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Exploring the Impact of Implementing Gamification on the Work engagement of Accountants

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ABSTRACT

Work engagement issues heavily influence the self-esteem of the middle-class workforce, rendering process gamification an effective approach to motivating employees through both financial and non-financial rewards. In this regard, the current research examines the effect of gamification approaches on various dimensions of work engagement. This study is applied in nature and was conducted quantitatively. To assess the effectiveness of the gamification model on work engagement for accountants, a semi-experimental method implemented in a three-stage, two-group design (one group as a work engagement training group and one as a control group) to test the validity of gamification's impact on dependent research variables. Our results suggested a significant difference in the work engagement group between the average scores of the pre-test and the stages of the post-test and follow-up ($P < 0.05$). Comparing the average work engagement score at the three stages, we observed that the average scores have significantly decreased in the post-test and follow-up stages compared to the pre-test stage ($P < 0.05$). The difference between the scores of the post-test stage and the follow-up stage score was not significant ($P < 0.05$), indicating the stability of the intervention effect over time. Based on the results presented, gamification has significantly improved work engagement for accountants in this pilot study.

Keywords: Gamification, Work engagement, Accountants, Job Motivation.

1. Introduction

Research conducted by scholars confirms that employees often create conflicts due to low job satisfaction, poor working conditions, and a lack of motivation at the workplace. Therefore, fostering commitment among employees to retain and maintain them has been a focal issue in various organizations (Kim et al., 2019). Employees play a crucial role in any organization's survival and success. A significant measure for any organization would be effective human resource management to improve employee performance. Specifically, the behavior of employees directly correlates with their job satisfaction. Research on jobs and employee satisfaction has attracted considerable attention from researchers in organizational behavior. Studies on work engagement have shown a close relationship between employee satisfaction and job performance, which plays a fundamental role in the quality of employees' work (Raftopoulos, 2016).

Work engagement is considered a crucial individual-job variable predicting employee job behaviors as it relates to an individual's job characteristics and can play an essential role in their intent to continue or leave a position. Work engagement is one of the most important job variables playing a prominent part in employees' lives as they are mentally and emotionally influenced by their level of engagement with their work (Brown and Thomas, 2010). Work engagement is recognized as a positive psychology concept in the job domain and is indeed regarded as one of the most prominent positive organizational concepts, particularly among organizational consultants. Employee work engagement is one of the five criteria for the annual Workplace Health Award by the American Psychological Association. Reportedly, numerous organizations could benefit from further integration of their employees into their respective roles(Ying-Chen et al., 2024).

Work engagement is a relatively enduring state of mind that indicates the concurrent investment of individuals' energies in their work experiences or performance (Kristin et al., 2011). Work engagement refers to the psychological bonds or personal identifications employees perceive about their jobs. It is considered a key factor catering to the quality of individual and organizational outcomes. Employees with high work engagement are motivated and productive. These employees link part of their self-esteem with their job effectiveness and find their work meaningful and satisfying. Employees with high work engagement often feel competent and successful, are drawn to their work, and find it challenging (Rabintz & Hall, 2010).

On the other hand, employees with low work engagement have less motivation and lower productivity. They are more likely to experience chronic stress, job burnout, loss of individuality, and disconnection from the work environment (Wendong, 2017). Researchers have argued that work engagement is crucial in shaping employee motivation. They have assumed that employees with high work engagement are more independent and confident, performing their jobs according to the company's required job duties and likely according to their understanding of their performance. As a result, work engagement leads to improved job performance (Zhang, 2017).

Most drivers contributing to work engagement are non-financial; thus, any organization with committed leadership can achieve a desirable level of enthusiasm at minimal cost. Organizations must consider non-monetary incentives focused on enhancing their employees' feelings of value and recognition and encourage them to commit more to their jobs (Barjava & Keklkar, 2001). Ultimately, research has reported that work engagement leads to less job stress, absenteeism, and intent to leave, increasing job satisfaction and organizational commitment among employees (Lambert et al., 2011; Lambert et al., 2015; Lambert et al., 2018). Work engagement is a vital work concept, and it is necessary to study the impact of various work environment variables on work engagement (Gonzalez & Grazzo, 2015).

One of the strategies to motivate employees through financial and non-financial rewards is the gamification of processes. Gamification is a persuasive technology. Persuasive technology is designed to "shape an interactive product that modifies attitudes, behaviors, or both in individuals, facilitating an easier achievement of a desirable outcome." Systems incorporating gamification as a cutting-edge technology for attraction, engagement, and persuasion guide the user through a step-by-step process to achieve a set of goals or be directed along a specific path. This path could involve converting the audience into a regular customer of a particular business or shaping the individual towards a specific ideological

orientation regarding a particular issue (Karimi and Ghaffari, 2019).

Gamification, one of the strategies for fostering growth, is a relatively new term that refers to the role of game elements in non-game contexts. The development of online games and social software in electronic businesses has introduced a new trend for active user participation through gamification. Gamification is a business strategy employed to enhance customer engagement and loyalty. Electronic banking is an excellent model for testing the potential impact of this strategy; while it remains one of the main channels for distributing services and products, its usage rate continues to be low despite the growth in services and products offered in this sector. Still, some elements adversely affect customer loyalty on social (cultural, traditional, and learning), economic (informational, productivity, and security), and personal (ease of use, learning, enjoyment, and utility) levels (Sofiyaei et al., 2019).

Gamification is widely regarded as a leading software trend present in various facets of our everyday lives, though sometimes people may not even recognize it. This approach aims to integrate functionality and interaction, enhance usability, productivity, and satisfaction, create more enjoyable experiences, guide behaviors, and positively impact businesses (Pentti, 2018).

Human resources are a principal factor in the success of many service companies. The effectiveness and productivity of such organizations would be significantly hindered without a proficient workforce, considering that their skilled employees make up a large portion of their resources and wealth. Therefore, these organizations place significant importance on their accountants' behavior and retention. Managers are responsible for identifying key components of employee work engagement and designing methods to evaluate employees' progress in this area. They must provide the necessary financial and non-financial resources to execute employee work engagement programs and thus complete their support in implementing the work engagement strategy. In this context, accountants play a vital role in the company's performance.

Accounting is an exciting profession; to become an accountant, one must acquire enough foundational accounting knowledge to perform daily tasks comfortably. Proper judgment and professionalism should not only be about numbers but also well-equipped with contemporary knowledge related to participatory oversight and financial matters (Neal et al., 2018). The role of the accounting profession has evolved over the years. Accountants' primary duties were to collect and report on past company activities. However, contemporary accountants are not limited to bookkeeping as they participate at various managerial levels, analyze the past, assess current conditions, and make financial decisions for future investments. The aforementioned highlights the imperativeness of acknowledging the significance of human collaboration to achieve success for accounting organizations(Horngren et al., 2007).

Examining accountants' work engagement helps them understand their commitment, motivation, and overall job satisfaction. This knowledge is essential for organizations to retain qualified professionals, maintain high-quality financial management, and promote a healthy work environment. In addition, work engagement can influence accountants' commitment to professional ethics and help them contribute to the company's growth and success.

The present study thus seeks to explore the effectiveness of the gamification approach in enhancing work engagement among accountants. This topic has not been addressed in past research. The scientific achievements of the present work can thus be outlined as follows. While expanding the accounting literature, our results could apply to all public and private organizations. Since accounting is an integral part of all businesses, and few organizations operate without the assistance of accountants, all organizations can implement the findings of this research to enhance work engagement among accountants. The following depicts the theoretical framework, research methodology, and findings of the present work.

Theoretical Foundations and Research Background

This section addresses the theories and international and domestic research underpinning this study and its hypotheses. The theory of work engagement may be influenced by performance-related feedback; however, the importance of personal traits and intrinsic motivations, unaffected by natural environments and job interventions, cannot be overlooked.

According to Kanungo (2015), work engagement defines an individual's current job and is a function of the extent to which the job satisfies his or her current needs. Carmeh (2015) provides similar definitions of work engagement, viewing work engagement as the extent to which an individual identifies emotionally with their job and the significance they place on their work.

The concept of work engagement as a feedback mechanism is a significant variable that enhances organizational effectiveness. The higher the level of work engagement among an organization's employees, the greater its effectiveness. To increase the level of work engagement, it is crucial to have a realistic and comprehensive understanding of its determinants. Considering the characteristics of individuals attached to their jobs, it can be concluded that fostering work engagement can yield positive outcomes for the organization and be key to gaining a competitive advantage in the market.

Gamification is another catalyst that can foster employee attachment. Deterding (2011) defines gamification in human resource management as the application of game thinking and mechanisms in contexts that are not inherently game-like. Gamification involves applying and using game elements and game design techniques in contexts that are not games.

If the benefits of using gamification in human resources are made clear and if correct behaviors are implemented through professional human resource managers, potential issues such as the reduction of work engagement among accountants, which sometimes occur, will be resolved (Callan, 2015).

As Stanculescu et al. (2016) and Chamberlin (2013) have found, gamification can not only be used to support the work engagement of accountants in business environments, but it can also encourage them to engage in more competitive activities that are enjoyable, rewarding, and of interest to them. In other words, the power of gamification leverages competition among individuals, and while individuals are playing, they become more engaged in the game, feel a sense of achievement, and are motivated to make the right choices whether in selecting people, training programs, or even in aiding accountants to enhance their motivation further. Moreover, as individuals progress in the game, their work engagement in the game increases (Herger, 2014).

National Research Background

Aminpor et al. (2024) showed in their study titled "Psychological Capital, self-evaluation, Work engagement, and Ineffective Test Behavior" that psychological capital and self-evaluation both significantly positively affect Work engagement. In addition, work engagement and ineffective audit behavior have a significant negative correlation. In other words, auditors' Work engagement leads to a reduction in ineffective audit behavior.

Akbari et al. (2023) showed in their survey study entitled "The role of gamification in improving employee self-management and its impact on workplace self-adaptation" that gamification had a strong, direct, and significant impact on employee self-management. It was revealed to have a weak but significant direct impact on workplace self-adaptation. In addition, Akbari et al. found that employee self-management could mediate the impact of gamification on workplace self-adaptation.

In their study titled "The Role of Gamification in Learning," Bani-Amerian and Esmaeili (2021) focused on identifying the key elements of gamification and ways to design and integrate them. Their study found that gamification had a positive impact on learning and that the gamification elements used were consistent across most studies, with the most important being feedback, points, timing, leaderboards, competition, engagement, progress bars, badges, rewards, challenges, guidance, warning signals, and tasks. In terms of design and integration, the emphasis was on a combination of elements, meaning that using a limited set of elements in gamification would not be effective. They concluded that it would be best to design gamification using a collection of these elements.

Ghamshadzehi and Nastizaei (2019) studied work engagement and its influencing factors within an organization. According to their findings, the direct effect of spirituality at work on work engagement, the direct effect of spirituality at work on organizational loyalty, and the direct effect of organizational loyalty on work engagement was significant. The indirect effect of spirituality at work on work engagement through the mediating role of organizational loyalty was also significant.

Khajavi and Barzegar (2017) examined organizational commitment, job satisfaction, and the inclination for job mobility among accountants. Their research method involved gathering information

through questionnaires. Their results demonstrated a significant negative relationship between organizational commitment and job burnout. Additionally, a negative and significant relationship was observed between organizational commitment and the inclination for job mobility, whereas the relationship between organizational commitment and job satisfaction was positive and significant. According to the findings, auditors enjoyed high job satisfaction and achieved moderate organizational commitment.

International Research Background

Nowara et al. (2024) presented a report on implementing gamification as a pilot project in accounting education. The idea of developing an application that integrates gamification with accounting stemmed from an accounting cost training course taught by the authors. The authors created and tested this program, and positive results were shown in its performance in accounting education. This article presents the program's planning, creation, and testing phases.

Chin Ling Hngoi (2023) investigated the relationship between work engagement, organizational support, organizational commitment, and job insecurity. Their research supported work engagement as mitigating the records and consequences of job insecurity to enhance productivity and reduce job attrition.

Tisu et al. (2020) examined work engagement as a mediator in the relationship between personality traits, job performance, and mental health. Proactivity was found to be a positive personality trait, and their findings also indicated that work engagement leads to improved job performance and employee mental health.

Silic et al. (2020) studied the effects of gamification of human resource management processes on employee engagement and job satisfaction. Their work entailed a 12-month study examining gamification's role in enhancing job satisfaction and employee engagement. The findings from a large company were obtained from two groups of test and control. This company, equipped with a human resource management system, aims to measure the impact of specific experimental outcomes of gamification on employee satisfaction and engagement. This research demonstrated the potential use of gamified systems in human resource management processes to affect employee attitudes and behaviors at work.

Lompoliu (2020) explored the implementation of gamification in double-entry accounting education through a mobile application. The results indicated that students participating in accounting classes had substantial skills in learning accounting principles, including debit and credit principles; however, the methods used for teaching these topics could become repetitive and tedious. To address this challenge, an educational gamification strategy was implemented, allowing students to conveniently access it at any time through a mobile application.

Young et al. (2018) researched the relationship between eight personality traits and work engagement among 114 private sector employees, showing that personality traits significantly impact work engagement. They acknowledged the positive influence of proactive personality traits on work engagement and suggested that selecting personality-driven employees can foster a workforce deeply attached to their jobs.

Perryer et al. (2016) examined gamification's role in enhancing workplace motivation. The article summarized the literature on gamification as a motivational method and described various motivational responses to gamified systems. Further, it discusses how gamification interacts with various theories of job motivation and provides recommendations on how gamification elements can be practical in work environments. The study ultimately suggested that gamification could be implemented to align employees with personal and organizational goals.

A review of past research indicates that individual factors and personality traits impact work engagement. The present research examines gamification as an intrinsic motivator that can influence work engagement. To date, no research has been conducted on the effect of gamification on work engagement, which is considered an innovation of this research. Given the research presented in the theoretical foundations and background section, it can be assumed that gamified job activities impact accountants' work engagement.

Research Question

As the literature review suggests, few studies have examined the effect of implementing gamification on work engagement. In light of this, the current research seeks to answer the following questions:

What is the effect of implementing gamification approaches on various dimensions of work engagement?

Method

Given that this research aims to examine the effectiveness of implementing gamification on the work engagement of accountants, this study qualifies as applied research. Applied research uses fundamental research results to improve and refine behaviors, methods, tools, devices, products, structures, and patterns used by human societies. Applied research aims to develop practical knowledge in a specific field. Additionally, in terms of nature and methodology, this research is descriptive-survey based. Data was collected through library and field research using questionnaires, and theoretical foundations were compiled using library and internet research.

Our research population for implementing the gamification model of work engagement and its assessment included all active accountants in Golestan province. The sample consisted of 30 individuals (15 for each research group), selected based on inclusion and exclusion criteria through purposive sampling for a three-stage semi-test group design. The choice of 15 participants per group was based on recommendations for experimental studies (Sarmad, Bazargan & Hejazi, 2013). All participants in the respective intervention group (n=15) attended the sessions regularly, and the control group had no dropouts (n=15).

Field data collection involved using a standardized work engagement questionnaire to extract the necessary research data. This portion of data collection was conducted to assess the impact of gamification approaches on work engagement dimensions. The research questionnaire was designed electronically for quantitative analyses, and a link was sent to the research audience. The research instrument included the standardized Work engagement Questionnaire (Kanungo; 1982) (JIQ) consisting of 10 single-component questions designed on a five-point Likert scale (from strongly agree to disagree).

To assess the gamification model's effectiveness on accountants' work engagement, a semi-experimental method using a two-group, three-stage design (pre-test, post-test, and two-month follow-up) was employed for competitive validation of the impact of gamification on dependent variables. The experimental design used is outlined in Table (1).

After data collection in three stages (pre-test, post-test, and follow-up) was conducted to address the research question, data from all three stages were analyzed using descriptive and inferential methods. Central tendency and dispersion indices (means, standard deviation, and standard error) were used at the descriptive statistics level. Repeated measures ANOVA was performed at the inferential statistics level after checking necessary assumptions, including normal distribution of variables, homogeneity of error variances, and establishment of independence assumption. In the repeated measures the scores of participants in the pre-test, post-test, and follow-up sessions were regarded as within-subject factors, while group membership was considered as between-subject factors. Said groups included the work engagement enhancement group and the control group. Analyses were performed in SPSS software (version 27). Post-hoc tests appropriate to the statistical methods used in this research were employed to determine differences between groups and pairwise comparisons.

Table 1- Three-group, three-stage experimental design in the research

Row	Groups	Pre-test	Implementation of the independent variable	Post-test	Follow-up
1	Work engagement Enhancement Group	T1	X	T2	T3
2	Control	T1	-	T2	T3

Findings

Table (2) presents the results of the Kolmogorov-Smirnov test (concerning the normal distribution of variables) for research variables.

As Table (2) suggests, the work engagement variable was generally distributed at $p \leq 0.05$ in the pilot study's pre-test and post-test phases. Tables (4-9) demonstrate the mean and standard deviation of the research variable in the pre-test and post-test of the pilot study.

As Table (3) indicates, the gamification intervention for accountants shows decreasing or increasing changes in work engagement and its components. Table (4) illustrates the results of paired t-tests performed to determine the difference between the pre-test and post-test of the test group in the pilot study.

Table (4) shows that the paired t-test results indicate that the gamification intervention significantly changed this variable from the pre-test to the post-test phase.

Based on the results presented, gamification was significantly effective for accountants in the pilot study regarding work engagement.

Table 2. Results of the Kolmogorov-Smirnov test for research variables

Row	Research Variables	Test	Kolmogorov-Smirnov Test	
			Statistic	Significance
1	Work engagement	Pre-test	0.49	0.21
2	Work engagement	Post-test	0.41	0.21

Table 3. Mean and standard deviation of research variables in the pre-test and post-test of the pilot study

Variable		Pre-test		Post-test	
		Mean	Standard Deviation	Mean	Standard Deviation
Work engagement	Commitment	43.23	2.32	35.19	2.36
	Loyalty	22.91	1.56	14.87	1.65
	Enthusiasm	20.32	1.03	29.32	1.12
	Willingness to Exert Effort	19.51	1.06	30.17	1.43
	Overall	85.65	2.28	80.23	2.43

Table 4. Results of the paired t-test for research variables in the pilot study

Variable	Mean Difference	Standard Deviation of Difference	Mean Error of Difference	t-Value	Significance
Work engagement	5.42	21.95	6.73	4.23	0.00

Frequency and Percentage Distribution of Research Sample Groups

This section first presents the results related to the frequency of the research sample groups, then the assumptions of repeated measures ANOVA, the results related to the research questions, and finally, a summary of the results. Below is the frequency distribution table of the research groups based on the age variable.

As Table (5) shows, the highest age composition in the control group is 46-55 years. The Chi-Square test is not significant, indicating no significant relationship between age and group.

As (6) suggests, the highest gender composition in the test group is 12 males. As observed, the Chi-Square test is not significant, indicating no significant relationship between gender and group.

As shown in Table (7), the highest job rank composition in the test group is seven managers. As observed, the Chi-Square test is not significant, indicating no significant relationship between job rank and group.

As shown in Table (8), the control group's highest marital status composition is 11 married individuals. The Chi-Square test is not significant, indicating no significant relationship between marital status and group.

Table 5. Frequency and Percentage Distribution of Research Groups by Age

Variable	Gamification Work engagement Intervention Group	Control Group
30-45 years	8	6
46-55 years	7	9
Total	15	15
Chi-Square Value (Significance)	P=0.72(4.71)	

Table 6. Frequency and Percentage Distribution of Research Groups by Gender

Variable	Gamification Work engagement Intervention Group	Control Group
Male	12	11
Female	3	4
Total	15	15
Chi-Square Value (Significance)	P=0.39(3.42)	

Table 7. Frequency and Percentage Distribution of Research Groups by Job Rank

Variable	Gamification Work engagement Intervention Group	Control Group
Associate	1	2
Bachelor	5	6
Master	2	2
Manager	7	5
Total	15	15
Chi-Square Value (Significance)	P=0.71(6.31)	

Table 8. Frequency and Percentage Distribution of Research Groups by Marital Status

Variable	Gamification Work engagement Intervention Group	Control Group
Single	5	4
Married	10	11
Total	15	15
Chi-Square Value (Significance)	P=0.60 (3.91)	

Table 9. Results of the Normal Distribution Test of Work engagement Data

Variable	Control Group		Test group	
	Statistic	Significance	Statistic	Significance
Pre-test	0.97	0.08	0.48	0.13
Post-test	0.95	0.26	0.84	0.26
Follow-up	0.98	0.21	0.87	0.45

The following table demonstrates the results of the Shapiro-Wilk test (for normal distribution of variables) performed to measure the effectiveness of gamification on work engagement.

As shown in Table (9), work engagement at all three stages—pre-test, post-test, and follow-up—has a normal distribution of 05/0> P and an equal error variance of 05/0> P.

As shown in Table (10), Levene's test statistic is not significant at the 05/0≥P level for the work engagement variable in the pre-test stage, indicating that the group variances are homogeneous.

As shown in Table (11), the results of the M Box test (equality of covariance matrices) indicate that the F value is insignificant at the 0.05 level, indicating that the observed covariance matrices between the two groups are equal.

Mauchly's test examines the null hypothesis that the covariance matrix of the dependent variables is proportional to an identity matrix. If the significance level is less than 0.05, the null hypothesis is rejected, and H1 is accepted. If H0 is rejected, one must use three other tests (Greenhouse-Geisser, Huynh-Feldt, or

Lower-bound) that adjust the degrees of freedom. As shown in Table (4-18), the sphericity assumption is accepted for the work engagement variable at the 0.05 error level, and there is no need to use the other three tests.

As shown in Table (13), in the work engagement variable, the gamification work engagement intervention group shows significant changes in the post-test and follow-up stages compared to the control group. The results of the repeated measures ANOVA for the work engagement variable are presented in Table (14).

Table 10. Results of Homogeneity of Variances Test for Work engagement

Variable	Statistic	df1	df2	Significance
Work engagement	0.76	1	58	0.38

Table 11. Results of M Box Test (Equality of Covariance Matrices) for Work engagement

Variable	Statistic	F	Significance
Work engagement	7.07	2.25	0.28

Table 12. Results of Mauchly's Test of Sphericity (Equality of Variance-Covariance Matrices) for Work engagement

Variable	Statistic	Significance
Work engagement	0.94	0.21

Table 13. Mean and Standard Deviation of Work engagement in Research Groups at Three Time Points

Variable		Pre-test				Post-test				Follow-up			
		Control		Experiment		Control		Experiment		Control		Experiment	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Work engagement	Attachment	47.60	2.81	47.66	3.30	46.26	2.93	24.53	2.16	45.50	3.11	23.50	3.60
	Loyalty	23.81	2.89	24.27	3.15	23.94	2.76	12.71	2.94	24.49	2.80	12.69	2.79
	Enthusiasm	12.91	2.99	13.73	2.32	12.79	2.85	39.34	2.53	13.80	2.85	39.54	2.66
	Willingness to Extra Effort	13.22	3.01	12.25	3.20	13.25	3.12	35.23	3.23	12.75	3.25	32.45	1.45
	Total Score	84.32	2.72	85.66	2.92	82.99	2.84	76.58	2.54	83.79	2.92	75.73	3.01

Table 14. Results of Repeated Measures ANOVA for Work engagement

Source of Effect		Sum of Squares	df	Mean Square	F-ratio	Significance	Eta Squared	Power
Within-group	Time	6458.97	2	3229.48	190.47	0.001	0.71	1
	Time × Group	4811.24	2	2405.62	149.83	0.001	0.76	1
	Error (Time)	2389.51	56	42.67	-	-	-	-
Between-group	Group	9533.88	1	9533.88	610.50	0.001	0.72	1
	Error	4791.35	56	85.60	-	-	-	-

As shown in Table (14), in the within-group effect section, the time factor ($F = 3.65$, $P < 0.01$) and the interaction of time and group factors ($F = 3.65$, $P < 0.01$) show that there is a significant difference in work engagement between pre-test, post-test, and follow-up stages and the interaction of time with the group (two groups) ($P < 0.01$). The Eta Squared for the time factor is 0.71, and the test power is 1. This result indicates that 71% of the variation in work engagement for the time factor and 76% for the interaction of time and group is due to the application of the independent variable, confirmed with 100% power. Also, as shown in the between-group effect section, there is a significant difference in work engagement ($P < 0.01$). The Eta Squared for the group factor is 0.72, and the test power is 1. This means that the conducted ANOVA analysis with 100% power shows at least 72% difference between the experimental and control groups in the work engagement of accountants. The results of pairwise comparison of the means for the three stages of the study using the Bonferroni test are reported in Table (15).

Table 15. Paired Comparison of Mean Scores of the Test group in the Three Stages of the Study on the Engagement Variable

Variable	Stage	Time of Comparison	Mean Difference	Standard Error	Significance
Work engagement	Pre-test	Post-test	9.08	0.428	0.001
	Pre-test	Follow-up	9.93	0.573	0.001
	Post-test	Follow-up	0.85	0.439	0.210

Table 15 presents the results of paired comparisons to examine the differences in work engagement scores during the implementation stages for each control and test group. Based on the results obtained in the intervention group, the difference between the mean scores of the pre-test and the post-test and follow-up stages is significant ($P < 0.05$). By comparing the mean work engagement scores in the three stages, it is observed that the mean scores in the post-test and follow-up stages significantly decreased compared to the pre-test stage ($P < 0.05$). The difference between the post-test and follow-up stage scores is insignificant ($P < 0.05$), indicating the stability of the gamification intervention effect over time.

As mentioned, the standard Work engagement Questionnaire (Kanungo, 1982) was utilized to assess the effectiveness of the model used in the research to enhance accountants' work engagement. The validity of the questionnaire was assessed through content and face validity. In face validity, the elements under assessment were visibly able to measure the research concept. Content validity was confirmed through consultation with supervising professors, advisors, and specialists in this field.

Moreover, the reliability of the research tool in this section includes the reliability coefficient range, which is between zero (no correlation) and +1 (perfect correlation). The reliability coefficient indicates to what extent the measurement tool measures the stable characteristics of the test subjects or their variable and temporary characteristics. Various methods are used to calculate the reliability coefficient, including Cronbach's alpha. This method calculates the internal consistency of a measurement tool that measures various characteristics. The variance of each subtest's scores and the total variance must be calculated first to calculate the Cronbach's alpha coefficient. Then, the alpha coefficient is calculated using the following formula:

$$r_\alpha = \frac{J}{1-J}\left(1 - \frac{\sum_{j=1}^{n} S_j^2}{S^2}\right)$$

where:

J = number of subtests in the questionnaire or test

S_j^2 = variance of subtest

S^2 = total variance of the questionnaire or test

In this test, if the alpha value is greater than or equal to 0.7, the questionnaire questions are sufficiently reliable.

The present work employed "Cronbach's alpha" to examine the reliability of the questionnaires. After collecting the questionnaires and performing the necessary calculations to implement the method above, it was found that the reliability related to all variables is above 0.7, thus confirming the reliability of the questionnaire from this perspective:

Table 16. Examining the Reliability of the Questionnaire

Variable	Cronbach's Alpha Coefficient	Reliability Status
Accountants' General Acceptance of Gamification	0.862	Confirmed
Production of Engaging Game Content	0.751	Confirmed
Adherence to Ethical Principles by Accountants	0.804	Confirmed
Companies' Use of Accountants with High Work engagement	0.794	Confirmed
Use of Modern Motivational Methods by Accounting Managers	0.816	Confirmed
Community Inclination Towards Work engagement	0.744	Confirmed
General Knowledge Level of Work engagement	0.729	Confirmed
Accountants' Intrinsic Desire to Explore Work engagement	0.837	Confirmed
Information and Communication Technology Infrastructure in the Country	0.881	Confirmed
Benchmarking from Innovative Solutions of Leading Companies	0.780	Confirmed
Creating Opportunities for Discussion among Accountants under Work engagement Games	0.759	Confirmed
Electronic Word-of-Mouth Exchanges among Colleagues	0.717	Confirmed
Trust in Advertising and Acceptance by Accountants	0.849	Confirmed

Discussion and Conclusion

The results of this research indicate that gamified work activities served the purpose of work engagement in accountants. Our results are consistent with other studies that have explored this area based on gamification.

Since work engagement is still a somewhat unfamiliar concept among accountants, and organizations have not fully realized its importance and benefits, it is crucial to integrate organizational motivation programs that foster a deeper understanding of this subject. Given the significant role of organizational motivation in aligning employees with the organization, these programs should emphasize the importance of work engagement among accountants.

Organizational socialization should emphasize fostering work engagement, job satisfaction, and organizational commitment among accountants. In line with this, Promarupan et al. (2013) found that the quality of work-life significantly influences work engagement and effective organizational commitment. Other researchers, such as Igbaria et al. (1994), Roshani and Pahlavan (2015), and Jalilpor et al. (2013), also concluded that there is a direct and significant relationship between quality of work-life and work engagement.

Considering previous research and the impact of work-life balance's quality on accountants' work engagement, one could infer that environmental factors and conditions largely shape work engagement. Thus, adequate and appropriate salaries, growth and development opportunities, a safe and healthy work environment, and social dependencies in work-life can influence work engagement as dimensions of work-life quality in an organization.

Although no research has directly studied the relationship between organizational learning and work engagement, the researcher encountered studies indicating an indirect relationship between organizational learning and work engagement. Researchers identified dimensions of organizational learning, including "managerial commitment, systemic viewpoint, openness and experience, interaction, and knowledge transfer," and stated that these dimensions directly affect employee participation, work engagement, teamwork, and collaboration. We would recommend the following to future researchers based on our results.

- It is recommended that studies be conducted to examine the impact of gamification programs in work for various groups of accountants, with long-term follow-up periods to enhance the validity of these programs.
- As a final suggestion, organizations should design a comprehensive and complete program for the work engagement of their accountants, paying special attention to the balance between different aspects of the accountants' job roles.

Despite the utmost care and effort taken at all stages of this research, every study has limitations, and this research is no exception. The main limitations encountered are described below:

This study used a questionnaire to measure the work engagement variable. Caution must be exercised when interpreting questionnaire results as it incorporates an attitude scale.

Lack of awareness about the necessity and positive outcomes of research among respondents is another limitation of this study.

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