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Integrating Gamification in a Blended Learning Entrepreneurship Course: Discussing Student Learning and Achievement Motivation

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Design/Method: This study examines the acquisition of student learning outcomes using gamification. Therefore, the quasi-experimental design was chosen because it was appropriate to examine the effect of treatment of independent variable on the dependent variable. Suharjono (2000) explains that experimental research has three main characteristics. First, the existence of manipulated independent variables. Second control of all other variables. Third, there are observations and measurements of the dependent variable as a result of independent variable manipulation actions.
Findings: (1) There is a significant difference in entrepreneurship course material understanding between groups of students utilizing gamification learning strategies compared to groups of students utilizing project-based learning strategies. (2) There is a significant difference in entrepreneurship course material understanding between groups of students possessing high achievement motivation and students possessing low achievement motivation. (3) There is an effect of interaction between gamification learning strategies and project-based learning strategies with high and low achievement motivation on entrepreneurship course material understanding.
Originality: This study is one of the few studies that developed a gamification strategy, especially in Entrepreneurship courses for fifth-semester students of Indonesian Language and Literature Education Study Program, FKIP Unisda, Lamongan. The Gamification Strategy developed has four basic game components, namely gamification rules, feedback (leaderboards, prizes, and medals), goals, and challenges.
Keywords: Integrating Gamification, Blended Learning, Entrepreneurship, learning motivation.

1. Introduction

Learning is an active human process to obtain knowledge, experience, and changes in individual behavior caused by experience. This phenomenon occurs in students as well. This process requires good achievement motivation to start and pursue. A student's achievement motivation is different compared to their respective motivation during elementary and secondary school level. This is influenced by age and self-direction elements.

According to Mariani, the quality of learning that can be interpreted as the competence of systemic and synergic linkages between teachers, students, learning, and learning media in producing optimal learning processes and outcomes in accordance with curricular assistance (Haryati & Rochman). According to Daryanto, about the quality of learning is a high level of learning, in which there is senior learning, in that goal is an increase in knowledge, skills and development of student motivation through the learning process in class.

The purpose of the study design is to improve the learning quality. Improving the learning quality is conducted by choosing, establishing, and

developing optimal learning methods to achieve the desired results (Degeng, 1991). Learning process would not run well when a student merely conducts passive activities, such as reading and watching. This process requires a student to be actively communicating with their colleagues, facilitators, and other learning resources. When active communication has occurred, learning objectives will be achieved. This is because active communication is an important factor required by the learning approach to achieving learning goals (Rollings dan Adams, 2003).

Current phenomenon exhibits community in the productive age (between 17-40 years old) are dependent on games. The growth of game users in Indonesia reaches 30% per year. This encourages practitioners and developers endeavor to study game elements. In the scientific field, the application of game elements to non-game applications is known as gamification. In the learning process, gamification can be applied as a strategy and or media to improve the learning quality and provide achievement motivation. Achievement motivation that follows the learning process will have an impact on student learning outcomes (Li et al, 2012).

Based on preliminary studies in the field, the average grade 5th semester class A students in *Universitas Darul Ulum Lamongan* (Darul Ulum University Lamongan) 2016/2017 academic year for Entrepreneurship courses is sixty. This indicates that 5th semester students in class A *Universitas Darul Ulum Lamongan* in the 2016/2017 academic year do not possess high achievement motivation.

According to entrepreneur teachers, only 7.4% of all students were actively taking part in the lesson. As for the rest, 92.59% of all students remained silent and passive without any desire to interact with the lecturer. Low student learning outcomes is potentially caused by weak thought process and understanding concepts capability. This may affect the student's skills in solving life problems in the future. When one possess problem-solving skills, in addition to solving similar problems, one can also solve different problems in everyday life (Gagne, 1985; Gagne, Briggs, & Wager, 1992; Bransford, Sherwood, and Reiser, 1986).

Problem-solving skills are categorized as higher order thinking skills. In order to obtain problem-solving skills, one needs to first master other basic skills, such as thinking, collaboration, and communication (Gagne, 1985). Learning process research using gamification has been carried out by several experts. First, Glover (2012) and Chang (2009) stated that student achievement motivation is often a problem in learning, especially when students cannot understand learning objectives. Despite being new concepts originating from the web development industry, gamification is able to make the learning process more active and participatory. Based on research conducted by Glover (2012), Kim (2013), Volinsky et. al. (2016) gamification has three core or basic parts: (a) learning objectives, (b) reward mechanisms, and (c) tracking progress.

Second, Laskowski & Badurowicz (2014), Urha, Marko & Vukonic, Goran (2005), Groh (2012) stated that gamification has been applied in higher education in social courses. Providing a gamification strategy with game media obtained very positive results. Students have high achievement motivation in the learning process with a record of conducting a thorough evaluation and getting policy support during learning process implementation. Students possessing

gamification achievement motivation had a different positive impact. Therefore, gamification can be used as the main strategy in learning.

Third, Landsell, J & Hagglund (2016), Muntean (2011) stated that gamification refers to the application of game dynamics, mechanics, and frameworks in non-game settings. Many lecturers have carried out gamification with the acquisition of various success rates. They have utilized the dynamics of the game effectively to increase achievement motivation and student learning outcomes in the classroom. Fourth, Kapp (2014) stated that gamification has some content, such as the application of game elements, game mechanism, and game thought process. It is conducted to change content and make it similar to the game. Instead of creating a new game, however, but rather add elements and concepts from games to learning process instruction. Kapp (2014) also stated that the contents of gamification content are stories of challenges, curiosity, character, interactivity, feedback, reward, and punishment.

Fifth, Normandale & College Community (2013), Prambayun (2015), Sitorus (2016) stated that the purpose of his research was to provide solutions to learning by designing gamification. The Gamification was designed with a pattern of identifying the character of students as players, building game mechanics, building student engagement, and applying gamification elements. Sixth, aimed to describe and compare the application of gamification applied in Entrepreneurship, Financial Management, and Quantitative Methods at Telkom University. The relationship between the three subjects is illustrated by considering the 8 criteria contained in Octalysis: the Complete Gamification Framework. After being described, an analysis of Octalysis was carried out. The results of the analysis led to the comparison of the two research objects.

Seventh, Deterding et al. (2011), Olsson & Mozelius (2015) states that the use of gamification was first documented from the term 'Gamification' in 2008, precisely in the digital media sector. Since the documentation, the term 'Gamification' has been used in many different domains as a broader and more familiar concept. Based on the seven gamification studies, it can be concluded that the right gamification is further researched at the tertiary level with a different focus, such as the influence of achievement motivation on the problem-solving learning outcomes.

Gamification that will be used in learning in universities has several elements and steps: points, badges, levels, challenges, virtual goods, and leaderboards (Zichermann & Cunning-ham, 2011). First, the points intended in the gamification are values collected by users and can be used as status indicators to open access to certain content and buy virtual goods or gift (Bunchball, 2010; Educause, 2011). Second, the badge or trophy will follow the acquisition of points that appear as icons or logos on the web page. The icon exhibits student achievement in certain activities, such as completing a project.

Third, the level of gamification serves as mastery levels indicators of certain tasks. Challenges at each level will motivate students to complete the mission by paying attention to the target focus. Fourth, virtual goods refer to non-physical gifts or intangible objects — some virtual goods can be sold for real dollars — and used in online communities or online games. Fifth, the leaderboard is a score table that exhibits a comparison of student performance with one another.

This study is one of the few studies that developed a gamification strategy, especially in Entrepreneurship courses for fifth-semester students of Indonesian Language and Literature Education Study Program, FKIP Unisda, Lamongan. The Gamification Strategy developed has four basic game components, namely gamification rules, feedback (leaderboards, prizes, and medals), goals, and challenges. The gamification strategy is expected to (1) provide choices and control to students, (2) foster confidence in their ability to face and resolve challenges, (3) provide material and key answers, (4) reward for extra lessons taken, and (5) helping students establish social interactions through leadership activities or other social interactions.

In addition to the five points outlined above, this research is also expected to present a number of benefits, such as being input for lecturers to develop learning strategies and help smooth students in lectures while paying attention to the concepts developed by the university.

Based on the background description above, this study aims to (1) test the comparison of learning outcomes between students utilizing gamification and students utilizing project-based learning, (2) assess the comparison of learning outcomes between students possessing high achievement motivation and low achievement motivation, and (3) examine the interaction between gamification, project-based learning and achievement motivation on student learning outcomes.

The results of this study are expected to be used as a basis for further research and can develop the ability to conduct research, especially education-related research. As an input for higher education institutions, it is expcted that the institutions is be able to improve the learning experience in an endeavor to empower students' problem-solving thinking skills. It would have a direct impact on improving student learning outcomes and can provide an interesting learning atmosphere. Therefore students are more enthusiastic in attending lectures. The results of this study can be used as input to improve student learning quality through the implementation of various strategies and learning approaches capable to empower students and lecturers and provide learning resources with varied learning experiences for students.

The findings of this study are expected to strengthen theories and principles in developing knowledge in education technology, which can produce alternative strategies for delivering effective learning in improving the learning quality and student learning outcomes as an effort to achieve optimal learning goals by developing learning strategies. The results of this study are expected to be taken into consideration in advanced research related to other research variables and can provide input in the application of relevant learning strategies for research development at all levels of education, especially in education technology field.

To avoid a variety of interpretations of the terms used in this paper, it is deemed necessary to provide an understanding of each of the terms used. (1) Gamification. Gamification is a learning strategy that applies game elements to non-game applications with the aim of binding and motivating students to solve a problem. (2) Achievement Motivation. Achievement motivation is an effort to achieve success through competition by measuring the superiority or achievements of others and their own achievements. (3) Learning Outcomes. Learning outcomes are a description of the level of learning mastery measured by

the number of scores from test questions that are prepared with the basic competencies possessing been set beforehand. In this study, indicators of learning outcomes are numerical scores or post-test results scores.

2. Literature Review

2.1. Effect of Gamification and Achievement Motivation on Student Learning Outcomes.

Learning strategy is a plan that contains a series of activities designed to achieve educational goals. Furthermore, Degeng (2013) asserts that learning strategies are regarded as structuring ways that can be used in certain conditions for desired learning outcomes, therefore a procedural step can be used to achieve desired learning outcomes.

The interaction of gamification and achievement motivation can influence student learning outcomes. This strategy can overcome students' anxiety or fear of learning. A gathered students could overcome it. With a variety of anxiety and fear, students can build a sense of unity to do one task together. (Kapp, 2014). Anxiety and fear can be controlled, therefore student motivation to excel can also be raised. Hence increasing student learning outcomes. Learning strategies with gamification exhibit better learning outcomes compared to project-based learning strategies. Organizing content in gamification can provide improved learning outcomes because it contains a set of principles that are systematically integrated and aims to explain the content of learning to improve student progress in the learning process.

Based on the results of previous studies, gamification can improve students' ability and achievement motivation in obtaining learning outcomes. It can be assumed that gamification can have a better impact and influence on the acquisition of problem-solving learning outcomes.

The relationship concept between variables is illustrated in the following chart:

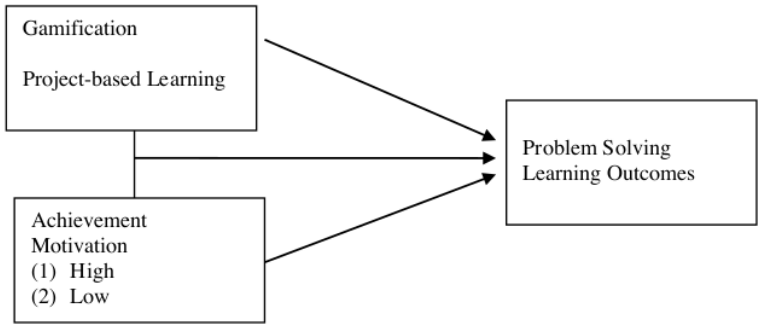

Figure 1. Relations between Research Variables Concept Chart

Based on the above concept, research hypothesis is described as follows: (H1) There are differences in student learning outcomes using gamification and project-based learning. (H2) There are differences in learning outcomes between students possessing high achievement motivation and low achievement motivation. (H3) There is an interaction between gamification, project-based

learning, and achievement motivation on student learning outcomes.

2.2. Characteristics of the Teaching and Education Faculty Unisda Lamongan Faculty Students

FKIP UNISDA students came different education background. Nevertheless, they generally came from similar education level such as high school, vocational school, MA. They took different majors, such as language, science and social studies. Comparison of their numbers is similar, but their academic abilities vary. In general, they possess medium ability. In terms of achievement motivation and learning independence requires improvement. This is based on direct field observations and interviews with the teaching team of Entrepreneurship courses.

Based on direct observation and the results of interviews with the teaching team, Entrepreneurship courses do not have learning media as a guide in the learning process. Students record the material delivered by the lecturer with a little practice. The lectures do not encourage active and efficient student learning, therefore the learning process becomes less effective and efficient. This was also confirmed by Heny Ekawati `Hariono, M.Pd. (In the interview on October 1, 2016), as one of the lecturers who taught Entrepreneurship subjects. Students generally possess minimal knowledge on entrepreneurship and there is lack of relevant learning media. Therefore, the learning process was less effective and more tedious in the classroom.

Analyzing the characteristics of students according to Degeng (1997) is determining the individual student characteristics in the form of talent, thought process maturity, and initial ability level. Based on the analysis, the correct approach can be chosen and designed. Suparman (1997) also states the importance of determining the student behavior and initial characteristics, because it will have implications for the preparation of teaching materials and instructional systems. He further stated that there were two approaches that could be chosen. First, the student adjusts to the subject and the second approach is the opposite, the subject is adjusted to the student.

2.3. Characteristics of Entrepreneurship Courses

The Faculty of Teacher Training and Education UNISDA Lamongan has a noble vision, mission, and purpose. The vision of FKIP UNISDA Lamongan is the realization of improving the quality of education and the quality of the Faculty which leads to the improvement of the quality of graduates absorbed by the job market. The mission of FKIP UNISDA is to develop knowledge regarding education and learning, develop learning resources, improve human resources both lecturers and students, and develop cooperation with institutions or individuals outside UNISDA. While the aim is to produce educators and education personnel possessing special expertise in education (*Universitas Darul Ulum Lamongan* Study Guidelines, 2009).

Entrepreneurship subjects are subjects that fall into the general basic subject group at the Teaching and Education Faculty, *Universitas Darul Ulum Lamongan*. This course is usually programmed in the 5th semester with 2-semester credit unit weight (SKS) and semester hours. This course is a

compulsory subject for Teaching and Education Faculty Faculty students (*Universitas Darul Ulum Lamongan* Study Guidelines, 2005).

Based on the explanation above, this course provides understanding and appreciation to students about entrepreneurship which is increasingly important to face the era of globalization. Globalization era features tight competition. Some are able to survive and even succeed and the less successful are eliminated. To face the challenge there is no other choice but to improve the quality of the resources, especially human resources. Understanding and appreciation of entrepreneurship include the role of entrepreneurial mental attitude for self and institution progress which has the core of entrepreneurial spirit and mental attitude through the introduction of entrepreneurial characteristics, fostering entrepreneurial interests and tips of successful entrepreneurs. Making a business plan will provide students with the provision to make business plans.

The following is the material and sub-material that will be used in the gamification strategy for Entrepreneurship courses at Darul Ulum Lamongan Islamic University

Table 1. Entrepreneurship Course Material

Material	Sub Material
Entrepreneurship Understanding	- Entrepreneurship Definition - Entrepreneur - Reason to become an entrepreneur - Time management - Entrepreneurship Methodology
Financial	- Time Value of Money - Incoming value of the annuity - The current value of an annuity - Capital recovery - Effective nominal interest
Entrepreneur behavior and profile	- Entrepreneur behavior and profile - Entrepreneur attitude - Entrepreneurship weakness in Indonesia
Creative idea and innovation	- Idea source and principle
Business Profile	- New entrepreneurship - Business variety
Marketing Planning	- Marketing concept - Customer oriented - Marketing strategy - Constructing a marketing plan
SMEs and budding entrepreneurs	- SMEs and budding entrepreneurs - SME financial system - SME human resource
Entrepreneurship ethics	- Ethic definition - Company culture

3. Research method

This study examines the acquisition of student learning outcomes using gamification. Therefore, the quasi-experimental design was chosen because it was appropriate to examine the effect of treatment of independent variable on the dependent variable. Suharjono (2000) explains that experimental research has three main characteristics. First, the existence of manipulated independent variables. Second control of all other variables. Third, there are observations and measurements of the dependent variable as a result of independent variable manipulation actions.

In this study, the subject selection and sorting involved in the experimental group and the control group were not randomly conducted, but using the existing classes. This is in accordance with Ardhana (1987) and Setyosari (2013) that in educational research the appointment of random subjects cannot be done. However, under these conditions, it is still possible to conduct experiments possessing adequate internal and external validity.

The design of this study was included in a quasi-experimental study. This study used an unequal control group design or nonequivalent pretest-control group design (Tuckman and Harper, 2012). The design used was based on the consideration that determining the experimental group and control group cannot be done randomly or randomly per individual but is based on existing classes using intact groups. The design pattern in this study is tabulated as follows:

Table 2. Research Design

Moderator variable **Achievement motivation (Z)**	**Learning Strategy (X)**	
	Gamification (1)	**Project-based Learning (2)**
High Achievement Motivation (1)	X_1Y_1	X_2Y_1
Low Achievement Motivation (2)	X_1Y_2	X_2Y_2

Description:

X_1Y_1 : students possessing high achievement motivation in the class using gamification (experimental group)

X_2Y_1 : students possessing high achievement motivation in the class using project-based learning (control group)

X_1Y_2 : students possessing low achievement motivation in the class using gamification (experimental group)

X_2Y_2 : students possessing low achievement motivation in the class using project-based learning (control group)

Based on Table 2. Above, this study will provide treatment in learning through two dimensions, learning, and gamification. Dimensions of achievement motivation include high achievement motivation and low achievement motivation. Thus, there are four groups: (1) groups of students taught with gamification possessing high achievement motivation, (2) groups of students taught with project-based learning possessing high achievement motivation, (3) groups of students taught with gamification possessing low achievement motivation, and (4) groups of students taught with project-based learning possessing low achievement motivation.

In this study, the two groups of students attended entrepreneurship courses with the same content, purpose, and learning time. Each group conducts learning in similar space, environmental conditions, and lecturers. The first group as the treatment group carried out the learning process using gamification, while the second group or control group carried out learning using project-based learning.

To obtain a clearer and more directed answer to the existing statistical hypothesis, it is necessary to explain in advance the variables that are the focus of this research. This study consists of three variables. The following is an explanation of each of these variables. (1) The independent variable in this study is gamification and project-based learning in the entrepreneurship subject. (2) The moderator variable in this study is student achievement motivation. (3) The dependent variable in this study is student learning outcomes.

In addition to the three variables mentioned above, there are also other variables that are not manipulated. These variables are thought to influence the internal health of this experiment and are kept constant. The variables identified are lecturers, experiment time, and measuring instruments used in the study. In practice, this study uses the same person and the time of the experiment, namely the minutes of each face-to-face meeting. Experimental activities are also carried out with the same test instrument.

A factorial design is defined as a research structure, in which two independent or confronted variables are used to assess their effects independently and interactively on a dependent variable (Kerlinger and Lee, 2000). Factorial design divides groups based on the number of variance types and types of groups studied. Furthermore, the research procedure carried out on the research subject can be seen in the following diagram.

K_1: O_1 X_1 O_2

K_2: O_3 X_2 O_4

Figure 2. Research Procedure: Diagram version of nonequivalent control group design (Adaptation of Tuckman and Harper, 2012)

Description

K_1 = Experimental group

K_2 = control group

O_1 = initial test/pre-test
O_3 = initial test/pre-test
O_2 = final test / post-test
O_4 = final test / post-test
X_1 = experimental group treatment (gamification)
X_2 = control group treatment (project-based learning)
--------- = whole group

This research was conducted on students of the Indonesian Language and Literature Education study program who take Entrepreneurship courses. Research subjects taken were 70 students. The seventy students came from 2 different classes, class A (35 students) as an experimental group and class B (35 students) as a control group.

Before learning activities begin, all students involved in the research are given achievement motivation. Based on the results of the initial achievement motivation test, students were further grouped into two groups namely the experimental group and the control group, each of which had high achievement motivation and low achievement motivation.

Table 3. Research Subjects

Gamification Usage	Achievement Motivation	Total Students	Total
Using Gamification	High	13; 22	35
	Low		
Not Using Gamification (Project-based)	High	10; 25	35
	Low		
Total Research Subject			70

Based on Table 3. above, obtained samples of each study were two classes containing 35 students each. Therefore the total sample of the study was 70 students. Factors to be studied are students who are taught using gamification and who do not use gamification (project-based) and have achievement motivation (high or low) on learning outcomes.

In accordance with the research design (factorial design 2×2), there are at least two groups of subjects involved in this experiment. One group learning is done using gamification and other group learning used project-based learning.

The research instrument is a means to obtain data that is an indicator of each variable in the study. In this study, the instrument used by researchers was an evaluation of learning outcomes and learning motivation. Each type of instrument was assessed using the validity test and reliability test.

The research instrument used in research to obtain the data needed. In this study, researchers used 2 types of instruments, namely: 1) an instrument to measure achievement motivation which is a moderator variable in the study; 2)

instruments for measuring learning outcomes which are dependent variables in the study. As for data analysis to test the research hypothesis using statistical techniques two way ANOVA (Analysis of Variance)

4. Finding and Discussion

4.1. Description of Achievement Motivation Data

This research was carried out in two groups, namely the subjects of Class A and Class B students in the Faculty of Teacher Training and Education *Universitas Darul Ulum Lamongan* in 4th semester 2016/2017 academic year. The number of students involved in this study was 70 people, consisting of 35 students in the class using gamification (experimental group), and 35 students in the class using project-based learning (control group). All students were given an achievement motivation questionnaire to identify the achievement motivation of students who were classified as low and high. The results of the identification of the ability of student achievement motivation are presented in Table 4. below:

Table 4. Student Achievement Motivation Identification Result

Student Achievement Motivation	Project Based Learning Group (Control Group)	Gamification Group (Experiment Group)	Total
Low	14	15	29
High	21	20	41
Total	35	35	70

Table 4 exhibited that the students in two classes generally possess high achievement motivation. In the project-based learning group (control group) there were 14 students with low achievement motivation abilities and 21 students with high achievement motivation abilities. Whereas in the gamification group (experimental group) there were 15 students with low achievement motivation abilities and 20 people with high achievement motivation abilities. There was an insignificant difference between the group (the control group and the experimental group) as much as 1-2 students.

4.2. Description of Pretest Results on Entrepreneurship Lecture Material

The results of the entrepreneurship lecture materials pretest between groups of students using gamification learning strategies and groups of students using project-based learning strategy. High and low achievement motivation abilities were recapitulated to obtain an overview of the initial conditions of the research subjects. The result is presented in Table 5 below.

Table 5. Entrepreneurship Lecture Material Understanding Pretest Result

Achievement Motivation	Control Group (Project Based)		Experiment Group (Gamification)	
	Average	Std. dev.	Average	Std. dev.

Low	59.11	8.00	60.33	7.19
High	60.60	11.04	60.13	10.05

Referring to Table 5, it indicates that in the control class or in the group of students using project-based learning strategies, the average score for entrepreneurship course material understanding with low achievement motivation abilities reaches 59.11, with a standard deviation 8.0. While for students possessing high achievement motivation, entrepreneurship course material understanding reaches 60.60, with a standard deviation of 11.04. The group of students in the experimental class or in the group of students who learned to use Gamification learning strategies, students with low achievement motivation ability obtained 60.33, with a standard deviation of 7.19. While for students possessing high achievement motivation obtained 60.13, with a standard deviation of 10.05.

Based on the overall results of the pretest, it did not exhibit a clear difference on entrepreneurship course material understanding between students possessing high and low achievement motivation abilities, both in the experimental class and in the control class. This also provides an illustration, that the initial ability of research subjects is not significantly different.

The initial ability of research subjects based on pretest results above was then analyzed using the SPSS program to determine how significant the ability to understand entrepreneurship course material between the experimental class and the control class. The results of the unpaired t-test analysis (independent sample t-test) using SPSS program are presented in Table 6. below.

Table 6. T Test Results for Entrepreneurship Lecture Material Pretest

Group Statistics

	Strategi pembelajaran	N	Mean	Std. Deviation	Std. Error Mean
Nilai hasil belajar (Pre test)	Pembelajaran berbasis proyek	35	60.0000	9.83317	1.66211
	Gamifikasi	35	60.2143	8.81533	1.49006

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Nilai hasil belajar (Pre test)	Equal variances assumed	.535	.467	-.096	68	.924	-.21429	2.23224	-4.66865	4.24008
	Equal variances not assumed			-.096	67.204	.924	-.21429	2.23224	-4.66961	4.24103

The results of the SPSS output on the Statistics Group above exhibited that 35 students in the experimental class obtained an average value 60.21 on entrepreneurship course material understanding, while in the control or project-based class has an average value of 60.0. Independent Samples Test output table exhibited Sig Levene's Test value 0.467, exhibiting significance value greater than 0.05. It can be concluded that there is no difference in variance in entrepreneurship course material understanding value between the control group

and the experimental group. Therefore it could continue to an independent t-test with the assumption of homogeneous data variance (equal variance assumed).

Furthermore, to determine the differences, it is necessary to assess statistically using an unpaired t-test (independent sample t-test). Based on Table 6, the results of the independent t-test for entrepreneurship course material understanding(pre-test) between the control group and the experimental group with a significance value of 0.924 ($p > 0.05$, H_0 accepted). It indicated no significant difference in the value of understanding (pre-test) between the control group and the experimental group. In other words, before the experiment using Gamification and project-based learning strategies, entrepreneurship course material understanding in the experimental group and control group was not significantly different, or relatively similar.

4.3. Description of Post Test Results on Entrepreneurship lecture material understanding

Posttest results in the form of entrepreneurship course material understanding obtained after gamification and project-based learning strategies experiment is presented in Table 7 below.

Table 7. Entrepreneurship lecture material understanding post test result

Achievement Motivation	Control Group (Project Based)		Experiment Group (Gamification)	
	Average	Std. dev.	Average	Std. dev.
Low	70.36	9.50	78.00	6.07
High	71.67	10.68	87.75	6.53

Table 7 above exhibits that in the experimental class average score for students with low achievement motivation abilities reached 78.0, with a standard deviation of 6.07. Students possessing high achievement motivation, obtained 87.75, with a standard deviation of 6.53. The low motivation achievement students in the control class obtained 70.36, with a standard deviation of 9.50 Students who had high achievement motivation obtained 71.67, with a standard deviation of 10.68.

4.4. Research Hypothesis Assessment

There are three hypotheses tested in this study. Hypothesis testing was carried out if all analysis requirements were met. Research hypothesis testing wasdone to prove statistically, whether the hypothesis proposed in this study can be accepted or rejected. Hypothesis testing is carried out by analyzing data on the results of entrepreneurial lecture material. It was calculated using SPSS program using a two-way analysis of variance (ANOVA) analysis techniques at a significance value of 0.05, which are presented in Table 8 below.

Table 8. Analysis Result of *Between Subjects Effects*

Tests of Between-Subjects Effects

Dependent Variable: Nilai hasil belajar (Post test)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3532.440[a]	3	1177.480	16.263	.000
Intercept	401862.439	1	401862.439	5550.318	.000
Strategi.Pembelajaran	2388.197	1	2388.197	32.985	.000
Motivasi.Berprestasi	518.904	1	518.904	7.167	.009
Strategi.Pembelajaran * Motivasi.Berprestasi	302.237	1	302.237	4.174	.045
Error	4778.631	66	72.403		
Total	427200.000	70			
Corrected Total	8311.071	69			

a. R Squared = .425 (Adjusted R Squared = .399)

Hypothesis testing is done by grouping similar hypotheses to facilitate analysis. For hypothesis 1 is based on the learning strategy used. Hypothesis 2 is based on achievement motivation and hypothesis 3 based on the interaction of both. In this case, it is tested by analyzing the null hypothesis pair (Ho) and the rival hypothesis (H1) as follows:

4.4.1. Hypothesis 1 Assessment

The hypothesis tested in the first hypothesis is the null hypothesis(H_0): There is no difference in entrepreneurship course material understanding between groups of students who carry out gamification learning strategies and students who implement project-based learning strategies. Comparative hypothesis(H_1): There is a difference in entrepreneurship course material understanding between groups of students who implement gamification learning strategies and students who implement project-based learning strategies.

ANOVA test results exhibited that the learning strategy has an effect on the student learning outcomes on entrepreneurship course material. This was exhibited by F value 32.985 with a significance value smaller than alpha $0.05 (p < 0.05)$, therefore (H_0) was rejected. It can be concluded that there is a significant difference in the value of post-test entrepreneurship course material understanding between groups of students who are given gamification learning strategies and groups of students who are given project-based learning strategies. This was also strengthened by the average value of entrepreneurship course material understanding in two groups of students. It exhibited that the average value of entrepreneurship lecture material understandings for groups of students who learned to use gamification learning strategies was 83.57. It is higher than the average score of students studying using project-based learning strategy (71.14). The average posttest score of the students' entrepreneurship lecture material understanding using the gamification learning strategy was higher compared to the post-test score of the entrepreneurship course material understanding using project-based learning strategies. It can be concluded that in general the ability to understand entrepreneurship course material understandingstudying using Gamification learning strategies are better than groups of students who study using project-based learning strategies.

Average score comparison of post-test entrepreneurship course material understanding in both learning strategies (gamification and project-based) is presented as follows:

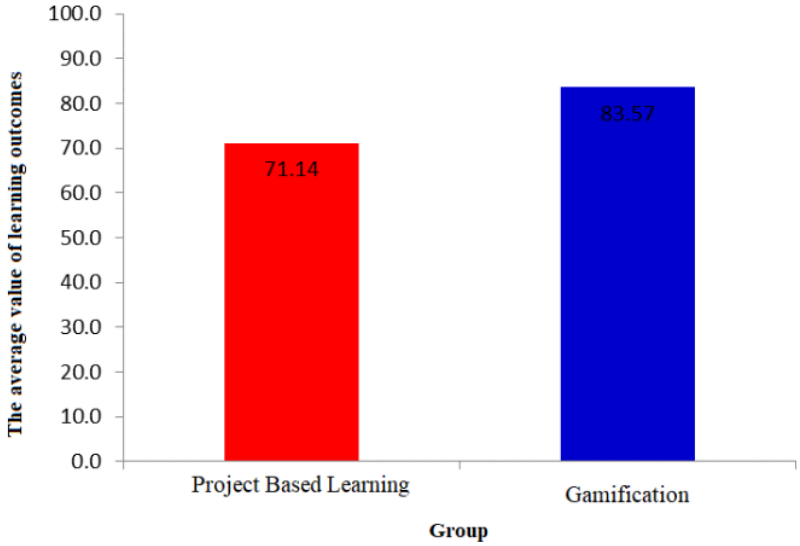

Figure 3. Average score comparison of post-test entrepreneurship course material understanding in both learning strategies (gamification and project-based)

Figure 3 exhibited that the average post-test level of understanding of the entrepreneurship lecture material utilizing gamification learning strategies was higher compared to project-based learning strategies.

In addition, estimated marginal means on the entrepreneurial course material understanding using both learning strategies (gamification and project-based) is described in the following figure.

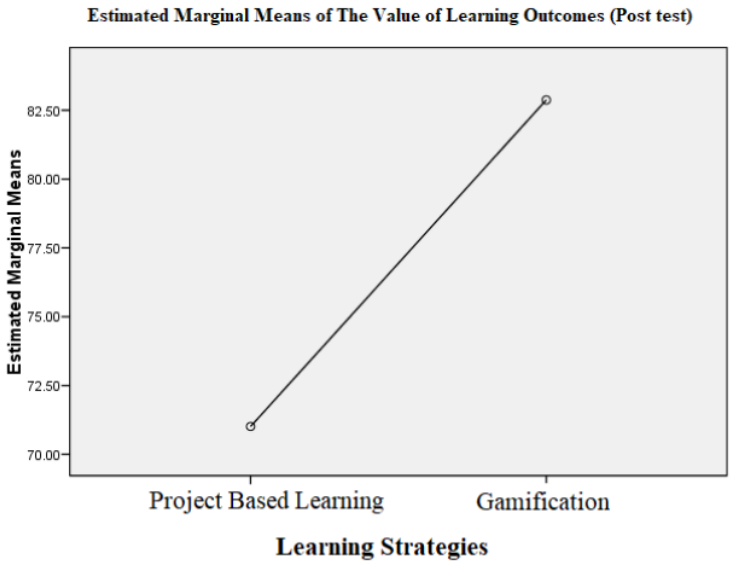

Figure 4. Estimated marginal means of entrepreneur course material understanding using both learning strategies (gamification and project-based)

Based on the marginal mean value (estimated marginal means) above it indicates that the average value of understanding on entrepreneurship lecture material utilizing gamification learning strategies is compared to project-based learning strategies.

4.4.2. Hypothesis 2 Assessment

The second hypothesis tested is the null hypothesis (H_0), there is no difference in entrepreneurship course material understanding between groups of students possessing high and low achievement motivation. The counter-hypothesis (H_1) stated that there are differences in entrepreneurship course material understanding between groups of students possessing high and low achievement motivation.

Based on ANOVA test results, Table 8 exhibited that achievement motivation also affects the value of student learning outcomes in entrepreneurship course material. F value for entrepreneurship course material understanding based on the achievement motivation ability is 7.167 with a significantly smaller than alpha $0.05\,(p < 0.05)$. Therefore H_0 was rejected and. H_1 was accepted. It can be concluded that there is a significant difference in the value of post-test entrepreneurship course material understanding between groups of students possessing low achievement motivation and high achievement motivation. This is also strengthened by the average value of entrepreneurship course material

understanding in groups of students with high achievement motivation (79.51) which is higher than their low achievement motivation counterpart (74.31). As the average posttest score of the entrepreneurship lecture material students possessing high achievement motivation was higher compared to students possessing low achievement motivation, it can be concluded that in general, the ability to understand material Entrepreneurship lectures for students possessing high achievement motivation is better than groups of students possessing low achievement motivation.

Average score comparison of post-test understanding on entrepreneurship lecture material between students with low and high achievement motivation is presented as follows:

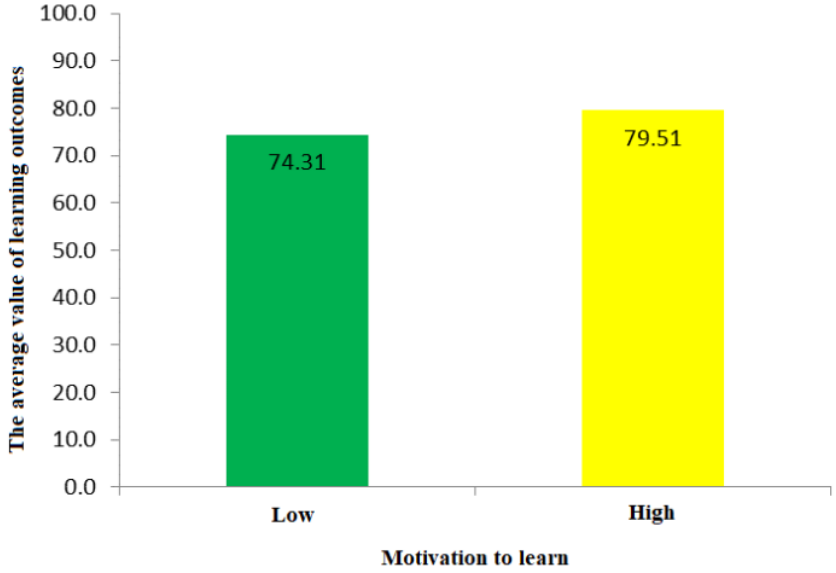

Figure 5. Average score comparison of post-test understanding on entrepreneurship lecture material between students possessing low and high achievement motivation

Based on the image above, it indicates that the average posttest score on the entrepreneurship lecture material of students possessing high achievement motivation was higher compared to students possessing low achievement motivation.

In addition, the estimated marginal means understanding on entrepreneurial course material based on achievement motivation (high and low) is described as follows.

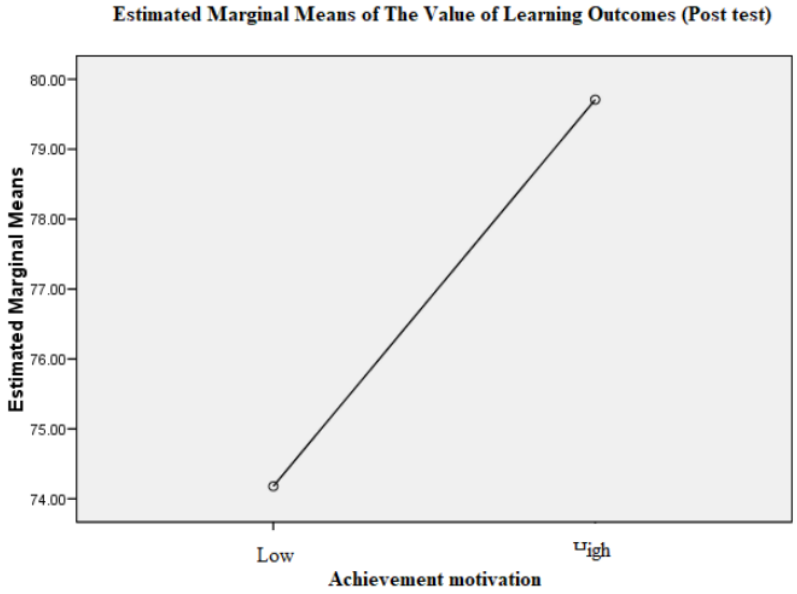

Figure 6. Estimated marginal means entrepreneurship course material understanding based on achievement motivation (high and low)

Based on the estimated marginal means above, it indicates that the average value of entrepreneurship lecture material understanding of student groups possessing high achievement motivation is relatively higher than the average value of the group of students possessing low achievement motivation.

4.4.3. Hypothesis 3 Assessment

The third hypothesis tests the null hypothesis (H_0): There is no influence of interaction between gamification learning strategies and project-based learning strategies with high and low achievement motivation on entrepreneurship course material understanding. A counter-hypothesis (H_1): There is an interaction effect between gamification learning strategies and project-based learning strategies with high and low achievement motivation on entrepreneurship course material understanding.

The results of data calculation to test hypotheses about the effect of interaction between learning strategies and student achievement motivation on the ability to understand entrepreneurial course material was determined by F score and the significance score on the learning strategy source and achievement motivation in table 8. Based on table 8, the interaction between **learning strategies and achievement motivation** has an F value of 4.174 with a significance of p = 0.045 which is smaller than alpha 0.05 $(p < 0.05)$. Therefore H_0 was rejected and H_1 was accepted. It can be concluded that there is a

significant difference in the posttest value of entrepreneurship course material understanding resulting from the interaction between learning strategies (gamification and project-based) with achievement motivation (high achievement motivation and low achievement motivation). In other words, there is a shared influence between learning strategies (gamification and project-based) with achievement motivation (high achievement motivation and low achievement motivation) on the post-test scores of entrepreneurship course material understanding.

This result was proven by the average posttest score for entrepreneurship course material understanding with gamification learning strategies and high achievement motivation (87.75). It was slightly higher compared to average posttest score for entrepreneurship course material understanding with gamification and low achievement motivation (78.0). The average posttest score for entrepreneurship course material understanding with project-based learning strategies and high achievement motivation was (71.67). It is slightly higher compared to the average posttest score for entrepreneurship course material understanding with project-based learning and low achievement motivation (70.36). Therefore, the test results on interaction differences between learning strategies and achievement motivation indicate that there are significant differences in the ability to understand entrepreneurship course material between groups of students utilizing gamification learning and achievement motivation (high and low), and groups utilizing project-based learning and achievement motivation (high and low).

The influence of the learning strategy (gamification and project-based) with achievement motivation (high achievement motivation and low achievement motivation) on the posttest score of the students' entrepreneurship course material understanding is equal to R Squared (42.5%). It indicates that the variability of posttest entrepreneurship course material understanding could be explained by the variables of learning strategies (gamification and project-based) and achievement motivation (high achievement motivation and low achievement motivation). The interaction between the two is 42.5%. The remaining 57.5% is influenced by other factors, in addition to learning strategies and achievement motivation.

Average score comparison of entrepreneurship course material understanding post-test based on the interaction between learning strategies (gamification and project-based) and achievement motivation (high achievement motivation and low achievement motivation) is presented as follows:

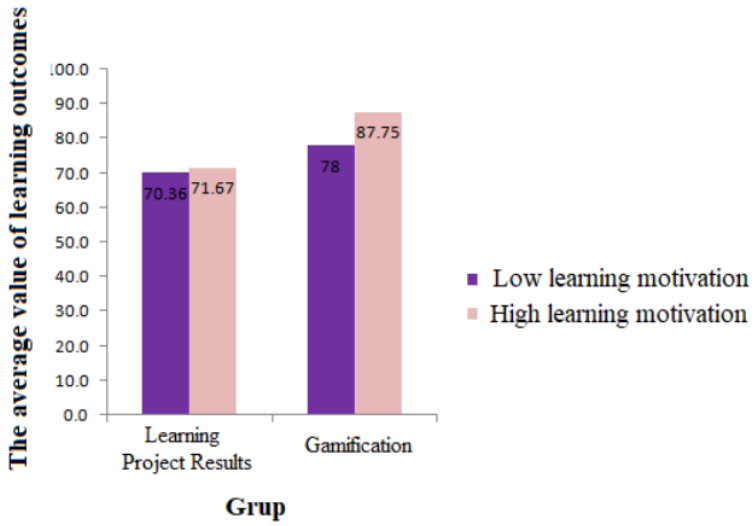

Figure 7. Average score comparison of post-test entrepreneurship course material understanding based on the interaction of learning strategies and achievement motivation

Based on the figure above, it indicates that the average posttest score on the entrepreneurship course material understanding based on interaction between gamification learning strategies and achievement motivation (high and low) exhibited higher scores, compared to the posttest scores on the entrepreneurship course material understanding based on interaction between project-based learning strategies and achievement motivation (high and low).

Estimated marginal means of entrepreneurship course material understanding based on the interaction of learning strategies (gamification and project-based) and achievement motivation (high and low) is described as follows:

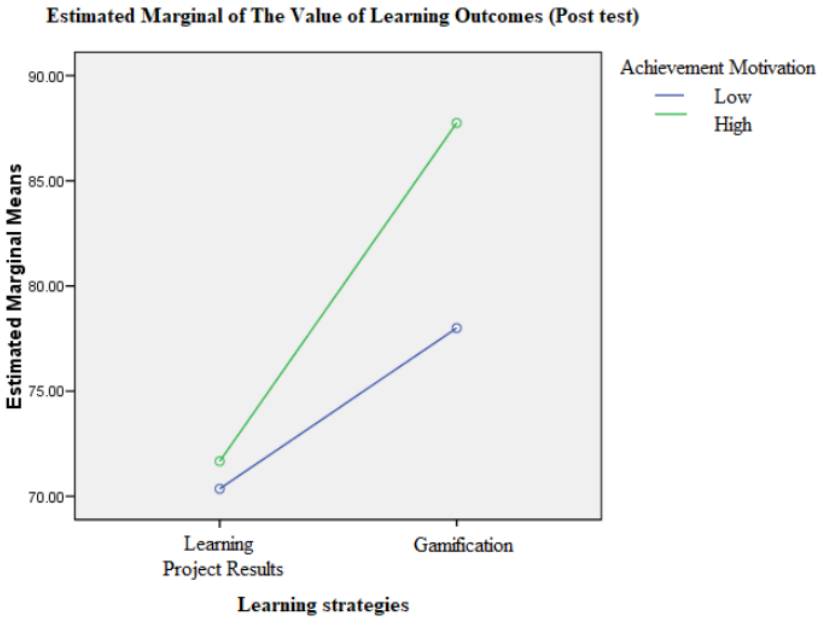

Figure 8. Estimated marginal means of entrepreneurship course material understanding based on the interaction of learning strategies (gamification and project-based) and achievement motivation (high and low)

Based on the estimated marginal means above, it indicates that the average value of entrepreneurship course material understanding of student groups utilizing gamification learning strategies possessing high or low achievement motivation is relatively higher compared to the average value of the students utilizing project-based learning possessing high and low achievement motivation. In addition, the interaction graph above exhibits that both lines almost intersect (= interaction), therefore strengthens the ANOVA test results. It exhibited that there is an interaction effect between gamification learning strategies and project-based learning strategies for students possessing high and low achievement motivation on entrepreneurship course material understanding. There are significant differences in the ability to understand entrepreneurship course material between groups of students utilizing gamification learning and achievement motivation (high and low), as well as groups utilizing project-based learning and achievement motivation (high and low).

The average value of the interaction between gamification learning strategies and project-based learning strategies with high and low achievement motivation towards entrepreneurship course material understanding is presented in Table 9 below.

4. Achievement motivation * Learning strategies

Dependent Variabel: The value of learning outcomes (Post test)

Achievement Motivation	Learning Stategies	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Low	Learning project based gamification	70.357	2.274	65.817	74.898
		78.000	2.197	73.614	82.386
High	Learning project based gamification	71.667	1.857	67.959	75.374
		87.750	1.903	83.951	91.549

Table 9. Average Value of Interaction Learning Strategies and Student Achievement Motivation

5. Conclusion

Based on the results of the analysis and research hypotheses assessment, the results of this study can be summarized as follows: (1) There is a significant difference in entrepreneurship course material understanding between groups of students utilizing gamification learning strategies compared to groups of students utilizing project-based learning strategies. (2) There is a significant difference in entrepreneurship course material understanding between groups of students possessing high achievement motivation and students possessing low achievement motivation. (3) There is an effect of interaction between gamification learning strategies and project-based learning strategies with high and low achievement motivation on entrepreneurship course material understanding.

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