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Hybrid Learning Approach Using Chamilo for Students of the Faculty of Tarbiyah dan Ilmu Keguruan, Institut Agama Islam Negeri (IAIN) Manado

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Abstract	Learning Management System (LMS) is a learning process that utilizes information technology in the form of computers equipped with telecommunications facilities. The purpose of developing a Learning Management System is to facilitate and assist students in learning the subject of program evaluation. This research method is R & D (Research and Development), which is research to produce and test the effectiveness of these products. There are four stages in making e-learning, (1) Analysis of the system includes hardware, software, learning material, and student development, (2) Design includes instructional design analysis, teaching materials, and media (software) used, (3) Implementation, that is product and development of the resulting Learning Management System, (4) Evaluation, namely the Assessment stage by experts to test the feasibility of the system.
	The sample of this study was 67 students from two classes who were enrolled in this study. The results showed that the average difference in pre-test and post-test scores was -8.83582. Whereas the test-t test Ho: pre-test = post-test gives the value t = -3.222 with degrees of freedom was 66. While the value p for two-sided tests 0.000 was smaller than α = 0.05. This data proves that the statistical hypothesis of Ho: pre-test = post-test is rejected, meaning that the average pre-test and post-test scores differ significantly. The findings of this research can be used to recommend implementing effective learning and teaching process using hybrid learning models, therefore improving students' learning outcomes in higher education.
Keywords	Development; Model; Learning Management System; Hybrid; Program; Evaluation

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1. INTRODUCTION

The rapid development of information and communication technology (ICT) in this recent globalization era has an unavoidable effect on education. The demand of the global world has urged the education world to always adapt itself to technology development, especially adaptation of the use of ICT in the teaching and learning process. The advance of information technology has brought many positive impacts on the progress of education nowadays. Especially computer and internet technology, either hardware or software, has given many offers and choices to support learning.

The advances that are offered rely not only on the factor of speed to acquire information but also on the multimedia facility capable of making learning more interesting, visual, and interactive. The changes in the educational system demand a nation have quality human resources. Through a learning environment supported by information and communication technology, students have access to abundant learning resources, receive feedback and continuously perfect their knowledge through generative learning (actively constructing knowledge and learning). The learning result is the actual capability that can be measured directly, in which, with the measurement of the learning result, how far the achievement of educational and learning purposes can also be measured. Learning achievement has an extremely important role in the learning process. The evaluation of learning achievement could inform instructors of students' progress in achieving the learning process through learning activities. Furthermore, based on that information, instructors could design and plan the learning process to achieve better learning purposes.

Some studies have shown that the effectiveness of learning using ICT is better compared to traditional or conventional ones. (Tolks et al., 2014) Hybrid learning is an integrated teaching instruction method as hybrid or blended learning that combines face-to-face and online meetings and aims to complete each of the different interfaces and to increase the learning experience and overall achievement. (Littlejohn, A., & Pegler, 2007) Hybrid learning combines an instructional and face-to-face learning approach with an online approach. Hybrid learning, also known as blended learning, is a learning and teaching method combining offline and online components. (Ahmad, 2013) Hybrid learning is a concept that puts online and face-to-face learning. Findings show that hybrid learning impacts students' satisfaction in the globalization era. (Klentien & Wannasawade, 2016) A study on "Development of blended learning model with virtual science laboratory for secondary students." This research and development study aims to develop a blended learning model that uses project-based learning through a virtual science laboratory for science major high school students. The model can increase students' ability to comprehend lessons better and enable them to do experiments, therefore, triggering students to do further experiments.

(Kintu & Zhu, 2016) A study on "Student Characteristics and Learning Outcomes in a Blended Learning Environment Intervention in a Ugandan University" found that the effect of blended learning on learning achievement is significant. This shows that blended learning improves students' accomplishments. (Yigit et al., 2014) referring to existing research results, a blended learning model that combines face-to-face and online learning showed an increase in students' comprehension in mastering the materials it eventually improved students' learning achievements. Therefore, it is important to research to develop an alternative learning strategy or model to obtain effective learning objectives. (Dinning et al., 2015) Blended learning is an e-learning approach that combines synchronous and asynchronous activities to improve overall learning experiences. (Tubagus et al., 2019) The development of blended learning in tertiary institutions contributes significantly toward students' learning achievement. The study's findings explained that blended or mixed learning was not only accepted by the students but also fun learning and improved students' learning achievement.

(Wang et al., 2021) Using learning models effectively can also affect students' interest and satisfaction. Students' motivation, autonomous learning, and contentment with their participation in blended learning are indicators of their perceptions of the method. The environment of the blended

learning model and its components can improve students' learning satisfaction. (Çırak Kurt & Yıldırım, 2018) The results of this study indicate that student satisfaction is very important in determining the quality of blended learning. Teachers, interactions in learning, technology, and classroom management influence this. According to (Hew & Cheung, 2015), blended learning is any time students can study independently, both in class and online, with the help of the internet. Furthermore (Okaz, 2015) describes blended learning as an approach to the learning and teaching process that combines face-to-face and online learning, or e-learning learning with synchronous and asynchronous frameworks facilitated. This learning approach aims to complement each other and enhance the learning experience.

2. METHODS

Research Approach and Method

(Creswell, 2015) Based on the approach, this study fell into the mixed method research category design, a procedure to collect, analyze, and mix quantitative and qualitative in a particular study or a series of studies to comprehend research problems. The basic assumption was that using quantitative and qualitative methods simultaneously results in a more comprehensive understanding of the research problems and questions than if each method is used separately. The research problem of this study was how to develop a hybrid learning model that combines face-to-face with online learning on the Information System Analysis and Design subject.

The phases of Hybrid learning based on a Learning Management System on the Learning Media subject were conducted by referring to the research and development model proposed by (Borg, 1983) Borg and Gell that comprised the following ten steps: (1) research and collecting information, (2) Planning, (3) developing a preliminary form of product), (4) Preliminary field trial, (5) main product revision, (6) main field testing, (8) operational product revision, (8) operational field testing, (9) final product revision, and (10) Dissemination and implementation.

The study also used quantitative data resulting from questionnaires or respondents. (Kumar, 2012) The researcher developed a questionnaire based on the necessary factors, tested by the experts in their field, and completed before being distributed to selected respondent groups. Some questions in the questionnaire were specifically prepared to examine the objective of hybrid learning in relation to the effectiveness of learners and the use of e-learning at the Faculty of Islamic Teaching and Training and the Faculty of Islamic Economy and Business of the Manado State Institute of Islamic Studies in the year of 2021. Therefore, the questionnaires were given to students to collect data. The first step in conducting the research was summarizing, interpreting, and evaluating relevant literature to build the theory. The questionnaire was updated before being given to the respondents to be filled out. There were 67 respondents, i.e., 32 students in the Islamic Education Management Department and 35 in the Islamic Economy Department. All students in these programs received the questionnaire.

The data was collected in three weeks. After the survey ended, the researcher collected data for additional analysis to obtain results and findings for constructing a hybrid learning model. Besides, all the data received from the respondents was collected and analyzed using SPSS version 22. This present study combined the descriptive and inferential methods. The total frequency and proportion in the demographical context were studied using descriptive analysis. This was used in calculating the mean, deviation standard, frequency, and percentage to measure the developmental efficacy of the hybrid learning model.

The Steps of Model Development

In the implementation, the steps of research and development suggested by Gall and Borg were classified into four steps: (1) the Initial phase, (2) Planning and development, (3) Evaluation and revision, and (4) Implementation. (Walter Dick, Lou Carey, 2015) In the second, especially at the development phase, the study referred Dick and Carey's model of learning system development. Therefore, the framework that was used in this study is as follows:
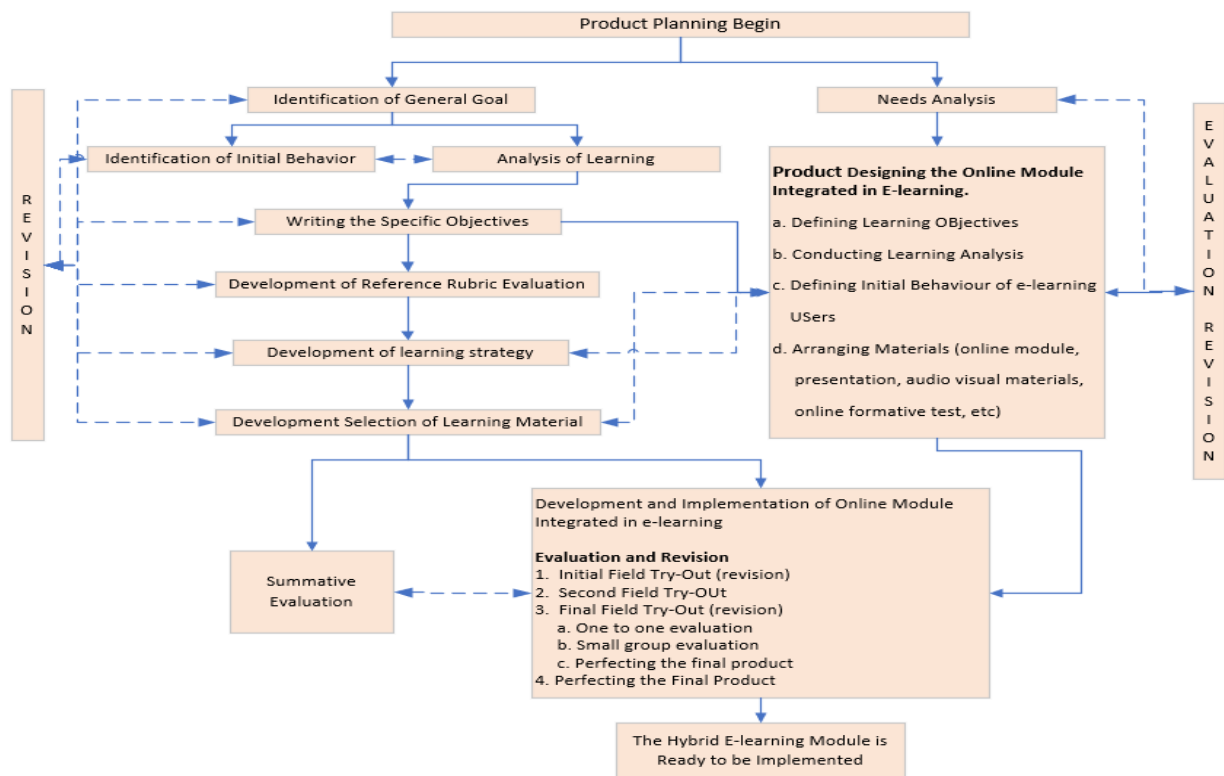
Picture 1. The conceptual model of the development of Hybrid learning combining the Borg, W.R. and Gall, M.D model. & Dick and Carey

a.   Preliminary Investigation

This part consists of a conceptual and field study to examine the results of previous studies that are relevant to the validity of the developed concepts. This first phase covers needs analysis, literature study, minor study, and necessary report standard. To conduct the need analysis, there were several criteria related to the urgency of the product and the product development itself, as well as competent human resources and sufficient time for development. A literature study was conducted to introduce the developed program temporarily, and this was done to collect research findings and other information related to the planned product development. Minor research was necessary for the researcher to know about the product.

b.   Analysis

The steps of analysis were: 1) the validating work performance discrepancy: measuring actual work performance, determining the aimed work performance, and identifying the causes; 2) Determining instructional objectives: using Bloom's and other Taxonomy; 3) Identifying students' characteristics: competency, experience, motivation, attitude, etc.;4) Analyzing resources and available technology.

c.   Design

The design was the phase after the analysis phase, which was the follow-up or the core activity of the analysis phase. Learning design was also known as a design in the learning process. The design was arranged by studying the problems and finding the solution by identifying the need analysis in the previous phase. One of the purposes of this phase was to determine the correct effective learning strategies so that the students could obtain the learning objectives, especially in achieving the competency that had been determined in the learning process.

The purpose of this phase was to verify the work performance that will be achieved and to select

the suitable test method. The general steps in designing learning were: 1) enlisting the tasks; 2) arranging work performance; 3) arranging test strategy; 4) counting the investment/cost. The design components include a tasks list diagram, supplementary equipment on learning objectives, complete test equipment, test strategy, and investment/cost proposal.

d.   Development

This phase consists of three components:

1)   Arranging the learning result evaluation

2)   Developing a collaborative learning strategy

   a)   *Engagement.* In this phase, the instructor evaluated students' competency, interest, talent, and intelligence of each student. Then, the students were grouped that consisted of high achiever, medium, and low achiever students.

   b)   *Exploration.* After the grouping, the instructors began to give an assignment, for example, by giving problems to be solved by the student groups. With this problem, each member of the group must contribute in terms of knowledge, opinions, or ideas.

   c)   *Transformation.* Based on the differences in competencies, each group member exchanged thoughts in group discussion. By doing so, low-achiever students could gradually improve their achievements due to the transformation process from higher achievers to low achievers.

   d)   *Presentation.* After the discussion and report writing, each group presented their discussion results, and other groups observed, paid attention, and compared presentation results and commented on them.

   e)   *Reflection.* There was a question and answer session between the groups when all the presentations were done. The Presenting groups accepted questions, comments, or oppositions from other groups. Each presenting group member worked together to address these responses from the other groups properly.

3)   Development of learning materials

This phase aimed to produce and validate learning resources through 1) content formation; 2) selection and formation of supportive media; 3) formation of guidelines for the students; 4) formation of guidelines for the instructors; 5) development of formative revision; 6) formation and administration of the pilot test.

e.   Implementation

The result of a learning plan would not be known without action. The action was very meaningful because learning could bring out new things in the form of an impact that could be used as experience or even reference when the action had produced a result. Therefore, implementation is needed, which means the implementation or application of a plan in which one of the models of Borg and Gell is an integrated part of the previous phases as the complement and significant to learning actuation.

The implementation and presentation of learning materials was the fourth step of Borg and Gell's model of learning system design. The main aims of this step were: 1) to guide students to achieve objective or competency; 2) to guarantee there was problem-solving/solution to handle the discrepancy of learning results faced by the students; 3) to make sure that at the end of the learning program, students need to have necessary competency, knowledge, skill, and attitude.

f.   Evaluation

A well-prepared learning plan will go through the phases of Borg and Gell's development model smoothly and end in the evaluation phase. An evaluation was the phase in which actions were taken to determine the learning plan's success.   The things that were done to guarantee the success of this phase were conducted not only at this very phase, but evaluation could also be done in the previous phases. In Evaluation, it is important to pay attention to the objectives that were set up at the beginning of the planning because evaluation had the criterion to find out the achievement to the previously stated limit,

and from these activities, there were necessary information and data from the evaluated objects for the shake of the success of the evaluation process.

The evaluation aimed to measure the quality of the product and the before and after the process of an activity. The main procedures of the evaluation process were: 1) determining the evaluation criteria, 2) Choosing the evaluation tools, and 3) administering the evaluation. The result of the evaluation was evaluation planning. The components of evaluation planning were; a summary of objectives, data collection tools, the responsibility of time, and personnel/group for each level of evaluation.

3. FINDINGS AND DISCUSSIONS

Normality testing was statistical data counting to test whether or not continuous data were normally distributed. This study used the *Liliefor* normality testing. The calculation process and testing are seen in the attachment.

The statistical hypothesis that was based on the normality testing was:

Ho: the data is normally distributed

H1: the data is not normally distributed

Based on the above hypothesis, then the criterion that was used: to reject the null hypothesis was that if the L count > L table on the significant value of α=0.05, which means that the data came from a population that is not normally distributed. On the contrary, the data came from a normally distributed population to accept the null hypothesis if the L count < L table on the significant value of α=0.05.

a. Pre-test normality data test

The pre-test data was the data of students' performance before experiencing the products of e-learning media. Based on the counting application Microsoft excel, it was found that the mean score of students' pre-test was 43.88, and the value of standard deviation (si) was 17. Next was to determine the normal cumulative probability F (zi) and empirical cumulative probability based on normal cumulative probability, and big probability was L count = 0.093, sample = 67, and significant value α = 0.05.

L table $= x = \frac{0.886}{\sqrt{67}} = 0.1082$. The result of the calculation was seen at a significant value of 0.05. The L count < L table (0.093 < 0.1082) meant the null hypothesis was accepted. The conclusion was that the pre-test data came from a normally distributed population.

b. Post-test data Normality

The post-test data was students' scores after experiencing learning using the product of e-learning media. Based on the Excel application calculation, the mean score of the post-test was 52.716, and the standard deviation (si)value was 21.341. Furthermore, determining normal cumulative probability S(zi) and empiric cumulative probability F(zi), based on the normal cumulative probability F(zi) and empiric cumulative probability, the value of the student's post-test was L count = 0.07462 Sample = 67 and significant value of α = 0,05.

L table $= x = \frac{0.886}{\sqrt{67}} = 0.10831$. The counting result showed that at the significant value of 0.05, the L count L hitung < L tabel (0.07462 < 0.10831) meant that the null hypothesis was accepted. The conclusion was that the pre-test data came from a normally distributed population.

c. Data homogeneity Test

After the data sample was proven to be normally distributed, the next step was the homogeneity test on both sample variances. The homogeneity test technique was the Barriet test, and the counting and testing process was in the appendix. The statistical hypothesis based on this test was:

Ho: the sample data was homogenous

H1: the sample data was not homogenous

Based on the hypothesis above, the criteria used to reject the null hypothesis was that if the value of x^2count > x^2 table at the significant level of $\alpha = 0.05$, the sample data was not homogenous.

Based on the hypothesis above, the criterion used to reject the null hypothesis was that if the x^2count > x^2table on the significance level of $\alpha = 0.05$, the data sample was not homogeneous. Conversely, the null hypothesis was accepted if the value of x^2count < x^2table on the significance level of $\alpha = 0.05$, which means the sample data was homogeneous. Based on the calculation using the Microsoft Excel application, it was known that the combined sample variance = 87.24022 and the unit value B = 190.1902, and the x^2count = -151.192, the value of x^2table on the significance level of $\alpha = 0.05$ was 3.841. Therefore, the x^2count= -151.192 < x^2 tabel = 3.841. Hence it can be concluded that Ho was accepted, meaning that the sample data was homogeneous.

d.   Paired t-test

This model was implemented to see the effectiveness of the blended learning package product on the Management Information System subject. The effectiveness of this developed model product was calculated through an analysis using SPSS that resulted in the information below:

The result of the SPPSS Calculation

Table 1. Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pretest	43.8806	67	17.63220	2.15412
Post-test	52.7164	67	21.34195	2.60733

Table 2. Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 Pre test & Post-test	67	.349	.004

Table 3. Paired Samples Test

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
			Lawer	Upper			
Pair 1 Pre test Post test -8.83582	22.45034	2.74275	-14.31189	-3.3595	-3.222	66	.002

The data above indicated that the mean of the pre-test and post-test scores were -8.83582. At the same time, the t-test, which tests the Ho: μpre-test = μpost-test, gave the t value = -3.222 with a degree of freedom of 66. At the same time, the *p-value* of 2 tailed test was 0.000, which was smaller than $\alpha = 0.05$. This data proved that the statistics of the hypothesis Ho: μpre-test = μ*post-test* was rejected. The conclusion was that the pre-test and post-test mean were significantly different.

The data above also showed that the mean difference between the pre-test and post-test was -8.83582. While the t-test, which tested the Ho: μpre-test = μpost-test, resulted in t value = -3.222 with a degree of freedom of 67. At the same time, the *p-value* of the two-tailed test was 0.002, which was less than = 0.05. The data proved the statistical hypothesis Ho: μpre-test = μpost-test was rejected. The conclusion can be drawn is the mean scores of the pre-test and the post-test. The data above also showed the correlation between the two variables was significantly different. The data also showed that the correlation of the two variables was r = 0.349, and the hypothesis test data to determine the correlation

significance was p-value = 0.002. The p-value = 0.002 was smaller than α = 0.05 in this case. Therefore the Pearson correlation was significant. Based on the data above, it can be concluded that the mean of the pre-test and post-test scores were different, and the difference was significant. The product of e-learning media that the students used was effective because they resulted in meaningful learning results for the students.

4. CONCLUSION

Referring to the result of the study and data analysis obtained from the evaluation result during the process of product development of the e-learning media, hence the research questions could be answered as follows:

a. The process of research and development has produced an e-learning media. The product consists of a procedural and physical model. The procedural model resulted from constructing a theoretical study described in the pictorial description. The procedural model developed in this study consists of phases of development of an e-learning media tool. At the same time, the physical product was a program (system) of a Learning Management System-based Hybrid learning.

b. The development includes field-trial evaluation to determine the effectiveness of the product development of e-learning media. The effectiveness test was conducted by initial testing of the normality of the data (pre-test), whose calculation result indicated that L count < L count < L tabel (0.093 < 0.1082) on the significance level of 0.05, which means that the null hypothesis was accepted. The pre-test concluded that the data came from a normally distributed population. The final data test (post-test) resulted in a calculation of L count < L table (0.07462 < 0.10831) on the significance level of 0.05, which means that the null hypothesis was accepted. The post-test concluded that the data came from a normally distributed population.

c. The data homogeneity test was observed on the significance level of = 0.05, resulting in x^2 table = 3.841, so x^2 count = -151.192 < x^2 tabel = 3.841, therefore it can be concluded that the H_0 was accepted, which means that the data was homogeneous. The Effectiveness test of the data was conducted by analyzing the mean of pre-test and post-test results using the SPSS program. Based on the data on students' opinions and evaluations of the hybrid learning model, it can be concluded that the mean of the pre-test and the post-test data were significantly different (different). The data showed the correlation of the two variables was r = 0.349, and the hypothesis testing to determine the correlation's significance was p-value = 0.000. In this case, the p-value = 0.000 was lesser than α = 0.05; hence the Pearson correlation was significant.

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