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The Direct and Indirect Influence of Gamification on Learning Engagement: The Importance of Learning Goal Orientation (A Preliminary Study)

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Abstract: With the widespread use of digital gaming, there is a growing need to determine how games and its components might be used for learning and teaching. The majority of study in this topic has taken place in more economically established and developed regions, leaving a research void in emerging country situations. To gain a deeper understanding of the learning engagement, it is of significance to examine the gamification perceived ease of use as well as a dive into the learning goal orientation. This study examines the moderating effect of learning goal orientation that influences the relationship between gamification application and learning engagement. The theoretical model was tested in a quantitative study using structural equation modelling based on a PLS-SEM approach, conducted in Jakarta, with actual local college students. The findings of this investigation noted that gamification perceived ease of use was positively related to learning engagement, and learning goal orientation partially mediated this positive relationship. The value of this research may aid educators and practitioners in determining which factors may influence the adoption of gamification in formal higher education.

Index Terms: e-learning, gamification, learning goal orientation, learning engagement, perceived ease of use, technology acceptance model.

1. Introduction

With proper integration of gamification in the field of e-learning into higher education, positive effects on the learning process, such as increased satisfaction, motivation, and student engagement, can be achieved [1]. Higher education institutions are striving to achieve goals and outcomes through e-learning, such as increased student happiness, motivation, effectiveness, and efficiency. Many e-learning systems, however, fail to accomplish their objectives due to non-compliance and a lack of knowledge of methodologies and processes for the development of online information systems [2].

Gamification can increase the efficiency, effectiveness, motivation, and engagement of students in e-learning by incorporating video game characteristics (game mechanics and game dynamics) into non-game applications. Its goal is to increase people's engagement and encourage particular actions [3,4]. Due to its technological character, online learning [5] is one of the sectors where gamification may have a stronger impact. In the realm of e-learning, the usage of games in learning is expanding in popularity [6]. The paper outlines an e-learning approach for higher education that is enhanced by gamification.

Meanwhile, students react to learning failures in different ways; some regard them as a challenge, while others remain gloomy [7]. When given ideas on how to enhance their performance, students react differently; some react negatively, displaying sentiments of disdain and perplexity, whereas others use them to flourish [8,9]. What variables play a role in these disparities in attitudes and behaviors? Individuals have goal orientations toward growing or demonstrating ability in accomplishment situations, according to Dweck et al. [10]. Goal orientation has been found to influence students' affective, behavioral, and cognitive responses in academic settings [11,12]. Thus, goal orientation is contingent to the requirements of individual achievements, and especially when it comes to learning and teaching, it becomes crucial to maintain purposeful motivation.

Acosta-Medina et al. [13] and Rahman et al. [14] conducted systematic studies and found mixed results regarding the effect of perceived ease of use on participation. As a result, we claim that learning goal orientation is a critical mediating mechanism that explains how the simplicity of use of gamification can be leveraged to promote learning engagement. As a result, the goal of this study was to investigate the impact of gamification ease of use on learning engagement, as well as an intervening learning goal orientation variable.

1.1. Problem Statement

Universities were forced to carry out their activities with students completely online as a result of the epidemic. Positive benefits on the learning process could well be attained with appropriate integration of gamification in the field of e-learning into higher education. In this study, we wanted to see if there is a link between gamification perceived ease of use and learning engagement, and if so, what conclusions can be drawn and how they can be used to understand and gain insights into students' declining motivation and delayed feedback or help due to lecturers' inadequate knowledge of methods at the time when students may need help. It is possible to obtain a better knowledge of the link between learning engagement, learning goal orientation, and gamification ease of use by researching them, while this affects the students and learning institutions.

1.2. Objectives of the Study

The specific main objective was to determine if there is a relationship between learning engagement and gamification perceived ease of use. The secondary objective was to determine whether learning goal orientation mediates the relationship.

2. Literature Review

2.1. The Model for Introduction of Gamification to e-Learning in Higher Education

Contact between students and faculty members, reciprocity and cooperation among students, prompt feedback, time on task, active learning techniques, communication of high expectations, and respect for the diversity and learning styles of each student should all be encouraged in an effective online learning environment [15]. The primary goal of e-learning is to increase student efficiency, effectiveness, engagement, contentment, and motivation, which may be accomplished through the use of game mechanics and gamification [16].

The basic goal of e-learning is to establish conditions in which students are motivated, satisfied, effective, and efficient. The model includes e-learning management. The model is depicted in Figure 1 and includes the following main elements: e-learning management, important factors in e-learning, user experience elements, development phases (analysis, planning, development, implementation, and evaluation), game mechanics, game dynamics, gamification elements in e-learning, and their effects on students. Organizing, planning, staffing, directing, and regulating all major parts of e-learning constitutes good e-learning management [17]. Pedagogical, technological, design, administration, human, financial, and gamification factors are all important in e-learning [18].

2.2. e-Learning in Higher Education

Universities are the most common setting for higher education. University students select a subject of study that is narrowly specialized and matches their needs. A study's individual selection contributes to the study's seriousness. E-learning is becoming increasingly popular in higher education. Higher education has its unique set of peculiarities when it comes to e-learning. Students' age, demographic features, topic of study, complexity, and other factors influence the characteristics of e-learning in higher education. Student characteristics, such as the learning ideas with which they attend courses; course environment, such as teaching methods; learning context, such as student perceptions of teaching quality and quantity of work; and student approaches to learning in higher education have all been studied.

Furthermore, the characteristics of higher education have changed dramatically in recent years. As previously stated, the growing number of inter- and transdisciplinary programs, as well as a larger level of involvement in foreign mobility programs, provide unique learning scenarios that can be better managed using gamification theory [19]. The next part covers the fundamentals of game mechanics, game dynamics, gamification, and their use in e-learning (see Figure 1).

2.3. Gamification

Gamification is a set of activities and processes that employ or apply game-design elements and game concepts in non-game contexts to improve user experience and engagement [20], or as a tool for influencing people's motivation or engagement to solve hard problems, complete specific actions, or simply have fun [21]. Some see it as a new way of thinking about problems, devising solutions, and implementing them [22]. Technology has long been connected with business and work, assisting in the completion of duties, but it may also be used for ludic purposes. Gamification was inspired by the idea that people enjoy having fun in their life. Normally used to influence, engage, and motivate

individuals, groups, and communities, game concepts, methods, and systems are now being utilized to drive behaviors and deliver results.

The link between digital games and learning has been investigated from several angles, including informal learning that occurs during play and the integration of digital games into formal learning activities [23,24]. However, in order to support cognitive growth, games, simulations, and gamification frequently blur the lines between formal and informal learning [25]. While it is crucial to understand the terminology, the primary distinction between a digital game and gamification is that the latter is not as thoroughly developed as a complete game [26].

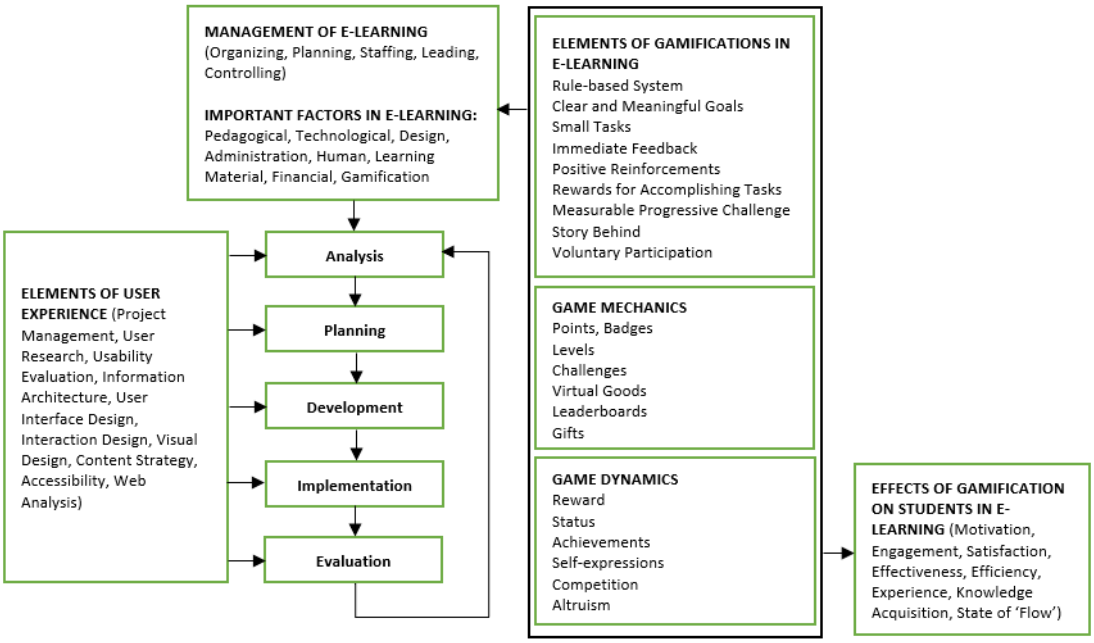

Fig.1. The model for introduction of gamification into e-learning.

2.4. Learning Goal Orientation (LGO)

Goals are frequently specified in terms of the performance requirements to be met in the goal-setting literature, and researchers look at the effects of variables like goal specificity, goal difficulty, and goal acceptance on goal achievement [27]. Individuals have goal orientations, which are characterized as differences in goal preferences in attainment contexts, according to Dweck and Leggett [10], who theorized objectives at a higher level and in more subordinate classes. As such, two major classes of goal orientation were identified: (1) Learning goal orientation: a desire to grow as a person through learning new skills and mastering new situations, (2) Performance goal orientation: to seek favorable judgements and avoid negative judgments regarding one's ability to demonstrate and validate one's competence. The latter class was later developed into two separate dimensions: prove (performance) goal orientation and avoid (performance) goal orientation.

For these reasons, the focus of this study is on learning goal orientation. Badges, which represent achievement feedback in the form of milestones, might serve as a demanding goal, according to Sailer et al. [27]. Badges resemble adaptive reaction patterns seen in people with greater LGO levels. Furthermore, badges aided students with higher LGO [28], corroborating the theory that those with higher LGO are better suited to a tough profession. Individuals with a higher LGO, on the other hand, are more likely to seek and use performance feedback during the learning process to preserve or build self-efficacy [29].

2.5. Technology Acceptance Model (TAM)

For forecasting technological acceptance, one of the most extensively used models is the TAM., having been used in a number of theoretical research [30,31]. In essence, TAM contends that prior use-related perceptions influence IT adoption. Perceived usefulness (PU) and perceived ease of use (PEOU) are two such principles that IT adoption is influenced by. PU refers to a person's belief that employing a particular system will improve his or her job performance, while PEOU is the degree to which a person believes that using a certain system will be effortless [32].

PU has been found to influence IT adoption, but it has largely failed to do so when it comes to PEOU [28]. Their research demonstrates that whether PEOU has a direct impact on usage intention is determined by the task or type of intended use. Gefen and Straub's [33] findings give researchers a starting point for answering questions about the importance and role of PEOU that have been addressed in some TAM investigations (e.g., [34,35]).

Furthermore, TAM's lack of task concentration was highlighted by Dishaw and Strong [36], which as a result, in order to improve TAM's external validity, more research into the nature and specific influences of technology and usage-context elements that may influence user acceptability is required. Hence, the necessity to focus on PEOU in this research.

2.6. Learning Engagement

Students get more engaged in their learning when they use an online learning platform, because the learning materials are exclusively accessible by the students themselves in this environment [37]. Student's engagement refers to how involved students are in their educational activities, and it is associated to a variety of positive outcomes, such as excellent grades, student happiness, and perseverance [38]. Active and collaborative learning, participation in rigorous academic activities, formative dialogue with academic staff, pleasant educational experiences, and a sense of legitimacy and support are all examples of engagement [39]. Maintaining students' interest and participation is a difficult task that puts educators in a bind, and it's a concern because students' involvement weakens their achievement and performance [40].

2.7. Hypothesis Development

The model in Figure 2 intimated that learning goal would influence the learning engagement of students. Gamification is more likely to be accepted by students if they perceive it is straightforward to apply. As such, several hypotheses are proposed:

H1: Gamification perceived ease of use affects learning engagement.
H2: Gamification perceived ease of use influences learning goal orientation.
H3: Learning goal orientation impacts learning engagement.

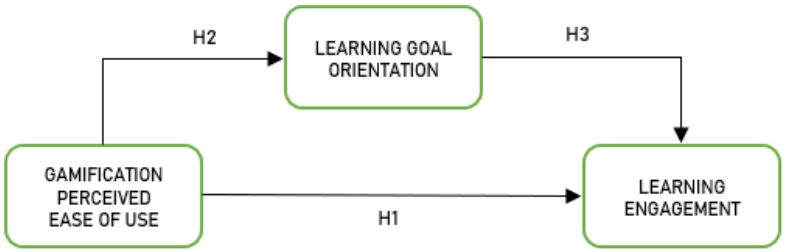

Fig.2. Proposed research model.

3. Research Methodology

In this study, the authors utilized quantitative method with primary data. This research was conducted in Jakarta in August 2021. The authors conducted the survey by utilizing an online questionnaire platform, comprising a set of survey items in Likert Scale measurement which was sent online to the respondents. The sample frame included 46 undergraduate students: 52% are male and 48% female. The majority of them were from private institutions (71%). Of all respondents, they were familiar with Kahoot! (98%), Quizizz (28%), Bamboozle (7%), Gimkit (2%), Worldwall (2%), Socrative (2%), and Flippity (2%).

This study measures the items employing a Likert scale having five points from "1" strongly disagree to "5" strongly agree. All the variables will be measured empirically using a 5-point Likert scale developed by Rahman et al. [13]. An altered version of Vandewalle's [12] 13-item measure was used to assess learning goal orientation. Since the focus of this study is on the learning goal orientation, which is one-third of the scale, four items were adapted. Example items for LGO are "I am willing to select a challenging work assignment that I can learn a lot from" and "I would rather prove my ability on a task that I can do well than try a new task." Gamification ease of use is measured by adapting Rahman et al.'s [13] study. Some of the items are "Interacting with the online gamification system does not require a lot of my mental effort" and "I find the online gamification system to be flexible to be used." Learning engagement is measured by adapting Dogan's [41] study. Example items for learning engagement are "The teachers/lecturers at my school/college are always ready to help whenever I need them" and "I always participate in class activities."

A face validation was necessary after arriving at a draft version of the scale. The judges added weight to the facial validation [42]. Face validation offers the benefit of increasing the likelihood of statistical testing approval of an instrument [43]. The face validation method began with the judge(s) (in this context, a university professor teaching a gamification course) being invited to return the questionnaire by e-mail. The goal of this stage is to determine whether the scale's elements are suitable for measuring a construct [42]. After establishing the face validation and setting the procedure, the purification of the scale begins with calculating the reliability of the model's application to a sample of

respondents using an electronic questionnaire. In the context of this investigation, the use of Structural Equation Modeling facilitated this step (SEM).

The Partial Least Square (PLS) approach was utilized in this study to estimate the associations hypothesized in the current model. When formative constructs are present in the structural model, PLS is the preferable method [44]. Convergent validity, indicator collinearity, statistical significance and relevance of the indicator weights are all factors that are considered when evaluating formative measurement models [45].

Cronbach's alpha was utilized as the criterion for determining whether the scale was reliable during the reliability test. According to Field [46], the scale should have a Cronbach's alpha of at least 0.7. The alpha value must be in the range of 0.7-0.8 or above to be considered reliable and accurate. If the value is less than 0.7, it is regarded untrustworthy. Two dependent variables (learning engagement and learning goal orientation) and two independent factors make up the current study's questionnaire (learning goal orientation and gamification perceived ease of use).

Table 1. Validity and Reliability

Constructs	Items	Loadings	Alpha	CR	AVE
Gamification Ease of Use	GEOU1	0.691	0.755	0.836	0.562
	GEOU2	0.832			
	GEOU3	0.645			
	GEOU4	0.815			
Learner's Engagement	LENG1	0.781	0.804	0.866	0.621
	LENG2	0.645			
	LENG3	0.841			
	LENG4	0.866			
Learning Goal Orientation	LGO1	0.780	0.842	0.894	0.680
	LGO2	0.878			
	LGO3	0.855			
	LGO4	0.782			

4. Results and Discussion

Cronbach's alpha and Composite Reliability (CR) scores were above 0.70 in the reliability analysis, indicating a reliable measurement instrument for this investigation (Table 1). The latent constructs' Average Variance Extracted (AVE) values, implying how much of the indicators' variance can be explained by the latent variable, were above 0.50.

Table 2. Collinearity

Constructs	Items	Outer VIF	GEOU	LENG	LGO
GEOU	GEOU1	1.239			1.000
	GEOU2	1.666			
	GEOU3	1.553			
	GEOU4	1.682			
LENG	LENG1	4.569	1.192		
	LENG2	3.872			
	LENG3	3.244			
	LENG4	2.550			
LGO	LGO1	1.985		1.192	
	LGO2	2.664			
	LGO3	2.170			
	LGO4	2.274			

The variance inflation factor (VIF) is frequently used to assess formative indicator collinearity. The level of collinearity is greater when VIF values are higher. Collinearity issues between the predictor components are indicated by VIF values of 5 or above (Hair et al., 2018). In Table 2, all the values are below 5 indicating no issues in collinearity.

Table 3. Path Analysis

Path	β	Mean	SD	t statistics	p values
GEOU → LENG	0.463	0.534	0.181	2.557	0.011
GEOU → LGO	0.401	0.463	0.160	2.514	0.012
LGO → LENG	0.617	0.563	0.189	3.267	0.001

After that, we ran a bootstrapping analysis using 5,000 subsamples and a 95% significance level to get the standard error and p value for each path coefficient (see Table 3). From the hypotheses, they show that GEOU affects LENG ($\beta = 0.463$, $t = 0.2557$). Therefore, hypothesis 1 is supported. The findings also discovered that GEOU is related to LGO ($\beta = 0.401$, $t = 2.514$). Thus, we can confirm hypothesis 2. The effect of LGO has shown a positive relationship with LENG ($\beta = 0.617$, $t = 3.267$). Therefore, hypothesis 3 is confirmed. Table 4 summarizes the findings.

Table 4. Summary of the Findings

H#	Hypothesis	Supported?
H1	Gamification ease of use affects learning engagement.	Yes
H2	Gamification ease of use affects learning goal orientation.	Yes
H3	Learning goal orientation affects learning engagement.	Yes

5. Conclusion

According to the study, students were more likely to adopt gamification if the technology was simple to use. The involvement of students in their learning activities was also shown to be better predicted by learning goal orientation, as they did not have to worry about the technology's "know how" in addition to solving the quizzes.

The study also found that students' participation may be utilized as a metric for measuring student approval of gamification. To predict student engagement, however, the constructs of learning goal orientation and learning engagement toward employing gamification technologies must be factored as a whole. As a result, in order to promote student engagement in the classroom, gamification of the educational environment must guarantee that the technology used is simple to use and appealing to students.

5.1. Theoretical Implications

The findings in current study show that gamification perceived ease of use has a significant relationship with learning engagement. The result of current study is in line with Rahman et al.'s [13] study. The result of hypothesis 2 validates several previous studies (e.g. [47]) which found that perceived ease of use has a significant relationship with learning goal orientation. Based on hypothesis 3, this study found that learning goal orientation is a part of learning engagement, and it validates a past study from Li and Tsai [48].

5.2. Managerial Implications

Students were more likely to employ gamification if the technology was simple to use, according to the findings. Learning goal orientation was also discovered to be an inferior indicator towards using gamification technology, yet students are still encouraged to concern themselves with the desire of learning new skills while attaining enjoyment in getting challenged [49,50]. Higher education institutions are recommended to provide sufficient trainings of the technology and equipment usage in order to upgrade and enhance skills and competencies of its faculty members as well as better engagement for the students.

The result suggests that gamification is more closely linked to students' views of ease of use than learning goal orientation. In the field of gamification research, these present findings are noteworthy. These findings might be utilized to establish methods for adopting effective programs that will aid in the professional growth of educators.

5.3. Limitation and Future Research

Since the present study is a preliminary attempt to understand gamification ease of use, learning goal orientation, and learning engagement, it is limited to the relationship between the three variables. Furthermore, because the study's demographic and sample are restricted to undergraduate students, the results cannot be extended to other levels of education. Furthermore, utilizing a quantitative method with a self-administered questionnaire may have reduced the ability to elicit more in-depth and meaningful information about the reasons for disposal. All of the data indicated that the primary survey may be continued with minor changes.

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