Vol.3 No.2 October 2026: 77-82
International Journal of Computer Science and Humanitarian AI (IJCSHAI)
e-ISSN: 3064-4372
DOI: 110.21512/ijcshaijournal.v3i2.16043

# Employee Aptitude & Personality testing using Gamification for more accurate results

**Raymond Alexander[1*], Sonya Rapinta Manalu[2]**

[1,2]Mobile Application and Technology, School of Computer Science,
Bina Nusantara University,
Jakarta, Indonesia 11480
raymond.alexander@binus.ac.id; sonya.manalu@binus.ac.id

***Abstract*—The concept of "gamification" and how it is applied to make boring, tedious work seem exciting, rewarding, and fun is becoming more prevalent in many industries. Gamification has made many mundane tasks seem enjoyable and rewarding through the use of simple reward systems, which is something we typically find in games. In addition to enhancing employee motivation to complete tasks, there are indications that gamification could be an effective method to evaluate an individual's psychological makeup. This research will investigate the possibility of using gamified systems as a way to assess an employee's potential to perform at a high level (aptitude) and their personality characteristics. It is suggested that game-based assessments will yield more reliable information regarding an employee's ability to think critically, make decisions based upon data, and manage resources than conventional testing methods. Because employees are evaluated through their performance in the game, the employee does not experience the anxiety associated with traditional testing, the employee does not have to worry about providing socially desirable responses, and the employee does not have to worry about answering questions honestly. The proposed approach allows for evaluation of employee competencies, including problem solving, adaptability, risk assessment, and strategic planning in simulated environments related to specific jobs.***

***Keywords*—Gamification; Technology; Aptitude Test; Games**

*Received: Jan. 19, 2026; received in revised form: Oct 14, 2026; accepted: Oct. 14, 2026; available online: Nov. 02, 2026.*

*Corresponding: raymond.alexander@binus.ac.id*

## I. INTRODUCTION

The increased use of technology to assess employees is changing the way companies evaluate the potential of employees. Many organizations are now using both aptitude tests and personality assessments in order to make decisions about who they will recruit, place, and help develop professionally. For years, traditional assessment tools like standardized questionnaires, self-report inventories, and structured interviews were criticized because of their susceptibility to response bias, test anxiety, and lack of ecological validity [1], [2]. All three issues can limit the ability to predict job performance based on the results of the assessments.

The use of game-like features within other non-gaming environments (e.g., software) is known as Gamification. This technique has shown to be a successful method to enhance user engagement, motivation, and task completion rates across several areas [3]. Gamified software can increase user involvement through game-like features including points, challenges, feedback loops, and progression. In addition, gamified software allows for systematic collection of data. Previous studies have shown that gamification is effective in education, productivity in the workplace, and behavior modification programs; therefore, the application of gamification extends far beyond simply creating games for entertainment purposes [4], [5].

The use of gamification as a way to assess an individual's ability to perform well at work and their general personality type has developed as a new method of performing aptitude and personality assessments. Gamification provides an alternative to traditional methods of evaluating people through self-report questionnaires. Instead of having users report on themselves, gamified assessments evaluate people based upon how they act while playing games. Gamified assessments provide evaluators with data about users' behavior during game play in real time. Evaluators then

IJCSHAI Press

*Copyright © 2026*

use this data to determine users' cognitive abilities, their ability to make decisions, and their ability to manage resources while interacting with the game environment [6]. An alternative method of directly measuring variables has been found to have two advantages: it reduces the effect of social desirability bias, and it increases the ecological validity of the study. This is accomplished through presenting subjects with simulated environments which are similar to those experienced in everyday life [7].

Gamification as a means of employee testing (both skill/aptitude and personality) is explored in this paper with focus on how it may be used to increase reliability of assessments, decrease biases associated with assessments, and enhance participants' engagement. This proposed model attempts to connect theoretical assessment to real-world job performance by placing psychological assessment measures into interactive game-like settings. In addition, this study contributes to the literature through providing an overview of current gamified assessment practices, evaluating the psychological and technical validity of these practices, and discussing the implications of gamification on recruiting/talent evaluation systems.

## II. Related Work

### A. Traditional Aptitude and Personality Assessment Methods

Employee aptitude and personality assessments have historically used a variety of types of employee aptitude and personality assessments including psychometric questionnaires, cognitive ability tests and structured interviews. These types of employee aptitude and personality assessments are designed to assess traits such as intelligence, conscientiousness, emotional stability, and problem solving skills using standardized and validated instruments. There are several widely accepted frameworks that demonstrate high levels of reliability and predictive validity in many different job environments [8], [9]. This includes the Big Five personality model and General Mental Ability (GMA) tests.

In addition, many studies have shown that there are inherent limitations in the conventional approaches. Self-report based instruments are particularly vulnerable to social desirability bias, impression management, and faking behaviours, especially in high-stakes recruitment contexts [10]. Additionally, test anxiety and artificial testing environments can negatively influence performance, resulting in outcomes that do not accurately reflect an individual's real-world capabilities [1]. These limitations have motivated researchers to explore alternative evaluation strategies that emphasize behavioural observation and contextual realism.

### B. Gamified and Game-Based Assessment Approaches

The body of literature exploring the potential of gamified or game-based assessments as an alternative to conventional psychometric assessments continues to grow. Both methods incorporate assessment goals into digital, interactive environments where individuals are able to complete simulated real world problem solving tasks. Game-based assessment models use data collected from user interactions with the game environment (e.g., response times, decision making processes, how resources are allocated and adaptiveness) to make inferences about cognitive and personality characteristics in a more indirect and ongoing fashion [6], [7].

Empirical studies show how gamified assessments can increase participants' engagement and decrease the amount of test-related stress they experience. However, there are some disadvantages with gamified assessments. One major disadvantage is that it is difficult to maintain the same degree of accuracy as traditional assessments. Another disadvantage is that gamified assessments capture long-term behavioral data; therefore, they may provide more realistic views of individual behavior in comparison to traditional assessments. In addition, gamified assessments provide more detailed information about individuals who demonstrate strategic thinking, collaborate well with others, and manage risk. Although there are many benefits associated with gamified assessments, there are still several issues that need to be addressed before gamified assessments can be widely used as an alternative to traditional assessments. Some of the issues include the lack of standards for creating and administering gamified assessments, the difficulty of interpreting the results obtained from gamified assessments, and the inability to validate gamified assessments in different jobs and organizations. Research has shown that there is a requirement for a rigorous design framework and a validation process to ensure that gamified assessments produce results that are fair, transparent, and applicable to job performance.

## III. Proposed Methods

### A. Interview/Survey

The interview process is a structured form of communication that involves multiple parties (usually two or more). This type of communication can take many forms but is most commonly used to obtain relevant information from respondents, evaluate applicant qualifications, and/or facilitate discussions among several participants. A survey, on the other hand, is a scientific method employed to collect data from a sample population of respondents/participants in order to determine their views, actions, choices, etc., as well as some demographic characteristics of the sample population.

IC Press

The general objective of both interviews and surveys is to obtain information from people; however, these two methods differ with respect to how they are conducted and the way in which data is obtained. Interviews use a face-to-face method to explore in-depth the views and experiences of each individual being interviewed. Surveys utilize a standard form or questionnaire to allow researchers to gather data from numerous respondents quickly and systematically. Although there are differences between the two forms of data collection, each has its place in research and data collection as each provides different advantages and insights based upon the purpose of the research and the environment where the research takes place.

### B. *Gamified Assessment Application*

Custom gamified assessments were developed to simulate decision-making, problem-solving, and resource management tasks. These custom gamified assessment applications utilize various game elements (i.e., time constraints, scoring mechanisms, progressive difficulty levels, and feedback) to encourage users to participate actively in the assessment process while maintaining the assessment application's validity as an assessment instrument. Each of the different game scenarios is associated with a specific type of cognitive/behavioral characteristic(s) such as adaptability, strategic planning, risk assessment, attention management, etc.

The manner in which players engage with one another is recorded during the game. A specific cognitive or behavioral concept is associated with each decision made by a player. We use the behavioral data that we gather to assess indirectly the player's ability and personality characteristics; thus, enabling us to examine the player's actions in an objective fashion while not requiring the player to directly describe himself/herself. The application is designed to be platform-agnostic and accessible via personal computers or mobile devices to ensure ease of participation.

## IV. EXPERIMENTAL RESULT

In this research, an application was made and used to determine the level of effectiveness of Gamification in appraising respondent's Personality metrics according to The Myers-Briggs Type Indicator (MBTI). Based on the survey conducted, there were 32 participants, of which The majority of respondents were between 18 and 24 years old, accounting for 62.5%(20 Respondents) of the total sample. Participants aged 25 to 30 represented 21.9% (7 Respondents), while those under 18 years old accounted for 9.4% (3 respondents). Participants over the age of 30 are a minority, only accounting 6.2%(2 Respondents) of the sample.

### A. *Interview/Survey*

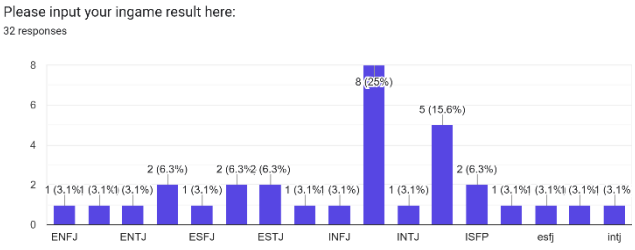



Fig. 1. Distribution of MBTI Personality Type Results for Respondents (n = 32)

This survey shows (Fig.1) that there are a lot of distribution which suggests that the game is capable of producing a range of personality classifications Based on the in-game personality assessment system, participants were classified into various MBTI personality types. The most frequently obtained personality type was INFP, representing 25% (8 Respondents) of respondents, followed by INTP at 15.6 % (5 Respondents). The rest of the personality types are spread about evenly.

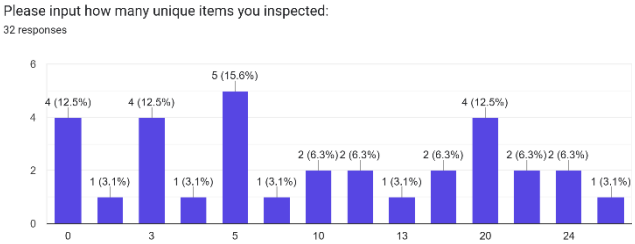



Fig. 2. Distribution of the Number of Unique Items Examined by Respondents (n = 32)

The number of unique items interacted with by participants was recorded as an indicator of the Sensing (S) and Intuition (N) personality dimension. The individuals that had contact with a greater quantity of distinct items would typically be considered "Sensing" individuals; therefore, they would most likely use a method of collecting as much detail as possible about their surroundings. On the other hand, those that made contact with a lesser quantity of items would generally be viewed as "Intuitive" individuals and would typically view things in terms of overall trends rather than focusing on the finer points. Most people have very few contacts with items as indicated by the results of this study, and this is related to how frequently people receive an "N" personality type.

IEEE

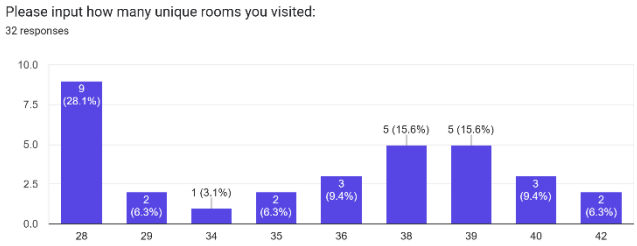



Fig. 3. Distribution of the Number of Unique Rooms Visited by Respondents (n = 32)

The participant's number of distinct rooms that they visited served as an operationalization for their J-P (Judging vs. Perceiving) personality type. Participants with higher numbers of rooms explored exhibited traits associated with the "Judging" type — i.e., increased curiosity and flexibility in how they played the game. Those participants with lower numbers of rooms explored were more likely to fall into the "Perceiving" category, which is indicative of a more focused and structured way of exploring. It can be seen in the results that most respondents tend to have low counts of visiting rooms which correlates with how frequent respondents are assigned with P personality types.

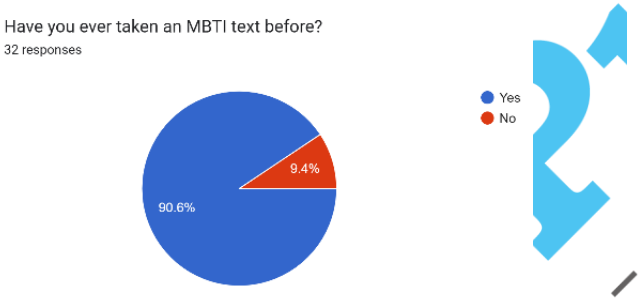



Fig. 4. Proportion of respondents who had previously taken the MBTI test (n = 32)

Respondents were asked whether they have had experience with another form of MBTI personality assessments before. Results show that 90.6% (29 Respondents) of respondents have had experience with MBTI assessment before whilst 9.4% (3 Respondents) of respondents have never tried an MBTI assessment before. This information was collected to provide a basis for comparing the personality types generated by the game against respondents' previously known personality types.

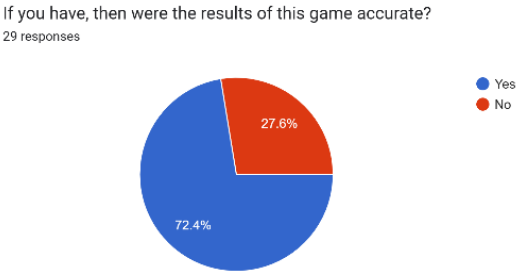



Fig. 5. Respondents' Perceptions of the Accuracy of the Game Results Compared with Previous MBTI Tests (n = 29)

Among respondents who have had previously taken an MBTI assessment, 72.4% (21 Respondents) reported that their previous test and the result displayed by the game are the same. Meanwhile, 27.6% (8 Respondents) of the respondents report that the game's results differ from their previous assessment. This highlights that while the game has successfully guessed a majority of respondents' MBTI assessment, there are still some flaws that will need to be ironed out.

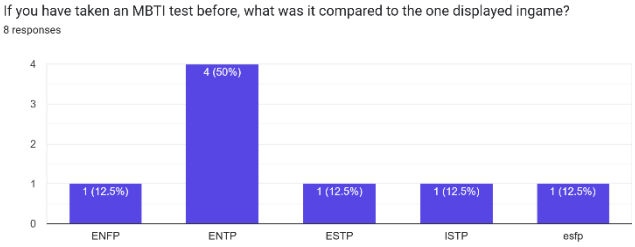



Fig. 6. Distribution of MBTI Types from Previous Test Results Among Respondents Who Considered the Game Results to Be Inaccurate (n = 8)

Respondents whose game-generated MBTI type differed from their previous assessment were asked to provide their earlier MBTI result. As seen in the survey, most of the falsely assigned type is the Extroversion (E) trait.

### *B. Gamified Assessment Application*

Respondents were given a specialized game to play which had algorithms that collected data on a player's behavior throughout the game. This game was designed not only as an interactive adventure experience but also as a tool for assessing the player's MBTI personality type through their in-game behavior. Unlike traditional MBTI assessments that rely on self-report questionnaires, the proposed system infers personality traits by observing player actions and decisions during gameplay.

The personality assessment system operates by tracking specific player behaviors associated with each MBTI dimension. Throughout the game, the player is presented with opportunities to explore environments, interact with objects, and ask questions that contribute

to four personality dimensions: Extraversion versus Introversion (E-I), Sensing versus Intuition (S-N), Thinking versus Feeling (T-F), and Judging versus Perceiving (J-P).

Each relevant action performed by the player contributes points to one side of a personality dimension. At the conclusion of the game, the accumulated scores are compared, and the dominant trait from each dimension is selected to generate the player's final four-letter MBTI personality type.

*1) Extraversion vs Introversion:*

The Extraversion and Introversion dimension is determined through the player's social behavior and interaction preferences. The player is given a character that they can converse and ask information with. The amount of times the player chooses to converse with said character contributes to the Extraversion score. At the end of the game, the amount of times the player has conversed with said character is counted and if it is more than half of the total conversations possible with the character.

*2) Sensing vs Intuition:*

The Sensing and Intuition dimension is determined by the variety of environmental objects examined by the player. Players who frequently inspect unique objects and gather detailed information from their surroundings receive additional Sensing points. Players who focus primarily on key objectives and interact with fewer environmental details accumulate Intuition points. This mechanism was designed to reflect the tendency of Sensing individuals to focus on concrete information and Intuitive individuals to prioritize broader concepts and patterns.

*3) Thinking vs Feeling:*

The amount of thinking and feeling is determined by the topic of conversation that occurs when encountering a character in the game. When a character discusses logical thinking, goal setting, and objective viewing, the thinking score increases. Conversely, when a character discusses empathy, personal value systems, and emotional responses, the feeling score increases. At the end of the game, the player's classification in this area is based upon which score is greater.

*4) Judging vs Perceiving:*

Players can demonstrate their level of flexibility and willingness to try out new things through how they behave when exploring. When players visit many different areas in the game and spend time looking around, they will earn judging points, which show that they have been open to learning more about the world. On the other hand, if a player is very focused on getting to her/his next objective as fast as possible and does not take any extra time to look around, she/he will earn perceiving points. This shows that the player has taken a structured, objective-oriented approach to completing the game. After the game ends, whoever has earned more points in either category will be categorized into that group.

*5) MBTI Final Verdict:*

After every piece of game play data has been gathered, the player's overall MBTI type will be determined based upon the results of the players' performance on each of the four dimensions of personality. The dimension of each opposing trait pair with the higher score will be selected. As an example, if a player's Extraversion score was higher than his/her Introversion score, then the first letter of the MBTI type would be "E". This procedure is used to determine the first, second, third, and fourth letters of the MBTI types for players.

The results from this sample group indicate that the proposed video game based personality assessment system was able to accurately determine the MBTI personality type for most of the participants. Most of the participants stated that their video game generated personality type was either the same or similar to what they received when taking the MBTI. This indicates that how players interact in a video game can reveal aspects of their personality and may be used as another way to evaluate someone's personality.

However, several participants received personality classifications that differed from their previous MBTI results. These discrepancies may be attributed to a number of factors. First, traditional MBTI assessments rely on self-reported responses, whereas the proposed system evaluates observable behavior during gameplay. Second, player decisions may be influenced by curiosity, experimentation, or game-related objectives rather than their actual personality preferences. Finally, personality traits themselves may change over time, causing differences between previous assessments and the results generated during this study[14].

## V. Conclusion

This study aimed to design and developed a game-based personality assessment system capable of determining a player's MBTI personality type through gameplay behavior. Unlike traditional MBTI assessments that rely on questionnaires, the proposed system evaluated player actions such as environmental exploration, object interaction, and decision-making throughout the game. By translating these behaviors into personality scores, the system generated a four-letter MBTI classification upon completion of the game.

The developed game is relatively successful in implementing behavioral tracking mechanisms corresponding to the four MBTI personality dimensions: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving. Data collected from survey participants demonstrated

In Press

that the game was able to produce personality classifications that were generally consistent with participants' previous MBTI assessment results. These findings suggest that player behavior within an interactive virtual environment can provide useful indicators for personality evaluation. The game was capable of collecting behavioral data, processing personality-related metrics, and generating MBTI personality classifications without the use of a traditional questionnaire.

Overall, the study achieved its objective of designing and implementing a game capable of estimating MBTI personality types through player behavior. While additional refinement and testing with a larger participant pool are recommended, the results provide evidence that behavioral data collected through gameplay can be utilized to support personality assessment and analysis.

Several improvements may be considered for future development of these systems. Firstly, a larger and more diverse respondent sample should be utilized to further evaluate the reliability and validity of the generated personality classifications. Second, additional gameplay mechanics and behavioral indicators could be incorporated to provide a more comprehensive assessment of personality traits.

## AUTHOR CONTRIBUTION STATEMENT

Raymond Alexander developed the concept, designed, implemented, collected the data, analyzed the data, and wrote about the findings of this research project. I am extremely grateful to my Supervisor, Sonya Rapinta Manalu, for giving me direction in terms of academic knowledge, feedback on methodology, and reviewing the manuscript at each stage of the research process. Ultimately, all of the major decisions related to the design and implementation of the system, analysis of the data, and writing of the thesis were taken by Raymond Alexander.

## DATA AND MATERIALS AVAILABILITY

The data and materials used in this study, including the survey responses, gameplay data, and source code developed for the research, are available from the author upon reasonable request. Access may be subject to the protection of participant privacy and institutional requirements.

In Press

## ACKNOWLEDGEMENTS

This research is supported by Bina Nusantara University, Jakarta, Indonesia.

## REFERENCES

[1] P. R. Sackett, N. J. Schmitt, J. L. Ellingson, and J. F. Kabin, "High-stakes testing in employment, credentialing, and higher education," *American Psychologist*, vol. 56, no. 4, pp. 302–318, 2001.

[2] R. Paulhus and M. John, "Egoistic and moralistic biases in self-perception," *Journal of Personality*, vol. 66, no. 6, pp. 1025–1060, 1998.

[3] S. Deterding, D. Dixon, R. Khaled, and L. Nacke, "From game design elements to gamefulness: Defining gamification," in *Proc. 15th Int. Academic MindTrek Conf.*, 2011, pp. 9–15.

[4] K. Werbach and D. Hunter, *For the Win: How Game Thinking Can Revolutionize Your Business*. Philadelphia, PA, USA: Wharton Digital Press, 2012.

[5] J. Hamari, J. Koivisto, and H. Sarsa, "Does gamification work? A literature review of empirical studies," in *Proc. 47th Hawaii Int. Conf. on System Sciences*, 2014, pp. 3025–3034.

[6] M. Landers, K. N. Auer, A. B. Collmus, and R. C. Armstrong, "Gamification science, its history and future: Definitions and a research agenda," *Simulation & Gaming*, vol. 49, no. 3, pp. 315–337, 2018.

[7] J. L. Shute and M. Ventura, "Stealth assessment: Measuring and supporting learning in video games," Cambridge, MA, USA: MIT Press, 2013.

[8] L. R. Goldberg, "The structure of phenotypic personality traits," *American Psychologist*, vol. 48, no. 1, pp. 26–34, 1993.

[9] F. L. Schmidt and J. E. Hunter, "The validity and utility of selection methods in personnel psychology," *Psychological Bulletin*, vol. 124, no. 2, pp. 262–274, 1998.

[10] M. Ziegler, C. MacCann, and R. D. Roberts, *New Perspectives on Faking in Personality Assessment*. Oxford, U.K.: Oxford Univ. Press, 2011.

[11] R. N. Landers and A. K. Armstrong, "Enhancing instructional outcomes with gamification: An empirical test of the Technology-Enhanced Training Effectiveness Model," *Computers in Human Behavior*, vol. 71, pp. 499–507, 2017.

[12] J. Hamari and J. Koivisto, "Why do people use gamification services?" *International Journal of Information Management*, vol. 35, no. 4, pp. 419–431, 2015.

[13] I. I. Kiili, S. de Freitas, S. Arnab, and T. Lainema, "Engagement and immersion in game-based learning," *Computers in Human Behavior*, vol. 40, pp. 1–14, 2014.

[14] Chopik WJ, Kitayama S. Personality change across the life span: Insights from a cross-cultural, longitudinal study. J Pers. 2018 Jun;86(3):508-521. doi: 10.1111/jopy.12332. Epub 2017 Jul 29. PMID: 28646503; PMCID: PMC5742083.