Development Of Blended Learning Models To Improve The Learning Effectiveness In Higher Education

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ABSTRACT

This study aims to: 1) Know the description of needs analysis in blended learning at the Islamic University of Makassar;2) Produce products in the form of model books and blended learning tools that are practical and effective to increase the effectiveness of learning at the Islamic University of Makassar. The subjects of this study were students and lecturers of the Elementary School Teacher Education Study Program (PGSD) of the Faculty of Teacher Training and Education, Islamic University of Makassar. The research and development procedure used is a 4-D (Four-D) model: Define, Design, Develop and Disseminate. The data collection techniques are observation, interviews, tests, questionnaires and documentation. The research instrument uses an instrument to observe the implementation of learning, a test instrument for assessing student learning outcomes, and a validation sheet for learning tools. The data analysis technique is carried out using; 1) analysis of the level of practicality and effectiveness; 2) analysis of student and lecturer response data. This study's results show the need to develop a blended learning model to increase the effectiveness of high-level learning. The practicality and effectiveness test results state that this model has proven to be very practical and effectively used based on the results of observations of learning implementation and questionnaires of lecturer and student responses.
Keywords: Model Development, Blended Learning, Learning Effectiveness, Higher Education

ABSTRAK

Penelitian ini bertujuan untukk :1) Mengetahui gambaran analisis kebutuhan dalam pembelajaran blended learning diperguruan tinggi Universitas Islam Makassar ;2) Menghasilkan Produk berupa buku model dan perangkat pembelajaran blended learning yang praktis dan efektif untuk meningkatkan efektifitas pembelajaran diperguruan tinggi Universitas Islam Makassar. Subjek penelitian ini adalah mahasiswa dan dosen Program Studi Pendidikan Guru Sekolah Dasar (PGSD) Fakultas Keguruan dan Ilmu Pendidikan Universitas Islam Makassar. Prosedur penelitian dan pengembangan yang digunakan adalah model 4-D (Four-D) yaitu Define, Design, Develop dan Disseminate. Teknik pengumpulan data yang digunakan adalah pengamatan, wawancara, tes, angket dan dokumentasi. Instrument penelitian menggunakan instrument pengamatan keterlaksanaan pembelajaran,instrument tes penelaian hasil belajar mahasiswa, dan lembar validasi perangkat pembelajaran. Adapun Teknik analisis datanya dilakukan dengan cara; 1) analisis tingkat kepraktisan, dan keefektifan; 2) analisis data respon mahasiswa dan dosen. Hasil penelitian ini bahwa perlunya pengembangan model blended learning untuk meningkatkan efektifitas pembelajaran diperguruan tinggi. Hasil uji kepraktisan dan keefektifan menyatakan bahwa model ini terbukti sangat praktis dan efektif digunakan berdasarkan hasil observasi keterlaksanaan pembelajaran dan angket respon dosen dan mahasiswa
Kata Kunci: Pengembangan Model, Blended Learning, Efektivitas Pembelajaran, Perguruan Tinggi

1. INTRODUCTION

The industrial revolution 4.0 is interpreted as an era that uses digital technology in its life activities. The era of the industrial revolution 4.0 refers to the next leap of industrial change, a combination of the latest technologies achieved in the last two decades (Lavanya et al., 2017). There are several main ideas contained in this revolutionary era, namely: (1) the availability and use of the internet and IoT (Internet of Things), (2) integration between technical processes and business processes in the company, (3) digital mapping and virtualization in the real world, and (4) the existence of smart factories that include the production of intelligent industries and intelligent products (Rojko, 2017). In addition, a different description was put forward by (Thai & Anh, 2017), who said that three areas are the main domains in the era of the industrial revolution 4.0, namely: (1) digital areas, such as big data, such as the internet of things and artificial intelligence, (2) biotechnology such as some applications in agriculture, fisheries, medicine, food processes, environmental protection, energy, and chemistry, and (3) physical, such as the latest generation of robots, auto-controlled cars, and nanotechnology

In today's era of globalization, technology and information are developing very rapidly. The education sector is also required to form human resources with adaptive abilities and critical thinking to any changes and developments that occur. Science learning is one of the drivers of advances in information and communication technology applied in universities. The science learning process is expected to develop the ability to reason and think systematically (Wenno, 2008). Science learning should be taught following the nature of science learning, which includes three domains, namely cognitive shutters (minds on), affective (hearts on) and psychomotor (hands-on) (Rustaman, 2011). According to the (National Science Teachers Association, 2006), the demands of science learning in the 21st century are to prepare students with a variety of skills such as creativity, innovation, critical thinking, problem-solving, communication, collaboration, ICT literacy and leadership. The ability to think critically and the skills to use ICT are one of the primary capitals that students must possess to face competition in the era of globalization.

The field of education today has made very rapid progress compared to decades ago. Education has now led to information technology-based education. Information technology has developed rapidly from year to year and has touched various aspects of human life, including the educational aspect. One of the changes in education was a change in the education paradigm, where the educational paradigm that was once conventional is now starting to shift to information technology-based education.

One of the changing educational paradigms is the orientation of learning from the outside guide to self-guided and from knowledge as a possession to knowledge as construction. Learning is a process where there is an interaction between students and learning resources. In achieving the goals that have been set, it can only be achieved if the learning presented can help and facilitate learners to develop their potential as optimally and effectively as possible, oriented towards interests, talents, needs and learning abilities.

Quality education is needed to prepare and develop the human resources demanded by the global community in the 21st century because it can facilitate change as a result of globalization efficiently, evenly, and relevantly to the needs of society. The development of this ability requires gradual improvement efforts both in encouraging training to students, as well as improving the quality of its main supporting components, namely: lecturers, curriculum, facilities, educational facilities, training tools and materials, management funds, climate, and the environment (Sukmadinata, 2002).

Improving the qualifications of lecturers is one of the priorities of the Indonesian government; this is a form of realization of the Law on Teachers and Lecturers No.14/2005. Based on the Higher Education Law Number 12 of 2012, Article 31 concerning Distance Education, distance education is a teaching and learning process carried out remotely through various communication media. The purpose of providing distance education is expected to be to provide higher education services to community groups who cannot attend face-to-face or regular education, expand access, and facilitate higher education services in education and learning. Distance education is organized in various forms and scopes supported by learning facilities and services and an assessment system that ensures graduates' quality following national higher education standards

The learning process is essential to develop student activities and creativity through various interactions and learning experiences. Student activity supports the achievement of learning objectives. Students who are active in the learning process will develop their potential through various cognitive, affective, and psychomotor activities. According to (Dimyati & Mudjiono, 2006), the implications of the principle of activeness for students further demand direct involvement in the learning process. (Mulyasa, 2012) suggests that learning is said to be successful and quality if all or at least 75% of students are physically, mentally, and socially involved in the learning process. The effectiveness of this learning can be seen in students' activeness in asking questions, expressing opinions in discussions, and being active in various learning activities.

The results of preliminary observations show that the ranking of learning activities of elementary school teacher education students, Faculty of Teacher Training and Education, Islamic University of Makassar, is still far behind other campuses. The results of a research survey coordinated by one of the lecturers in charge of the Basics of education course in 2021-2022 scored their learning activities in a low category with an average score of 62.06 per cent. This presentation illustrates that the learning effectiveness ability of elementary school teacher education students, Faculty of Teacher Training and Education, the Islamic University of Makassar in the Basics of Education course is still low, which impacts learning effectiveness. It shows that one of the abilities students must possess in the 21st century, namely learning activity, has not been achieved. Based on the description of the importance of learning effectiveness and facts in the field that show that students' learning activities are still low, it is the main reason for the need to increase learning activity ability

Learning emphasizes the ability of student effectiveness to produce meaningful and valuable learning experiences for students and educators (Duron et al., 2006). The low ability of students in Elementary School Teacher Education, Faculty of Teacher Training and Education, Islamic University of Makassar shows that learning effectiveness is not easy for students, but learning effectiveness can be learned and trained. The ability to be creative in learning must be taught early because every human being must possess the importance of learning effectiveness. What can be done to develop it is to include learning that contains learning activities in the educational curriculum. Learning Activity is one of the learnings that can train students in the learning process. Therefore, in learning effectiveness, students should be trained in learning independence.

One of the essential goals of education today is to direct students to be independent in the learning process. Improving the quality of education can be done through the implementation of education reforms. Education reform is called the change in conventional learning towards technology-based learning that further increases learning effectiveness (Redhana, 2010). One form of education reform can be carried out using a learning model that can help educators create experts by applying the Blended Learning learning model. This Blended Learning model is a model that refers to two components of science, namely: knowledge and technology.

Empirical evidence and theoretical studies such as the description above show the importance of students' learning ability in developing learning models in higher education. The learning process in students is trained through critical thinking activities and how to solve problems. As designers and implementers of learning activities, Lecturers have responsibilities

that can improve students' metacognitive abilities and develop various interventions or lecturer approaches in stimulating the learning process and problem-solving with various types. Given the importance of learning effectiveness in student learning success, lecturers need to have competence in understanding various learning theories, developing learning models, skilled in using teaching and learning strategies, making learning plans with various components which include concepts, learning objectives, learning steps, learning tools / resources and evaluation techniques.

Improving students' learning ability is very necessary, especially in developing blended learning models, because the learning process refers to higher-order thinking that involves active control of cognitive processes. A solid reason to develop blended learning models is to build cognitive structures in designing learning effectiveness. Blended learning models can be developed to increase the effectiveness of learning new material by summarising essential concepts about what is learned and its relationship with material that already exists in students' cognitive structure. To develop a blended learning model, it is necessary to utilize learning media as instruction. Blended learning is a model of education that enables students to effectively absorb, digest, and retain lesson content. Students can reexplain the material in their activities, providing a unique learning experience when acquiring new information.

Blended learning is instrumental in the process of transferring knowledge. This model is a way to help learners think more broadly in analyzing concepts and will influence the way students learn who tend to be passive towards a more active direction. For deductive reasons, students can use examples that occur in everyday life before the learning process occurs. In creativity, there is a creative thought process. Creative thinking is also called divergent thinking. Divergent thinkers can combine elements in unusual and unexpected ways (Nelson, 2016). With creativity in developing blended learning models, students are expected to dare to solve problems using their methods or ideas.

Learning as a learning process is built by lecturers to develop cognitive, affective and psychomotor creativity that can improve the quality of students and the ability to construct new knowledge to improve good abilities in teaching materials. These four factors must be considered by instructors when selecting and determining the learning models to be used in learning activities. Several interdependent and interdependent components are required for success in learning activities: objectives, material components, teaching and Learning strategies, and evaluation components. Several interdependent and interdependent components are required for success in learning activities: objectives, material components, teaching and Learning strategies, and evaluation components.

According to Joyce et al. (2011), a learning model is a plan or pattern that can be used to form a curriculum and long-term learning, design learning materials and guide learning inside and outside the classroom. A blended learning model is a constructivist approach based on orienting students to the material before reading or class presentations, used to improve the performance of students who have shared understanding so that learning objectives can take place effectively and efficiently.

One of the efforts to increase the effectiveness of high-level learning is fostering interest in learning using the Blended Learning model. Interest in learning will grow if students have initial abilities that are built from previous knowledge attached to students. Therefore, lecturers try to use various strategies so that students have preliminary knowledge before the subject matter takes place in the classroom so that learning interests can be created. One of the courses that can be used to see the effectiveness of learning in high education is the basics of education course.

In fact, in the field, the obligation to study in higher education is more directed at learning independence and using information technology in the learning process is more directed to using an independent learning model by utilizing existing technology. To improve the learning process, it is essential to develop a learning model that can provide a combination of learning with face-to-face models and learning using online methods to foster desire or encouragement in learning to students, as well as provide solutions to problems that exist in learning today.

Learning the basics of education should focus on methods that can foster initiative, creativity, intellectuality, and personal disposition. The course of the basics of higher education is based on the idea that humans are social beings that cannot be separated from other human lives. Therefore, the basics of education course is a very complex field of knowledge, so lecturers must master various competencies or skills that can make learning in the classroom more exciting and motivate students to learn the basics of education (Arsyad, 2019).

The results of the research conducted (Alam 2019) in Tacinnong, Amali District, Bone Regency. Shows that there is a strong relationship between the effectiveness of learning and the learning interests of learners. Thus, interest in learning is a passion or enthusiasm students have when participating in learning. Interest in learning will affect the effectiveness of learning as well as good learning outcomes. Interest-based learning activities will encourage students to learn better to improve learning outcomes.

The learning process at the Elementary School Teacher Education College, Faculty of Teacher Training and Education, Islamic University of Makassar, shows that the effectiveness

of student learning can be assessed as suitable. However, students do not show effective learning in the Basics of Education course. Students tend to be passive in receiving the subject matter and less reactive to the questions asked by the lecturer, rarely expressing opinions and asking questions. From the results of interviews with students, it is known that students are less interested in the material of Basics of Education which tends to have to memorize various materials taught. Students are less interested in the learning process that does not involve them, even if learning is still teacher-oriented.

Responding to the fact in higher education that the learning played by lecturers in teaching their students is still limited to the use of learning models. The application of learning models can optimize student learning outcomes. However, the actual application of learning models has not been as expected by learning theories. This is evidenced in the application of the learning model chosen. Ideally, optimal learning should determine the type of model used in learning.

Based on this phenomenon, there is no other way except to find problem-solving that can challenge students to study harder. One way to respond to student dynamics is the need to develop a Blended Learning learning model. The development of this learning model is expected to motivate and challenge students to be more active in learning to have permanent retention.

2. LITERATURE REVIEW

The development of a learning model for lecturers is a design or set of strategies based on theory and research results consisting of several integrated components so that it can be used as a guide for lecturers and about the process of activities carried out to achieve the goals of learning activities that have been set. This research will develop a Blended Learning learning model to improve the effectiveness of student learning in Higher Education.

A blended learning model was developed to address the challenges above. A blended learning model was developed to address the challenges above. In blended learning, the function of electronic or internet-based learning in classroom learning activities is a supplement, as electronic learning materials are designed to supplement students' learning materials in the classroom. Electronic learning materials are programmed to serve as reinforcement material for students to supplement conventional learning activities.

One solution to overcome the problem of learning effectiveness in today's digital era, especially in universities, requires online learning applications that combine online and

conventional learning. Face-to-face learning is still needed to transfer grades or rubber for students, especially in terms of habituation, attitude, example and discipline.

Students are therefore expected to be capable of analyzing, evaluating, concluding, explaining, and interpreting a collection of facts and concepts and applying them in real-world situations. To achieve this, an adaptable learning strategy is necessary. Among them is the use of a blended learning model. This learning model emphasizes individual differences. Students are therefore expected to be capable of analyzing, evaluating, concluding, explaining, and interpreting a collection of facts and concepts and applying them in real-world situations. To achieve this, an adaptable learning strategy is necessary. Among them is the use of a blended learning model. This learning model emphasizes independent learning by combining face-to-face and distance learning, which can be accomplished by anyone who desires to learn and has access to the internet and smart devices. The blended learning model is one of the current practical learning models, where the teaching and learning process is typically carried out outside of the classroom with the assistance of technology. The dependent learning process combines face-to-face and distance learning that can be accomplished by anyone desiring to learn using the internet and intelligent devices they own. The blended learning model is one of the current practical learning models, where the teaching and learning process is typically carried out outside of the classroom with the assistance of technology.

Blended learning is a combination of face-to-face learning in the classroom and learning that is carried out online. Blended learning is one of the learning models that can accommodate and develop critical thinking skills and accommodate students optimize the use of information and communication technology. This strategy is proven to improve learning outcomes, as seen in the results of research conducted by (Yemen and Graf, 2010). Evaluation Of An International Blended Learning Cooperation, research carried out at two universities, namely Hacettepe University Turkey and The University of Technology Dortmund Germany, shows that the evaluation results show a relatively high increase in learning outcomes in the two different universities. In addition, other studies conducted in Turkey emphasize that blended learning is also effectively used in secondary education (Yapici & Akbayin, 2012).

The implementation of blended learning is the right solution to various criticisms of e-learning shortcomings related to the limited range of e-learning activities, the availability of infrastructure, the frequency of direct contact between fellow students and between students and speakers or lecturers is very minimal, as well as limited student opportunities to socialize.

The Blended Learning learning model is the latest breakthrough in education that wants the achievement of 21st-century competencies (Creativity and Innovation, Collaboration,

Communication, Critical Thinking and Problem Solving), character values, and literacy organized in higher education. Similarly, the implementation refers to KKNI, which emphasizes a scientific approach. An approach that demands the effectiveness of student learning by emphasizing the five most important aspects: observing, questioning, trying, reasoning, and communicating. The five aspects are interrelated with each other. Based on the background outlined above, the author is interested in researching the Development of Blended Learning Models to Improve Learning Effectiveness in Higher Education.

3. METHOD

This research used a 4D model development design proposed by Thiagarajan, Semmel, & Semmel (1974). This 4D theory consists of four main stages, namely the defining stage (define), Design (Design), development (develop), and dissemination (disseminate). This research and development were carried out at the Elementary School Teacher Education Study Program of the Islamic University of Makassar. Specifically, this research is aimed at odd-semester students in 2021-2022 at the Elementary School Teacher Education Study Program at the Islamic University of Makassar who are taking courses in primary education.

The research subject groups involved in this study are students and lecturers. There are three lecturers in the basics of education course who are effective in the course, and students are also involved in the trial phase (effectiveness test) of 1 class (34 people). The technique used in determining the subject of this study using the Purposive Sampling technique. That is, this technique is a way of sampling/researching subjects by paying attention in detail to some considerations or specific criteria.

4. RESULTS AND DISCUSSION

The initial stage in this research is to conduct a preliminary investigation related to the needs of learning models in higher education so that they can be analyzed some of the objectives and obstacles found in the learning process through theoretical studies, empirical studies and analysis related to model development needs.

Based on the results of the Semester Learning Plan (RPS) analysis, it was found that the application of the direct learning model was 25%, and the cooperative learning model was 75%. These results indicate that lecturers of the Education study program for elementary school teachers, faculty of teacher training and education, and Universitas Islam Makassar generally apply a cooperative learning model. Based on these findings, BL-SAS adopts cooperative learning as one of the foundations of model development.

The application of the BL-SAS approach is an effort that can encourage students to solve problems in life individually and in groups by applying knowledge and utilizing technology. The accuracy of choosing an approach to learning is the key to success in actualizing the learning outcomes that have been formulated. The way of presentation is developed by referring to the learning outcomes to be actualized. The results of the practicality of data analysis on the response of lecturers to the implementation of the BL-SAS learning model obtained data are shown in Table 1.

Table 1. Results of Lecturers' Responses to the BL-SAS Learning Model

No	Assessment Indicators	Validators			Ki	Information
		V1	V2	V3		
1	Learning tools	3,6	3,8	3,9	3,8	Very Practical
2	Eligibility of Presentation	3,5	3,5	3,8	3,6	Very Practical
3	Language Eligibility	4,0	3,0	4,0	3,5	Practical
4	Learning Assessment	3,5	3,5	4,0	3,7	Very Practical
	Average				3,63	Very Practical
	Percentage				90,63%	Very Practical

The results of the analysis shown in the table above show that

1. The average score of the lecturer's response to the overall silliness is $(\bar{x}) = 3.63$; if it is reflected on the silliness criteria, it is included in the very practical category.

2. The average value of lecturers' responses to the practicality of the model in the aspect of achievement of learning devices is $(\bar{x}) = 3.8$; if it is reflected in the criteria of silverness, it is included in the very practical category.

3. The average value of the lecturer's response to the model's performance in the aspect of achieving the feasibility of the presentation is $(\bar{x}) = 3.6$; if it is reflected in the silliness criteria, it is included in the practical category.

4. The average value of the lecturer's response to the model's performance in the aspect of language achievement is $(\bar{x}) = 3.5$; if it is reflected in the technical criteria, it is included in the practical category.

5. The average value of lecturers' responses to the model's performance in the aspect of learning assessment achievement is $(\bar{x}) = 3.7$ if it is reflected in the literacy criteria, it is included in the category is very, very practical.

Thus, the value of lecturers' responses to the BL-SAS learning model was 90.63%, with a very practical category. From the results of data analysis on lecturers' responses to the implementation of the BL-SAS learning model, it shows that the model is practical to apply in learning, where the assessment criteria are 70% of lecturers give a positive response to the ≥BL-SAS learning model.

The results of data analysis on student responses to the implementation of the BL-SAS learning model obtained data are shown in the following table.

Table 2. Results of Student Response to the BL-SAS Learning Model.

No	Assessment Indicators	Ki	Information
1	Student assignments	3,7	Very Practical
2	Learning atmosphere	3.7	Very Practical
3	Lecturers' response to students	3,7	Very Practical
	Average	3,69	Very Practical
	Percentage	92,16%	Very Practical

The results of the analysis shown in the table above show that

1. The average score of student responses to the overall silliness is $(\bar{x}) = 3.69$; if it is reflected on the silliness criteria, it is included in the very practical category.

2. The average score of student responses to the model's performance in the aspect of achieving student $\bar{x}$Assignments are $() = 3.7$; if reflected in the technical criteria, they are included in the very practical category.

3. The average score of student responses to the model's performance in the aspect of achieving the learning atmosphere is $(\bar{x}) = 3.7$; if it is reflected on the criteria for silverness, it is included in the very practical category.

4. The average value of student responses to the achievement of the model in the aspect of achievement of lecturers' responses to students is $(\bar{x}) = 3.7$; if it is reflected in the criteria of silverness, it is included in the very practical category.

Thus, the value of student response to the BL-SAS learning model was 92.16% with the Very Practical category. From the results of data analysis on student responses to the implementation of the BL-SAS learning model, it shows that the model is practical to apply in learning, where the assessment criteria are 70% of students give a positive response to the ≥BL-SAS learning model.

The effectiveness of the analysis used is inferential statistical analysis with the SPSS program. Before performing inferential statistical analysis to test hypotheses, fundamental

tests, such as normality tests, must be conducted. This normality test is intended to determine whether the data used is normally distributed. Data is called normally distributed if it meets the normality criteria, namely if it is Sig.>α (0.05) and not normally distributed if it is Sig.<α (0.05). Normality tests were performed on pretest and post-test data. The following data were obtained based on the SPSS 26 data processing results.

Table 3. Pretest Data Normality Test and *Postest* learning model BL-SAS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.129	34	.167	.964	34	.311
Posttest	.142	34	.081	.935	34	.044

Based on Table 3. shows that the *pretest* normality test results obtained Sig values.= 0.311 > 0.05, while the post-test normality test results obtained *Sig* values. = 0.44 > 0.05. it shows that the *pretest* and *post-test* data meet the normality test criteria, so it can be concluded that the *blended learning* model is normally distributed.

Based on the prerequisite statistical analysis test, it was obtained that the data from the *blended learning* model in this study were normally distributed. Therefore, the difference in learning effectiveness can be measured using non-parametric inferential statistics with a rigidification level of a=0.05 (2-tailed) through the t-test formula, namely the *Independent Sample Test*. Here are the results of the t-test.

Table 4. *Paired Samples Statistics* Test Results

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	3.4356	34	.12171	.02087
	Posttest	3.8135	34	.07874	.01350

Based on Table 4. above, a summary of the descriptive statistical results of the two samples studied is shown, namely *the pretest* and *post-test* values. For the *pretest* score, the average learning effectiveness score or *mean* was 3.4356. As for the *post-test* score, the average learning effectiveness score was obtained at 3.8135. The number of students used as research samples was 34 people. For the Std. *The deviation* value (standard deviation) in the *pretest* is 0.12171, and *the post-test* is 0.07874. Last but not least is the *Std. Error Mean* value for the pretest of 0.02087 and *the post-test* of 0.01350.

Because the average score of learning effects on the pretest is 3.4356 and the average score on the post-test is 3.8135, descriptively, there is a difference between the average character observation results on the pretest and the post-test. To determine whether this difference is real (significant), it is necessary to interpret the Paired Sample T-Test output table.

Table 5. *Paired Samples* Correlations Test Results

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	34	.058	.746

Based on Table 5. above, it shows the results of the correlation test, the relationship between the two data, or the relationship between the *pretest variable with the post-test* variable. Based on this output, it can be seen that the value of the correlation coefficient is 0.58 with a significance value *(Sig.)* of 0.746. Since the value of Sig. 0.000 < probability of 0.05, it can be said that there is a relationship between the *pretest* variable and the *post-test* variable. A complete explanation of the meaning of the above correlation coefficient numbers can be presented in the following table:

Table 6. *Independent Sample Test* Results

Paired Samples Test

		Paired Differences	T	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference			
		Upper			
Pair 1	Pretest – Posttest	-.32871	-15.619	33	.000

Based on Table 6. above, answers were obtained regarding the presence or absence of the influence of using *blended learning* models to increase the effectiveness of learning in higher education. However, before interpreting the numbers in the *Paired Samples Test* result table above, it is necessary to first know the formulation of research hypotheses and decision-making guidelines in the *paired sample t-test*. The formulation of the research hypothesis is as follows:

$H_0 =$ There is no average difference between the observed value of the prisoner's character in the *pretest* and *the post-test*, which means that there is no influence on the use of *blended learning* models to increase the effectiveness of learning in higher education.

$H_a =$ There is an average difference between the character observation scores in the *pretest* and the *post-test*, meaning that blended learning models are not used to increase learning effectiveness in higher education.

The decision-making guidelines in the *Paired Sample T-Test* based on the significance value *(Sig.)* of the SPSS output results are as follows.

1. If the value of *Sig. (2-tailed)* < 0.05, then H_0 is rejected, and H_a is accepted.
2. If the value of *Sig. (2-tailed)* > 0.05, then H_0 is accepted, and H_a is rejected.

Based on the table of *Paired Samples Test* results above, Sig's value is known. *(2-tailed)* is 0.000 < 0.05, then H_0 is rejected, and H_a is accepted. So it can be concluded that there is an average difference between the observed value of the prisoner's character in the *pretest* and *the post-test*, which means that there is an influence on the use of *blended learning* models to increase the effectiveness of learning in higher education.

In addition to comparing the significance value *(Sig.)* with the probability of 0.05, there is another way that can be done to test the hypothesis in this *paired sample t-test*, namely by comparing the calculated t value with the $_{table}$ t. The guidelines or basis for making decisions are as follows.

1. If the value of $t_{counts} > t_{of the table}$, then H_0 is rejected, and H_a is accepted.
2. If the value of $t_{counts} < t_{of the table}$, then H_0 is accepted, and H_a is rejected.

Based on the table of *Paired Samples Test* results above, it is known that the t_{count} has a negative value of -15,619. So the calculated t value becomes 15,619. The negative tcount score is caused because the average score of student learning effectiveness of the pretest results is lower than the average learning effectiveness of the post-test students. Thus, a negative calculated t-value can have a positive meaning.

Next is the stage of looking for the value of t table, where t_{table} is searched based on the value of *df* (*degree of freedom*) and significance *(α/2)*. From the output above, it is known that

the df value is 33, and the value of 0.05/2 equals 0.025. This value is used as a reference in finding $_{the\ table}$ t value on the statistical table t value distribution. Then find the table t value is 2.034. Thus, since the calculated value of t is 15,619,> t_{table} 2,034, then as the basis for the above decision-making, it is concluded that H_0 is rejected and H_a is accepted. So it can be concluded that there is an average difference between the value of learning effectiveness in the *pretest* and the *post-test*, which means that there is an influence on the use of *blended* learning models to increase the effectiveness of learning in higher education.

After knowing the influence of using blended learning models to increase the effectiveness of learning in higher education, the next question is how effective is the use of blended learning models to increase the effectiveness of learning in higher education with *normalized* gain or *N-gain score* which aims to determine the effectiveness of using a treatment model. The *N-gain score* test is carried out by calculating the difference between the *pretest* value (the test before the implementation of the BL-SAS learning model) and the *post-test* value (the test after the implementation of the BL-SAS learning model).

By calculating the difference between the *pretest* and *post-test* scores or *gain scores*, researchers can determine whether the application of the blended learning model to increase the effectiveness of learning in higher education can be said to be effective.

Table 7. *Gain Score Pretest* and *Postest* Values

No	Pre Test	Post Test	N-Gain	Category
1	55	80	0,56	Keep
2	60	85	0,63	Keep
3	60	90	0,75	Tall
4	55	80	0,56	Keep
5	55	95	0,89	Tall
6	70	90	0,67	Keep
7	55	90	0,78	Tall
8	70	95	0,83	Tall
9	60	95	0,88	Tall
10	65	85	0,57	Keep
11	55	85	0,67	Keep
12	55	90	0,78	Tall
13	65	90	0,71	Tall
14	70	80	0,33	Keep

15	55	90	0,78	Tall
16	60	85	0,63	Keep
17	65	85	0,57	Keep
18	70	85	0,50	Keep
19	55	90	0,78	Tall
20	60	80	0,50	Keep
21	70	95	0,83	Tall
22	65	95	0,86	Tall
23	55	85	0,67	Keep
24	55	85	0,67	Keep
25	65	95	0,86	Tall
26	60	85	0,63	Keep
27	65	90	0,71	Tall
28	65	80	0,43	Keep
29	60	95	0,88	Keep
30	65	75	0,29	Low
31	70	95	0,83	Tall
32	75	95	0,80	Tall
33	65	85	0,57	Keep
34	60	85	0,63	Keep
Sum	2110	2985	23	
Average	62,06	87,79	0,68	**Keep**

Based on table 7. related to the results of the analysis of student learning outcomes scores, before the application of the BL-SAS learning model obtained 62.06 (low category), and the number of student learning outcomes scores after the application of the BL-SAS learning model was obtained by 87.79 (medium category). And the average gain index obtained was 0.68. The results show that the results of students' learning abilities have increased. When referring to the gain index (Hake, 1999), 0.68 is in the high category and students are said to be successful (complete) if they get a score greater than or equal to the value of 75 (Minimum value). Learning is said to be classically successful if at least 80% of students achieve complete grades. It shows that the BL-SAS learning model developed has been effective.

5. CONCLUSIONS

Based on the data analysis and discussion results, this research can be concluded as follows.

1. Based on the analysis of needs through various information about the potential development of learning models, it was obtained that the response to the needs of the industrial revolution 4.0, where humans and technology are aligned to create new opportunities creatively and innovatively, where they must be prepared for the challenges they will face in the future, the development of the BL-SAS model is the answer to the needs of students in the learning process in higher education.

2. The BL-SAS Learning Model is declared "practical" based on the results of observations on the implementation of the BL-SAS Learning model, learning management, and increasing student learning activities are all well carried out.

3. The BL-SAS Learning Model is declared "effective" based on the results of testing the effectiveness of student learning and is responded to positively by students and lecturers.

6. SUGGESTION

About the findings of this study, researchers have proposed the following:

1. The BL-SAS learning model is recommended as a learning model that can be applied at the tertiary level, especially for educational students.

2. Considering all the potential and impacts caused by the application of *blended learning* paying attention to several things when learning online is no longer a problem. Even with the pandemic in this global era, the freedom to learn and collaborate can be enjoyed by students as learners.

3. Using the BL-SAS learning model as an alternative model can increase activity and effective time in learning.

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