This section presents the results and analysis of data obtained from the implementation of the gamification-based Weight Loss Challenge program. The findings include the analysis of changes in employee health indicators measured at two observation points, specifically body mass index (BMI) and weight loss percentage. Furthermore, cross-tabulation analyses were conducted on categorized variables, including weight loss percentage categories, activity reporting via Google Sheets, sharing activity in WhatsApp groups, webinar participation, and total final point categories, to examine the contribution of each category to the overall assessment outcomes.

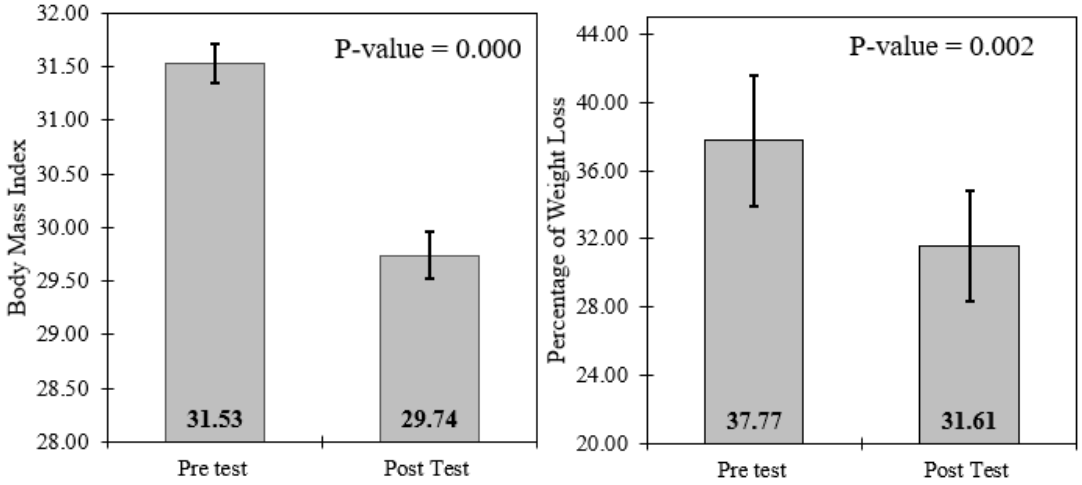

Figure 1. Body Mass Index and weight loss percentage before and after the intervention

Source: Adapted from the research conducted at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta, 2026

The paired sample t-test results indicated a significant difference in employees' body mass index (BMI) before and after participating in the gamification-based Weight Loss Challenge program. The mean BMI decreased by 1.79 kg/m² ($p < 0.001$), suggesting that the observed change was statistically significant and unlikely due to chance. This reduction reflects an improvement in participants' anthropometric status over the intervention period, indicating a physiological response to the program.

These findings align with existing literature, which emphasizes that workplace health interventions, particularly multicomponent programs, can improve anthropometric indicators such as BMI. A systematic review by Peñalvo et al. (2021) highlighted that workplace wellness programs combining structured physical activity, nutrition education, and ongoing health behavior monitoring tend to achieve more consistent BMI reductions compared to single-component interventions. However, the magnitude of effect is influenced by program duration, intervention intensity, and participant engagement.

In the context of this study, the significant BMI reduction can be attributed to the gamification approach, which promoted active participation and consistent healthy behaviors. Gamification mechanisms, including points, challenges, and rewards, are known to enhance intrinsic motivation and adherence to health-related activities, ultimately supporting medium-

term behavioral changes such as increased physical activity and improved dietary habits (Cugelman, 2018). Other studies have similarly emphasized that sustained engagement is a key determinant of successful workplace weight loss programs, with more actively involved employees demonstrating greater improvements in health indicators (Proper & van Oostrom, 2019).

Nonetheless, these results should be interpreted cautiously. The absence of a control group limits the ability to attribute BMI changes solely to the intervention. Additionally, literature suggests that workplace BMI reductions are typically moderate and may fluctuate over time without long-term behavioral maintenance strategies (Anderson et al., 2015). Therefore, the findings should be understood as indicative of positive changes during the program period rather than evidence of long-term causal effectiveness.

In addition to BMI, the paired t-test on weight loss percentage also revealed a significant difference between pre- and post-intervention measurements, with an average reduction of 6.16%. This indicates relatively consistent weight loss among participants, supporting the intervention's effect on anthropometric outcomes. Using percentage weight loss as an indicator is methodologically advantageous, as it accounts for baseline weight variability among participants. An average weight reduction of 5–10% has been associated with clinically meaningful improvements in metabolic parameters and cardiovascular health (Jensen et al., 2018).

These findings are consistent with literature highlighting the importance of structured workplace weight loss programs. Patel et al. (2021) reported that interventions combining behavioral strategies, regular monitoring, and social support yield more stable weight loss than purely informational approaches. Furthermore, recent studies emphasize that program success depends not only on diet or physical activity components but also on participant engagement. Workplace interventions providing regular feedback, clear goals, and moderate competitive elements enhance adherence and sustain healthy behaviors, ultimately resulting in statistically significant weight reduction (Mitchell et al., 2020).

The observed weight loss and BMI reduction in this study reflect the effectiveness of gamification in promoting engagement, motivation, and behavioral consistency. Gamification leverages psychological mechanisms such as immediate feedback, reward systems, light competition, and social reinforcement, collectively fostering adherence to physical activity, dietary regulation, and continuous health behavior reporting. These mechanisms are particularly relevant for weight management, which requires medium- to long-term behavioral consistency rather than short-term changes (Johnson et al., 2016; Sardi et al., 2017).

Empirical studies have shown that gamification in workplace wellness programs can improve behavioral and anthropometric outcomes, including increased physical activity and weight reduction. For example, Patel et al. (2021) demonstrated that digital interventions combining self-monitoring, feedback, and competitive elements lead to meaningful health behavior changes, although effect sizes vary across individuals and groups. Such variability suggests that gamification is part of a broader intervention ecosystem, with effectiveness influenced by program design, implementation intensity, and participant characteristics.

This is consistent with systematic reviews indicating heterogeneous outcomes in workplace weight management interventions. Peñalvo et al. (2021) emphasized that program effectiveness is shaped by intervention duration, the comprehensiveness of components (e.g.,

physical activity, nutrition education, social support), and participants' baseline characteristics. Therefore, variations in outcomes reflect typical behavioral intervention patterns rather than anomalies.

Overall, the findings suggest that the gamification-based Weight Loss Challenge was associated with significant anthropometric improvements among participants. The results support evidence that structured workplace health interventions utilizing innovative behavioral approaches can positively impact employee health. However, program effectiveness should be interpreted within the limitations of the study design and considered as a foundation for further research employing more rigorous experimental designs to assess causal relationships comprehensively.

Table 1. Distribution of Categories for Weight Loss Challenge Program Components, Participants' Final Scores, and Strength of Association

Component	Component Category	Final Score n(%)			p-value (χ^2)	Cramér's V	Strength of Association
		Low	Medium	High			
Weight Loss Percentage	Low	60 (83.3)	12 (16.7)	0 (0.0)	<0.001	0.691	Very strong
	Medium	0 (0.0)	12 (85.7)	2 (14.3)			
	High	0 (0.0)	3 (25.0)	9 (75.0)			
Activity Points	Medium	56 (81.2)	12 (17.4)	1 (1.4)	<0.001	0.668	Very strong
	High	4 (13.8)	15 (51.7)	10 (34.5)			
Sharing Activity	Low	49 (77.8)	12 (19.0)	2 (3.2)	<0.001	0.418	Moderate
	Medium	11 (52.4)	7 (33.3)	3 (14.3)			
	High	0 (0.0)	8 (57.1)	6 (42.9)			
Webinar Participation	Low	54 (76.1)	13 (18.3)	4 (5.6)	<0.001	0.385	Moderate
	Medium	6 (33.3)	7 (38.9)	5 (27.8)			
	High	0 (0.0)	7 (77.8)	2 (22.2)			

Source: Adapted from the research conducted at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta, 2026

Frequency analysis showed the distribution of participants' total final scores based on achievements in each component of the Weight Loss Challenge program. For the weight loss percentage component, the majority of participants in the low category (n = 60; 83.3%) were classified in the low final score category. Conversely, participants in the high category (n = 9; 75.0%) mostly belonged to the high final score category, while the medium category corresponded to medium final scores (n = 12; 85.7%). This pattern indicates that the degree of weight loss directly contributes to overall program achievement, reflecting consistency between physical outcomes and accumulated final scores.

The activity points component also displayed a strong distribution pattern. Most participants with medium activity points (n = 56; 81.2%) fell into the low final score category,

whereas those with high activity points (n = 10; 34.5%) were more frequently in the high final score category. This distribution demonstrates that intensive participation in activities significantly influences overall program achievement. For sharing activity, the majority of participants in the low category (n = 49; 77.8%) had low final scores, while participants in the high category (n = 6; 42.9%) tended to achieve high final scores. This indicates that social engagement and peer interaction support total score accumulation, albeit more moderately than the weight loss and activity point components. Similarly, webinar participation showed a comparable pattern: participants in the low category (n = 54; 76.1%) dominated the low final score category, whereas high-category participants (n = 2; 22.2%) were in the high final score group, suggesting that engagement in educational online activities contributes to total scores, though to a lesser extent than outcome-oriented and intensive components.

Cross-tabulation analysis revealed significant associations between each program component and participants' total final score categories. Chi-square tests for all components yielded p-values < 0.001, indicating that the distribution of final scores was not random but related to achievement levels within each program component The weight loss percentage component exhibited a very strong association with final score categories (Cramér's V = 0.691). Participants with low weight loss were largely concentrated in the low final score category, while those with high weight loss predominated in the high final score category. This demonstrates that anthropometric outcomes consistently reflect overall program achievement, aligning with literature that identifies weight loss as a primary indicator of success in behavioral workplace interventions with continuous monitoring (Peñalvo et al., 2021).

The activity points component also showed a very strong relationship with final score categories (Cramér's V = 0.668). Participants with high activity points tended to fall within medium-to-high final score categories, while those with medium points were mainly in the low final score group. This indicates that the intensity and consistency of task participation, measured through the point system, is a key mechanism in driving total program achievement. Theoretically, points in gamification function as behavioral reinforcement, strengthening adherence to healthy activities via instant feedback and measurable objectives (Sardi et al., 2017; Johnson et al., 2016).

In contrast, sharing activity demonstrated a significant but moderate association with final scores (Cramér's V = 0.418). Participants with high sharing activity levels tended to have higher final scores than those in the low category, although the distribution was less pronounced compared to physical outcomes and core activity points. This suggests that social interaction and peer support act as supportive, rather than primary, factors in program success. Previous literature emphasizes that social support in health programs can enhance motivation and behavior sustainability, but its impact is often indirect and influenced by organizational context and individual characteristics (Patel et al., 2021).

A similar pattern was observed for webinar participation, which also showed a significant moderate association with final scores (Cramér's V = 0.385). Participants with higher webinar participation generally achieved better final scores, although variability was greater than in physical activity and weight loss components. This indicates that educational components serve as enabling factors that promote health awareness and understanding, though their effectiveness depends on translating knowledge into daily behavioral practices (Fishbein et al., 2016).

Overall, frequency and category distribution analyses demonstrate that outcome-oriented components, such as weight loss, and behavior-intensive components, like activity points, exhibit stronger relationships with total final scores than supportive components, such as sharing activity and webinar participation. This suggests that measurable outcomes and active engagement in program tasks contribute most significantly to score accumulation and participant success. These findings are consistent with Behavior Change Theory, which emphasizes that interventions are more effective when integrating motivational elements, behavior monitoring, and objectively measurable outcomes (Michie et al., 2017). Other studies have also shown that gamification programs combining positive reinforcement through reward points, regular feedback, and clear targets enhance engagement while strengthening consistent healthy behaviors (Sardi et al., 2017; Johnson et al., 2016).

Thus, the application of gamification in the Weight Loss Challenge functions not only as a tool to increase participant motivation and engagement but also as an intervention framework that links behavior, process, and outcomes in a measurable manner. This approach ensures that each activity and achieved outcome can be systematically evaluated, allowing program strategies to adjust intervention intensity according to participant needs. Moreover, the findings support the view that gamification program designs emphasizing outcome and behavior intensity can yield more significant changes than purely educational or supportive approaches (Lister et al., 2014; Patel et al., 2021).

CONCLUSION

The gamification-based Weight Loss Challenge program at PT Kereta Api Indonesia (Persero) DAOP 1 Jakarta effectively enhanced employee engagement, consistency, and health outcomes, as evidenced by a significant mean BMI reduction of 1.79 kg/m² and an average weight loss of 6.16% over the intervention period. Outcome-oriented components, such as weight loss, and behavior-intensive components, such as activity points, demonstrated the strongest associations with total program scores, while supportive components, including sharing activities and webinar participation, contributed moderately. These findings align with behavior change theory, underscoring the importance of integrating motivation, behavioral monitoring, and measurable outcomes to promote sustainable lifestyle change. To further enhance engagement and long-term commitment, the company should consider incorporating additional gamification elements such as leaderboards, social competitions, and badges, as well as expanding program eligibility beyond employees with a BMI ≥30 to benefit a broader workforce population. Future research should employ experimental designs with a control group to more rigorously establish causal relationships between gamification and health outcomes, while also incorporating a post-intervention follow-up period to assess the sustainability of behavioral changes and explore the deeper integration of social support and educational content within gamification frameworks across diverse organizational settings.

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