

Research Paper

Effectiveness of Gamification of Ubiquitous-based Learning Media as an Initiative of Open-World Learning Metaverse Conversion in Business and Management Course

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Abstract.

The low-education index also causes the low level of Indonesia's competitiveness in the ASEAN Region in Indonesia. A strategy to improve the quality of education in Indonesia is needed. One of these strategies is technology-based learning media innovation. This is known because of the inability of existing learning media to meet the learning needs of students in conditions of swift technological development. So, it is necessary to increase the effectiveness of learning with the technology-based, problem-based learning (PBL) method. One of the efforts that can be made is the gamification of ubiquitous-based learning media. This can also be an open-world learning metaverse conversion initiative in the world of education. The approach used in this study is a quantitative approach, which is significant in the effectiveness of the use of gamification of ubiquitous-based learning media applications on students' interest in learning and mastery of the material. This study involved 100 application users, in this case, university students, who took business and management courses at various universities in East Java. The results of this study indicate that students have an interest in learning by participating in business and management courses and are able to improve material mastery when using gamification applications from ubiquitous-based learning media. From the results of this study, it is hoped that the application of gamification of ubiquitous-based learning media can be an alternative media learning for business and management courses and can be an open-world learning metaverse conversion initiative in the world of education.

Keywords: business and management course, gamification, learning media, project-based learning, ubiquitous learning

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1. Introduction

Indonesia received a score of 0.622 in 2017's Human Development Reports' Education Index, placing it seventh among ASEAN nations. Singapore received the highest rating of 0.832. Brunei Darussalam follows in second (0.719), then Malaysia (0.704). With a combined score of 0.661, Thailand and the Philippines are tied for fourth place. Indonesia's ability to compete in the ASEAN region is hampered by this situation. In view of these facts, a plan is needed to improve education in Indonesia more quickly. One way for our education to catch up with technology is the creation of learning media that is based on technology [1].

Now, Indonesia's efforts to address these issues have spawned a plethora of innovations in information technology-based educational media [1]. However, there are not yet many technology-based learning media that have not been able to create a conducive learning environment and can enhance students' comprehension of the learning delivery process [2]. Therefore, the existing learning media have not been able to meet the learning needs of students, which can affect their learning mindset and their rate of learning [3].

Implementing a learning approach that engages students directly in learning activities, such as demonstrations and practice, would boost the efficiency of learning. The game-based learning notion can be implemented via gamification-based learning media [4]. The advantage of the game style is that players will feel more connected to the game's content due to their increased immersion. This is because the learning process is more successful when conducted in an immersive environment [2].

Based on the aforementioned conditions, it is necessary to develop learning media innovations that are integrated with ubiquitous learning in order to increase learning speed and meet the needs of students. Yogyanto defines ubiquitous learning as a new learning paradigm that provides resources or learning networks with communication and connectivity whenever and wherever they are needed [5]. In response to the emergence of digital learning tools, the development of ubiquitous learning technology infrastructure is required [6].

The key issue with this research is the absence of business learning material that may refine students' entrepreneurial skills and allow them to develop and learn autonomously and creatively. It is hoped that the world of education will find inspiration and a remedy for globalization and the acceleration of technological advancement through the creation of learning media.

2. Research Method

2.1. Research Design

There were multiple stages to the research examining the efficiency of the gamification of the ubiquitous-based learning media that were compiled. In order for the respondents to accurately represent the population as a whole, the first step is to gather respondents who fulfil the chosen criteria [7]. A pre-test was given to the respondents in the second stage. This step is needed so that researchers can measure or establish baselines based on the performance of the most recent respondent. Additionally, in the third step, gamification of ubiquitous-based learning media is applied to the appropriate courses, and also set up for respondents who were chosen in the first stage. In the fourth stage, participants took a post-test to measure how well they did after utilizing the gamification of the built learning media application. The acquired data will be analysed and a hypothesis analysis will be done in the final stage.

2.2. Sample Identification

The sample needed in this study were students of state universities in East Java province who majored in management and business. The number of samples collected was 100 students who met these requirements. The selected respondents will conduct a pre-test and post-test after undergoing lectures using the gamification of ubiquitous-based learning media application that has been prepared.

2.3. Data Collection

The data collected in the form of student personal data, pre-test and post-test of courses designed to use the application of gamification of ubiquitous-based learning media. Data collection is done by selecting students who have complied with the specified requirements, then a pre-test is carried out using questions that are in accordance with the course. Followed by a post-test after using the application in the courses taken by students. Later the data that has been obtained will be analysed further.

2.4. Data Analysis Method

The acquired data will be analysed, followed by an analysis of hypotheses. The initial examination is the validity test. This step determines the accuracy of the instrument used

to describe the condition of the subject under investigation. Using product moment equations, the structure in this study was validated. There are various standards that must be completed in order to validate an instrument [8]. These conditions, including the Corrected Item-Total Correlation value, must be greater than r-table and positive. In addition, the product moment is compared during the validity test. If the result of the equation exceeds the r-table, it is considered valid.

After the validity test is done, then the reliability test is then carried out. Reliability test was conducted to determine the stability of the measurement results of the research instrument used. In measuring the reliability of the instrument used, this study uses Cronbach Alpha Equation to measure the reliability of each question in this research instrument [9]. The results of the alpha value of the equation must be compared with the alpha value in the table.

After conducting validity and reliability tests, data normalization analysis is required for this research. This study was undertaken to assess if the collected data followed a normal distribution. This analysis employs the Kolmogorov-Smirnov Test by comparing the computed probability value (p-value) to a significance threshold of 0.05 [10]. If the p-value for each independent variable is greater than 0.05, then the data are regularly distributed.

This investigation concludes with a hypothesis analysis. This investigation is required to determine whether or not the hypothesis suggested in this study has been confirmed [11]. Students' pre-test and post-test scores were compared with a T-test in order to analyze the null hypothesis.

3. Results and Discussion

3.1. Instrument Analysis

The instrument used in the study to collect data from respondents must be analyzed in order to evaluate its validity and reliability. In this research, validity and reliability tests are undertaken.

3.1.1. Validity Test

By comparing the Pearson Product Moment correlation index with its critical value and a significance criterion of 5%, the validity test reveals the extent to which the measuring instrument to measure what is being assessed is legitimate or not. On the basis of the

results of the questionnaire’s validity test, it is known that all survey questions have a significant value (sig) of less than 0.05, indicating that all survey question items are valid.

3.1.2. Reliability Test

The alpha reliability test of Cronbach’s alpha was applied. The findings of the reliability test demonstrate that the variables in the questionnaire have a Cronbach Alpha coefficient higher impact than 0.6, indicating that the question instrument employed in question of the surveys is trustworthy.

3.2. Data Normality Analysis

The data have a normal distribution if the probability value (p-value) of each independent variable is greater than 0.05, but not if it is less than 0.05. The table 1 demonstrates that each variable’s probability value (p-value) is bigger than 0.05, indicating that the data in this research is normally distributed. The results of the normalcy test are presented in the table below.

TABLE 1: Data Normality Test Result.

| | | Pre-test | Post-test |
|--------------------------------------|-----------------------|----------|-----------|
| N | | 100 | 100 |
| Normal Parameters^a | Mean | 12.0851 | 42.3642 |
| | Std. Deviation | 1.342552 | 1.52348 |
| Most Extreme Differences | Absolute | .179 | .112 |
| | Positive | .179 | .112 |
| | Negative | -.139 | -.086 |
| Kolmogorov-Smirnov Z | | 1.23 | .991 |
| Asymp. Sig. (2-tailed) | | .180 | .283 |

3.3. Hypothesis Analysis

Game Applications of Ubiquitous-Based Learning Media that have been accepted for testing in their use as a learning media and then tested to determine the efficacy of business simulation applications in enhancing analytical and business abilities in management and business courses. If the computed T-calculated value at T test is more than the T-table value at a 5% error level (= 0.05), or if the probability value is

equal to 0.05, then the T-Test approval conditions for H1 are met. The average pre-test grade for participants in the control group is 71.84, whereas the average pre-test grade for individuals in the experimental group is 72.56. The computed T value is -0.413, while the t-table value is 2.06 with 24 degrees of freedom (n-1) and a 5% error rate. Since the t-count number for Game Application of Ubiquitous-Based Learning Media is -0.413 and both classes have the same beginning capability, it may be employed as a ubiquitous-based learning media. The following are the test results of students' initial ability at the time of the pre-test:

TABLE 2: Student Pre-Test Score T-Test Result.

| Class | Avg. Pre-Test Score | T-Calculated | Probability | Meaning |
|------------|---------------------|--------------|-------------|-------------|
| Control | 71,84 | -0,413 | 0,681 | H0 Accepted |
| Experiment | 72,56 | | | |

After Game Application of Ubiquitous-Based Learning Media is implemented in the experimental class, a post-test is administered. The results of the post-tests will be compared to determine the efficacy of learning through the usage of a Game Application of Ubiquitous-Based Learning Media to enhance student competency in management and business courses. The hypothesis applied in the t-test of post-test score is as follows:

H0 : There are no differences between control and experiment class students in management and business courses.

H1 : There are differences between control and experiment class students in management and business courses.

The result of T-test on student post-test score is as follows:

TABLE 3: Student Post-Test Score T-Test Result.

| Class | Avg. Post-Test Score | T-Calculated | Probability | Meaning |
|------------|----------------------|--------------|-------------|-------------|
| Control | 78,32 | -2,926 | 0,005 | H0 Rejected |
| Experiment | 82,96 | | | |

As seen in the table above, the mean post-test grade for the control group is 78.32, whereas the experimental group's post-test grade is 82.96. T-calculated equals -2,926, while t-table on degrees of freedom 24 (n-1) with a 5% error rate equals 2.06. Value t-calculated equivalent to 2,926 > t-table value; similarly, by looking at probability value less than 0.05, it is stated that H0 in this study is rejected, indicating that there is a difference between the control class and the experiment in terms of student performance in management and business courses.

4. Conclusions

The objective of this study was to investigate the efficacy of gamification of ubiquitous-based learning media as a learning medium in business and management courses. In addition, this application can be used as a stepping stone towards transforming the teaching and learning process into the metaverse. On the basis of the findings of this study, it is known that the application of gamification to ubiquitous-based learning media can successfully enhance student performance in management and business courses. By implementing this program, it is believed that students will find lectures on management and business courses more enjoyable, and that the teaching and learning process will be streamlined, hence enhancing student performance and quality.

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