Identify Student Commitment In Creating 3D Digital Model of Gamification Learning Activities

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Abstract. This study aims to describe student commitment when developing 3D model digital learning media for gamification activities. This is important to do to get an explanation of the commitment of students who have no experience in creating digital 3D models by implementing gamification activities. These gamification activities are integrated into six weeks. The elements are designed in such a way as to motivate and plan the time for each stage in completing the product independently with the support of learning resources through the LMS. The commitment survey uses a questionnaire whose aspects are adapted from Meyer and Allen. The results shown that more students are committed to completing the product even though most have no experience. Many students choose 3D models of the Solid Model type which are relatively easy to create, while construction models are not an option for students because of the difficulty level. The average score of student commitment in the three models is the same, while the commitment score is higher for students who develop the Solid Model. Overall students tend to have affective and normative commitment. Female students are more committed than male students. The findings are discussed further in the discussion of this article.

Keywords: Commitment, 3D Digital Model, Learning Media, Gamification.

1 Introduction

1.1 Background

Graphic and visual media courses are one of the courses in the Department of Educational Technology, State University of Malang which implements a gamification strategy. This course can be taken by students in the first semester with a total of three credits. The purpose of this course is to provide knowledge and skills for students to examine how to develop learning media with three-dimensional digital character models or to attempt to express ideas, content, material to others in the form of three-dimensional animation using computer/digital technology. Graphic and visual media courses are project-based courses by producing products. The product creation project in this course begins in the middle of the first semester.

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product completion process. More students do not even have basic skills in completing three-dimensional products. His previous educational background came from high school or public school so he did not get design knowledge except for those who were self-taught.

In addition, these first-year students are students who have experienced online learning for two consecutive years due to the COVID outbreak. These students will experience a transition period from always learning activities online to offline. This change should be able to make them passionate about learning again. Therefore, learning graphic and visual media courses is carried out by implementing gamification activities. This activity is believed to be able to motivate first-year students when the subject is considered difficult or they have no experience with it [1].

There is no definition set as a standard to explain motivation [2], but motivation can be explained as a desire or encouragement that someone has to make changes in behavior. Motivation is very important to have in order to achieve goals and form a positive attitude for each individual [3]. Commitment is a motivation that comes from within a person. The commitment referred to here is when an individual has a high will, the individual will feel more responsible for his decision. Therefore, adaptation or acceptance of organizational goals and values is necessary so that someone can survive in an organization. This is in line with the opinion of Meyer and Allen, namely work as a collection of tasks and responsibilities will require individuals who have the skills and abilities to adapt to the demands of the situation [4]. In gamification activities in the Graphic and Visual Media course, students are given responsibility for making decisions in managing performance based on an agreement that each student has agreed with the lecturer for the Graphic and Visual Media course.

Based on the background that has been presented, it is important to know the commitment of students when doing gamification activities in order to achieve learning objectives in the Graphic and Visual Media course. This is also important to do considering the characteristics of students as research subjects are students in the transition period and the diversity of their previous education. Besides that, there is no research that discusses student commitment in gamification activities to develop 3D digital model products. The purpose of this study was to describe the commitment of students to develop 3D digital model learning media products through gamification activities in graphic and visual media courses.

1.2 Literature Review

Commitment Theory. Commitment is a person's desire or willingness to stay in membership, identification with goals, loyalty of a member, and willingness to exert considerable effort to achieve organizational goals [5]. Commitment reflects an individual's willingness to work towards and accept organizational goals. Organizational commitment has been identified as a guideline for forms of

satisfaction, organizational member behavior, absenteeism and turnover, performance within the organization, perceived organizational support, productivity, job alternatives, and investment and obligations [6]. In Porter et al. argues that commitment consists of belief in and acceptance of organizational goals and values, willingness to

exert effort towards achieving organizational goals, and a strong desire to maintain organizational membership [7]. Commitment is a core description of a person's attitude towards an organization and is a strong indicator of a tendency to withdraw, and one's voluntary behavior in an organization [8]. According to Mercurio [9], commitment can be interpreted as an individual's psychological state of an organization which is a consequence of the individual's actions. Someone who is committed will put more effort into achieving tasks and targets, spend more time in the organization, have a more positive relationship with the organization [10]. Meyer and Allen identified three components of commitment namely, affective commitment, continuance commitment and normative commitment [11]. Affective commitment refers to a person's emotional attachment to and involvement in the organization. Someone who has a strong affective commitment will stay in an organization because of his will. It is the belief that acceptance of the goals and values of the organization, the willingness to exert effort within an organization to achieve its goals and the intention to remain in organizational membership. Continuing commitment refers to awareness of the future needs of the individual when leaving the organization. Someone who has a need in an organization is based on an ongoing commitment because they need to do it. Continuing commitment means that the individual feels that he will face a loss when he leaves the organization. Meanwhile, normative commitment reflects a feeling of obligation to perform a task or job. Someone with high normative commitment will feel compelled to remain with the organization because of a feeling of responsibility within the organization [4].

Gamification Theory. According to Deterding et. al [12], Gamification is the integration of game elements and game thinking in non-game activities. Characteristics of games in learning activities with gamification strategies, namely the presence of challenges. It can be striking and captivating to the user, playful learning is especially concerned with the psychology of the game, and these motivational strategies can be adopted with or without the help of technology [13]. This is in accordance with the opinion of Deterding in [14] that the purpose of gamification is to foster activity, increase motivation, and increase user memory. Gamification seeks to empower users by introducing choices, creating opportunities, and encouraging critical and creative thinking, and they do so primarily through the integration of game mechanics [15]. Gamification in the learning context is the design process of adding game elements to change the existing learning process [16]. Game characteristics according to [17] are goals, rules, players, equipment, directions, constraints, penalties, choices. Goals are goals or results that must be achieved by players. Rules are rules that must be followed by players. Players are players in a game. Equipment is a device used to help players in a game. Directions are directions or instructions for players to understand the flow of the game. Constraints are obstacles that must be passed by players in the game. When a player commits a fraud or violation, the player will receive a penalty or what is known as a penalty. Players will be given a choice of difficulty level before playing or also called Choices. From these characteristics at least use five characteristics to meet the criteria of a game [1]. The main thing to encourage gamification in education is its stimulating elements, such as direct feedback, feelings of achievement, challenge and defeat [18]. In practice, gamification has several distinctive features that play a key role in gamification for learning approaches in order to motivate users [19]. The features in question are levels, badges or badges, rewards, points, leaderboards, and narratives.

Point is the value that students get after passing a challenge. Level is the level of difficulty in the form of product performance and accuracy. Reward is an award for students who complete assignments in accordance with the provisions. Students who successfully complete the challenge will get a badge as a sign of achievement status. Status and at least the number of points earned by students will be listed on the leaderboard. This will certainly motivate students to compete in learning. While narration is an element that underlies a game, namely with a narration, students' emotions will be directed.

2 Method

This research uses a descriptive quantitative method. This method seeks to explain the data obtained through surveys. The survey was conducted when students were in the process of completing their products. Students are free to determine the type of 3D digital model learning media product. These product types are solid models, cross-section models, working models or construction models.

Data were obtained using a questionnaire which was developed based on the three dimensions of commitment from Meyer and Allen. The dimensions of this commitment are affective, normative and continuation using a Likert scale. indicators of affective commitment are the desire to become members of the lecture, feeling involved in achieving the goals of the lecture, emotional connection with the course, being proud of the course to others. Indicators of normative commitment include feeling guilty about leaving lectures, staying in lectures is an obligation, having a sense of responsibility towards lectures. Indicators of continuation commitment, namely hoping to get benefits if you persist, remaining in lectures is a necessity and finally considering leaving lectures. The developed questionnaire contains 20 favorable and unfavorable statements.

The subjects in this study were students from the Department of Educational Technology Class of 2022, State University of Malang, who were taking the Graphic and Visual Media course. The number of students who gave responses was 122 consisting of 41 men and 81 girls. There were three classes for students to get the course.

3 Result and Discussion

The results of the data obtained in this study were processed and presented in tables according to descriptive statistical techniques. The data presented is a general explanation of the data obtained during the survey.

Based on the results of the descriptive analysis presented in table 1, that the maximum score is 100, the minimum is 67 with a range of 33. The mean score of students in responding to the questionnaire is 80.8197 with a standard deviation of 5.82, a median value of 80 and the score that occurs most frequently is 78 (13 students).

Table 1. Descriptive analysist result

Mean	Median	Mode	SD	Variance	Range	Maximum	Minimum
80.82	80.00	78.00	5.82	33.91	33.0	100	67.00

The average student commitment is above the hypothetical mean or median value of 60, although there is one student who gets a minimum score of 67. There is only one student who achieves a maximum commitment score of 100. This can mean that all students are committed to completing their products. This finding is consistent with previous research that gamification activities can increase participant motivation through the use of game mechanisms and affect increased student participation, commitment, and loyalty which can result in more proactive participants [20].

Table 2. Commitment categorization results

Category	Frequency	Percent
High	68	54,4
Low	54	44,3

Table 2 shows that students who are committed in the low category are 44.3% and in the high category are 54.4%. These results indicate that more students have high commitment than low commitment in taking graphic and visual media courses. The level of student commitment to this graphic and visual media course is calculated based on the median results of the questionnaire. The low category is seen from a value that is less than 80 and the high category is seen from a value that is more than equal to 80.

Students with low commitment feel that they are not emotionally connected to the course, which is an indicator of affective commitment. Some students feel normal when the completion of each step of developing their product exceeds the deadline but is still completed, thereby reducing the level of commitment. The results of this presentation are supported by several students who agree with the statement "I think I am not as easily attached to other subjects as I am bound with this course" and some students who disagree with the statement "I feel if I cannot understand the Media course Graphics and Visuals there will be some course objectives that are not achieved. This is in line with research proving that low commitment indicates an inability to articulate goals and a lack of member commitment. A study proposed by Lencioni [21] identified lack of commitment as one of the important reasons for failure. Students with low commitment also choose to agree to the statement "When I feel difficulty I think it's okay to finish a 3D product beyond the deadline, because the most important thing for me is to finish working on it even though the results are mediocre" this shows that they are following the course to abort the obligation not achieve learning goals. In addition, teams that show low commitment show a lack of a sense of cooperation with colleagues. On the other hand, in the research of Salleh, Nair and Harun [22] which states that at a moderate level of commitment, individuals also have a high intention to leave class on the grounds that they are not satisfied with the rewards received. Based on this, the gamification strategy is implemented by using game elements to increase commitment and motivation and influence student behavior [23].

Whereas in the high commitment category individuals feel more able to accept lecture goals as evidenced by more students who strongly agree with the statement "As

a course participant I feel involved in achieving lecture goals" and feel compelled to understand the course and complete project assignments that are their needs . Research by Thomas and Magana [24] says that what makes high commitment is understanding effective goals, encouraging collaboration, providing feedback, focusing on communication and quality of work, and room for improvement. This statement is in accordance with the gamification activity applied to graphic and visual media courses, namely the existence of an assistance system that will trigger commitment and motivation. Research Katzenbach and Smith [25] proposes that commitment can only be achieved when goals are well defined. The approach with games leads to higher levels of user commitment and motivation towards the activities and processes in which they are involved [26]. On the other hand, among students with high commitment, they feel more responsible for completing their 3D product according to the agreed contract. This is supported by several students who chose to strongly agree and agree on the statement "I feel I have to complete my Graphic and Visual Media project assignments according to the deadlines in the contract that I made." Another finding from this study is that there is no aspect of commitment that stands out in the commitment category. low. Meanwhile, in the high commitment category, students tend to be normative commitment. However, when viewed from the whole students tend towards affective commitment and normative commitment. This finding is different from the research of Mahembe and Engelbrecht
[27] who argue that individuals who show low commitment show normative commitment, which means they perceive work or assignments as requirements or obligations. Conversely, individuals who show high commitment show affective commitment, which means that individuals are intrinsically and emotionally attached to the course class.

Table 3. Commitment analysis by gender

Gender	N	Mean	SD
Male	41	79.70	5,46
Female	81	81.38	5,95

The results of the analysis of student commitment based on gender are presented in table 3. The mean score of male commitment (41 students) was 79.70 with a standard deviation of 5.46. Meanwhile, female students (81 students) had an average commitment score of 81.3827 with a standard deviation of 5.95. Based on this, the commitment of male students is lower than that of female students.
Research Toda et. al [28] said, the application of gamification in educational scenarios from the perspective of the user's gender. For the female sample, the most interestingelements were related to levels, badges and information. While the most interesting rules for the male sample were related to level, renovation, and choice. The graphic and visual media course also applies gamification elements including levels, badges, rules, rewards, and points. The gamification elements applied to this course are suitable for both men and women. However, the elements used are more likely to attract women. So that the average commitment of female students is slightly greater than that of male students. Other studies also reveal that if psychological needs can be met, students will become intrinsically motivated [29]. Therefore, even though women's commitment is slightly higher than men's, this does not determine that men's

commitment is lower because a person's commitment is influenced by psychological factors.

Table 4. Commitment analysis by class

Class	N	Mean	Median	Variance	Max	Min	SD
A	42	81.47	82	21.71	92	71	4.66
B	38	80.97	79.5	38.67	96	70	6.22
C	42	80.02	79.5	42.31	100	67	6.5

Table 4 presents the results of student commitment scores by class. From these data it can be seen that class A has the highest average or mean value of 81.4762, then class B with a mean of 80.9737, and lastly class C with a mean of 80.0238. The median or median value in class A is 82, while the median for class B and class C has the same value, namely 79.5. The maximum and minimum values for the three offerings are different. The maximum value of A is 92 and the minimum value is 71, for class B the maximum value is 96 and the minimum value is 70, while C has a maximum value of 100 and a minimum value of 67.

However, the average commitment score of the three offerings is not much different. This means that the three offerings share the same commitment in participating in graphic and visual media courses with gamification activities. Gamification in the classroom contributes to increasing student commitment to succeed in solving challenges [30]. The classroom is of course a battlefield where colleagues cooperate and compete with other individuals. Sanchez, Young and Jouneau-Sion's research [31] also revealed that this idea can foster student commitment. Students will decide to do their work or they will be behind others in points. Therefore, the point elements in gamification can encourage student commitment in completing three-dimensional products.

Table 5. Commitment analysis by model type

Class	N	Mean	Median	Max	Min	SD
SM	62	80.87	80	100	70	5.96
CSM	58	80.72	80	92	67	5.81
WM	2	82	82	82	82	0

The results of the analysis of student commitment are based on the type of model chosen by students in table 5. There are 4 models in making three-dimensional products, namely Solid Model (SM), Cross Section Model (CSM), Working Model (WM), and Construction Model (CM). From these data it can be seen that students who chose to make products with a solid model were 62 and had a mean or average commitment of 80.87. There were 58 students who chose to make products with a cross sectional model with an average commitment of 80.72. There were 2 students who chose the working model with an average commitment of 82. As for the construction model, no students chose to make products with that model. For students who choose the solid model, the median value is 80, the maximum value is 100, and the value is 70. Students who choose the cross-sectional model have a median value of 80, the maximum value is 92, and the

minimum value is 67. Students who choose the working model have the median value, the maximum , and the same minimum is 82.
These results indicate that SM and CSM have more enthusiasts than WM and CM. This is because students already know that making Working Models and Construction Models has a higher level of complexity than Solid Models and Cross Section Models. However, the results of the average score of the three selected models are not significantly different. Individuals who already know the goals and consequences of making decisions will be able to manage their commitments. the research findings of Vogel and Vogel [32] which state that academic success is the result of how students manage their academic commitments which ultimately affect student investment and involvement, students must have goals that are in accordance with their decisions in the academic realm. In this case, the formation of an optimal cooperative work environment with the application of gamification strategies and high student commitment to achieving learning goals is very relevant [33].

4 Conclusion

Students who have a high commitment to graphic and visual media courses will certainly have aligned goals, namely wanting to learn about making three-dimensional products for learning activities. In general, students are still committed to completing products with gamification activities and more than half of students are highly committed. However, there is no aspect of commitment that stands out in students with low commitment. Meanwhile, students with high commitment tend to be normative commitment. However, when viewed from the whole students tend towards affective commitment and normative commitment.

Furthermore, the results of commitments based on gender, class, or type of digital 3D model product did not differ significantly. But women are superior in commitment than men. The commitment of each class even though there are those who are superior but reveal that the application of gamification can trigger an individual's unwillingness to be left behind so as to increase student motivation. Meanwhile, based on the level of difficulty of product development, it proves that individuals already know their goals and their ability to make products so that they have almost the same commitment. Further research was conducted to examine the effect of commitment on the implementation of a gamification strategy.

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