Research on Impact of Work Gamification on Employee Performance

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Abstract: Gamification has been applied in the workplace as an innovative way to motivate employees and break people's traditional concept of playing games. However, different scholars have different views on the emergence of this form of work. To verify the effectiveness of gamification in the workplace, based on the S-O-R theory, the study explores the mechanism of gamification on job performance from the perspective of employees and empirically analyzes the collected questionnaire data. The results showed that work gamification positively affects employees' productive behavior and outcomes. Job satisfaction moderates the impact of work gamification on employee performance. Employee traditionality negatively regulates the relationship between work gamification and job satisfaction. Finally, the outcomes of the study are synthesized in this paper to provide management-relevant advice and measures for the application of work gamification in organizations.

Keywords: Work gamification, Job satisfaction, Job performance, Traditionality

1. Introduction

"Living for the weekend" or "looking forward to off-duty hours" is the status quo of most employees. Domestic employees' interest in their jobs is low and their motivation to work is decreasing, which in turn affects their work quality and work efficiency. Studies have shown that work-related boredom is associated with a variety of negative outcomes, such as low effort and performance, job dissatisfaction, absenteeism, intent to leave, and counterproductive work behavior[1]. At the same time, the post-90s and post-00s, who grew up in the digital technology environment, are gradually entering the workplace. Compared with the older generation of employees, they pay more attention to flexible work methods, like soft benefits, and favor exciting and novel forms of work, and the effect of traditional working methods on their motivation is not obvious. How to enhance the enthusiasm and performance of employees has always been a topic of enterprises and scholars continue to pursue. So in the face of the current situation, the company needs to consider how to create a good working atmosphere to stimulate the interest of employees to work, and how to motivate employees' job performance?

Some companies at home and abroad have started trying to motivate employees to work hard by incorporating game elements into the workplace. For instance, domestic delivery platform companies classify their delivery riders into different levels, such as bronze, silver, gold, diamond, platinum, and king's glory. Riders also have their virtual titles. The higher the status level, the more lucrative the rewards and points for delivery riders[2]. Additionally, the emergence of the term "Gamification" dates back to the late 20th and early 21st centuries, which incorporates motivational elements and mechanics of the game designed to enhance the participant experience by using them in non-game tasks or processes of a non-game nature[3]. Gamification is a new buzzword applied to research in the fields of knowledge sharing and human resource development[4]. However, less research has been conducted on the actual effects of gamification in the work environment[3]. Besides, scholars at home and abroad have different views on the effects of work gamification, so there is still a need to explore its effects on the job in depth. At the same time, work gamification model has been applied for a relatively short period. The specific mechanism of its effect on employees' job performance needs further study[5].

Based on this, this paper investigates the mechanism of work gamification on employees' job performance. Besides, this study proposes a research model to examine the impact of work gamification on work behavior and outcomes from individual perspective. Gamification in the work environment stimulates employees through a series of game elements, which may influence their cognitive and psychological feelings, resulting in positive or resistive emotion and further making employees' work

behavior different. At the same time, gamification in the work environment may also directly affect employees' work behavior, which can be explained by S-O-R theory. In addition, considering the differences in employees' attitudes toward work gamification in different generation or different background, this paper also investigates the moderating role of individual traditionality in the relationship between work gamification and employees' job performance, to explore the boundary condition of individual traditionality in the relationship between work gamification and job performance. Finally, based on the findings of this study, we propose targeted management insights and provide suggestions and methods for companies to better carry out work gamification.

2. Hypotheses development

2.1 Work gamification and job performance

Previous empirical studies on gamification and productivity have highlighted the great potential of work gamification to improve performance[6]. In an organizational production setting, Warmelink et al. examined the effects of gamification on employee motivation, processes, and efficiency[7]. Compared with the traditional work model, work gamification model can effectively motivate employees and influence the final work outcome. The game elements such as points, progress bars, and leaderboards in work gamification motivate employees to create high productivity by quantifying the work.

From a theoretical perspective, work gamification improves visibility, comparability, and immediacy of performance information, provides users with feedback about their job performance[6]. Flow theory can effectively explain the impact of gamification on job performance[8]. "Flow experience" refers to complete immersion in current activities without any distractions and ignoring the existence of time[9]. The individual feels almost identical to the state of mind flow when playing the game. The design of work gamification brings employees a game-like experience through fun and interactivity. Employees perceive that work is enjoyable., then they are willing to immerse themselves in work tasks, which ultimately leads to higher key performance indicator. At the same time, the fun and immersion experience brought by the flow experience to employees will again motivate them to actively put energy into their work, thus realizing the continuity of employees' engagement in their work and promoting the efficient completion of tasks. Therefore, this study proposed the following hypothesis:

Hypothesis 1: There is a positive relationship between work gamification and employees' job performance.

2.2 Mediating role of job satisfaction

Managers can use strategies to improve employees' job satisfaction and motivation, which in turn improves employees' performance[10]. By using the model of work gamification, the company's employees feel recognized and thus increase their satisfaction, so they are motivated to continue using the work gamification model[11], which ultimately affects their job performance. Gamification system in a company's work environment has a significant impact on employees' job satisfaction, engagement, and subsequent performance[5]. It enhances individuals' sense of playfulness and pleasure at work[12], and it also has the potential to improve employees' job performance, which means having fun at work can improve employees' job satisfaction, engagement, well-being, and performance[13]. Therefore, this paper argues that employees' perceptions of work gamification can influence employees' productive behavior.

Employees' internal perceptions are crucial for organizational survival and growth, and job characteristics strongly influence employees' perception. If employees experience more satisfaction and engagement at work as a result of gamification, it is also more likely to benefit the organization[4]. In contrast, when the job does not provide sufficient satisfaction to employees or even makes them dissatisfied, employees feel disappointed and less motivated, which results in lower productivity and more poor work quality. Therefore, this paper proposes the following hypothesis:

Hypothesis 2: Job satisfaction plays a mediating role in the relationship between work gamification and employee job performance.

2.3 Influence mechanism of traditionality

Chinese tradition tends to attribute both success and failure to external factors. When faced with the inability to make changes in work pattern adjustment, employees with high traditionality may adopt

status quo, passive avoidance, or inaction under the influence of external control beliefs[14]. And those employees have negative emotions toward work. There are significant differences in employees' psychological experiences[15] and behaviors[16] at both high and low levels of traditionality. Some studies have found that individual traditionality has a significant impact on employees' inner activities and behaviors[17].

Influenced by Confucian culture, Chinese people have traditional characteristics such as obedience to authority, peace of mind, and fatalistic self-preservation[18], and these characteristics affect the effect of the company's work gamification model and its mechanism of action on different employees' work attitudes and behaviors. That is, employees with different levels of traditionality will have various job satisfaction and output results for the development of the company's gamification work form. Specifically, the implementation of work gamification in the company will, to a certain extent, cause individual and group competition among employees. Employees with high traditionality prefer to seek a stable form of work and may resist game elements and game mechanisms such as leaderboards and levels in the work gamification model. In addition, when employees with high traditionality believe that they have no control or ability over their work, they will be reluctant to accept work assignments and do not want to take any responsibility for their job[19]. Besides, they are also dissatisfied with the existing work format. In contrast, employees with low traditionality do not worry about interpersonal conflicts among colleagues and are more willing to try novel forms of work. Therefore, the following hypothesis is proposed in this study:

Hypothesis 3: Employees' traditionality plays a negative moderating role in the relationship between work gamification and job satisfaction, that is, the lower the employees' traditionality, the stronger the positive effect of work gamification on employees' job satisfaction (Figure 1).
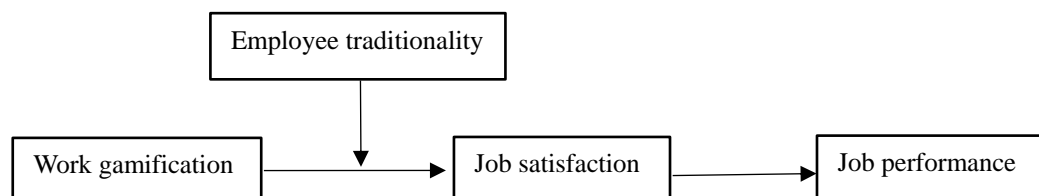

Figure 1 Mechanism of the effect of work gamification on employees' job performance

3. Methodology

3.1 Sample and data collection

The questionnaire was administered to the employees of companies conducting work gamification. This paper administered the questionnaires to the employees of different companies in May 2022 and January 2023 respectively. Finally, this paper collected 411 questionnaires. Excluding some questionnaires that were not seriously answered, we got 348 valid sample data, and the questionnaire collection efficiency reached 84.7%. The gender distribution of the sample data is balanced, among which 42.8% (149) are male. In the distribution of education, 85.6% are a bachelor's degree or above. In the distribution of working years, 61.5% (214) have worked in the existing company for less than five years. Finally, in the composition of rank, there are only 26 senior managers, accounting for 7.5%.

3.2. Measurements

This paper uses the questionnaire method. The relevant scales refer to the established scales in previous studies. Besides, this study modified the established scales based on the research content. The questionnaire of this paper adopts the seven-point Likert method for measurement, and the options are divided into seven degrees (1 means totally disagree and 7 means totally agree).

(1) Work gamification. The measurement of employees' gamification experience uses the scale in Eppmann et al.'s article[20], which contains six dimensions: hedonic, immersion, degree of creative thinking, activity, non-negativity, and dominance, with a total of 21 questions. In this study, the scale was adapted to the context of the study, with the addition of work gamification-related items, such as "work gamification is fun." In this study, Cronbach's alpha coefficient of this scale is 0.854.

(2) Job satisfaction. This variable was measured using the scale in Bala and Venkatesh's study[21], which contains 3 items, with representative items such as "All things considered, I am satisfied with my

job." The Cronbach's alpha coefficient for this scale in this study was 0.806.

(3) Job performance. This variable was measured using the scale in Farh and Cheng's study[22] and the representative question was: "I always complete my assigned work tasks on time." In this study, Cronbach's alpha coefficient for this scale was 0.747.

(4) Traditionality. This variable was measured using Farh et al.'s scale[17], which has five items, with representative questions such as "Children should respect those whom their parents respect." In the present study, Cronbach's alpha coefficient on this scale was 0.793.

(5) Control variables. Concerning the general variable characteristics, the basic demographic characteristics of employees' gender, education, rank, and years of work experience were used as control variables in this paper.

4. Analysis

4.1. Confirmatory factor analysis

This study tested the discriminant validity among the variables by confirming factor analysis. As shown in Table 1, the final analysis results showed that the four-factor model (gamification, job satisfaction, employee job performance, and traditionality) had a better fit (χ^2/df = 1.792, CFI = 0.901, IFI = 0.903, RMSEA = 0.048, SRMR = 0.059), which was the best compared to other models, indicating that the four-factor variables had good discriminant validity among the four factors, thus laying the foundation for the subsequent hypothesis testing.

Table 1 Confirmatory factor analysis results

Factor Model	χ^2/df	CFI	IFI	RMSEA	SRMR
Four-factor model(GA;JS;JP;ET)	1.792	0.901	0.903	0.048	0.059
Three-factor model(GA+JS;JP;ET)	2.359	0.827	0.829	0.063	0.067
Two-factor model(GA+JS+JP;ET)	2.548	0.802	0.804	0.067	0.068
One-factor model(GA+JS+JP+ET)	3.468	0.684	0.687	0.084	0.086

Note: N = 348, GA = gamification, JS = job satisfaction, JP = job performance, ET = employee traditionality.

4.2. Descriptive statistical analysis

The correlations of the variables used Pearson correlation analysis, and the data results showed in Table 2. work gamification was positively correlated with job satisfaction significantly (r = 0.684, p < 0.001). Work gamification was positively correlated with employee performance significantly(r = 0.607, p < 0.001). Job satisfaction was positively correlated with employee performance significantly (r = 0.545. p < 0.001), and the relationship between the variables was in line with the basic theoretical expectations, setting the stage for the following hypothesis testing.

Table 2 Standard deviation, mean and correlation coefficient of each variable

Construct	1	2	3	4	5	6	7	8
1 Gender	--							
2 Education	0.043	--						
3 Tenure	-0.171**	-0.159*	--					
4 Rank	-0.032	0.105	0.517***	--				
5 Gamification	-0.194***	-0.007	0.278***	0.155**	--			
6 Job satisfaction	-0.112*	-0.007	0.273***	0.179***	0.684***	--		
7 Job performance	-0.174**	-0.029	0.324***	0.243***	0.607***	0.545***	--	
8 Traditionality	-0.065	-0.118*	0.195***	0.094	0.155**	0.162**	0.209***	--
Mean	1.570	4.030	3.190	2.030	5.486	5.933	5.757	4.252
SD	0.496	0.650	1.160	1.049	0.551	0.712	0.701	1.133

Note: N = 348, * p < 0.05, ** p < 0.01, *** p < 0.001.

4.4. Hypothesis testing

4.4.1. Main effect test

The results of the regression analysis of the main effects are shown in Table 3. In Model 6, work gamification is significantly and positively related to job performance (β = 0.518, p < 0.001). Therefore,

Hypothesis 1 is verified.

4.4.2. Mediating effect test

Table 3 shows the regression analysis's results of job satisfaction's mediating effect. Model 2 shows the test results in which work gamification is positively related to employee job satisfaction significantly ($\beta = 0.582$, $p < 0.001$). In Model 7, employee satisfaction is positively related to job performance ($\beta = 0.484$, $p < 0.001$). As shown in Model 8, when gamification and job satisfaction are added to the regression equation at the same time, the relationship between work gamification and job performance is still significant. The effect diminished not 0 ($\beta = 0.357$, $p < 0.001$), and the coefficient decreased from 0.518 to 0.357. So job satisfaction plays a partially mediating role between gamification and job performance. Thus, hypothesis 2 is verified.

Table 3 Effect test of the relationship between work gamification and employee job performance

Construct	Job satisfaction				Job performance			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Gender	-0.070	0.002	0.002	0.008	-0.128*	-0.064	-0.095*	-0.065
Education	0.030	0.023	0.025	0.027	0.004	-0.002	-0.010	-0.008
Working years	0.241***	0.107*	0.104	0.097	0.244***	0.126*	0.128*	0.096
Rank	0.049	0.029	0.029	0.035	0.112	0.094	0.088	0.086
Gamification		0.582***	0.577***	0.541***		0.518***		0.357***
Job satisfaction							0.484***	0.277***
Traditionality			0.028	0.068				
Gamification x Traditionality				-0.114*				
R^2	0.082	0.391	0.392	0.403	0.128	0.374	0.343	0.420
ΔR^2	0.082	0.309	0.001	0.010	0.128	0.245	0.215	0.047
F	7.649***	43.982***	36.654***	32.728***	12.636***	40.807***	35.742***	41.221***
ΔF	7.649	173.724	0.399	5.968	12.636	133.908	111.835	27.487

Note: N = 348, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
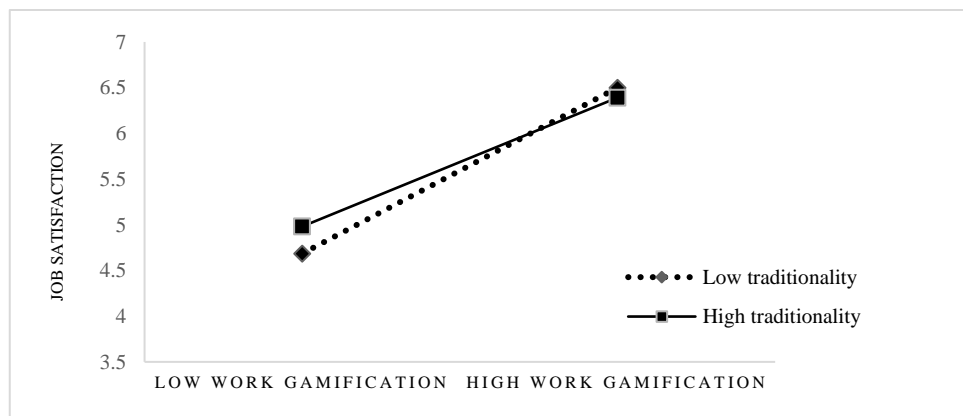
4.4.3. Moderating effect test

Figure 2 The moderating role of employee traditionality in the relationship between work gamification and employee job satisfaction

Before analyzing the moderating effect, it is necessary to construct the interaction term between work gamification and employee traditionality. Table 3 shows the results of the analysis. In Model 4, the regression coefficient of the interaction term between work gamification and employee traditionality is negative and significant ($\beta = -0.114$, $p < 0.05$). So employee traditionality plays a moderating role between work gamification and employee satisfaction. Meanwhile, as shown in Figure 2, the effect of work gamification on employee satisfaction is more moderate at high level of traditionality. In contrast, the effect of work gamification on their satisfaction is steeper at low level of traditionality, which indicates that employee traditionality plays a buffering role in the effect of work gamification on employee satisfaction. Therefore, Hypothesis 3 is tested.

5. Discussion

5.1. Theorical implications

This paper investigated the mechanism of the role of gamification on employees' job performance. Through the empirical analysis of 348 company employees' data, combined with the model of this paper, the main conclusions of this study are as follows:

According to the verification of the main effect in this paper, employees' good experience with gamification can positively promote their productive efficiency. On the one hand, by setting various game elements and game mechanisms, gamification adds fun and freshness to work. On the other hand, gamification forms realize the diversity of work presentation and can give employees immediate feedback. Employees of companies can learn about their work progress through progress bars, points, and other game elements in the process of work. In short, job can be made exciting and engaging through gamification, just like playing a game!

The effect of work gamification on employee performance is partially mediated by employee satisfaction. The mediating effect verifies that employee job satisfaction partially mediates the positive relationship between work gamification and performance. That is, work gamification patterns can promote employee productivity by positively increasing employee satisfaction. Work gamification can make employees feel happier and more satisfied. Besides, it can motivate them to pursue excellence and innovation as well as achieve key performance indicator. Finally, work gamification improves the quality and efficiency of employees' work and generates economic benefits.

The relationship between traditionality-moderated work gamification and employee job satisfaction. Traditionality negatively moderates the positive relationship between work gamification and employee satisfaction. The higher the employee's traditionality, the less the positive effect of work gamification on employee job satisfaction. Employees with high traditionality are more likely to rest on the status quo, pursue stability and refuse to change[23], while some game elements may not be acceptable to employees with high traditionality in a short time, and they may feel discomfort and dissatisfaction.

5.2. Implications for practice

Firstly, in a competitive environment, innovative work models can motivate colleagues and improve employee work climate. In the process of gamification mode of the company, game elements or game mechanisms should focus on employees' game-like experience, increase their work immersion, and avoid pursuing too much competitive content. On the other hand, the integration of gamification into the workplace should focus on promoting employees' work well-being and adding fun to work. Companies should properly design game levels, content unlocking, and other game elements or mechanics, while instant feedback should be provided to employees in time.

Secondly, work gamification should pay attention to employees' job satisfaction. Besides, workplace gamification in the company affects employees' production behavior through job satisfaction, and employees with higher satisfaction produce more output than those with lower satisfaction. Therefore, the game elements and game mechanisms added by the company should consider the aspects of the original work model that cause employees' dissatisfaction, and enhance employees' job satisfaction through the adjustment of the work model. At the same time, game elements or mechanisms can quantify the work content and dividing the difficulty areas, improve the transparency of game rules and game mechanisms, and add fun to work while also achieving employees' sense of work fairness and satisfaction!

Thirdly, gamification mode in enterprises should consider the traditionality of internal employees. And the high degree of traditionality of company employees will affect the effectiveness of work gamification. Some studies indicate that subordinates with low traditionality may adapt to modern management practices more than those with high traditionality. Before preparing to promote gamification work mode within the company, companies should understand the level of traditionality of employees beforehand and design gamification work flexibly according to the actual situation of employees within the company. The company can classify employees according to the high and low level of traditionality. Different gamification work elements can be set in separate blocks. For instance, For employees with low traditionality, more challenging and innovative game elements and mechanisms can be designed to stimulate employees' work motivation and creativity.

6. Conclusions

Work gamification is a new method of working that has the potential to significantly change employees' job behavior and feelings. This study looked into how work gamification affects employees' job performance. We discovered that the results of the gamification process significantly affect employees' productivity and job satisfaction. In conclusion, this paper examined the mechanism of the gamification model's impact on employee performance in the workplace. Additionally, some theoretical and practical insights are deduced, which may serve as a guide for future researchers considering new lines of inquiry and serve as motivation for businesses considering the gamification work model.

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