



Development of flipped classroom based blended learning on the subject of classification of living creatures at SMP Negeri 10 Manado

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Abstract

Research has been carried out which aims to develop flipped classroom-based blended learning on the subject of classification of living things at SMP Negeri 10 Manado. The research method used in this research refers to the Research and Development Model with the ADDIE model which consists of five stages, namely analysis, design, development, implementation and evaluation. The results show that: (1) The quality of the product produced is in accordance with theory and internal consistency (valid), the product developed is easy to use (practical), and the product that has been created and developed provides good results for its users (effective); (2) The product has been successfully designed and developed and then tested, and based on research statistical data it is concluded that flipped classroom-based blended learning on the subject of classification of living things at SMP N 10 Manado increases the effectiveness of science learning.

Keywords: Blended learning, flipped classroom, research and development model

Introduction

Technology is an essential thing that humans use every day. The use of technology is also often utilized in the world of education, especially in learning to improve quality and effectiveness in the classroom. This means that teachers and students have the right to receive and hope to always develop in education with the use of technology. The Independent Learning Curriculum is a form of government effort to improve the quality of education in Indonesia, which is oriented towards students' freedom to be more creative through learning activities that have been created by utilizing existing technology, and allows teachers to be more flexible in carrying out different learning depending on their needs. from the skills and abilities of the students in the class. Thus, the learning process in schools that implement the independent learning curriculum is also experiencing changes, along with technological developments. Therefore, teachers are required to be able to keep up with the changes that occur, especially in using the facilities available at school.

However, there are problems in implementing the free learning curriculum in the world of education, including that the implementation of the free learning curriculum causes teachers and students to experience problems in using technology during the learning process. Technology cannot be separated from problems, because technology was born and developed to solve problems faced by humans which have become a collective problem for the nation and even the world which brings changes and demands for adaptation in various lines of life, including education and learning (Kemendikbud, 2022). There are other problems such as adaptation from students who are not used to learning at different levels, especially science lessons. At elementary school (SD) level, natural science learning is usually only associated with natural phenomena which can be absorbed and understood easily, whereas at higher levels, natural science tends to be more complex towards branches of

natural science and combined with branches of natural science. another.

This is what is experienced by the 7th grade students at SMP Negeri 10 Manado, in science learning, students are not yet accustomed to the new learning environment, which results in the effectiveness of learning still being relatively low, with indications that the learning offered is less interesting and boring, there is a lack of student interest in learning and lack of motivation in implementing the learning process that takes place in the classroom, which results in students' learning outcomes decreasing. Therefore, an appropriate learning model or approach is needed to overcome this problem, especially in the matter of classifying living things. But of course, in implementing a learning model, the teacher must first develop a model or approach according to the conditions in the classroom, especially for science learning, so the teacher must also understand the characteristics of the lesson. The characteristics of science subject matter require the ability to master and manage changes between different representations simultaneously. In science learning, a mature understanding of concepts is needed so that students can understand.

Seeing the opportunities for using technology in learning, Blended Learning can be used as an alternative for teachers and students to overcome the problem of learning effectiveness. Blended Learning, comes from English which consists of two words, namely blended and learning. Blend, which is a mixture or combination of various kinds or types of learning, and Learning which means learning. Thus, it can be defined as a combination of aspects in learning consisting of two or more strategies or media used. The aspects combined can take any form, for example methods, media, resources, environment or learning strategies and are not only limited to a combination of face-to-face and online learning so as to provide the most effective and efficient experience (Nurdian, 2016) ^[18].

In choosing a model that can be integrated into blended learning, the flipped classroom can be used as a model that can encourage active-effective learning for students. Flipped classroom is one element of blended learning, integrating face-to-face learning in class through group discussions and distance learning outside of class by watching asynchronous video lessons and online collaboration. Therefore, by implementing a flipped classroom approach for teaching and learning activities, teachers can move traditional lectures to video and students can listen to the lesson anywhere outside the classroom. Based on the description above, it is necessary to carry out research aimed at developing a flipped classroom-based blended learning model product on the subject of classification of living things at SMP Negeri 10 Manado.

Method

The type of research that will be used is Research and Development which aims to develop Canva-based learning media. The research method used in this research refers to the Research and Development Model with the ADDIE model which consists of five stages, namely Analysis, Design, Development, Implementation and Evaluation developed by Dick and Carey (1996) [2]. Next, the product developed is tested.

The instrument or data collection tool in this research follows the ADDIE model development procedures such as the analysis, design and development stages including validity. Meanwhile, the implementation stage includes effectiveness and the evaluation stage includes practicality. Data collection techniques at the analysis stage are interviews and observation. At the design stage, the product to be produced consists of learning media in the form of videos and PPTs as well as teaching modules consisting of RPPs and LKPD. At the development stage, product development is carried out, such as material and media validation and product revision. The implementation stage is the implementation stage of providing products to students. The data collection technique is in the form of statistical tests of learning outcomes in the experimental class and the control class. The data collection technique at the evaluation stage is in the form of giving questionnaires to teachers and students which will later be used as a practical test result.

Data analysis techniques used in this research include validity analysis (valid criteria test), learning effectiveness analysis (effective criteria test) such as paired samples t-test statistical tests, and product practicality analysis (practical criteria test). The conditions that must be met before carrying out the paired sample t-test are that the samples

must be paired, normality test and homogeneity test. The form of teacher and student questionnaires uses a Likert scale. The practicality of this learning design is determined from the results of the response questionnaire by teachers and students.

Results and Discussion

A. Results

1. Validity/Feasibility Test

1. Analysis

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

a. Needs Analysis

From the results of an interview with one of the science subject teachers at SMP Negeri 10 Manado, learning in the classroom tends not to motivate students to learn because the material provided is monotonous and inflexible. Students also experience problems regarding the material they study because only through the modules they are given too much information, making students lose interest in learning

Through the summary of the problems above, blended learning can be utilized by researchers in overcoming existing problems. Researchers then designed media designs in the form of short learning videos, with the hope of minimizing or overcoming these problems.

b. Technology Analysis






In determining the design of blended learning instruments, researchers utilized several free content as well as paid content in the external adobe after effects program in designing learning videos.

2. Design

The next stage is designing or designing learning materials and media. In this research, the learning design starts from the teaching module, which consists of lesson plans and worksheets which are divided into 2 meetings, once each for the classification of living things. The learning activities that will be carried out refer to discovery learning steps which organize students to think creatively, as well as the flipped learning model which organizes students to learn independently. Flipped learning provides students with the opportunity to evaluate learning in the classroom. Next, instruments were designed that would be used in both discovery learning and flipped learning. The learning instruments can be seen in Table 1.

Table 1: Design of learning instruments

1	 <p>Apakah kamu pernah memperhatikan benda-benda yang ada di lingkungan sekitar? Segala sesuatu yang ada di sekitar kita terdiri atas benda-benda.</p> <p>Perhatikan air yang biasa diminum, udara yang dihirup setiap saat, atau uang logam yang digunakan sebagai uang jajan.</p>	5	<p>Tugas Kelompok</p> <p>Bentuk kelompok dan pilih salah satu hewan disamping sebagai pokok pembahasan kalian, Jelaskan secara rinci mengenai klasifikasi hewan tersebut!</p>  <p>Group Assignments in Flipped Classroom learning</p>
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<p>2</p>	 <p>Tugas: Ilustrasi dan Contoh</p> <p>Dapatkan kalian mengkalimatkan 3 Contoh dibawah ini? Bentuk kelompok dengan teman dan diskusikan salah satu topik dibawah ini!</p> <p>Tasks in Discovery Learning</p>	<p>6</p>	 <p>Initial view of the Teaching Module</p>
<p>3</p>	 <p>Discovery-Flipped Classroom Teaching Materials</p>	<p>7</p>	 <p>Display of the contents of the Teaching Module</p>
<p>4</p>	 <p>Individual Assignments in Flipped Classroom learning</p>		

Development

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

a. Material Expert Validator

This validation is carried out by material experts consisting of two validators with a value range for expert assessment scores of 1-5. The results obtained were that the learning design in terms of the material aspect was declared valid with revision. Because the score reached the very good category, the learning design was declared valid.

b. Media Expert Validator

This validation is carried out by media experts consisting of one validator with a value range for expert assessment scores of 1-5. Because the score reaches the good category, the learning design is declared valid. Next, the total average of the results of the validity questionnaire conducted by material and media expert validators is calculated. Because

the score reached the very good category, the learning media design was declared very valid and can be used.

c. Revision of Initial Materials and Media

Initial product revisions aim to improve products that have been designed in accordance with the validator's directions. After revision, the product will be tested on a small group. At this stage, based on the validation results from material and media experts, the product can be used by making revisions. The revisions made were visual improvements and the addition of learning audio video music.

d. Small Group Test

The trial to discuss the suitability of this learning design was carried out by 5 people, namely 5 Class 8 students (randomly) at SMP Negeri 10 Manado. From the trial results, this learning design was declared suitable for implementation in real learning, through the feedback provided.

e. Revision of Final Materials and Media

Revision activities aim to carry out comprehensive finalization or final improvements to the product being designed. After the product has passed this stage, the product is ready to be given in class. The revision includes a

display of the materials used, which are summarized in Table 2.

2. Test Effectiveness

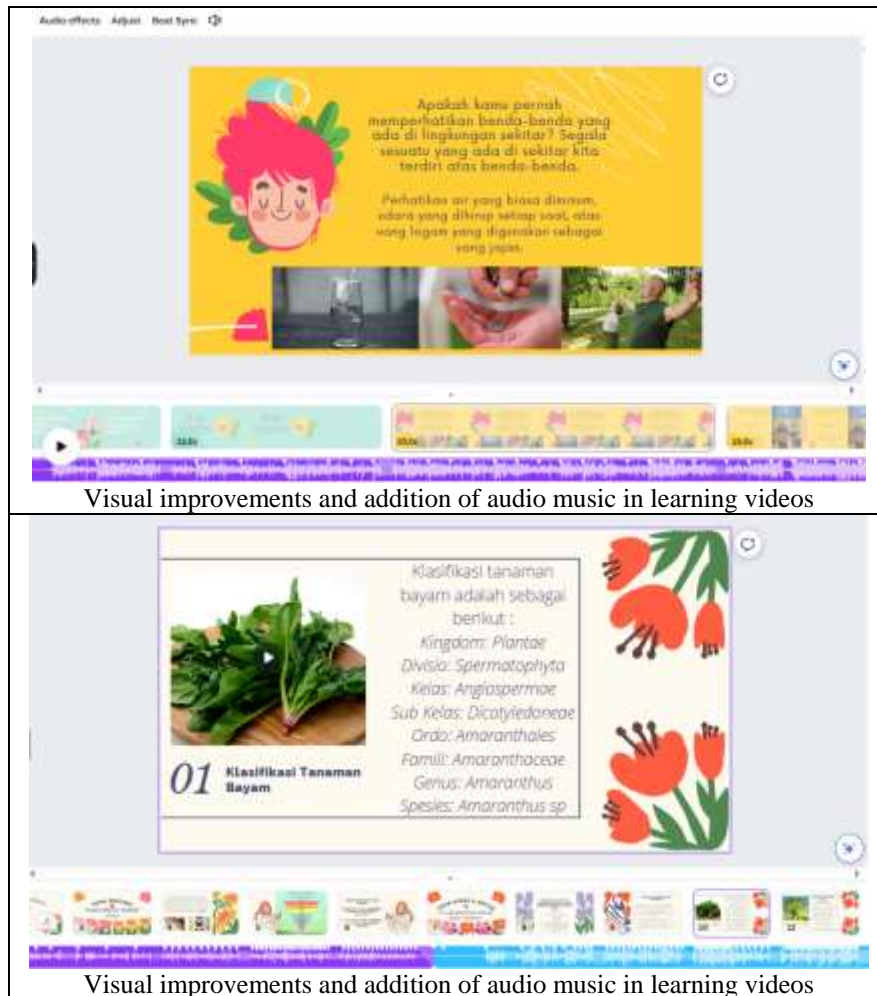
4. Implementation

Paired Sample t-test uses 2 class groups. Determination of this group is carried out during the data collection process, as well as after the product is ready for testing. The pre-test was not carried out in the control class because in this research, the control class will only be used as a comparison of the experimental class. Next, proceed with the prerequisite paired sample t-test, namely the normality test and homogeneity test.

a. Normality test

Next, the researcher carried out a normality test on the pre-test and post-test data for the experimental class and the post-test data for the control class. The Sig value in the Kolmogorov-Smirnov test on the experimental pre-test data is 0.78 and on the experimental post-test data is 0.59, so it can be said that the pre-test and post-test data are normally distributed because the Sig value is > 0.05 . Researchers also tested post-test data from the control class which will later be used as a comparison after testing the paired sample t-test. Sig value $0.055 > 0.05$ means the data is normally distributed.

Table 2: Product finalization



Visual improvements and addition of audio music in learning videos

Visual improvements and addition of audio music in learning videos

b. Homogeneity Test

The homogeneity test can be carried out if the data group is in a normal distribution. Data is said to be homogeneous if the sig value is > 0.05 . Based on the significance value of the average student learning outcomes, the data is homogeneous seen from the Sig value. $0.245 > 0.05$, so that the prerequisites for paired sample t-test testing have been met and can be continued.

c. Hypothesis Testing and Paired Sample t-test

Hypothesis testing in this research uses a paired sample t-test, which is an analysis by comparing the difference between two means of two paired samples with the prerequisite of data that is normally distributed and homogeneous. The Sig (2-tailed) significance value of the

experimental class students' learning outcomes obtained was smaller than 0.001. So, based on the statistical hypothesis test decision, H_0 is rejected and H_a is accepted, there is a significant difference in the average learning outcomes (pre-test $>$ treatment $>$ post-test) taught using flipped classroom-based blended learning.

Next, the researchers tested the initial research hypothesis to see whether there was an increase in the learning outcomes of students who used flipped classroom-based blended learning, higher than students who did not use this learning. The test carried out was comparing the average post-test score for the experimental class and the control class. The average value of the experimental class is 86.29 higher than the average value of the control class of 70.71 so it can be concluded that there is a difference in the learning outcomes

of students who use flipped classroom-based blended learning and it is higher than students who do not use learning.

3. Practicality Test

5. Evaluation

The decision on the practicality of the product was taken from the results of the students' positive responses in the questionnaire distribution. The questionnaire was filled out by 35 students as respondents, to see and analyze their responses to the products that had been designed and developed. From the total average results obtained, it can be concluded that the flipped classroom-based blended learning product is practical.

Discussion

The learning approaches commonly applied in various schools today still tend to use conventional methods, which emphasize direct interaction between teachers and students. This happens even though the world of work and business is currently increasingly focused on information and communication technology (ICT), which makes various activities easier. In the context of knowledge transfer in learning, various modern media have made it easier for students to access the information and knowledge needed in the realm of education.

The main challenge faced is the low level of technology mastery by students and teachers, so that many educational institutions in Indonesia are still switching to traditional learning methods. Therefore, it is highly hoped that educational institutions can revolutionize learning approaches, replacing traditional face-to-face models with digital-based learning methods to prevent learning loss.

Learning loss is a situation where students lose general or specific knowledge or skills, or decrease academic achievement, which is caused by continuous learning crises. Learning loss can also occur as a result of stopping the educational process. Furthermore, learning loss is a concept that is defined as the absence of optimal learning processes carried out in schools (Kashyap et al., 2021; Li et al., 2020). Ekayogi (2023) believes that as educators, teachers are required to be able to innovate in learning. Therefore, in the learning process it is not enough to just apply the learning model, but there must be innovation. Currently, the role of appropriate technology is really needed to connect teachers and students so they can communicate and meet face to face even in different locations. This aims to achieve the expected educational goals and learning objectives. Addressing the 21st century generation of students requires teachers to adapt teaching strategies, models and methods according to the special characteristics of that generation. Teachers can no longer use conventional standard learning approaches. On the contrary, creativity and innovation are needed from teachers to enrich and update their knowledge and skills, so that they are able to present interesting learning activities by utilizing technology, including blended learning (Puspitarini, 2022)^[3].

Arifin (2023)^[1] summarizes that blended learning is face-to-face learning in class using information technology carried out online where there is a combination of learning resources, learning methods and learning media. Students access learning via the internet using computers and cellphones based on guidance from student worksheets. Students learn to understand examples of problem solving

from internet videos, then work on the questions given by the teacher.

Husamah (2014)^[8] explains that there are three components that support Blended Learning, namely: (1) Face-to-face, which is a learning process where an educator interacts or meets directly with students in a place, for example a school. (2) E-learning, internet technology-based learning activities in the process of interaction between students and educators. (3) M-Learning, is the meaning of the technological media that will be used, for example, PC, laptop, tablet, cellphone and other technological media. Based on the three components stated above, we can draw a conclusion, namely that in blended learning, there are three components that must be completed to carry out the blended learning model.

Sulangi (2022)^[17] in research on the development of Discord-based blended learning at SMA N 1 Tomohon, developed a product in the form of a Learning Management System (LMS) and found that using Discord as an E-learning LMS was able to improve student learning outcomes and increase student learning motivation. This can be seen from the research results with the effectiveness level of the difference between the mean of the experimental class and the control class of 6.733, which is the difference between the average learning outcomes of the control group students and the learning outcomes of the experimental group students. The difference is 9.170 to 4.297 (95% Confidence Interval of the Difference Upper Lower).

Anggrayni (2023)^[4] in research on the application of the blended learning model with SAMS e-learning media also showed significant improvement results, seen from the results of observations of student activities obtained. Data on the average percentage of observation of meeting 1 in cycle 1 was 79.96%, while the average percentage of observation in meeting 2 in cycle 1 was 82.91%. while the average percentage of observations in cycle 1 was 81.44%. From the results of activity observations carried out twice, it showed a significant increase.

The application of the blended learning model can also be combined with the mastery flipped classroom. The research stages began with (a) the researcher distributing learning material on the WhatsApp group, the material was delivered in the form of a learning video. (b) the researcher informs the students to study the material that has been distributed. (c) the next day of face-to-face learning. (d) the researcher reviews a little of the material presented via video. (e) researchers distribute LKPD. (f) students present the results of the LKPD in front of the class. (g) researchers appreciate the success and activeness of students in participating in the learning process. (h) researchers provide evaluations in the form of multiple choices (Shelawati et al., 2023)^[15].

Similar research was also conducted by Hazmi (2021)^[7] to increase students' digital literacy, namely implementing the blended learning model in the 4.0 learning process in order to increase the digital literacy of classroom students. The implementation of the blended learning model starts with online learning via WhatsApp. This learning begins with the teacher sending materials and assignments, which students then respond to by sending photos and videos according to the assignments given. When there are several things related to the material and assignments that students do not understand, they can ask at any time via the WhatsApp class group or personal chat with the class teacher. If students don't understand the e-learning process, they will be given the opportunity to come to school in turns.

Learning using the blended learning model can overcome learning problems that generally occur in schools, such as an inadequate number of teachers so that the combination of technology in the learning process can be an alternative source of information for students to be able to understand and obtain the information they need themselves. Learning that is packaged in an interesting way and combined with technology will increase students' interest in learning. Apart from that, students will be able to gain broader knowledge. Blended learning can support diverse student characteristics through providing varied instruction (Prescott et al., 2018). Thus, blended learning with the application of the flipped classroom, which is basically an online basis, can be applied to learning in schools and have a significant impact on student learning outcomes.

A summary of the results tested and carried out at SMP N 10 Manado, namely the validity, effectiveness and practicality of the products that have been developed, is shown in Table 3. Thus, the development of flipped classroom-based blended learning on the material of classification of living things is viewed from the criteria of validity, practicality and effectively provides a good effect and helps students and teachers in carrying out learning at school, especially at SMP N 10 Manado.

Table 3: Summary of research results and data analysis

Valid	The flipped classroom-based blended learning lesson seen from the results of the validator assessment of media experts and material experts is 4.45
Effective	The learning design is effective because it has fulfilled the research hypothesis of testing effectiveness through learning outcomes tests and statistical data from the Paired Sample t-test
Practical	Flipped classroom-based blended learning is very practical as seen from the percentage of teacher and student responses reaching 89.9%

Conclusion

1. The quality of the product produced is in accordance with theory and internal consistency (valid), the product developed is easy to use (practical), and the product that has been created and developed provides good results for its users (effective).
2. The product has been successfully designed and developed and then tested, and based on research statistical data it is concluded that flipped classroom-based blended learning on the classification of living things at SMP N 10 Manado increases the effectiveness of science learning.

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