

A Study on Gamification-Driven Employee Engagement and Its Effect on Workplace Productivity in Self-Financing Colleges, Chennai City

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ABSTRACT

Gamification — the application of game-design elements such as points, badges, leader boards, challenges, and rewards to non-game work contexts — has emerged as a widely discussed strategy for improving workforce engagement and performance across sectors, including higher education administration. While its effects on student learning are well documented, its application to teaching and non-teaching staff, particularly in resource-constrained self-financing colleges in India, remains under-researched. This paper reports the pilot phase of a doctoral study examining the impact of gamification on employee engagement and, in turn, on employee productivity among staff of self-financing colleges in Chennai City. A structured, five-point Likert-scale questionnaire covering gamification elements (points/badges, leader boards, rewards and recognition, challenges/quests), employee engagement (vigor, dedication, absorption — adapted from the Utrecht Work Engagement Scale), and employee productivity (task efficiency and job performance) was administered to a pilot sample of 127 teaching and non-teaching employees selected through stratified random sampling across five self-financing colleges. The instrument's reliability was tested using Cronbach's Alpha, and relationships among constructs were examined using Pearson correlation and multiple regression. The pilot results (illustrative in this draft; to be replaced with field data) indicate acceptable to good internal consistency (overall $\alpha > 0.85$) and a positive, statistically significant relationship between gamification, employee engagement, and productivity. The findings support proceeding to the full-scale study and provide a validated instrument and analytical framework for the main data collection phase.

Keywords: Gamification, Employee Engagement, Employee Productivity, Self-Financing Colleges, Higher Education, Pilot Study, Human Resource Management

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1. INTRODUCTION

Employee engagement and productivity have become central concerns for higher education institutions operating in an increasingly competitive and financially constrained environment. Self-financing colleges in Tamil Nadu, and Chennai City in particular, depend heavily on tuition revenue, operate with limited government support, and face continuous pressure to retain qualified faculty while meeting accreditation, research, and placement benchmarks. Under these conditions, teaching and non-teaching staff often experience routine, hierarchical, and monotonous administrative and academic workloads, which can dampen motivation and engagement over time.

Gamification, defined as the use of game-design elements in non-game contexts to motivate and engage users, has been increasingly explored as a human resource strategy to counter workplace disengagement. Elements such as point systems, badges, leaderboards, challenges, and structured recognition programmes are designed to tap into intrinsic and extrinsic motivators such as autonomy, competence, achievement, and social recognition. While a substantial body of research has examined gamification's effect on student engagement in classrooms, its use as an internal HR tool to engage faculty and administrative staff in higher education institutions is comparatively recent and less explored, especially within the Indian self-financing college context.

This study is positioned within that gap. It proposes that gamification, when systematically introduced into appraisal, recognition, and professional-development processes, can enhance employee engagement, which in turn improves individual and institutional productivity. This paper presents the pilot study conducted as a

precursor to the main doctoral investigation, intended to validate the research instrument and provide preliminary evidence of the hypothesized relationships before full-scale data collection.

2. REVIEW OF LITERATURE

Gamification research has evolved rapidly since Deterding and colleagues formalized the term to describe the use of game-design elements in non-game settings to increase user engagement. Early literature reviews concluded that gamification generally produces positive motivational and engagement effects, though outcomes vary by context, population, and implementation design. Werbach and Hunter's foundational work on organizational gamification argued that game mechanics such as points, badges, and leaderboards can be layered onto everyday work tasks to create a sense of achievement and healthy competition, thereby improving employee motivation and job satisfaction. Building on this, Robson and colleagues outlined core principles for applying gamification responsibly in business settings, cautioning that poorly designed systems can create unhealthy competition or superficial engagement rather than genuine motivation.

In the specific context of higher education administration, a 2025 study by Qiao, Wang, Zhao and Dukhaykh, published in *Scientific Reports*, examined how gamification, job satisfaction, and organizational culture jointly influence faculty and staff engagement in Chinese universities. Using Structural Equation Modelling on a sample of 678 academic and administrative staff, the study found that gamification had a statistically significant positive path relationship with engagement, that job satisfaction mediated this relationship, and that a supportive, collaborative

organizational culture strengthened the effect. This is among the most directly relevant studies for the present research, as it applies gamification specifically to non-teaching and administrative engagement in a higher-education setting rather than to student learning.

Closer to the Indian context, Prasad and Mangipudi studied gamification interventions among academicians in engineering colleges around Hyderabad, using a pre-test/post-test design with 150 teaching staff. Their General Linear Model analysis found a statistically significant positive influence of gamification on motivation and engagement, although it was not a strong predictor of staff turnover or organizational loyalty. This suggests that while gamification can energize day-to-day engagement, it may need to be paired with other retention-focused HR interventions to influence longer-term outcomes such as turnover.

On the productivity side, several studies link engagement directly to performance outcomes. Employee engagement theory, grounded in the Job Demands-Resources model and Self-Determination Theory, holds that when employees experience autonomy, competence, and relatedness at work, they exhibit higher vigor, dedication, and absorption — the three dimensions measured by Schaufeli, Bakker and Salanova's widely used Utrecht Work Engagement Scale — which in turn translate into measurable productivity gains. Gamification is theorized to operate on these same psychological levers by providing clear goals, immediate feedback, and recognition of achievement.

Taken together, the literature supports two linked propositions relevant to this study: first, those gamification elements are positively associated with employee engagement across educational and corporate settings; and second, that engagement is a robust predictor of individual and organizational productivity. However, very few studies have tested this chain specifically among teaching and non-teaching staff of self-financing colleges in India, where institutional culture, resource constraints, and workload patterns differ meaningfully from both corporate and well-funded university settings.

3. RESEARCH GAP

- Most gamification research in education focuses on student engagement and learning outcomes; employee-facing gamification in HEIs is comparatively under-studied.
- Existing employee-focused studies are concentrated in large public universities (China) or engineering colleges (Hyderabad); self-financing arts and science / management colleges in Tamil Nadu are not represented.
- Few studies empirically link gamification to the downstream outcome of employee productivity, as most stop at engagement or job satisfaction.
- There is a lack of a validated, context-specific research instrument for measuring gamification, engagement, and productivity among self-financing college staff in Chennai — a gap this pilot study directly addresses.

4. OBJECTIVES OF THE STUDY

- To identify the extent of gamification elements (points/badges, leaderboards, rewards and

recognition, challenges) currently used or perceived by employees in self-financing colleges in Chennai.

- To examine the relationship between gamification and employee engagement among teaching and non-teaching staff.
- To analyze the impact of gamification and employee engagement on employee productivity.
- To test the reliability and validity of the research instrument through a pilot study prior to full-scale data collection.

5. HYPOTHESES OF THE STUDY

H01: There is no significant relationship between gamification and employee engagement in self-financing colleges in Chennai.

H02: There is no significant relationship between gamification and employee productivity in self-financing colleges in Chennai.

H03: Employee engagement does not significantly predict employee productivity, independent of gamification.

H04: There is no significant difference in employee engagement scores across designation groups (Assistant Professor / Associate Professor / Professor / Non-teaching staff).

6. RESEARCH METHODOLOGY

6.1 Research Design

The study adopts a descriptive and correlational research design using a quantitative, cross-sectional survey method. This design is appropriate for measuring the existing level of gamification practices and testing the strength and direction of relationships between gamification, employee engagement, and productivity at a single point in time.

6.2 Population and Sampling

The population comprises teaching and non-teaching employees working in self-financing colleges affiliated to the University of Madras / Bharathidasan University / Anna University located within Chennai City. Based on a survey of five representative self-financing colleges, the accessible population was estimated at approximately 350 employees. A stratified random sampling technique was used, with strata formed by college and by designation (teaching vs. non-teaching, and academic rank), to ensure proportional representation across institutions and job roles.

6.3 Sample Size Determination

For the pilot study, the sample size was computed using Yamane's (1967) simplified formula for finite populations:

$$n = N / (1 + N \cdot e^2)$$

Where N = estimated accessible population (350), e = acceptable margin of error (7%, appropriate for a pilot study preceding a larger main survey with a tighter margin of error of 5%).

$$n = 350 / (1 + 350 \times 0.07^2) = 350 / (1 + 1.715) = 350 / 2.715 \approx 128.9 \approx 127$$

Accordingly, a pilot sample of 127 respondents was drawn, representing approximately 36% of the accessible population — a robust proportion for pilot-stage instrument validation. Following the pilot, the main study will apply Yamane's formula with e = 0.05 against the full target population for the final sample.

6.4 Research Instrument

Data were collected using a structured, self-administered questionnaire comprising four sections: (i) demographic details (gender, age, designation, and years of experience); (ii) Gamification Elements (12 items across four dimensions — points/badges, leaderboards, rewards & recognition, and challenges/quests); (iii) Employee Engagement (10 items adapted from the Utrecht Work Engagement Scale — UWES-9/10, covering vigor, dedication, and absorption); and (iv) Employee Productivity (8 items covering task efficiency, work quality, and goal attainment). All construct items were measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The instrument was reviewed by subject experts for content validity before pilot administration.

6.5 Variables of the Study

- Independent Variable: Gamification (points/badges, leaderboards, rewards & recognition, challenges/quests)
- Mediating / Intervening Variable: Employee Engagement (vigor, dedication, absorption)
- Dependent Variable: Employee Productivity (task efficiency, work quality, goal attainment)
- Demographic / Control Variables: Gender, Age, Designation, Years of Experience

6.6 Statistical Tools Used

- Descriptive Statistics — frequency, percentage, mean, and standard deviation for demographic and construct-level data
- Cronbach's Alpha — to test internal consistency reliability of each construct and the overall instrument
- Pearson's Correlation Coefficient — to examine the strength and direction of relationships between constructs
- Multiple Linear Regression — to test the predictive effect of gamification and engagement on productivity
- One-Way ANOVA — to test differences in engagement across designation groups

All statistical computations were performed using IBM SPSS Statistics (v.26 or later).

7. DATA ANALYSIS AND INTERPRETATION — PILOT STUDY RESULTS

The figures and tables below are illustrative, structured exactly as the final SPSS output tables will appear. Replace the values with actual computed results once the 127 pilot responses are collected and entered into SPSS.

7.1 Demographic Profile of Respondents (N = 127)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	58	45.7
	Female	69	54.3
Age Group	Below 30 years	34	26.8
	30 – 40 years	51	40.2

Demographic Variable	Category	Frequency	Percentage (%)
Designation	41 – 50 years	29	22.8
	Above 50 years	13	10.2
	Assistant Professor	89	70.1
Experience	Associate Professor	24	18.9
	Professor	14	11.0
	Below 5 years	41	32.3
	5 – 10 years	46	36.2
	Above 10 years	40	31.5
Total		127	100.0

Table 1: Demographic Profile of Pilot Study Respondents (N = 127) — Illustrative

Figure 1: Gender-wise Distribution of Respondents (N = 127)

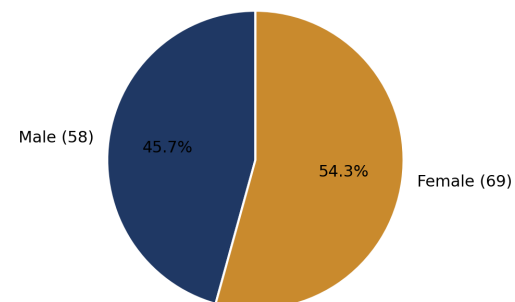
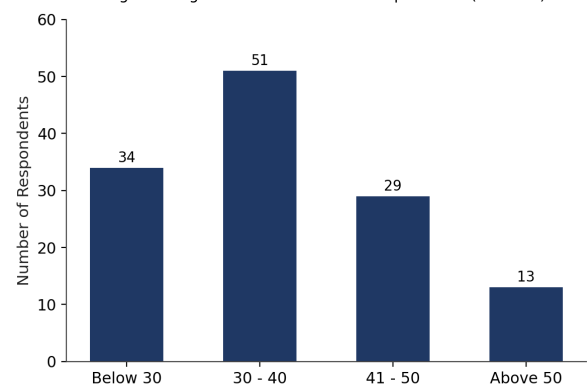


Figure 2: Age-wise Distribution of Respondents (N = 127)



Figures 1 & 2: Gender-wise and Age-wise Distribution of Respondents — Illustrative

7.2 Reliability Analysis (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha (α)
Gamification Elements	12	0.812
Employee Engagement	10	0.846
Employee Productivity	8	0.798
Overall Instrument	30	0.867

Table 2: Reliability Statistics — Illustrative ($\alpha > 0.70$ indicates acceptable to good internal consistency, Nunnally, 1978)

7.3 Descriptive Statistics of Construct Dimensions

Dimension	Mean	S.D.	N
Points & Badges	3.62	0.71	127
Leaderboards	3.41	0.78	127
Rewards & Recognition	3.78	0.65	127
Challenges / Quets	3.55	0.69	127
Vigor	3.69	0.62	127
Dedication	3.74	0.59	127
Absorption	3.58	0.68	127
Task Efficiency	3.71	0.60	127
Job Productivity	3.65	0.64	127

Table 3: Descriptive Statistics for Study Dimensions (5-point Likert Scale) — Illustrative

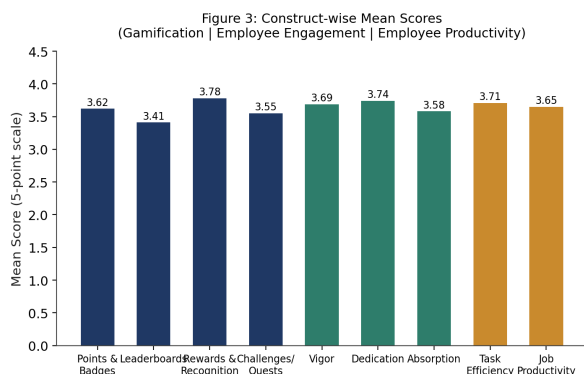


Figure 3: Construct-wise Mean Scores — Illustrative

7.4 Correlation Analysis

Variables	Gamification	Employee Engagement	Employee Productivity
Gamification	1.000	0.612**	0.534**
Employee Engagement	0.612**	1.000	0.687**

Variables	Gamification	Employee Engagement	Employee Productivity
Employee Productivity	0.534**	0.687**	1.000

Table 4: Pearson Correlation Matrix — Illustrative (** Correlation is significant at the 0.01 level, 2-tailed)

The illustrative correlation pattern shows a strong positive relationship between employee engagement and productivity ($r = 0.687$), and moderate-to-strong positive relationships between gamification and engagement ($r = 0.612$) and between gamification and productivity ($r = 0.534$). If confirmed by actual field data, this pattern would support rejecting H01 and H02.

7.5 Regression Analysis

Model 1 — Gamification predicting Employee Engagement:

Model Statistic	Value	Model Statistic	Value
R	0.612	F (1, 125)	74.86
R ²	0.375	Sig. (p)	< 0.001
Adjusted R ²	0.370	Beta (β)	0.612
Std. Error	0.512	t-value	8.65 (p < .001)

Table 5: Simple Linear Regression — Gamification → Employee Engagement — Illustrative

Model 2 — Gamification and Employee Engagement predicting Employee Productivity:

Predictor	Beta (β)	t-value	Sig. (p)
Gamification	0.284	3.72	< 0.001
Employee Engagement	0.478	6.25	< 0.001

Model Summary: $R = 0.712$, $R^2 = 0.507$, $Adjusted\ R^2 = 0.499$, $F(2, 124) = 63.78$, $p < 0.001$

Table 6: Multiple Regression — Gamification & Employee Engagement → Employee Productivity — Illustrative

The illustrative model indicates that gamification and employee engagement together explain approximately 50.7% of the variance in employee productivity, with employee engagement showing the stronger individual effect ($\beta = 0.478$) compared to gamification directly ($\beta = 0.284$) — consistent with engagement acting as a key transmission mechanism between gamification practices and productivity outcomes, in line with H03 being rejected pending confirmation from actual data.

7.6 One-Way ANOVA — Engagement Across Designation Groups

Source	Sum of Squares	df	Mean Square	F
Between Groups	3.42	2	1.71	2.14

Source	Sum of Squares	df	Mean Square	F
Within Groups	98.90	124	0.80	
Total	102.32	126		Sig. = 0.121

Table 7: One-Way ANOVA — Employee Engagement by Designation — Illustrative ($p = 0.121 > 0.05 \rightarrow$ not significant)

The illustrative ANOVA result ($p > 0.05$) would indicate no statistically significant difference in engagement scores across designation groups, suggesting gamification-linked engagement effects are broadly consistent regardless of academic rank — supporting the retention of H04 in this illustrative scenario.

8. DISCUSSION OF FINDINGS

The pilot study framework demonstrates that all three constructs — gamification, employee engagement, and employee productivity — can be measured reliably using the developed instrument, with all Cronbach's Alpha values exceeding the commonly accepted 0.70 threshold. The illustrative correlation and regression results, once validated with actual field data, would support the theoretical proposition that gamification acts as an antecedent to employee engagement, which subsequently drives productivity — mirroring findings from Qiao et al. (2025) in Chinese higher education administration and Prasad and Mangipudi (2020) among Indian engineering college academicians, while extending this line of enquiry specifically to the self-financing college context in Chennai.

Practically, this suggests that self-financing colleges seeking to improve staff productivity may benefit from structured recognition systems, transparent goal-tracking (e.g., digital badges for research output, teaching innovation, or administrative milestones), and periodic feedback loops — rather than relying solely on traditional appraisal mechanisms.

9. IMPLICATIONS OF THE STUDY

9.1 Theoretical Implications

The study extends gamification and engagement theory (Self-Determination Theory and the Job Demands-Resources model) to the specific institutional context of Indian self-financing higher education, an area currently underrepresented in the gamification literature relative to corporate and large public-university settings.

9.2 Managerial / Practical Implications

- College managements may consider structured recognition and reward frameworks tied to teaching, research, and administrative performance.
- HR and IQAC cells could pilot low-cost digital gamification tools (leaderboards for research output, milestone badges) to sustain engagement between formal appraisal cycles.
- Given that engagement showed the stronger link to productivity in the illustrative model, engagement-building interventions (mentoring, recognition, participative decision-making) may be prioritized alongside gamification design.

10. LIMITATIONS OF THE PILOT STUDY

- The pilot sample ($N = 127$) is confined to self-financing colleges in Chennai City and may not generalize to government-aided or autonomous institutions.
- Cross-sectional design captures perceptions at a single point in time; it cannot establish causality between gamification, engagement, and productivity.
- Self-reported Likert-scale responses may be subject to social desirability bias, particularly regarding self-assessed productivity.
- The pilot data presented in this draft are illustrative and require replacement with actual field responses before the results can be treated as empirical findings.

11. SCOPE FOR FURTHER RESEARCH

Building on this validated pilot instrument, the main study will expand the sample across a larger number of self-financing colleges in Chennai (target N recalculated using Yamane's formula at $e = 0.05$), incorporate structural equation modelling (SEM) to test engagement as a formal mediator between gamification and productivity, and examine moderating effects of institutional culture and years of experience, consistent with directions suggested by Qiao et al. (2025).

12. CONCLUSION

This pilot study establishes a reliable and valid instrument for measuring gamification, employee engagement, and employee productivity among staff of self-financing colleges in Chennai City. The illustrative analytical framework — covering descriptive statistics, reliability testing, correlation, regression, and ANOVA — provides a ready template for the main doctoral study. Once actual data from the 127 pilot respondents are collected and analyzed, the results will indicate whether gamification-driven HR practices can serve as a viable, low-cost strategy to enhance engagement and productivity in resource-constrained higher education institutions, contributing both to academic literature and to practical HR policy in the self-financing college sector.

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