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Development of blended learning based on discord media on elasticity materials in SMA Negeri 1 Tomohon

Jovelio O S Sulangi[1], Meytij Jeanne Rampe[2], Rolles N Palilingan[2]
[1] Student of Master Program, Study Program of Natural Sciences Education, Postgraduate Program, Manado State University, Indonesia
[2] Postgraduate Program, Manado State University, Indonesia

Abstract
The learning model that can be combined in blended learning is Inquiry-based Learning with Flipped Classroom which can make it easier for teachers to design or design, and develop classroom learning by utilizing existing technology. The location used in this research is SMA Negeri 1 Tomohon. This research was conducted in the even semester of the 2021/2022 academic year. Based on the description above, the implementation of Blended Learning with the use of the Learning Management System is very in line with current conditions and is expected to have a good, efficient, practical, and interesting effect. The ADDIE model was developed by Dick and Carry.. The stages that must be carried out in research in the ADDIE model are as follows: Analysis, 2. Design, 3. Development, 4. Implementation, and 5. Evaluation. Research results show, 1) discord media-based blended learning learning design is valid because the results of the assessment of the media expert and material expert validator are 4.24 (Valid). 2) Discord-based blended learning learning design is practical because the percentage of teacher and student responses reaches 86.83%. 3). Discord-based blended learning learning design is effective because it meets the research hypothesis of effectiveness testing through student learning outcomes tests.

Keywords: blended learning, discord media, elasticity

Introduction

The All-Digital transformation, namely Era Society 5.0 in the world of education, has begun to be implemented in several countries. In the future, Society 5.0 is expected to create value through the development of advanced technology and can reduce the gap between humans and the problems that will be faced in the future, especially in the field of education. Thus in the era of Society 5.0, artificial intelligence (artificial intelligence) is used to change all data in all aspects of life. Indonesia, which has a large population but with an uneven distribution of knowledge and education, Society 5.0 can be a complementary factor of success if implemented properly. However, Society 5.0 cannot be fully implemented because the conditions in Indonesia are inversely proportional to other countries. There are several influencing factors, namely the use of technology in the learning process and the lack of human resources.

Efforts to overcome the problem of using technology and increasing natural resources can be done through improving the quality of education. Education, of course, continues to change over time, and at this time we are faced with changes in education in the digital era so that the digitization of schools has begun to be implemented by the government. Nadiem Makarim (2021) in an article from the Ministry of Education and Culture said that digitizing schools as one of the priorities of independent learning through the development of a technology-based national education platform and the construction of future classroom or school infrastructure and in this pandemic period proves how big the role of technology is in ensuring that students remain getting education when face-to-face cannot be done and ready to run limited face-to-face learning which requires schools to provide educational services outside the network (offline) and in the network (online).

Meanwhile, the problem that is often encountered among teachers and students is that they have not utilized technology optimally, especially in learning physics. So the teacher must have a learning plan that is able to increase the effectiveness of learning, as well as the activeness of the students in participating in learning activities in the classroom, especially online learning in accordance with the digitalization of education.

Physics is one of the branches of science that underlies the concept of living in harmony with nature. As a science that studies natural phenomena, physics also provides good lessons for humans to live in harmony based on natural laws. So that the paradigm of learning physics is often associated with phenomena that occur around them.

The problems of learning physics that are currently being faced are influenced by several factors and sources of problems, including the substance of the curriculum material, learning models, facilities/facilities for supporting learning activities, as well as the presence of students and an environment that does not allow students to study

offline. One of the factors that are often found are learning methods and models that are not suitable to be applied in learning, especially physics lessons at this time.

Blended Learning can be used as an alternative in implementing learning and digitizing education. Blended Learning is a learning facility that combines various modes of delivery, teaching models, and learning styles, introducing various choices of media for dialogue between the facilitator and the person being taught. Blended learning is also a combination of face-to-face teaching and online teaching, but more than that as an element of social interaction. Blended Learning according to Semler (2005) [15] is combining the best aspects of online learning, structured face-to-face activities, and real-world practices. Online learning systems, classroom training, and work experience have their own major drawbacks. The blended learning approach uses the strengths of each against the weaknesses of the others.

The learning model that can be combined in blended learning is Inquiry-based Learning with Flipped Classroom which can make it easier for teachers to design or design, and develop classroom learning by utilizing existing technology.

Blended Learning is a solution for teachers in improving the quality of education and learning effectiveness. It is hoped that there will be innovations in learning technology that are more effective and passed on to teachers so that the quality is better which has an impact on improving the quality and competitiveness of students, so there must be product or media development that can be used in learning, especially in exact sciences such as elasticity material in class XI physics learning.

Elasticity in physics is the tendency of solid materials to return to their original shape after being deformed. A solid object will deform when a force is applied to it. If the material is elastic, the object will return to its original shape and size when the force is removed.

The implementation of blended elasticity learning requires an application, namely the Learning Management System (LMS). Learning Management System (LMS) is an application or software used to manage online learning which includes several aspects, namely material, placement, management, and assessment (Mahnegar, 2012) [10].

Currently, there are many applications that can be used as media or Learning Management System platforms for learning using the Blended Learning model. There are several types of applications that can be used in the learning process including Schoology, Learnboos, Edmodo, Moodle, and others.

As for the Discord application, a Voice over Internet Protocol (VoIP) application designed to create community. Discord has the main advantages, namely the freedom to manage a server, voice and video calls, text messages, media and files that can be used individually or in groups. In addition to communication, in the Discord application you can add a Server to collect users, as well as Bots / Artificial Intelligence (AI) which are useful in Entertainment and Education bases. Discord can even combine media files used in learning such as PPT, Video, PDF, etc.

Previously Discord was only known by gamers to communicate and even create a community in it so that it could connect many people in one place (server). In the implementation of LMS, Discord still lacks exposure among teachers. (Jagad Dewantara, 2020) [8]

Based on the description above, the implementation of Blended Learning with the use of the Learning Management System is very in line with current conditions and is expected to have a good, efficient, practical, and interesting effect. Therefore, researchers feel compelled to conduct research on "Development of Discord-Based Learning Blended Learning in Elasticity Materials at SMA Negeri 1 Tomohon".

Research Methods

Development Research Design

The type of research that will be used is Research and Development (R&D). Research and Development is a research method used to produce a product. The resulting product will be tested for effectiveness in the field (Sugiono, 2014). There are three objectives in Research and Development, namely: the resulting product can be considered good because the resulting product has passed various continuous assessments, the resulting product is also adapted to the needs in the field, and the last is the product development process from the initial stage to the evaluation. validated. (Sanjaya, 2014).

The research method used in this study refers to the Research and Development Model with the ADDIE model which consists of five stages, namely Analysis, Design, Development, Implementation and Evaluation because the research model and This development is more rational and more complete than other models according to product development steps.

The ADDIE model was developed by Dick and Carry (1996). The steps that must be carried out in research in the ADDIE model are as follows:

Analysis

At this stage, the main activity is to analyze the need to develop new learning models/methods and analyze the feasibility and requirements for developing new learning models/methods. The development of new learning methods begins with a problem in the learning model/method that has been applied. Problems can occur because the existing learning models/methods are no longer relevant to the needs of the target, learning environment, technology, student characteristics, etc. After analyzing the problem of the need to develop new learning models/methods, researchers also need to analyze the feasibility and requirements for developing these new

learning models/methods. The analysis process, for example, is carried out by answering the following questions: (1) whether the new model/method is able to overcome the learning problems encountered, (2) whether the new model/method is supported by facilities to be implemented; (3) whether the lecturer or teacher is able to apply the new learning model/method. In this analysis, it should not happen that there is a good model/method design that cannot be implemented because of some limitations, for example, there are no tools or the teacher is unable to implement it. Analysis of the new learning method needs to be done to determine the feasibility if the learning method is applied.

Design
In designing learning models/methods, the design stage is similar to designing teaching and learning activities. This activity is a systematic process that starts from setting learning objectives, designing scenarios or teaching and learning activities, designing learning tools, designing learning materials and evaluating learning outcomes. The design of this learning model/method is still conceptual and will underlie the next development process.

Development
Development in the ADDIE model contains the realization of product design activities. In the design stage, a conceptual framework for the application of new learning models/methods has been developed. In the development stage, the conceptual framework is realized into a product that is ready to be implemented. For example, if at the design stage the use of a new conceptual model/method has been designed, then at the development stage, learning tools are prepared or made with the new model/method such as lesson plans, media and subject matter. As for development in the sense of developing products that have been made but there are still shortcomings found during field trials.

Implementation
At this stage the designs and methods that have been developed are implemented in real situations, namely in the classroom. During implementation, the design model/method that has been developed is applied to actual conditions. The material is delivered according to the new developed model/method. After the application of the method, an initial evaluation is carried out to provide feedback on the application of the next model/method.

Evaluation
At this stage, the designs and methods that have been developed are implemented in real situations, namely in the classroom. During implementation, the design model/method that has been developed is applied to actual conditions. The material is delivered according to the new developed model/method. After the application of the method, an initial evaluation is carried out to provide feedback on the application of the next model/method.

Research Development Procedure
In this section, the researcher presents the procedural steps taken in the study, following the ADDIE procedure.

Research and Information Collecting (Analyze)
At this stage the researcher conducts a preliminary study or exploratory study to examine, investigate, and collect information. This step is done by coming to SMA Negeri 1 Tomohon.

School Selection
The location used in this research is SMA Negeri 1 Tomohon. This research was conducted in the even semester of the 2021/2022 academic year. This location is used as a place for conducting research with the following considerations:

1. Principals and teachers who are cooperative and open to receive developments in education, especially development that supports the learning process
2. The school is accredited A, so it can be assumed that the quality of learning in schools is also qualified.

Material Selection
The material that will be developed in this research is elasticity material in class XI MIPA. The selection of this material is based on several reasons, one of which is because the use of this material is closely related to the problems of everyday life.

Needs Analysis
Needs analysis is done by first analyzing the state of teaching materials as the main information in learning and the availability of teaching materials that support the implementation of a lesson. At this stage, the teaching materials that need to be developed will be determined to help students learn.
The needs analysis that will be carried out includes curriculum analysis and technology analysis which is considered to represent the importance of developing learning media in this study.

Needs Analysis
The curriculum applied in most schools is the 2013 curriculum. The subject matter that will be developed is physics as an important material that underlies students to know the science of science.

Technology Analysis

This learning is using "web based learning." Four aspects of learning using the website are considered to have met the category as learning media: First, Materials. Internet-based media material is in the form of software (software) that functions to find learning references and learning resources, and what will be used is the Discord application. Second, Tools. Internet-based media utilize hardware in the form of smartphones, PC computers as tools to process and obtain learning references that contain information related to learning materials. Third, techniques, or routine procedures used to use tools, applying techniques are carried out by discussion and self-presentation. Fourth, Environment. The location of students is very possible to do outdoors.

Material and Media Design and Development Phase/Preliminary Development Form of the Product (Design and Development)

The learning design is designed and made based on the previous needs analysis and adapts the material in physics learning. The steps are as follows:

1. Design (Design)

The initial step in development is to design a media development framework.

a. Initial Preparation of Materials and Media The media used, namely Discord, is an application that can be directly accessed, so it can be developed immediately.

The steps in material design are as follows:

a. Formulate KI and KD according to those used in school

b. Designing material in the form of Power Point and inputting some references on the discord server.

The steps in designing LMS-Discord are as follows:

a. Discord server creation

b. Content creation on Discord servers

Next, the researcher will make an assessment or validation instrument that will be given to media experts and material experts as validators.

2. Development (Development)

The materials and media designed were developed and revised in several ways, namely material and media expert tests, as well as implementation in small group trials and large group trials.

3. Product Revision

Make revisions based on the results of the evaluation, namely the improvement and refinement of the products made.

4. Preliminary Testing

Products that have been made must of course pass an initial evaluation, which is carried out by material experts and media experts, namely lecturers and school teachers. The initial trial can also be referred to as the initial product validation stage.

5. Field Testing (Implementation)

Conduct field trials. The experiment was conducted by researchers only in one school. The trial aims to determine the feasibility of the product that has been developed. From this field test, a test of student learning outcomes will be obtained, and determine the effectiveness of the student activity sheet.

Product Evaluation and Revision/Post Operational Product Revision and Evaluation (Evaluation)

After the application of the product in the real class, the researcher distributed a questionnaire/questionnaire to teachers and students with the aim of seeing the responses of teachers and students to the product that had been developed, so that the level of practicality could be known. The Post Operational Product Revision is intended to make revisions if the results obtained do not meet the criteria.

C. Product Trial

Product trials developed include

1. Trial Design
2. Trial Subject

a. Validation Subject

b. Trial Subject

D. Data Collection Techniques and Instruments

The data collection instrument in this study followed the ADDIE model development procedure (Analysis, Design, Development, Implementation, Evaluation).

Eligibility

1. Analysis
2. Design

3. Development

At this stage, the resulting product development is carried out, namely Blended Learning learning materials on Elasticity, as well as Discord-based Learning Management System media.
a. Material and Media Validation
b. Product Revision
1. Effectiveness
2. Implementation

This stage is the implementation stage or the implementation of giving products/treatments to students, to determine the effectiveness or learning outcomes of students before being given treatment through questions in the early stages of Pre-test, and test of learning outcomes (Post-test). The data collection technique was in the form of statistical test of learning outcomes in the experimental class and the control class.

3. Practicality
4. Evaluation

In the last stage of the ADDIE model, the activities carried out are evaluating learning programs and evaluating learning outcomes. At this stage, the evaluation stage is a stage to measure the practicality of the product being developed. The data collection technique is in the form of giving questionnaires to teachers and students which will later be used as the results of the practicality test.

Data Analysis Techniques
Data analysis techniques used in this study include:

Quantitative Data Analysis
a. Validity Analysis (Valid Criteria Test)
The questionnaire test for the validation of material experts and learning media can be done by comparing the number of respondents' scores (∑) with the number of ideal scores (N). The formula according to Arifin (in Endang, 2013) is as follows:

$$P = \frac{\sum R}{N} x\ 100\%$$

Information
P = Percentage score (rounded up)
R = Total score of answers given by each respondent
N = The total number of ideal scores in one item

The questionnaire consists of positive questions with answer choices of Very Appropriate, Appropriate, Less Appropriate, Not Appropriate, and Strongly Not Appropriate. The scores for each answer are: 5 for the Very Appropriate category, 4 for the Appropriate category, 3 for the Less Appropriate category, 2 for the Disapproving category and 1 for the Strongly Disagreeable category. Furthermore, the average actual score for each aspect of the assessment obtained is converted into qualitative data on a scale of five referring to the table as follows.

Table 1: Criteria for Validity of Discord-based Blended Learning

No	Interval	Category Score
1	$X > \bar{X}_i + 1{,}8sb_i$	Very good
2	$\bar{X}_i + 0{,}6sb_i < X \leq \bar{X}_i + 1{,}8sb_i$	Good
3	$\bar{X}_i - 0{,}6sb_i < X \leq \bar{X}_i + 0{,}6sb_i$	Pertty good
4	$\bar{X}_i - 1{,}8sb_i < X \leq \bar{X}_i - 0{,}6sb_i$	Enough good
5	$X \leq \bar{X}_i - 1{,}8sb_i$	Not goot

Information

X = score from validator
$\bar{X}_i$ = mean ideal score
= $\frac{1}{2}$ (ideal maximum score + ideal minimum score)

sb_i = ideal standard deviation

$= \frac{1}{6}$ (ideal maximum score – ideal minimum score)

Widoyoko (2009)

Table 2: Criteria for the Validity of Discord-based Blended Learning

No	Score Interval	Category
1	$X > 4{,}2$	Very good
2	$3{,}4 < X \leq 4{,}2$	Good
3	$2{,}6 < X \leq 3{,}4$	Pertty good
4	$1{,}8 < X \leq 2{,}6$	Enough good
5	$X \leq 1{,}8$	Not good

a. Learning Effectiveness Analysis (Effective Criteria Test)
a) Test Statistics Independent Samples T-Test
The conditions that must be met before conducting the T-test are:
1. Samples must be Independent (free)
2. Normality Test
a. Graph Analysis
b. Kolmogorov-Smirnov. test
This test is based on the Kolmogorof-Smirnov Test on the model being tested. The Kolmogorov-Smirnov test is carried out by making the following hypotheses:
Ho: data is normally distributed, if sig. 2-tailed > a + 0.05
Ha: the data is not normally distributed, if sig. 2-tailed < a + 0.05

3) Homogeneity Test
The formulation of the hypothesis is:
- Ho: There is no difference in the average student learning outcomes between the experimental group and the control group
- Ha: there is a difference in the average student learning outcomes between the experimental group and the control group

The basis for decision making in the hypothesis is as follows:
a. If the value of Sig. (2-tailed) > 0.05 then Ho is accepted and Ha is rejected.
b. If the value of Sig. (2-tailed) < 0.05 then Ho is rejected and Ha is accepted.
The decision making is based on the comparison of the value of tcount with ttable in the independent samples t-test, namely:
c. If the value of tcount < ttable then Ho is accepted and Ha is rejected.
d. If the value of tcount > ttable then Ho is accepted and Ha is rejected.

b. Product Practicality Analysis (Practical Criteria Test)
Learning media is said to be practical if it meets the following indicators:
1. The validator states that the media can be used with little or no revision which is called theoretically practical.
2. The results of the teacher's response and the student's response gave a positive response, which was indicated by the results of the questionnaire given.
The calculation steps are as follows:
1. Determine the category for each statement item in the questionnaire according to the available alternative answer choices

Table 3: Choice of Answers and Category of Statements

Answer Options	Category	
	Positive Statements	Negative Statement
Strongly Agree	Very Good	Very Disagree
Agree	Good	Not good
Fairly Agree	Fairly good	Fairly good
Disagree	Not good	Good
Strongly Disagree	Strongly Disagree	Very Good

1) Calculate the response category of each aspect
For each response category for each aspect, the percentage is calculated using the following formula:

$$U_{ij} = \frac{Jumlah\ respon\ aspek\ ke-i\ kategori\ ke-j}{Jumlah\ maksimal\ respon\ aspek\ ke-i\ kategori\ ke-j} \times 100\%$$

Keterangan: U_{ij} = Persentase respon aspek ke-i kategori ke-j

1. Calculating the percentage of total responses for each category

$$U_{ij} = \sum_{i=1}^{n} U_{ij}$$

Description: Uj = percentage of total response for each category
n = number of aspects

The steps for calculating the percentage of positive responses from teachers and students are as follows:
Give a score for each statement item in the questionnaire according to the alternative answer choices given

Table 4: Answer Options and Scores for Each Statement

Answer Choice Score	Skor	
	Positive Statement	Negative Statement
Strongly Agree	5	1
Agree	4	2
Simply Agree	3	3
Disagree	2	4
Strongly Disagree	1	5

2) Calculate the percentage of response for each aspect
The formula used in calculating the percentage of response for each aspect is as follows:

$$PR_i = \frac{\sum_{j=1}^{n} S_j}{Skor\ maksimal\ aspek\ ke-i} \times 100\%$$

Description: PRi = percentage of response to the i-th aspect
Sj = j statement score
n = the number of statements in the i-th aspect

2) Calculate the average of the total percentages:
The formula used in calculating the average total percentage is as follows:

$$RPT = \frac{\sum_{i=1}^{m} PR_i}{m}$$

Description: RPT = average percentage of total
PRi = percentage of response to the i-th aspect

Table 5: Positive Response Criteria

Average Percentage Total (%)	Category
85 ≤ RPT	Very positive
70 ≤ RPT < 85	Positive
50 ≤ RPT < 70	Less positive
RPT < 50	Not positive

Yamasari (2010)

From these data, it can be seen the response of students and teachers to the developed learning design. In addition, the data obtained is also an assessment of the practicality of the design developed.

Results and Discussion
Description of Research Results
1. Validity/Feasibility Test

Analysis
The first stage in this development research is Analysis. There are two points analyzed, namely analysis of needs in the field and analysis of technology.

a. Needs Analysis

From the results of an interview with one of the Physics subject teachers at SMA Negeri 1 Tomohon, Dra. Mintje Pontoh, has summarized some information that can be used, namely; (1) Learning in the classroom, especially the 11th grade Physics lesson currently relies on modules (2) The orientation of learning tends to be irregular because there is no special platform for learning that can be used as a place for student interaction inside and outside of school (3) Students also experience problems regarding the material being studied because only through the modules provided too much information makes students lose interest in learning (4) Students are given video-assisted material, but tend to be of long duration.

Through the summary of the problems above, the researchers designed the Blended Learning learning design which is expected to minimize or overcome these problems.

b. Technology Analysis

In determining the media to be used as a Learning Management System, there are several options that can be used, such as Google Classroom, Edmodo, etc. The media used as a Learning Management System in this study is Discord. Discord is an online media that has various advantages that can be applied in learning.

The advantages of the Discord application:

- Free app
- Chat via text, voice or Videocall
- Can send files on channels (Max 8MB)
- Does not consume a lot of memory when running
- Data is encrypted so its security is guaranteed

From these advantages, Discord is suitable for the development of blended learning on Elasticity material for remote/online learning.

Design

The next stage is designing or designing learning materials and media.

a. Learning Design

In this study, the learning design of RPP Blended Learning was divided into 2 meetings, one meeting each offline (outside the network) and online (in the network).

The learning model that is combined in each meeting is the Flipped Classroom model.

The learning activities that will be carried out refer to the steps of blended learning with the flipped classroom model, organize students to learn, provide opportunities for students to study in groups, and evaluate the results of student discussions. The learning design or blended-learning lesson plans that will be implemented are briefly described in table 4.1

b. Media design

The media design stage carried out includes several stages, namely the preparation of the display on the website server www.discord.gg (web)/Discord application, making PowerPoint as a learning reference for students, selecting material from related sources, inputting material into the online server, share server links to students via the Whatsapp application in class groups or directly in class.

1. Setup server view

The arrangement of the display on the server is the initial stage before inputting material and learning activities in Discord media. This is done so that when students enter Discord, students do not have difficulty finding material and participating in learning activities. Discord provides various facilities such as: (a) Voice Call, (b) Video Call, (c) Room to talk/discuss, (d) Sharescreen, etc.

The display arrangement can be done when logged into Discord. An option will appear to create a server, if you already have a server, we can adjust the appearance of the server according to the concept you want to create. The steps for setting up the server display are as follows: (a) click the + sign next to a text channel to create or add a text channel; (b) input the channel name according to the function of the channel; (c) click the + sign next to the text channel to create a voice channel; (d) name the voice channel according to the function of the channel; (e) input material into the server; (f) invite students/members to join; (g) Discord media is ready to use.

Discord display that has been designed as shown in Figures 4.1 and 4.2

2. Material input stage Elasticity
3. Discord media sharing link sharing stage
4. The learning stage using Discord media

The last stage after students join is the learning stage. At this stage learning is carried out online in accordance with the Learning Design that has been made. The learning steps through the Discord application/web are as follows: (a) Students are directed to

Development

The third stage in the ADDIE procedure is development. At this stage the development of the design results that have been designed is carried out. After designing the design, a design validity test was carried out by media experts and material experts as well as a small group test to determine the validity of the Discord media-based learning design that had been made.

Learning Design Feasibility Validation

The validation of this learning design was carried out by media experts and material experts.

1) Material Expert Validator

This validation was carried out by a material expert consisting of two validators with a range of values for an expert assessment score of 1-5. It was found that the Discord media-based learning design in terms of the material aspect was declared valid with a slight revision.

Because the score reaches the very good category, the learning design is declared valid.

Media Expert Validator

This validation was carried out by media experts consisting of one validator with a range of values for the expert assessment score of 1-5.

Because the score reaches a good category, the learning design is declared valid.

1. Revision of Initial Material and Media After being revised, the product will be tested on a small group.
2. Small Group Test This Learning Design is declared feasible to be implemented in real learning, through the feedback provided.
3. Revision of Final Material and Media The product is ready to be given in class.

The revision includes the appearance of the material used, which is summarized in Table 8.

Test Effectiveness

Implementation

The implementation phase is carried out to see the effectiveness of learning (learning outcomes). The results of the development of Blended Learning learning were implemented in a real class (field test) to 30 experimental class students, and to see the comparison/effectiveness of the resulting product, 30 control class students were taken as comparisons.

Learning Outcome Test, Independent Sample T-Test

Independent Samples T-test is a statistical test whose function is to compare the averages of two groups that are not related to each other (two independent samples), so that it can be seen whether the two samples have the same average or not.

Output Interpretation, Group Statistics

It is known that the number of learning outcomes for both the control class and the experimental class is 30 each. The average value (mean) for the control class is 36.40, while the experimental class is 43.13. Thus, statistically descriptive, it can be concluded that there is a difference in the average learning outcomes of class students who use Discord-based blended learning products and those who do not use these products.

Table 6: Table of Statistics of Control Group and Experimental Group

Group Statistics

	Kelas	N	Mean	Std. Deviation	Std. Error Mean
Hasil Belajar Siswa	Kelas Kontrol	30	36.40	5.367	.980
	Kelas Eksperimen	30	43.13	3.954	.722

A) Independent Samples Test

To prove whether the difference between the control class and the experimental class is significant, it can be seen through the independent samples test table.

Table 7: Table of Independent Samples Test Student Learning Outcomes

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
Hasil Belajar Siswa	Equal variances assumed	.508	.479	-5.532	58	.000	-6.733	1.217	-9.170	-4.297
	Equal variances not assumed			-5.532	53.321	.000	-6.733	1.217	-9.174	-4.293

Based on the output above, it is known that the value of Sig. Levene's Test for Equality of Variances is 0.479 > 0.05, it means that the data variance between the control group and the experimental group is homogeneous or the same (V. Wiratna, 2014)

So that the interpretation of the Independent Samples Test output table is guided by the values contained in the "Equal variances assumed" table. experimental group. The difference between these differences is -9,170 to -4,297 (95% Confidence Interval of the Difference Upper Lower)

Furthermore, the value of tcount is -5.532. The tcount value is negative because the average value of the learning outcomes of the first group (control group) is lower than the average value of the learning outcomes of the second group (experimental group). Then the decision-making test of independent samples t-test through a comparison between the values of tcount and ttable can be continued, by changing the value of tcount to be positive, tcount = 5.532.

To find the value of ttable refer to the formula /2; (df), is the level of significance, in this study is 0.05, while df is the degrees of freedom or degrees of freedom in this study, namely 60-2 = 58. So that the ttable seen in the distribution table is 0.025;58, which is 2.00172, ttable = 2.00172.

Thus, t¬count 5.532 > ttable 2.00172, so based on the basis of decision making through comparison of tcount and ttable values, it can be concluded that Ho is rejected and Ha is accepted, which means that there is a difference in the average student learning outcomes between the control group and the experimental group, or with In other words, the effectiveness of discord-based blended learning experiences differences and produces different learning outcomes.

Practicality Test

Evaluation

The evaluation stage is the last stage in the ADDIE model. Evaluation stage is used to analyze the practicality of products that have been designed, developed and implemented. The practicality test was obtained from a questionnaire of teacher and student responses to the product being developed.

Practicality Assessment

Results of Teacher Practical Analysis of Discord-based Blended Learning Products.

Table 8: Table of Practicality Analysis by Teachers

No	Aspec	Category					Total (%)
		SB(%)	B(%)	CB(%)	TB(%)	STB(%)	
1.	Quality of Content and Objectives	32.33	66.67	0	0	0	100
2.	Technical quality	31.67	75	0	0	0	100
3.	Quality of learning and instructional	50	44	0	0	0	100
Total average (%)		38	62	0	0	0	100

Description: SB = Very Good, B = Good, CB = Pretty Good, TB = Not Good, STB = Very Bad

1) Results of the Analysis of Teachers' Positive Responses to Discord-based Blended Learning Products

Table 9: Percentage of positive responses of teachers to the learning design of blended learning based on Discord media

No	Aspect	Positive Response (%)	Category
1	Quality of Content and Objectives	87	Very Positive
2	Technical quality	86	Very Positive
3	Quality of learning and instructional	88	Very Positive
		87	Very Positive

Results of the Practical Analysis of Students on Blended Learning Products based on Discord

Table 10: Table of Practical Analysis by Students

No	Aspect	Category					Total (%)
		SB(%)	B(%)	CB(%)	TB(%)	STB(%)	
1.	Quality of Content and Objectives	44.80	51.20	0.00	4.00	0.00	100
2.	Technical quality	51.20	47.40	0.00	0.60	0.80	100
3.	Quality of learning and instructional	49.40	49.00	0.00	1.60	0.00	100
Total average (%)		48.46	49.2	0.00	2.06	0.27	100

Description: SB = Very Good, B = Good, CB = Fairly Good, TB = Not Good, STB = Very Not Good

1) Results of the Analysis of Student's Positive Response to Blended Learning Products based on Discord

Table 11: Percentage of positive student responses to the blended learning design based on Discord media media

No	Aspect	Positive response (%)	Category
1	Quality of Content and Objectives	87	Very Positive
2	Technical quality	87	Very Positive
3	Quality of learning and instructional	86	Very Positive
Total average (%)		86.66	Very Positive

Discussion

1. The Process of Developing Blended Learning Design Based on Discord Media

Discord media-based blended learning learning designs that have been created and validated by media expert validators and material experts are included in the valid category and can be used with minor revisions. After the learning design is declared valid by the validator, it will be tested on class XI students at SMA Negeri 1 Tomohon to determine the validity, practicality and effectiveness of the teaching aids developed.

2. Assessment of Feasibility Criteria for Blended Learning Design Based on Discord Media in terms of its validity

Validity of Discord-based blended learning learning design refers to the results of the assessment data analysis on the validation sheet of media experts and material experts. The learning design is said to be valid if it meets the valid or very valid criteria. The results of the validation sheet data analysis by media experts and material experts are shown in table 4.13 below:

Based on the results of data analysis on the assessment of blended learning learning design based on Discord media that has been validated by media experts and material experts, the average total score is 4.24. These results indicate that the Discord-based blended learning learning design that was developed is included in the Very Valid category, matched with the validity criteria according to Widoyoko (2009). Thus, the blended learning design based on Discord media can be said to be valid.

Assessment of Feasibility Criteria for Blended Learning Design Based on Discord Media in terms of its effectiveness

Discord-based blended learning learning design is said to be effective if the effectiveness criteria are in accordance with the hypothesis that each test aspect has a difference between the experimental class and the control class (the average value of the experimental class > the average value of the control class)

The following are the results of the effectiveness analysis through student learning outcomes tests:

Thus, the blended learning design based on Discord media can be said to be effective.

1. Assessment of the Feasibility Criteria for Blended Learning Design Based on Discord Media in terms of its practicality

Discord-based blended learning learning design is said to be practical if the average percentage of teacher and student questionnaire responses reaches the practical category.

Based on the results of the practicality analysis in table 4.15, it was found that the average percentage of total teacher and student responses reached 86.83% and was included in the very practical category. Thus the learning design of blended learning based on Discord media can be said to be very good or very practical.

1. Conclusion of Validity, Practicality and Effectiveness of Discord-Based Blended Learning Learning Design

The results of the research and data analysis that have been carried out by researchers, state that the blended learning design based on Discord media can be used in learning mathematics with three-variable linear equation systems. The following are the results of research and data analysis as a whole:

Table 12: Conclusion of Research Results and Data Analysis

Valid	**Discord media-based blended learning learning design is valid because the results of the assessment of the media expert and material expert validator are 4.24**

Practical	Discord-based blended learning learning design is practical because the percentage of teacher and student responses reaches 86.83%
Effective	Discord-based blended learning learning design is effective because it meets the research hypothesis of effectiveness testing through student learning outcomes tests

These data indicate that the blended learning learning design based on Discord media elasticity material that has been designed and developed has met the valid, practical, and effective criteria.

Conclusion

Discord media-based blended learning learning design is valid because the results of the assessment of the media expert and material expert validator are 4.24 (Valid). 2) Discord-based blended learning learning design is practical because the percentage of teacher and student responses reaches 86.83%. 3). Discord-based blended learning learning design is effective because it meets the research hypothesis of effectiveness testing through student learning outcomes tests

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