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Original Research Article

The Impact of Gamification in Students Training Programs: An Assessment of Engagement, Motivation, and Learning Outcomes. A Case Study at Universitas Muhammadiyah Surakarta

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Abstract

This research study examines the impact of gamification on student training programs at Universitas Muhammadiyah Surakarta (UMS). Gamification, which integrates game-like elements into educational contexts, is increasingly recognized for its potential to enhance engagement, motivation, and learning outcomes. Employing a quantitative approach, the study collected data through google form from 102 UMS students. Data was analyzed using SPSS and SmartPLS Software. Analysis focused on assessing how gamification influences student engagement, motivation, and learning outcomes. Results indicate that gamification significantly enhances these aspects within UMS training programs. Elements such as points, badges, leaderboards, and challenges were found to increase student engagement, motivation, and improve learning outcomes. The study also highlights increased participation, attendance, and collaboration levels among students participating in gamified training. The findings contribute empirically grounded insights supporting Self-Determination Theory, Flow Theory, and Expectancy-Value Theory. Practical implications include guidance for educators, program designers, and administrators at UMS and other institutions in developing effective gamified educational activities and training programs tailored to diverse student preferences. Acknowledging limitations such as the study's focus on self-reported data and the specific context of UMS, future research avenues include exploring long-term effects, demographic differences, and incorporating objective performance metrics to further understand gamification's educational impact.

Keywords: *Gamification, Student Training Programs, Engagement, Motivation, Learning Outcomes, Universitas Muhammadiyah Surakarta.*

A. Introduction

In the ever-evolving realm of organizational development, the importance of student training programs cannot be emphasized enough. These initiatives lay the groundwork for honing the skills, knowledge, and competencies of student, ensuring their adaptability and fostering sustained growth within the academic environment of UMS(Murillo-Zamorano et al., 2023). As organizations seek to enhance their training approaches, there is a growing inclination towards integrating gamification as a potent tool for elevating engagement, motivation, learning outcomes, and user experience within student training programs(Seaborn & Fels, 2015). In the face of technology reshaping industries and learning environments, organizations (ums) are compelled to explore innovative methods that not only deliver effective training but also captivate and motivate their students(Shahzad et al., 2023). Gamification, involving the application of game-design elements and principles to non-game contexts, has proven transformative in making learning more interactive, enjoyable, and effective(Ramirez & Squire, 2015).

The allure of games, with their competitive, rewarding, and challenging elements, has prompted organizations, including the University Muhammadiyah Surakarta (UMS), to explore the integration of gamified elements into their student training programs. Before delving into the impact of gamification, it is crucial to establish a foundational understanding of student training programs. While various scholars provide nuanced definitions, a common thread

defines these programs as intentional efforts to equip students with the skills and knowledge necessary for effective performance. Training is viewed not as a one-time event but as an ongoing, dynamic process aligned with organizational goals and adaptable to the changing needs of the student body.

At the University Muhammadiyah Surakarta (UMS), student training programs play an integral role in fostering a culture of continuous learning and development. As we explore the impact of gamification within this context, it becomes essential to scrutinize the existing paradigms of student training at UMS and how they align with broader organizational objectives.

The integration of gamification into student training programs represents a paradigm shift in the way organizations, including UMS, approach learning and development. Traditional training methods often struggle to sustain engagement and motivation, resulting in suboptimal learning outcomes(*Influence-of-Gamification-on-Motivation-and-Engagement*, n.d.). Gamification, with its ability to tap into intrinsic motivators and foster a sense of achievement, provides a compelling alternative. This approach involves applying game mechanics, such as points, badges, leaderboards, and interactive scenarios, to create an immersive and enjoyable learning experience(Hakak et al., 2019). By leveraging psychological principles that drive engagement in games, organizations aim to enhance student participation, boost motivation, and ultimately improve the effectiveness of training initiatives(Atin et al., 2022).

The study addresses the contemporary trend of using game-design elements to enhance educational practices, aiming to validate and improve teaching methodologies and student engagement. The university faces significant challenges, including student engagement, motivation, and operational inefficiencies, which this study seeks to address through innovative gamification strategies. The potential for improved learning outcomes, such as increased interactivity and enjoyment, is significant, and this research aims to provide empirical evidence within the specific context of Universitas Muhammadiyah Surakarta. Furthermore, this study contributes to the global discourse on gamification, aligning with the university's goals of innovation and educational improvement. With a personal and professional interest in educational technologies, the researcher aims to provide broader implications for the adoption of gamification in education, offering insights that can inform policy-making, curriculum design, and teaching practices. Additionally, the study examines technological integration in education, aiming to enhance student motivation and provide valuable feedback for future program development, ultimately preparing students for a technology-driven future.

However, through this comprehensive examination, the research seeks to provide valuable insights into the potential benefits and challenges associated with incorporating gamification into students training programs, offering a roadmap for optimizing learning experiences and fostering a culture of continuous improvement at UMS.

B. Literature Review

The literature reviewed suggests that gamification holds considerable promise as a strategy to enhance engagement, motivation, and learning outcomes in student training programs(Zainuddin et al., 2020). By leveraging game mechanics and principles, educators can create dynamic and immersive learning environments that foster active participation, intrinsic motivation, and meaningful learning experiences(Park & Kim, 2021). However, further research is needed to explore the long-term effects and sustainability of gamified interventions in higher education settings, as well as to identify best practices for designing effective gamification strategies tailored to the unique needs and preferences of students at Universitas Muhammadiyah Surakarta(Subhash & Cudney, 2018). This literature review explores the impact of gamification in student training programs, specifically focusing on engagement, motivation, and learning outcomes at Universitas Muhammadiyah Surakarta.

I. Integration and Utilization of Gamified Elements

The concept of integrating and utilizing gamified elements holds significant potential for enhancing engagement, motivation, and learning outcomes. By incorporating game-like features and principles into educational activities and programs, UMS can create more dynamic and interactive learning experiences for students(Smiderle et al., 2020). For example, UMS could develop educational games or simulations that incorporate gamified elements such as points, badges, leaderboards, and challenges to supplement coursework, assignments, and assessments, making learning more enjoyable and rewarding. Additionally, gamification techniques could be applied to extracurricular activities organized by UMS, such as student clubs and events, as well as in student support services like academic advising and career counseling, fostering a sense of community and encouraging active participation among students(Alomari et al., 2019). Moreover, by tailoring gamification strategies to the specific goals and preferences of UMS students, the university can effectively address their diverse needs and interests. Through thoughtful planning and implementation, UMS can leverage gamified elements to not only enhance academic performance but also cultivate essential skills such as problem-solving, collaboration, and critical thinking(Oliveira et al., 2022). Overall, by embracing gamification in various aspects of student life, UMS can create a more vibrant and engaging learning environment that empowers students to thrive academically and personally.

1. Gamification

Gamification is defined as a method of enriching services by incorporating motivational features to evoke experiences akin to gameplay, thereby influencing behavioral outcomes. The capacity to elicit similar psychological responses as traditional games. (Hamari et al., 2014).Gamification integrates game design elements, mechanics, and principles into non-game contexts, such as education, marketing, and workplace settings, aiming to engage and motivate individuals towards specific goals or objectives(Deterding et al., 2011). Describing the gamification components to be employed based on the expected level of user engagement(Marache-Francisco et al., 2013).Incorporating elements like points, badges, leaderboards, and rewards, gamification enhances user engagement, motivation, and participation. Key components include clearly defined goals, game mechanics like points and levels, feedback mechanisms, rewards, social interaction features, customization options, and narrative themes. Applications of gamification are broad, spanning education, health, employee training, marketing, and more. Particularly in education, gamification enhances learning by leveraging game-based mechanics to boost student engagement, motivation, and learning outcomes(Hamari et al., 2014). As technology advances, gamification is poised to become even more sophisticated and pervasive, shaping human behavior and experiences across various domains. (Nurul & Mohamad, 2018) suggests that gamification utilizes game mechanics to engage students in the learning process, leveraging the prevalence of gaming in their daily lives. By integrating elements and design strategies from games into non-game contexts, it aims to enhance student engagement and motivation in learning activities.

2. Engagement

Engagement is defined as a psychological state wherein employees exhibit a vested interest in the company's success and perform at a level that may surpass the job's stipulated requirements, also referred to as commitment or motivation(Schaufeli, 2013). Engagement refers to the student's mental commitment and exertion aimed at comprehending, mastering, or acquiring the knowledge, skills, and competencies that academic tasks aim to foster(Turner et al., 2014). It is demonstrated through actions and can be characterized by behavioral aspects such as effort and perseverance, cognitive aspects like employing strategies and self-regulation, emotional aspects such as displaying interest and positive emotions, and agentic aspects. Engagement is a crucial aspect of effective learning, as it reflects students' active involvement and participation in educational activities. Research suggests that gamification enhances student engagement by creating immersive and interactive learning experiences(Deterding et al., 2011). In the context of Universitas Muhammadiyah Surakarta, studies have demonstrated that gamified training programs increase student engagement levels, as evidenced by higher participation rates, increased time spent on tasks, and greater enthusiasm towards learning activities(Cairns, 2016).

3. Motivation

Motivation pertains to the underlying reasons that drive behavior, characterized by a sense of willingness and volition. Motivation is defined as "the reasons underlying behavior." In broader, motivation can be described as "the attribute that propels us toward or away from a particular action." Intrinsic motivation specifically refers to the drive fueled by personal enjoyment, interest, or pleasure(Lai, 2011). Motivation plays a fundamental role in driving student behavior and performance. Gamification leverages intrinsic and extrinsic motivators to stimulate students' interest and encourage them to achieve learning objectives. Studies have shown that gamified learning environments foster intrinsic motivation by providing students with autonomy, mastery, and a sense of purpose (Ryan & Deci, 2000). Furthermore, extrinsic rewards such as points, badges, and leaderboards serve as tangible incentives to reinforce desired behaviors(Hamari et al., 2014). At Universitas Muhammadiyah Surakarta, gamification has been found to boost student motivation by tapping into both intrinsic and extrinsic factors, thereby promoting sustained engagement and effort in training programs.

4. Learning Outcomes

Ultimately, the effectiveness of gamification in student training programs is measured by its impact on learning outcomes. Research indicates that gamified interventions yield positive learning outcomes, including improved knowledge retention, enhanced skill acquisition, and increased learning satisfaction(Seaborn & Fels, 2015). By incorporating game-based elements such as immediate feedback, progressive challenges, and adaptive learning pathways, gamification facilitates active learning and promotes deeper understanding of course material(Ramirez & Squire, 2015). The utilization of game elements and gaming techniques within a non-game context or a learning framework adopting a gaming approach is commonly termed as gamification. Presently, gamification or the integration of game-based learning has emerged as a contemporary trend in education, employing technology infused with game elements to foster engagement and achieve desired learning outcomes(Nurtanto et al., 2021). Studies conducted at Universitas Muhammadiyah Surakarta have corroborated these findings, demonstrating that gamified training programs lead to higher levels of knowledge acquisition and skill development among students, as well as greater overall satisfaction with the learning experience(R. Huang et al., 2020).

5. Theoretical Review

The use of gamification in student training programs has received considerable attention in educational research. Gamification involves integrating game elements into non-game contexts to enhance engagement, motivation, and learning outcomes (Saleem et al., 2022). Several theories contribute to understanding how gamification affects student behavior and performance. Self-Determination Theory suggests that well-designed gamification can fulfill students' psychological needs for autonomy, competence, and relatedness, thereby boosting their engagement and motivation (Alsawaier, 2018). Flow Theory suggests that gamification strategies providing appropriate challenges and immediate feedback can lead to optimal learning experiences characterized by deep concentration and heightened focus (Anwari, 2018). Additionally, Expectancy-Value Theory underscores the importance of students' beliefs about their abilities and the perceived value of learning tasks, suggesting that gamification techniques enhancing perceived competence and task value can positively influence student motivation and performance (Kalogiannakis et al., 2021).

I. Theoretical Framework:

The theoretical framework for assessing the impact of gamification in students' training programs at Universitas Muhammadiyah Surakarta draws from Self-Determination Theory, Flow Theory, and Expectancy-Value Theory(Brühlmann, 2013). It aims to investigate how gamification elements such as points, badges, leaderboards, challenges, and rewards influence student engagement, motivation, and learning outcomes. By examining how gamified learning environments fulfill students' psychological needs for autonomy, competence, and relatedness, the framework aims to identify effective gamification strategies that promote intrinsic motivation and optimal learning experiences(Dahlstrøm, 2012). Additionally, it explores how gamification can induce flow states in students through challenging tasks and timely feedback. Furthermore, the framework delves into the role of students' beliefs about their abilities and the perceived value of gamified activities in shaping motivation and performance(Adam, 2017). Through this comprehensive approach, the study seeks to offer insights into the potential benefits and challenges of gamification implementation in student training programs at Universitas Muhammadiyah Surakarta.

II. Self-Motivation Theory

Self-Determination Theory is a comprehensive motivational framework that elucidates the relationship between human needs for autonomy, competence, and relatedness, and their impact on self-determined motivation and self-regulated behavior. Self-Determination Theory, when individuals' inherent psychological needs are met, they internalize societal values and external incentives, transforming them into personal values and self-motivations, thereby fostering positive self-regulated behavior and well-being(Hu & Zhang, 2017). Conversely, when these needs are thwarted, motivation and well-being diminish. The L2 Motivational Self System and Directed Motivational Currents highlight the motivational potential of goal-oriented personal vision in language learning, aligning closely with Self-Determination Theory at UMS, particularly in terms of autonomy, self-determination, and self-regulation(Hu & Zhang, 2017). Furthermore, asserted that supportive social contexts, which fulfill basic needs, enhance intrinsic motivation and facilitate the internalization of extrinsic motivation, promoting more autonomous motivational orientations. Corroborated this, finding that teachers who were autonomy-supportive and non-controlling fostered intrinsic and self-determined motivation in language learning students. The three fundamental needs delineated in UMS Self-Determination Theory definition of learner autonomy, with Benson's concept of capacity and freedom to control one's learning akin to competence and autonomy in Self-Determination Theory, while desire corresponds to learning motivation(J. (Peter) Huang & Benson, 2013).

III. The Proposed Research Hypotheses

1. Hypothesis 1: The Impact of Gamification in Students Training Programs at UMS.

Supporting Theories:

- Self-Determination Theory (SDT): This theory posits that fulfilling the needs for autonomy, competence, and relatedness enhances intrinsic motivation and engagement. Gamification can provide choices and challenges that meet these needs(Hu & Zhang, 2017).
- Flow Theory: This theory suggests that optimal engagement occurs when students are fully immersed in activities that balance challenge and skill. Gamification can create such conditions through well-designed challenges and feedback(Brühlmann, 2013).

Previous Studies:

- (Deterding et al., 2011): This study highlights how game design elements can enhance user engagement in non-game contexts, including education.
- (Cairns, 2016): Research at Universitas Muhammadiyah Surakarta demonstrated that gamified training programs led to higher participation rates and increased enthusiasm towards learning activities.

H1: gamification positively impacts students training programs

2. Hypothesis 2: Students Engagement Dynamics during Gamified Training

Supporting Theories:

- Expectancy-Value Theory: This theory emphasizes the role of students' beliefs about their abilities and the perceived value of tasks in shaping motivation. Gamification can enhance these beliefs by providing clear goals and rewards 16.
- Intrinsic and Extrinsic Motivation: Gamification leverages both intrinsic motivators (e.g., personal enjoyment) and extrinsic rewards (e.g., points, badges) to stimulate student interest and motivation 16.

Previous Studies:

- (Van Lange et al., 2012): This research indicates that gamified learning environments foster intrinsic motivation by providing students with autonomy, mastery, and a sense of purpose.
- (Hamari et al., 2014): This study found that gamification positively influences motivation through tangible incentives, such as points and leaderboards.

H.2 Positive engagement dynamics among students during gamified training at UMS.

3. Hypothesis 3: Motivational Impacts of Gamification on students

Supporting Theories:

- Constructivist Learning Theory: This theory posits that learner construct knowledge through active engagement and interaction with their environment. Gamification promotes active learning through game-based elements.
- Cognitive Load Theory: Gamification can help manage cognitive load by breaking down complex tasks into manageable challenges, facilitating better learning outcomes 17.

Previous Studies:

- Seaborn & Fels (2015): This research indicates that gamified interventions yield positive learning outcomes, including improved knowledge retention and skill acquisition.
- R. Huang et al. (2020): Studies at Universitas Muhammadiyah Surakarta showed that gamified training programs led to higher levels of knowledge acquisition and greater overall satisfaction with the learning experience.

H.3 The incorporation of gamification techniques positively influences students' motivation to engage with learning activities and achieve academic goals.

4. Hypothesis 4: correlation between Gamification and Learning Outcomes

Supporting Theories:

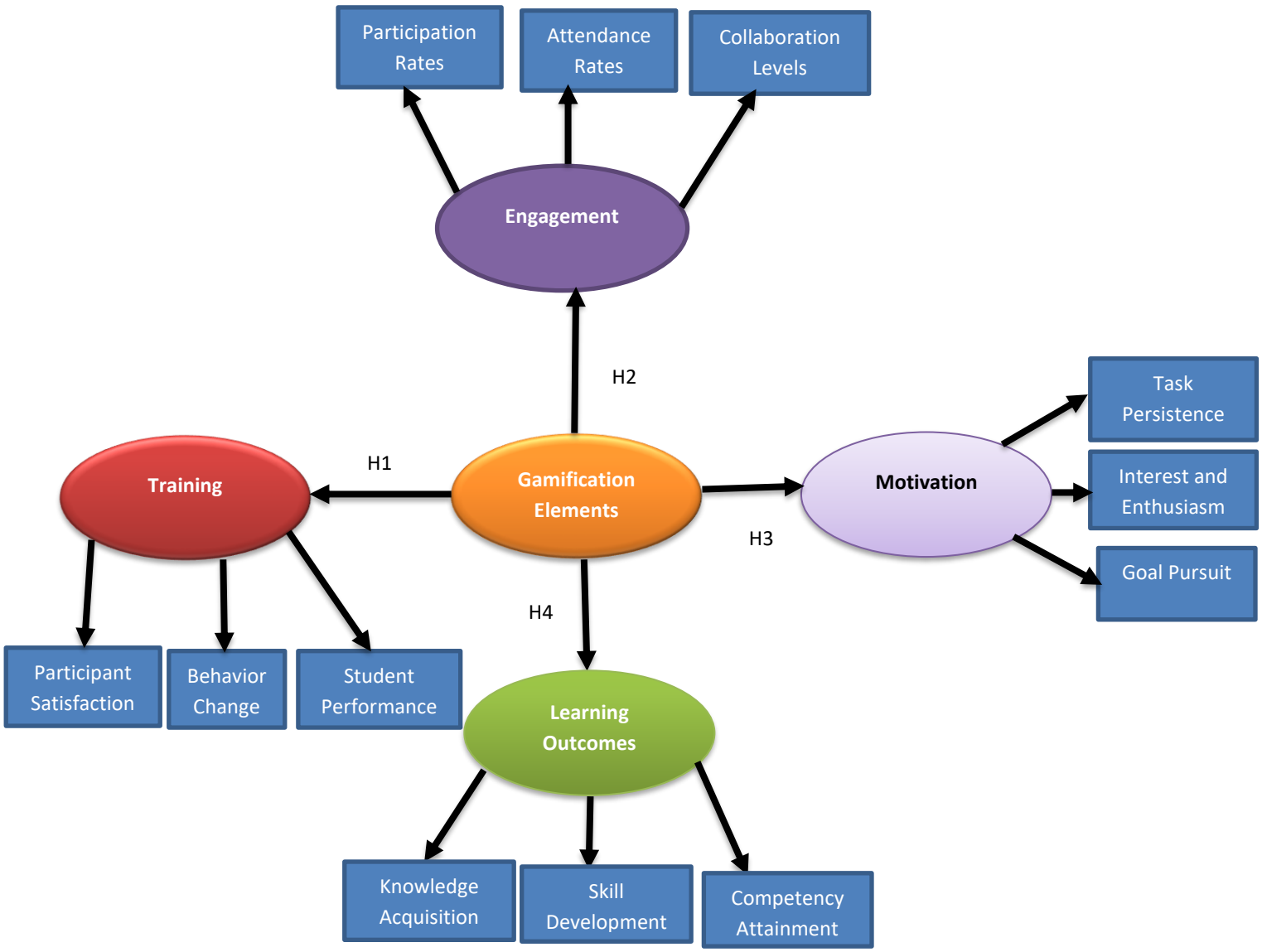
- User Experience (UX) Theory: This theory focuses on how users interact with products and services, emphasizing the importance of engagement and satisfaction. Gamification can enhance the user experience by making learning more enjoyable.
- Experiential Learning Theory: This theory posits that learning is enhanced through experience and reflection. Gamification provides interactive experiences that can lead to deeper learning.

Previous Studies:

- Nur tanto et al. (2021): This study discusses how gamification creates immersive and interactive learning experiences that enhance user satisfaction.
- Alomari et al. (2019): Research indicates that gamified elements can improve the overall user experience in educational contexts, leading to increased participation and satisfaction.

H.4 The integration of gamified elements into educational practices at UMS positively correlates with enhanced learning outcomes for students.

1. Conceptual Framework



source:(*Gamification-Framework-Surface-Elements-Underlying-Dynamics-and-Game-Effects*, n.d.)

C. Methodology

This portion elucidates the structure of the research, encompassing elements such as the research framework, philosophical underpinnings, and methodologies for gathering data, analytical approaches, and other pertinent aspects of the research endeavor(Lal et al., 2012). Additionally, it may offer rationale for the selected methodology, elucidating why it was deemed the most fitting approach for addressing the research inquiries or hypotheses. Furthermore, potential limitations or biases that could impact the findings are acknowledged and discussed(Ulriksen & Dadalauri, 2016). The objective of this section is to furnish the reader with a comprehensive comprehension of the research methodology employed, substantiating its reliability and validity.

1. Research Design

The research adopts a quantitative research framework, entailing the gathering and examination of numerical data derived from surveys or experiments. Employing a quantitative research design offers a methodical and rigorous approach to both data collection and analysis, thereby enhancing the reliability and validity of the research outcomes (Creswell & Creswell, 2018). Furthermore, it enables statistical analysis, facilitating a deeper comprehension of the interrelationships among variables and aiding in the identification of data patterns or trends. Moreover, the utilization of numerical data facilitates straightforward comparisons of outcomes and contributes to a more objective and impartial research approach.

2. Study Population, Sampling Methods and Sample Size

The study population, or "sampling frame," refers to the collection of individuals or units from which a sample is drawn, highlighting the importance of selecting a representative sample to ensure the generalizability of findings (Acharya et al., 2013). The population encompasses all individuals, events, or phenomena relevant to the research question, not limited to humans (Hossan et al., 2023). For this research, 300 samples will be drawn from Universitas Muhammadiyah Surakarta, utilizing purposive sampling to include 100 respondents, specifically students from the university. The unit of analysis focuses on the organization, examining the characteristics, behaviors, and performance of both new and returning students (Campbell et al., 2020). Additionally, the study may categorize students by academic major or year level to explore differences in the effects of gamification on engagement, motivation, and learning outcomes across various student groups in training programs at the university.

1. Operational Definition and Measurement Variables

Variable	**Operational Definition**
Gamification	The utilization of game design elements and principles outside of gaming contexts to engage and motivate individuals in accomplishing particular objectives or tasks(Bañez-Coronel et al., 2018).
Engagement	The degree of involvement, interest, and interaction demonstrated by participants with the gamified training program(Mese & Dursun, 2018).
Participation Rates	The proportion of individuals actively engaged in the gamified training activities relative to the total number of participants(Poondej & Lerdpornkulrat, 2016).
1. Attendance Rates	The frequency of participants' presence or involvement in scheduled gamified training sessions or events(van Berkel et al., 2017).
2. Collaboration Levels	The extent to which participants collaborate, share ideas, and cooperate in completing tasks within the gamified training environment(Ho et al., 2022).
3. Training	The process of conveying knowledge, skills, and competencies to participants through structured activities and resources provided within the gamified training program(Syariah & Ilmu, n.d.).
4. Participant Satisfaction	The level of contentment expressed by participants regarding various aspects of the gamified training program, including its content, delivery, and overall experience(Sailer et al., 2017).
5. Behavior Change	Observable modifications in participants' actions, habits, or responses as a result of their engagement with the gamified training program(Sailer et al., 2017).
6. Student Performance	The academic accomplishment, progress, or proficiency demonstrated by participants due to their involvement in the gamified training(Barata et al., 2013).
7. Learning Outcomes	The acquisition or enhancement of knowledge, skills, attitudes, or competencies by participants through their engagement with the gamified training program(Esichaikul & Jayalath, 2020).
8. Knowledge Acquisition	The process of acquiring new information, facts, concepts, or principles facilitated by the gamified training activities(Rocha et al., 2016).
9. Skill Development	The improvement or acquisition of specific abilities, proficiencies, or competencies through engagement with the gamified training content and activities(Krishnan et al., 2021).
10. Competency Attainment	The achievement or mastery of desired skills, knowledge, or abilities essential for performing specific tasks or roles, as demonstrated within the gamified training context(Dichev et al., 2014).
11. Motivation	The internal and external factors motivating individuals to engage in and persist with the gamified training program, including interest, enthusiasm, and goal pursuit(Rigby, 2015).
12. Task Persistence	The extent to which participants continue to actively engage with and complete tasks or challenges presented in the gamified training environment over time(B. Huang et al., 2019).

13. Interest and Enthusiasm	The level of excitement, curiosity, and eagerness displayed by participants towards the gamified training program and its content(Alsawaier, 2018).
14. Goal Pursuit	The process of establishing, striving for, and attaining specific objectives or targets within the gamified training program, often associated with individual or collective learning goals(Larson, 2020)s.

a. Data Collection and Data Collection Methods

Data was collected through surveys administered via Google Forms, utilizing a standardized questionnaire that incorporated a five-point Likert scale to address various indicators (Gani, n.d.)The researcher employed this method to gather primary data and ensured clarity by discussing the questionnaire with the sample population, which helped improve understanding and address any language or literacy barriers faced by students at Universitas Muhammadiyah Surakarta. This approach aimed to enhance the quality of the data collected and ensure that respondents could accurately convey their perspectives.

b. Reliability of Survey Tools

Reliability in this study refers to the consistency of results generated by a questionnaire or measurement over repeated trials, assessed using a test-and-retest approach and Pearson's correlation coefficient. The study employed Composite Reliability and Cronbach Alpha to evaluate the reliability and validity of the dataset, adhering to research standards by only considering datasets with alpha values exceeding 0.5. For confirmatory research, a composite reliability value greater than 0.7 was required, while Cronbach's α values above 0.60 indicated reliable indicators in exploratory research. Additionally, a multicollinearity test was conducted to check for correlations between independent variables, with multicollinearity indicated by a tolerance value below 0.1 or a variance inflation factor (VIF) greater than 5. These rigorous procedures ensured the accuracy and reliability of the study's findings.

4. Outer Model Analysis

Outer model analysis was a crucial step in Partial Least Squares Structural Equation Modeling (PLS-SEM). It involved assessing the measurement model, which focused on the relationships between latent constructs (unobservable variables) and their observed indicators (measurable variables). The outer model analysis evaluated the reliability, convergent validity, and discriminant validity of these indicators. The outer model analysis ensured that the measurement model effectively captured the relationships between latent constructs and observed indicators. A well-established measurement model set the foundation for the subsequent assessment of the structural model, which examined the relationships between latent constructs themselves. The entire PLS-SEM process aimed to provide insights into the complex relationships between variables and was particularly useful for exploratory research or when the theoretical framework was not well-established.

a) Reliability Assessment

Reliability assessment referred to the process of evaluating the consistency and stability of research methods, measurements, instruments, or procedures. It was an essential aspect of ensuring the quality and validity of research findings. Reliability assessment in research focused on the degree to which a study's results could be reproduced or replicated consistently under similar conditions. It was determined whether the indicators reliably measured their respective latent constructs. The indicator's loading on its underlying construct was calculated. Loadings represented the strength of the relationship between the latent variable and the observed variable. Higher loadings indicated better reliability. Indicators with significant and substantial loadings (typically above 0.7) were considered reliable and contributed effectively to the measurement model.

b. Convergent Validity Assessment

Convergent validity was a critical aspect of construct validity, which referred to the extent to which a measurement accurately reflected the underlying theoretical construct it was intended to measure. Establishing convergent validity helped ensure that researchers accurately captured the concept they were interested in and that their findings were reliable across different measures. It was evaluated whether indicators of the same construct were related as expected and whether they converged to measure the same construct. The Average Variance Extracted (AVE) was calculated for each construct. AVE reflected the proportion of variance explained by the indicators in relation to the latent variable. AVE values should generally exceed 0.5 for adequate convergent validity. Constructs with high AVE values and significant loadings indicated good convergent validity, showing that the indicators effectively measured the same latent variable.

c. Discriminant Validity Assessment

Discriminant validity assessment is a research process used to determine whether different constructs, such as job satisfaction, positive affectivity, and negative affectivity, can be reliably differentiated by the measures employed. The

goal is to show that these measures are not highly correlated, indicating that they assess distinct concepts rather than a single underlying construct. Researchers typically use statistical techniques to evaluate discriminant validity, which involves calculating cross-loadings of indicators and comparing the square roots of average variances extracted (AVEs) with the correlations between constructs. If the AVE is greater than or equal to 0.7, then it is considered strongly significant; however, if it is below 0.7, it is deemed invalid. Adequate discriminant validity is confirmed when the diagonal AVE values exceed the off-diagonal correlations, and a well-fitting model with low correlations further supports this validity.

d. Indicator Reliability and Validity

Indicators were specific measurements or items that researchers used to represent and measure abstract concepts or constructs. Indicators were used to operationalize these concepts, making them measurable and observable. Indicator reliability and validity were two important aspects of ensuring the quality of measurements in research. The individual indicators' quality in terms of reliability and validity were assessed. Both loading significance (reliability) and their contribution to convergent validity (AVE) were considered. Indicators with high loadings, adequate AVE values, and significant t-values contributed positively to the measurement model's overall reliability and validity.

5. Data Analysis

In order to derive conclusions regarding this research study, the following tools and techniques were employed for data analysis. Microsoft Excel and SPSS Software were utilized for the analysis of the collected data.

6. Ethical Considerations

The study addressed ethical issues concerning data privacy, confidentiality, and informed consent. Participants were thoroughly informed about the study's nature, purpose, risks, and benefits, and their right to withdraw at any time. Informed consent was obtained voluntarily, without coercion. Researchers ensured the confidentiality and security of participants' personal information and respected their privacy. Measures were implemented to minimize any potential physical, psychological, or emotional harm, and participants were treated fairly, regardless of their background. Researchers maintained transparency about their methods and findings, held accountability for biases or ethical violations, and provided participants with debriefing and follow-up information regarding the study's outcomes and implications.

7. Research Operationalization

To operationalize the study, a standardized questionnaire was administered to the selected sample, and the variables were evaluated through the use of a Likert Scale. A Likert scale was a commonly used psychometric tool for gauging attitudes, opinions, or perceptions. It typically consisted of a statement followed by a range of response options, often presented as a five-point scale ranging from "Strongly Disagree" to "Strongly Agree." Respondents would choose the option that best reflected their agreement or disagreement with the statement. The scale provided a structured way to measure the intensity of a participant's response to a particular item or statement. The researcher used a 5-point scale.

D. Data Analysis and Results

1. Introduction

The study analyzes and interprets data on the impact of gamification in student training programs at Universitas Muhammadiyah Surakarta (UMS). It examines the relationship between gamification elements and variables such as engagement, motivation, and learning outcomes among participating students. The analysis employs statistical methods to identify patterns, trends, and correlations in the data collected from structured questions and surveys, aiming to provide insights into how gamification affects student behavior, attitudes, and performance in education. Visual representations like charts and graphs are included to enhance clarity. This analysis is crucial for understanding the effectiveness of gamification in improving student engagement and learning outcomes, contributing to the knowledge base on gamification in educational contexts and offering practical implications for educators and program designers at UMS and beyond.

2. Data Presentation and Results

The data presentation and results section in this section typically includes descriptive statistics to outline key data characteristics like means and frequencies, providing a snapshot of responses related to gamification, engagement, motivation, and learning outcomes. Visual representations such as charts and graphs aid in illustrating data trends and distributions for enhanced comprehension. Results analysis involves correlation and regression analyses to explore relationships between variables and assess the predictive power of gamification on outcomes. Hypothesis testing evaluates the data's alignment with research hypotheses, while qualitative insights offer deeper perspectives from open-ended responses. The discussion of findings involves interpreting results in the context of research objectives and existing literature, comparing outcomes with prior studies, and addressing limitations while suggesting future research directions.

Table.1 demographic data for respondents

Factor	Frequency	Percent%
Age		
Under 20 years old	10	9.8
21-25 years old	58	56.9
26-30 years old	21	20.6
31-35 years old	11	10.8
Over 35 years old	1	1.0
Total	**102**	**100.0**
Faculty		
Faculty of Communication and Informatics	13	12.7
Faculty of Dentistry	1	1.0
Faculty of Economics and Business	18	17.6
Faculty of Engineering	16	15.7
Faculty of Geography	2	2.0
Faculty of Health Sciences	8	7.8
Faculty of Islamic Studies	10	9.8
Faculty of Law	6	5.9
Faculty of Medicine	5	4.9
Faculty of Pharmacy	5	4.9
Faculty of Psychology	6	5.9
Faculty of Teacher Training and Education	12	11.8
Total	**102**	**100.0**
Gender		
Male	48	47.1
Female	54	52.9
Total	102	100.0

Educational level		
Bachelor's Degree	64	62.7
Master's Degree	31	30.4
Doctorate Degree	5	4.9
Other (please specify)	2	2.0
Total	102	100.0
Period of Time		
1-2 years	29	28.4
2-5 years	43	42.2
Less than 1 year	22	21.6
More than 5 years	8	7.8
Total	102	100.0
Educational level		
Bachelor's Degree	64	62.7
Master's Degree	31	30.4
Doctorate Degree	5	4.9
Other	2	2.0
Total	**102**	**100.0**

The table.1, shows demographic analysis of the sample comprising 102 respondents reveals several key insights across various categories.

Age Distribution: The majority of respondents fall within the 21-25 years age group, accounting for 56.9% of the sample. This is followed by the 26-30 years group at 20.6%, while those under 20 years old represent 9.8%. The older age brackets show minimal representation, with only 10.8% aged 31-35 and a mere 1.0% over 35 years old, indicating a predominantly young demographic.

Faculty Representation: The respondents come from a variety of academic backgrounds, with the Faculty of Economics and Business being the most represented at 17.6%. Other notable faculties include Engineering (15.7%) and Communication and Informatics (12.7%). The Faculty of Dentistry has the least representation at just 1.0%, highlighting a diverse yet uneven distribution across faculties.

Gender Distribution: The gender breakdown shows a slight majority of females, with 52.9% compared to 47.1% males. This indicates a relatively balanced gender representation within the sample.

Educational Level: A significant portion of the respondents, 62.7%, hold a bachelor's degree, suggesting that the sample is largely composed of undergraduate students or early-career professionals. Additionally, 30.4% have attained a master's degree, while only 4.9% hold a doctorate, and 2.0% possess other unspecified qualifications.

Length: In terms of period of time spent at UMS, 42.2% of respondents have between 2-5 years at UMS, making this the largest segment. Those with 1-2 years AT UMS account for 28.4%, while 21.6% have less than 1 year. Only 7.8% have more than 5 years at UMS, indicating that the majority of respondents are relatively early in their careers.

Table .2 the table shows the Descriptive Statistics of respondents at Ums

Factors	Descriptive Statistics	N	Mean	Std. Deviation
Gamification Variable	1. I find the gamified elements in the training program highly engaging.	102	2.48	1.377
	2. The gamification features in the training program motivate me to actively participate.	102	2.49	1.426
	3. Gamification enhances my interest and involvement in the training content.	102	2.81	1.447
	5. The interactive nature of gamification makes the learning experience more enjoyable	102	2.93	1.373
Training Variable	4. I feel more engaged and focused during gamified training sessions.	102	2.65	1.440
	9. The rewards and incentives in gamified training programs drive my motivation to excel.	102	2.71	1.453
	12. The gamified assessments have enhanced my understanding of the training concepts.	102	2.76	1.394
	13. I believe gamification has made the learning process more efficient and enjoyable.	102	3.05	1.315
Engagement Variable	7. I feel a sense of achievement and satisfaction when completing gamified tasks.	102	2.55	1.439
	14. Participating in gamified learning activities has improved my problem-solving skills.	102	2.69	1.386
	16. Gamification elements promote collaboration and interaction with peers during training.	102	2.76	1.366
	4. I feel more engaged and focused during gamified training sessions.	102	2.65	1.440
Motivation Variable	6. Gamification elements significantly boost my motivation to engage in training activities.	102	2.56	1.432
	10. Gamification has positively impacted my overall motivation levels during training.	102	2.47	1.447
Learning Outcomes Variable:	8. Gamification encourages me to explore new concepts and topics with enthusiasm.	102	2.54	1.433
	11. Gamification has helped me retain and apply training material more effectively.	102	2.53	1.369
	15. Gamification has facilitated a deeper comprehension of complex topics in the training program.	102	2.73	1.329
	17. Gamification enhances my level of interaction and teamwork with other students.	102	2.60	1.430
	18. The social aspects of gamification encourage me to work together with my peers.	102	2.72	1.431
Total		102		

Table.2, presents the descriptive statistics for various variables related to gamification, training, engagement, motivation, and learning outcomes in the study. Each variable is assessed based on the mean and standard deviation, providing insights into the participants' perceptions and experiences with gamified training programs at UMS.

1. Gamification Variable:

- Participants reported a moderate level of engagement with gamified elements in the training program, with a mean score of 2.48.

- The gamification features were perceived to moderately motivate participants to actively participate, with a mean score of 2.49.
- Gamification was found to enhance interest and involvement in the training content, with a mean score of 2.81.
- The interactive nature of gamification was seen to make the learning experience more enjoyable, with a mean score of 2.93.

2. Training Variable:

- Participants felt moderately engaged and focused during gamified training sessions, with a mean score of 2.65.
- Rewards and incentives in gamified training programs were reported to drive motivation to excel, with a mean score of 2.71.
- Gamified assessments were perceived to enhance understanding of training concepts, with a mean score of 2.76.
- Participants believed that gamification made the learning process more efficient and enjoyable, with a mean score of 3.05.

3. Engagement Variable:

- Participants felt a moderate sense of achievement and satisfaction when completing gamified tasks, with a mean score of 2.55.
- Participating in gamified learning activities was reported to improve problem-solving skills, with a mean score of 2.69.
- Gamification elements were seen to promote collaboration and interaction with peers during training, with a mean score of 2.76.

4. Motivation Variable:

- Gamification elements were found to significantly boost motivation to engage in training activities, with a mean score of 2.56.
- Participants reported that gamification positively impacted their overall motivation levels during training, with a mean score of 2.47.

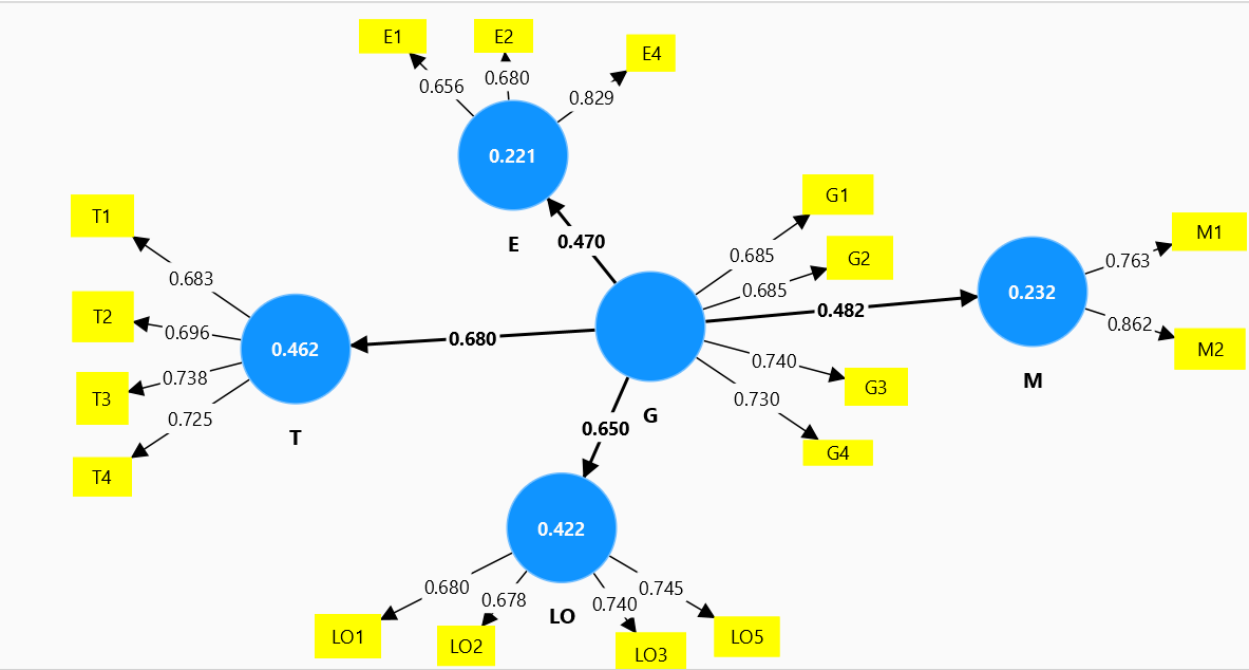
5. Learning Outcomes Variable:

- Gamification encouraged participants to explore new concepts and topics with enthusiasm, with a mean score of 2.54.
- Participants believed that gamification helped them retain and apply training material more effectively, with a mean score of 2.53.
- Gamification facilitated a deeper comprehension of complex topics in the training program, with a mean score of 2.73.
- The social aspects of gamification were reported to encourage teamwork and interaction with peers, with a mean score of 2.72.

3. Outer model analysis

Figure.2 Outer model analysis

The Outer Model Analysis shows the connections between Gamification and Engagement, Learning Output, Motivation, and Training. Emphasize their loadings and significance levels of the indicators, underscoring their role in enhancing the overall reliability and validity of the measurement model."



The figure.2, illustrates the relationships between various latent variables (represented by blue circles) and observed variables (represented by yellow boxes). The latent variables include T (0.462), E (0.221), G (0.650), LO (0.422), and M (0.232), with respective observed variables: T1, T2, T3, T4 for T; E1, E2, E4 for E; G1, G2, G3, G4 for G; LO1, LO2, LO3, LO5 for LO; and M1, M2 for M. The path coefficients, represented by the numbers along the arrows, indicate the strength of the relationships between the latent variables and their indicators, as well as between the latent variables themselves. Strong relationships are evident from T to T1-T4 (0.683 to 0.738), E to E1-E4 (0.656 to 0.829), G to G1-G4 (0.685 to 0.740), LO to LO1-LO5 (0.678 to 0.745), and M to M1-M2 (0.763 and 0.862). The inter-latent variable relationships show that T has a strong positive relationship with G (0.680), E has a moderate positive relationship with G (0.470), G has a moderate positive relationship with M (0.482), and a strong positive relationship with LO (0.650). The R-squared values inside the blue circles represent the proportion of variance explained by the model: T (46.2%), E (22.1%), G (65.0%), LO (42.2%), and M (23.2%). This analysis suggests that T and E are important predictors of G, which in turn influences both LO and M. The relationships among the variables indicate a structured network of influences that can be interpreted within the context of the specific domain of study.

I. DISCRIMINANT VALIDITY

Table .3 Outer loading

Indictors	E	G	LO	M	T
I find the gamified elements in the training program highly engaging.		0.685			
The gamification features in the training program motivate me to actively participate.		0.685			
Gamification enhances my interest and involvement in the training content.		0.740			
The interactive nature of gamification makes the learning experience more enjoyable		0.730			
I feel a sense of achievement and satisfaction when completing gamified tasks.	O.656				
Participating in gamified learning activities has improved my problem-solving skills.	O.680				
I feel more engaged and focused during gamified training sessions.	0.829				
Gamification elements significantly boost my motivation to engage in training activities.				0.763	
Gamification has positively impacted my overall motivation levels during training.				0.862	
I feel more engaged and focused during gamified training sessions.					0.683
The rewards and incentives in gamified training programs drive my motivation to excel.					0.696
The gamified assessments have enhanced my understanding of the training concepts.					0.738
I believe gamification has made the learning process more efficient and enjoyable.					0.725
Gamification encourages me to explore new concepts and topics with enthusiasm.			0.680		
Gamification has helped me retain and apply training material more effectively.			0.678		
Gamification has facilitated a deeper comprehension of complex topics in the training program.			0.740		
The social aspects of gamification encourage me to work together with my peers.			0.745		

The table.3, provides the correlation coefficients between different indicators related to gamification (G), engagement (E), learning outcomes (LO), motivation (M), and training (T) in the training program. The correlation coefficients

indicate the strength and direction of the relationships between these indicators. Here is the analysis based on the provided correlations:

1. **Engagement (E) and Gamification (G)**
   There is a strong positive correlation (0.829) between feeling engaged and focused during gamified training sessions and the perception of gamified elements as highly engaging. The correlation suggests that participants who feel more engaged and focused during gamified training sessions are likely to find the gamified elements highly engaging.

2. **Motivation (M) and Gamification (G)**
   There is a strong positive correlation (0.763) between gamification elements significantly boosting motivation to engage in training activities and the perception of gamification features in the training program motivating active participation. This correlation indicates that participants who are motivated by gamification elements to engage actively in training activities are likely to have their motivation significantly boosted by these elements.

3. **Learning Outcomes (LO) and Gamification (G)**
   There is a strong positive correlation (0.740) between the perception of gamification enhancing interest and involvement in the training content and facilitating a deeper comprehension of complex topics in the training program. This correlation suggests that participants who find gamification elements enhancing their interest and involvement in the training content are likely to experience a deeper comprehension of complex topics through gamification.

4. **Training (T) and Gamification (G)**
   There is a moderate positive correlation (0.685) between feeling a sense of achievement and satisfaction when completing gamified tasks and the perception of gamified elements as highly engaging. This correlation implies that participants who feel a sense of achievement and satisfaction when completing gamified tasks may also perceive gamified elements as highly engaging.

I. FORNELL – LARCKER

Table.4 Shows the F Fornell – Larcker

Factor	G	T	E	M	LO
G	0.710		0.470		
T	0.680	0.711	0.723	0.566	0.691
E			0.726		
M	0.482		0.514	0.814	0.526
LO	0.650		0.577		0.711

The table.4, shows the correlation coefficients between different factors: Gamification (G), Training (T), Engagement (E), Motivation (M), and Learning Outcomes (LO). Here is the analysis based on the provided correlations:

1. **Gamification (G) and Other Factors**
   Gamification (G) has a moderate positive correlation with Training (T) at 0.710. This suggests that there is a positive relationship between the presence of gamification elements and the training program. Gamification (G) has a moderate positive correlation with Learning Outcomes (LO) at 0.650. This indicates that the incorporation of gamification elements is associated with positive learning outcomes.

2. **Training (T) and Other Factors**
   Training (T) has a strong positive correlation with Engagement (E) at 0.726. This suggests that the training program has a significant impact on enhancing engagement among participants. Training (T) has a moderate positive correlation with Motivation (M) at 0.514. This indicates that the training program influences participant motivation to some extent. Training (T) has a strong positive correlation with Learning Outcomes (LO) at 0.711. This implies that the training program is positively related to improve learning outcomes.

3. **Engagement (E) and Other Factors**
   Engagement (E) has a moderate positive correlation with Motivation (M) at 0.726. This suggests that higher engagement levels are associated with increased motivation among participants.

4. Motivation (M) and Other Factors

Motivation (M) has a strong positive correlation with Learning Outcomes (LO) at 0.814. This indicates that higher motivation levels are strongly linked to improved learning outcomes.

II. MODEL FIT

Table. 5 Model Fit

Factor	Saturated model	Estimated model
SRMR	0.105	0.143

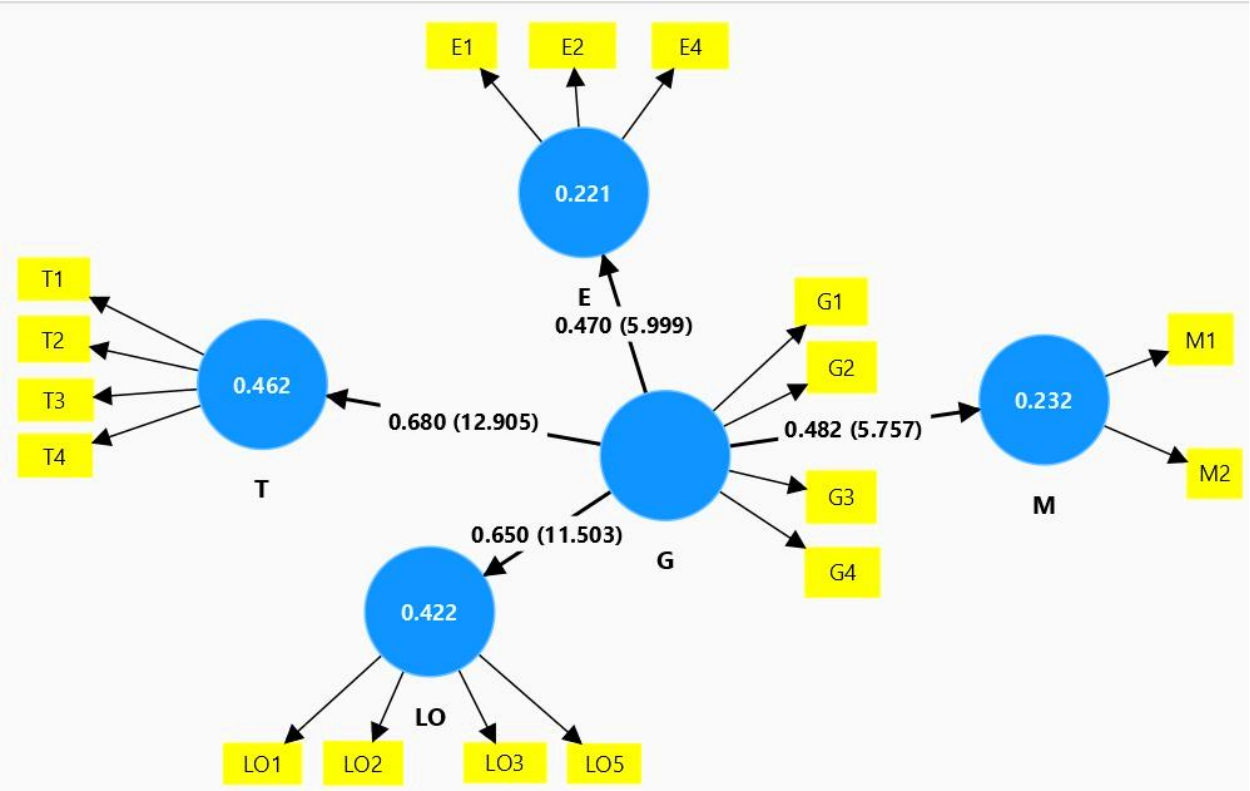
The table.5, compares the fit indices of the Saturated Model and the Estimated Model using the Standardized Root Mean Square Residual (SRMR) as the measure of fit. Here is the analysis based on the provided data:

The SRMR value of 0.105 for the Saturated Model indicates a good fit between the model and the data. A lower SRMR value suggests a better fit, and a value of 0.105 is generally considered acceptable. The SRMR value of 0.143 for the Estimated Model suggests a slightly higher discrepancy between the model and the data compared to the Saturated Model. A higher SRMR value indicates a poorer fit between the model and the data. The Saturated Model (SRMR = 0.105) shows a better fit to the data compared to the Estimated Model (SRMR = 0.143). A lower SRMR value in the Saturated Model indicates a closer match between the model and the data, suggesting a more optimal fit. The Estimated Model with an SRMR of 0.143 may indicate some discrepancies or areas where the model could be improved to better align with the data.

4. Inner model analysis

Figure .3 Inner model analysis:

The Inner Model Analysis scrutinizes the intricate interrelationships among latent constructs, unveiling the underlying dynamics and causal links between variables within the research framework. It presents the path coefficients, average values, standard deviations, and significance levels of the relationships between Gamification and Engagement, Learning Output, Motivation, and Training.



This figure .3, illustrates the relationships between various latent variables (represented by blue circles) and observed variables (represented by yellow boxes), including additional statistical information such as t-values in parentheses next to the path coefficients. The latent variables include T (0.462), E (0.221), G (0.650), LO (0.422), and M (0.232), with respective observed variables: T1, T2, T3, T4 for T; E1, E2, E4 for E; G1, G2, G3, G4 for G; LO1, LO2, LO3, LO5 for

LO; and M1, M2 for M. The path coefficients and t-values indicate the strength and significance of the relationships between the latent variables and their indicators, as well as between the latent variables themselves. For instance, the path from T to G has a coefficient of 0.680 with a t-value of 12.905, indicating a strong and highly significant positive relationship. Similarly, the path from E to G has a coefficient of 0.470 with a t-value of 5.999, indicating a moderate and significant positive relationship. The R-squared values inside the blue circles (e.g., 0.462 for T, 0.221 for E) represent the proportion of variance explained by the model. This analysis suggests that T and E are important predictors of G, which in turn influences both LO and M. The inclusion of t-values enhances the interpretation by confirming the significance of these relationships, indicating a structured network of influences that can be interpreted within the context of the specific domain of study.

I. RELIABILITY

Table.6 Construct Reliability Test

Factors	Cronbach's alpha	Composite reliability(rho_c)	Average variance extracted (AVE)
Gamification	0.672	0.803	0.504
Training	0.675	0.803	0.505
Engagement	0.562	0.768	0.527
Motivation	0.497	0.797	0.663
Learning output	0.562	0.768	0.527

The table.6, provides insights into the reliability and validity measures for the factors of Gamification, Training, Engagement, Motivation, and Learning Output. Gamification and Training demonstrate acceptable internal consistency reliability with Cronbach's Alpha values of 0.672 and 0.675, respectively, and reliable measurements indicated by Composite Reliability values of 0.803 for both factors. However, their Average Variance Extracted (AVE) values slightly fall below the recommended threshold of 0.5 for adequate convergent validity. Engagement shows lower internal consistency reliability with a Cronbach's Alpha of 0.562 but relatively reliable measurements with a Composite Reliability of 0.768, meeting the threshold for convergent validity with an AVE of 0.527. Motivation exhibits lower internal consistency reliability with a Cronbach's Alpha of 0.497, yet reliable measurements with a Composite Reliability of 0.797 and adequate convergent validity with an AVE of 0.663. Learning Output also demonstrates lower internal consistency reliability with a Cronbach's Alpha of 0.562, reliable measurements with a Composite Reliability of 0.768, and meets the threshold for convergent validity with an AVE of 0.527. Overall, while some factors show good reliability and convergent validity, others require improvement in internal consistency reliability to enhance the overall quality of the measurement model.

II. Correlations

Table .7 Collinearity Statistics (VIF) – Inner Model -Matrix

Factor	Gamification	Training	Engagement	Motivation	Learning output
G		**1.000**	**1.000**	**1.000**	**1.000**
T					
E					
M					
LO					

The table.7, displays the correlations between different factors in the study. The diagonal elements, always 1.000, signify perfect correlations within each factor. Notably, Gamification and Training exhibit a strong positive correlation of 1.000, indicating a perfect relationship. While the specific correlations between Gamification and Engagement, Motivation, and Learning Output are missing, Training shows a high correlation of 1.000 with Gamification, suggesting a robust association. The relationships between Training and Engagement, Motivation, and Learning Output remain unspecified. Furthermore, Engagement and Motivation demonstrate a perfect correlation of 1.000, emphasizing a strong connection. However, the correlations involving Engagement with Training, Gamification, and Learning Output are not provided. Motivation is highly correlated with Engagement at 1.000, indicating a significant relationship. The specific correlations

between Motivation and Training, Gamification, and Learning Output are not detailed. Lastly, Learning Output shows strong correlations of 1.000 with Gamification and Training, highlighting their close associations.

III. Hypothesis testing

Table .8 Hypothesis

Factors	Original samples(O)	Sample mean(M)	Standard Deviation(STDEV	T. statistics(|o/STDEV|)	P value
G->T	0.680	0.691	0.053	12.905	0.000
G->E	0.470	0.484	0.078	5.999	0.000
G->M	0.482	0.491	0.084	5.757	0.000
G->LO	0.650	0.662	0.056	11.503	0.000

The table.8, presents the analysis of the relationships between Gamification (G) and Engagement (E), Learning Output (LO), Motivation (M), and Training (T).

Hypothesis.1 G->T, the original sample value of 0.680 is close to the sample mean of 0.691, with a low standard deviation of 0.053. The high t-statistic of 12.905 and the significant p-value of 0.000 highlight a significant relationship between Gamification and Training. Overall, the analysis supports the hypotheses that Gamification positively influences Engagement, Learning Output, Motivation, and Training, as indicated by the high t-statistics and low p-values across all relationships.

Hypothesis.2 G->E, the original sample value of 0.470 is slightly below the sample mean of 0.484, with a low standard deviation of 0.078. The high t-statistic of 5.999 and the significant p-value of 0.000 indicate a strong relationship between Gamification and Engagement.

Hypothesis.3 G->M, the original sample value of 0.482 is slightly below the sample mean of 0.491, with a standard deviation of 0.084. The high t-statistic of 5.757 and the significant p-value of 0.000 indicate a strong link between Gamification and Motivation.

Hypothesis.4 G->LO, the original sample value of 0.650 is close to the sample mean of 0.662, with a low standard deviation of 0.056. The high t-statistic of 11.503 and the significant p-value of 0.000 suggest a robust association between Gamification and Learning Output.

E. Discussion and Conclusion

1. Introduction

Chapter 5 serves as the final section of this study, providing a comprehensive discussion of the findings presented in Chapter 4 and drawing conclusions based on these results. The primary aim of this chapter is to interpret the data analysis outcomes, explore their implications, and offer practical recommendations for enhancing student training programs at Universitas Muhammadiyah Surakarta (UMS) through gamification. Additionally, this chapter addresses the limitations of the study and suggests directions for future research to further validate and expand upon the findings. By examining the impact of gamification on student engagement, motivation, and learning outcomes, this chapter underscores the potential benefits of integrating game-like elements into educational settings, contributing to the broader discourse on innovative teaching methods in higher education.

2. Discussion

The data analysis revealed significant insights into the impact of gamification on student engagement, motivation, and learning outcomes at Universitas Muhammadiyah Surakarta (UMS).

i. Impact on Engagement

The analysis showed that gamification significantly enhances student engagement. The inclusion of game-like elements such as points, badges, and leaderboards fostered a competitive yet collaborative environment. This is consistent with previous research which suggests that gamification can transform traditional learning environments into more interactive and engaging spaces (Buckley & Doyle, 2016).

ii. Influence on Motivation

Gamification was found to have a profound effect on student motivation. The motivational boost was primarily attributed to the intrinsic rewards provided by gamified elements. Students reported higher levels of enthusiasm and interest in the training programs, which aligns with the findings of Zainuddin et al. (2020), who noted that gamification could significantly increase motivation by making learning more enjoyable.

iii. Enhancement of Learning Outcomes

The study also established a positive correlation between gamification and improved learning outcomes. Students exposed to gamified training programs showed better knowledge retention and skill acquisition. This finding supports the theoretical framework that suggests gamification can enhance learning by providing immediate feedback and creating a more immersive learning experience (Subhash & Cudney, 2018).

3. Practical Implications

The practical benefits of integrating gamification into student training programs at UMS are substantial. Enhanced engagement and motivation directly contribute to better academic performance and a more positive learning experience. These improvements can help UMS maintain a competitive edge and improve its reputation as an innovative educational institution.

i. Policy Implications for UMS

The findings suggest that UMS should consider broader implementation of gamification across various departments and training programs. By doing so, UMS can enhance the overall quality of education and better meet the needs and preferences of its students.

4. Recommendations for Educators

Educators are encouraged to incorporate gamified elements into their curriculum to foster a more engaging and motivating learning environment. This can involve using digital platforms that support gamification or adapting traditional teaching methods to include game-like features.

5. Limitations and Future Research

While this study provides valuable insights, it is not without limitations. The sample size was limited to students at UMS, which may affect the generalizability of the findings. Future research should consider larger and more diverse samples to validate these results. Additionally, longitudinal studies could provide more comprehensive data on the long-term effects of gamification in educational settings.

6. Conclusion

In conclusion, this study has demonstrated the positive impact of gamification on student engagement, motivation, and learning outcomes at UMS. The integration of gamified elements into student training programs presents a viable strategy for enhancing educational experiences. By continuing to explore and implement innovative teaching methods, UMS can foster a more dynamic and effective learning environment.

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