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Development of A Guided Discovery Learning Model Based on E-Learning in Thematic Learning

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Abstract: The research objectives include several things. The aim is to develop and analyze the effectiveness of an e-learning based guided discovery learning model in thematic learning for class V elementary school. The way to answer the research objectives is to use the ADDIE Research and Development (R&D) model. The school sample for testing the effectiveness of the model developed was selected based on probability sampling. After the sample was determined, the research results showed that the validity of the learning model was very good and could be used, while the results of the effectiveness of the model implementation could be understood through the posttest results and the results of filling out the questionnaire. Based on these results, it can be concluded that classes that use the guided discovery learning model have higher learning outcomes on average. The average learning outcome of students who studied with the e-learning based guided discovery learning model in the test class was 91.47 with a completion rate of 100%, while the control class which used the guided discovery learning model showed an average learning outcome of 88.33.

Keywords: Guided Discovery Learning; E Learning; Thematic Learning

Introduction

Often science learning is even carried out in the form of exercises to solve problems, solely in order to achieve the target learning outcome evaluation value as the main measure of student achievement and teacher success in managing learning. Science learning should emphasize mastery of basic scientific work abilities or science process skills. Based on document data and test results, it shows that the majority of class V students' learning outcomes in science subject content are still below the Minimum Completeness Criteria (MCC). For example, based on data on mid-semester science learning results for class V from 4 educational units in Blora District, an average score of 70.40 was obtained. So it can be seen that the average value is below 75 which is the Minimum Completeness Criteria (MCC) value. So, on this basis, before teaching, teachers should be able to determine the learning model that will be used according to the characteristics of the students. So by choosing the right learning model, the learning process will run well and appropriately to achieve the learning objectives. One learning model that teachers can apply is the e-learning based guided discovery learning model(Riyanti, 2018).

The e-learning based guided discovery learning model is a model developed from the guided discovery learning model. In most research, the model is still pure without the addition of other elements. So for that reason, this research takes the theme of developing an e-learning based guided discovery learning model with elements of renewal, namely e-learning. So, the important point of this research is the application of e-learning techniques embedded in the guided discovery learning model (Syamsir et al., 2020).

The Discovery Learning model is a model introduced by Bruner (1999) who believes that the Discovery Learning model is a model where students can obtain their own information, can evaluate their own results and sources so as to produce more information in

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each process. Arends (2012) explains that the Discovery Learning model emphasizes the learning process which is centered on students and active learning experiences where students then discover and express their ideas regarding the topic being studied. According to Popper (2005) discovery learning can train students to think critically, analyze and develop how they acquire knowledge (Saputri & Fransisca, 2020). According to Wenning (2005) the discovery learning model is at the lowest level at the level of inquiry. Discovery according to Wenning can make students develop basic concepts in the first experience where students focus on active involvement to build their knowledge. According to Kellough (2007) states that the steps in discovery learning are the need to identify relevant problems, in this case because students' thoughts will be visible when completing tasks either independently or in groups, then facilitating students in data collection activities and process it and students will be directed when making conclusions, then new knowledge will be discovered by students.

Each learning model will have its own characteristics which become a factor for teachers to consider in adjusting which learning model they choose according to their needs, including the guided discovery learning model. According to Westwood (2008), there are several characteristics of guided discovery learning, namely that in the implementation of learning, students are faced with a problem topic raised by the teacher, the teacher and students work together to find ways to investigate the topic where the teacher gives directions about what must be done and how to solve the problem given, students collect data from group discussions either individually or as a group about what has been found in the problem, then students make conclusions from the results of solving the problem, the teacher helps to straighten out students' understanding and confirms if there is wrong opinion (Naviri et al., 2019).

Meanwhile, E-learning or what is usually called an electronic learning system can be defined as the application of information technology to the world of education through virtual classes (Mufidah & Surjanti, 2021). E-learning can also be defined as any utilization or use of internet and web technology to create learning experiences. The principle of E-learning is that it is connected to a network which makes it easy to update, store, distribute, and share instructions and information instantly (Pamugar et al., 2014). E-learning has a very broad meaning, so it has been defined from various points of view. According to (Naidu, 2006) e-learning is an intensive use of information and communication technology networks in the teaching and learning process. According to (Rosenberg, 2006), e-learning is a tool for delivering information and a series of solutions, which aims to improve individual and organizational performance by using internet technology. Meanwhile, as explained by (Hartanto & Purbo, 2002), the term "e" or the abbreviation for electronics in elearning is used as a term for all technology used to support teaching efforts via internet electronic technology.

So, based on the explanation above, the essence of the e-learning based guided discovery learning model is electronic learning activities that are student-centered and active learning experiences where students then discover and express their ideas related to the topic being studied (Wiyanto, 2017). E-learning is a learning activity that fully involves students by utilizing information and communication technology networks to create a maximum learning process. In this case, the application that can be used to support e-learning is Google Classroom. Google Classroom can be accessed in 2 ways, namely via the website and application. The website can be accessed using any browser such as: Chrome, FireFox, Internet Explorer or Safari (Ebiere Dorgu, 2015). Meanwhile, the application can be downloaded for free via Playstore for Android and App Store for Google Classroom, namely an application that allows the creation of classrooms in cyberspace. Apart from that, Google Classroom can be a means of distributing assignments, collecting assignments and even assessing collected assignments (Singer, 2017).

Google Classroom acts as a media or tool that can be used by teachers and students to create online or virtual classes, saving time, teachers can provide announcements and assignments to students which are received directly (real time), so that everything remains organized for learning (Abid Azhar & Iqbal, 2018).

Method

This research is development research. Research and development methods are research methods related to products (Sugiyono, 2012). Development research can be carried out using several models, namely; ASSURE, Borg and Gall, Dick and Carry (2003), and the ADDIE model. In this development research, the ADDIE model was used. ADDIE stands for Analysis, Design, Development or Production, Implementation or Delivery and Evaluation. This model was developed by Dick and Carry. The flow of the ADDIE model is as Figure 1 (Sugihartini & Yudiana, 2018).

The research time including device testing is the even semester of the 2022/2023 academic year. The research was carried out in stages: preparation stage, development stage, and completion stage. This research was carried out in two elementary schools in the Dabin V area, Blora District, Blora Regency. The elementary schools are SDN 2 Patalan and SDN 2 Temurejo. SDN

Patalan as exam class 1 and SDN 2 Temurejo as exam class 2.

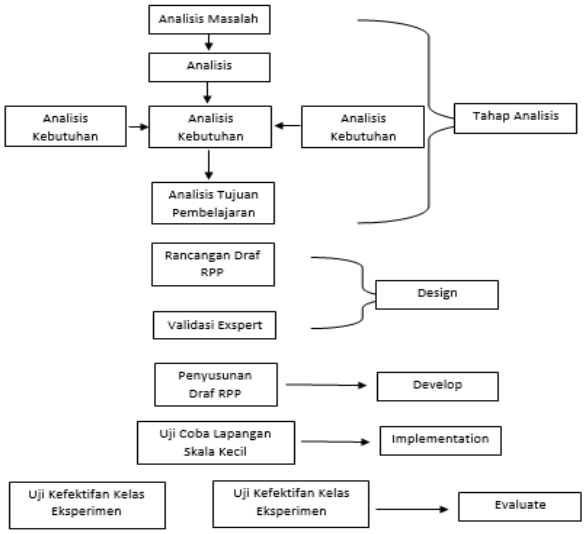

Figure 1. ADDIE model

The development model research procedure goes through several stages, these stages include: analysis, design, development, implementation, then evaluation to measure the achievement of the resulting product.

After testing the validity and reliability of the research tools and instruments, a complete data hypothesis test was carried out. In this research, the researcher conducted a prerequisite test first to determine the hypothesis test that will be carried out. This prerequisite test includes a normality test and a homogeneity test (Utami, 2017). Normality tests were carried out on learning motivation data and posttest results which showed the mathematical literacy abilities of the experimental and control groups using the Shapiro Wilk test formula. According to Triton (2006) data is said to be normal if Sig. > 0.05. The homogeneity test is carried out to find out whether the variants of several populations are the same or not. Suharsimi Arikunto (2006) stated that the homogeneity test aims to determine whether samples taken from the same population are uniform or not. The results of the homogeneity test calculation of learning motivation data and mathematics literacy scores use the Test of Homogeneity of Variances formula. Triton (2006) argues that data is homogeneous if the probability (sig.) is >0.05 and if the probability (sig.). Next, hypothesis testing was carried out on the post test results by comparing the results of the questionnaire with the LESSON PLAN using a proportion test. The aim is to find out whether the development of lesson plans is able to answer the hypothesis, with the criteria for hypothesis 1 being the same as the MCC 75 on average or the average not being the same as the MCC 75. Meanwhile, hypothesis 2 with the criteria that many students complete their studies more than 80%, then the development of the discovery learning model guided e-learning based on thematic learning in class V is effective or many students whose learning completeness is less than 80%, then the development of e-Learning based on guided discovery learning models in class is not effective.

Result and Discussion

The LESSON PLAN development process is adjusted to the research design. In developing the model there are several steps that are determined, these steps are:

Analysis Results

At this stage, the main activity is to analyze the need to develop new learning models/methods and analyze the feasibility and requirements for development. The activities carried out at this stage are: Pre-planning stage, namely thinking about new products (models, methods, media) that will be developed. By considering several literacies, the model developed is an e-learning based guided discovery learning model; Stage of identifying needs analysis. Based on the results of the student questionnaire, the needs related to current learning models require innovative learning models. This basis is the basis used by researchers to develop an e-learning based guided discovery learning model.

Table 1. Questionnaire Results from 28 Grade 5 Students Regarding Current Learning

Indicator	Number of Answers		Information
	Ya	Tidak	
The learning so far has made me happy to study science.	13	15	not enough
The teacher provides examples of questions that are interesting and easy to understand because they are related to everyday situations.	12	16	not enough
The teacher explains the material clearly and pleasantly.	13	15	not enough
Through the problems given by the teacher, an understanding of healthy food is created.	13	15	not enough
With the practice questions given by the teacher, I understand more about healthy food material.	14	14	not enough
This learning allows me to determine steps to solve a problem related to healthy food.	15	13	not enough

Indicator	Number of Answers		Information
	Ya	Tidak	
I am very interested in the problems given during the learning process.	10	18	not enough
I do the assignments given by the teacher because of my own will.	15	13	not enough
I complete the assignments given by the teacher within the specified time	11	17	not enough
I complete assignments from the teacher according to the steps and work instructions.	10	18	not enough
I try to complete every assignment from the teacher well and correctly.	15	15	not enough
The teacher always guides during the learning process	9	19	not enough
I enjoy studying in class with a group.	25	3	enough
I am confident to ask a teacher or friend if I encounter difficulties in completing.	15	13	not enough
The teacher helps us to draw conclusions from the results of the learning that has been carried out.	15	15	not enough

Based on the results of the questionnaire related to learning that was already underway before the research was conducted as shown in the table above, important points can be taken or reflected upon, namely: students are less interested in learning models so teachers need to innovate; examples of discussion material are not enough to activate students; learning has not been optimal in providing students with independent experience so they need to try new things; students are not punctual in completing assignments because they feel it is difficult; teachers do not guide students enough during the learning process, so teachers need to try online learning techniques to maximize the guidance process for students; and students like to study in groups.

Design Results

Referring to the results of the needs analysis above, the next step in this research is the design stage. 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 tools for evaluating learning outcomes. This design is still conceptual and will underlie the next development process. The activities carried out at this stage are with the following syntax:

Table 2. Syntax of The E-Learning Based Guided Discovery Learning Model

Stages	Activity
Expalin	Through Google Classroom, teachers convey goals/prepare students with student motivation by encouraging students to get involved in activities.
Student orientation to the problem	The teacher shares material links to explain simple problems related to learning material.
	Students read the material
	Students remember what they have learned
	Students answer the teacher's questions (reasoning)
	The teacher provides a reflection on the results of the students' answers
	Students listen to the teacher's explanation (gather information)
	Students observe learning media (observe) and record new things obtained (gather information)
Formulate a hypothesis	Guiding students to formulate hypotheses according to the problems raised through learning media.
	Students make small notes about the material based on learning media (reasoning)
	Students convey information related to the material obtained orally (reasoning)
Discovery activities	Guiding students in discovery activities by directing students to obtain the necessary information.
	The teacher divides the groups
	Students in their groups work on STUDENT WORKSHEETS (reasoning)
Present the findings	Guiding students in presenting the results of activities, formulating, concluding/finding concepts, and carrying out assessments.
	Group representatives present the results of their work (communicate)
	Students prepare reports on the results of activities
	The teacher and students conclude the lessons they have learned.
	Students complete a written evaluation
	Teachers provide follow-up to students (remedial/enrichment learning)
Evaluate activities	Evaluate activities. Evaluate the activity steps that have been carried out by reflecting on the beginning, middle and end of learning.

Development or Production Results

In this stage, the conceptual framework in the design stage is realized into a product that is ready to be implemented. The activity carried out at this stage is developing a lesson plan tool. The next activity is to validate the learning tools by expert validators consisting of 3 people, namely educational figures who have master's education qualifications and experts in the fields of language, materials and layout design. The learning tool assessment sheet uses a 1-4 Likert scale with the criteria Poor (K), Fair (C), Good (B), Very Good (SB). In order to give an idea of what the learning activities that constitute the development scenario look like, pay attention to the following table, while the full form of development of the e-learning based guided discovery learning model can be seen in the attachment.

Table 3. Learning Activities

Activity Description	Activity Mode
*Introductio*n	
The teacher greets and asks how the students are doing	Online
Students are invited to pray together according to their respective religions and beliefs	
The teacher invites students to sing the song "Indonesia Raya"	
Teachers communicate student attendance	
Students carry out literacy by reading a text entitled "healthy lifestyle"	
Students prepare for learning (preparation of stationery, textbooks, seats)	
Students sing the song "I am a healthy child" as an apperception	
The teacher conveys the learning objectives	
Core	
Teachers provide links to learning materials to students	
Step 1 Orientation/Stimulus	Online via
Students read the text "Dayu likes to eat vegetables" (reasoning)	Google
Students recall what they have learned about digestive medicine.	Classroom
Students answer the teacher's questions (reasoning)	
The teacher provides a reflection on the results of the students' answers	
Students listen to the teacher's explanation about the meaning of human digestive disorders (gathering information)	
Step 2 Identify the Problem	
Students observe pictures of human digestive organs (observe)	
Students complete a chart of human digestive organs using organ cards (reasoning)	
Students watch the video "Functions of the human digestive organs" (gather information)	
Step 3 Hypothesis Generation	
Students make small notes about the function of the digestive organs from the video shown (reasoning)	
Students describe the function of the human digestive organs orally in front of the class with the help of pictures of the human digestive organs (reasoning)	
Steps 3 and 4 Collecting data and Data Processing	
The teacher divides into 2 groups	
Students in their groups work on student worksheets 1 by naming pictures of organs and explaining the function of digestive organs (reasoning).	
Group representatives present the results of their work (communicate)	
Students listen to the teacher's explanation about healthy digestive organs which are also supported by a healthy lifestyle. A healthy lifestyle makes us aware of the importance of health and prevents us from bad habits that can disrupt our health. To remind us of the importance of a healthy lifestyle, print media advertisements are needed. (gather information)	
Students listen to the teacher's explanation about the elements of effective advertising (gather information)	
Students listen to examples of print media advertisements with the theme "healthy lifestyle" (gathering information)	
Students analyze print media advertisements including advertising sentences, keywords, image meaning and advertising targets (reasoning)	
Students state whether the advertisement is effective or not effective and the reasons (reasoning)	
Students give suggestions to make advertising more interesting/effective (reasoning)	
Students and their groups discuss working on student worksheets 2 analyzing print media advertisements (reasoning)	
Group representatives present the results of their work (communicate)	
Step 5 Verify	

Activity Description	Activity Mode
Students watch the video for the song "I'm a Healthy Child" and sing it to remember (gather information)	
Students listen to the teacher's explanation of simple rhythmic instruments for the song "I'm a Healthy Child" (gathering information)	
Students observe objects around them and create them into simple rhythmic instruments to accompany the song "I'm a Healthy Child" (reasoning)	
Students work on student worksheets 3 Singing the song "I am a healthy child" using a simple rhythmic instrument (reasoning)	
Group 1 sings the song "I am a healthy child" (trying)	
Group 2 accompanies the song with simple rhythmic instruments (trying)	
Students listen to the teacher's reflection about their performance (observe)	
Penutup	
Step 6 Concluding	
The teacher and students conclude the lessons they have learned.	
Students and teachers reflect on the activities that have been carried out during one lesson	
Students complete a written evaluation	
Teachers provide follow-up to students (remedial/enrichment learning)	
Students provide messages and impressions during one lesson	
The teacher informs the learning activity plan for the next meeting	
Students sing the regional song "Lir-ilir"	
Students pray according to their respective religions and beliefs	

Hasil Implementation or Delivery

At this stage, the designs and methods that have been developed are implemented in real situations, namely in the classroom. During implementation, the model/method design that has been developed is applied to actual conditions. The material is delivered in accordance with the new model/method developed. After implementing the method, an initial evaluation is carried out to provide feedback on the subsequent application of the model/method. Activities carried out at this stage are starting to use the new product in real learning, asking for initial feedback. Dick & Carey recommends three steps, namely:

Individual Trial

Individual trials are carried out to obtain initial input about the product on 1-3 people. After testing, the developer makes revisions based on input from the assessment results or observers (peers). As a foundation for understanding this individual trial, pay attention to the review below.

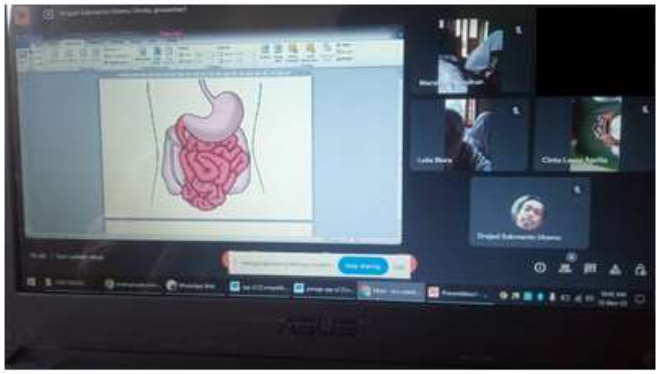

Figure 2. Individual Trial of Development Model

Table 4. Results of Individual Trial Observations by Colleagues

Indicator	Emergence	Reflection Results
Application of the e-learning based guided discovery learning model	yes	
The e-learning based guided discovery learning model can activate students.	yes	
Students look enthusiastic about participating in learning by implementing the e-learning based guided discovery learning model	yes	
Students look happy participating in learning activities using the e-learning based guided discovery learning model	yes	
Students carry out all learning activities without pressure	no	Students are still nervous about the e-learning based guided discovery learning model.
Students very easily understand the material presented by the teacher online	tidak	Suggestion: teachers need to convey information regarding the learning activities that will be carried out.

Indicator	Emergence	Reflection Results
The teacher's explanation of the material via Google Classroom is easy for students to understand.	yes	
The learning so far has made me happy to study science.	yes	
The teacher provides examples of questions that are interesting and easy to understand because they are related to everyday situations.	yes	
The teacher explains the material clearly and pleasantly.	yes	
Through the problems given by the teacher, an understanding of healthy food is created.	yes	
With practice questions given by the teacher, students will understand more about healthy food.	yes	
This learning allows students to determine steps to solve a problem related to healthy food.	yes	
Students are very interested in the problems given during the learning process.	yes	
Students are happy to complete the assignments given by the teacher	yes	
Students complete the assignments given by the teacher within the specified time	yes	
Students complete assignments from the teacher according to the steps and work instructions.	yes	
Students try to complete every assignment from the teacher well and correctly.	yes	
The teacher always guides during the learning process	yes	
Students are confident to ask teachers or friends if they encounter difficulties in solving.	yes	

Based on the results of the individual trial observations above, in general the e-learning based guided discovery learning model developed has had a positive impact on learning activities. However, despite this, several obstacles were still found, these obstacles were: students were still nervous about the e-learning based guided discovery learning model and students were nervous about learning activities that they were not used to, which affected their concentration in understanding the material.

Referring to the two problems above, for the next trial the teacher needs to do several things, namely: first, the teacher needs to convey information regarding the learning activities that will be carried out; second, teachers must often implement online-based learning.

Small group trials

Small group trials involve 5-8 people, then the results of these trials are used to revise the product. The process of this small group trial can be understood as described below.

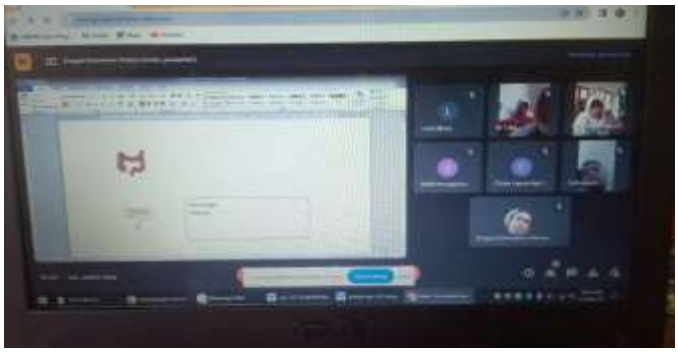

Figure 3. Small Group Trial of Development Model

Table 5. Observation Results of Small Class Trials by Colleagues

Indicator	Emergence	Reflection Results
Application of the e-learning based guided discovery learning model	yes	Overall, learning activities
The e-learning based guided discovery learning model can activate students.	yes	using the e-learning based
Students look enthusiastic about participating in learning by implementing the e-learning based guided discovery learning model	yes	guided discovery learning model went as expected
Students look happy participating in learning activities using the e-learning based guided discovery learning model	yes	
Students carry out all learning activities without pressure	yes	
Students very easily understand the material delivered by the teacher online	yes	
The teacher's explanation of the material via Google Classroom is easy for students to understand.	yes	
The learning so far has made me happy to study science.	yes	
The teacher provides examples of questions that are interesting and easy to understand because they are related to everyday situations.	yes	
The teacher explains the material clearly and pleasantly.	yes	
Through the problems given by the teacher, an understanding of healthy food is created.	yes	

Indicator	Emergence	Reflection Results
With practice questions given by the teacher, students will understand more about healthy food.	yes	
This learning allows students to determine steps to solve a problem related to healthy food.	yes	
Students are very interested in the problems given during the learning process.	yes	
Students are happy to complete the assignments given by the teacher	yes	
Students complete the assignments given by the teacher within the specified time	yes	
Students complete assignments from the teacher according to the steps and work instructions.	yes	
Students try to complete every assignment from the teacher well and correctly.	ya	
The teacher always guides during the learning process	ya	
Students are confident to ask teachers or friends if they encounter difficulties in solving.	ya	

The table above is the result of peer observations regarding small class trials. Based on this table, it can be explained that in this small class trial, learning using the e-learning based guided discovery learning model went as expected. This means that in this small class trial, it can be continued to field trials.

Field Trials

This field trial involved a larger class, namely class V at SDN 2 Temurejo as a whole. So, with capital from the results of individual trials and small class trials, it is hoped that this field test will get final results. What are the field trial conditions like, then pay attention to the following picture.

Figure 4. Students look happy with learning activities

Based on field trials, the next discussion is related to product validity and practicality. The validity of developing an e-learning based guided discovery learning model was measured from the results of assessments by 3 experts. Meanwhile, determining the practicality of developing an e-learning based guided discovery learning model was obtained through a questionnaire sheet on student responses to learning and responses from several teachers in Blora District. The questionnaire contains indicators regarding teacher and student responses to learning activities using the e-learning based guided discovery learning model. To understand more deeply the results of product validation and product practicality, pay attention to the tables below.

Table 6. Lesson Plan Validation Results from 3 Experts

Rated aspect	Validitor 1	2	3	Average
Lesson plan format	4	4	4	4
The format is clear so that it makes assessment easier	4	4	4	4
The format is in accordance with the Independent Curriculum	4	4	4	4
Fill in the lesson plan	4	4	4	4
Complete lesson plan identity	4	4	4	4
Core competencies, basic competencies and indicators are clearly formulated	4	4	4	4
Learning objectives are formulated clearly	4	4	4	4
The choice of material is formulated in outline	4	4	4	4
Assessment, sources and learning media are formulated in a comprehensive manner jelas	4	4	4	4
Use of Language	4	4	4	4
The language used is easy for readers to understand	4	4	4	4
The language used is in accordance with the rules of PUEBI (General Guidelines for Indonesian Spelling)	4	4	4	4
time	4	4	4	4
Suitability of the allocation used	4	4	4	4
Evaluation	4	4	4	4
Average assessment achievements from Validators				4.00

If you look closely, the table above shows positive results, with the results of the validator's assessment of the lesson plan developed being 4.00, then the e-learning based guided discovery learning model is valid and can be used.

Table 7. Practicality Test of the Guided Discovery Learning Model Based on E-Learning Based on 10 Teachers' Responses to Learning Activities

Cronbach's Alpha	N of Items
.96	14

Based on the reliability test above, N: 10 with an rtable (5%) value of 0.63, it can be said that Cronbach's Alpha > rtable, therefore the questionnaire items show the teacher's response to learning activities using the e-learning based guided discovery learning model has consistency high or reliable, it can be said that the e-learning based guided discovery learning model is practically applied in the learning of fifth grade elementary school students.

Table 8. Practicality Test of the E-Learning Based Guided Discovery Learning Model Based on Student Responses to Learning Activities

Cronbach's Alpha	N of Items
.97	15

Referring to the reliability test above, N: 28 with an rtable (5%) value of 0.37, it can be said that Cronbach's Alpha > rtable, therefore the questionnaire items show students' responses to learning activities using the e-learning based guided discovery learning model. high consistency or reliability, then the lesson plan developed is said to be practical to use.

Evaluation

Table 9. Results of Student Questionnaires regarding the Implementation of Learning by Class V Students

Name	Test 1 Lesson Plan Development	Name	Test 2 Lesson Plan Development
AY	83	ANF	92
AR	82	AK	92
DC	100	AS	87
DH	82	AM	88
GE	78	ARA	88
GF	53	CLA	100
HMT	95	ERF	80
ISB	77	GAP	83
JSB	90	LH	97
KS	88	MAL	93
LSN	92	NTN	80
LA	92	PS	83
MS	87	PAN	82
MHS	88	SWA	100
MAR	88	TL	82
NFR	95	VR	87
NSN	80	WSRD	90
PDA	78		
PSN	97		
SR	93		
WU	80		

Activities in this stage are reviewing the impact of learning in a critical way, measuring the achievement of product development goals, measuring what the targets have been able to achieve, looking for any information that can enable students to achieve good results. The effectiveness of the learning tools that have been developed is carried out by hypothesis testing. Test the hypothesis of the effectiveness of the learning model developed based on the average achievement of student learning outcomes. To understand more broadly what the learning outcomes of students who are given learning activities using the e-learning based guided discovery learning model are like, look at Table 9.

Table 10. Post Test Results by Class V Students

Name	Test 1 Lesson Plan Development	Name	Test 2 Lesson Plan Development
AY	95	ANF	95
AR	80	AK	95
DC	100	AS	90
DH	85	AM	90
GE	80	ARA	90
GF	65	CLA	100
HMT	95	ERF	85
ISB	85	GAP	85
JSB	90	LH	100
KS	85	MAL	95
LSN	100	NTN	80
LA	100	PS	85
MS	90	PAN	85
MHS	90	SWA	100
MAR	90	TL	90
NFR	95	VR	95
NSN	80	WSRD	95
PDA	75		
PSN	100		
SR	95		
WU	80		

Furthermore, from the data above, the research results are analyzed and presented starting from the normality test, reliability test, and hypothesis test as follows.

Table 11. Normality Test for the Development of Lesson Plan 1 on the learning outcomes

Unstandardized residual		
N		21
Normal parameters[a,b]	Mean	.00
	Std. deviation	4.10
Most extreme Differences	Absolute	.17
	Positive	.17
	Negative	-.08
Test statistic	.17	
Asymp. Sig. (2-tailed)	.14[c]	

Based on the One-Sample-Smirnov Test output, the Asymp Sig. (2-tailed) namely 0.140. This means that if the comparison is 0.14 > 0.05, then the distribution is said to be normal.

Table 12. Normality Test for the Development of lesson plan 2 on the learning outcomes of class V students at SDN 2 Temurejo

		Unstandardized residual
N		17
Normal Parameters[a,b]	Mean	.00
	Std. Deviation	2.21
Most Extreme Differences	Absolute	.15
	Positive	.13
	Negative	-.16
Test Statistic		.16
Asymp. Sig. (2-tailed)		.20[c,d]

Based on the One-Sample-Sminov Test output, the Asymp Sig. (2-tailed) namely 0.20. This means that if the comparison is 0.20 > 0.05, then the distribution is said to be normal. After the data was tested for normality, the data was then tested for homogeneity as follows.

Table 13. Homogeneity Test of Class V Student Learning Results at SDN 2 Patalan and SDN 2 Temurejo

Levene Statistic	df1	df2	Sig.
3.117	1	36	.09

Based on the output of "Test of Homogeneity of Variances", the Sig value is obtained. 0.09. So 0.09 > 0.05, so from this it can be concluded that the variance of test result data for students at SDN 2 Patalan and SDN 2 Temurejo is the same or homogeneous.

Based on the prerequisite tests above, a decision was obtained that hypothesis testing using the proportion test could be carried out. The results of the hypothesis test are divided into two. First, test hypothesis 1. Average post test results according to MCC. Second, test hypothesis 2, the number of students who complete exceeds the MCC. These tests are as follows.

Table 14. Descriptive Statistics

	N	Mean	Std. deviation	Minimum	Maximum
SDN 2 Patalan	21	88.33	9.40	65	100
SDN 2 Temurejo	17	91.47	6.06	80	100

Based on the "Descriptive Statistics" output above, it is known that Test Class 1 for lesson plan Development at SDN 2 Patalan has 21 students, while Test Class 2 for lesson plan Development at SDN 2 Temurejo has 17 students. The average posttest result for class V students at SDN 2 Patalan was 88.33, while the average posttest result for class V students at SDN 2 Temurejo was 91.47. Thus, from a statistical description, it can be concluded that there is a difference between lesson plan Test 1 class and lesson plan Test 2 class. Next, to prove whether the difference is significant (real) or not, it is necessary to interpret the output as follows.

Table 15. 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
Test Results	Equal variances assumed	3.12	.09	-1.19	36	.24	-3.14	2.64	-8.49	2.21
	Equal variances not assumed			-1.24	34.464	.22	-3.14	2.52	-8.26	1.99

To make a decision to answer the hypothesis, researchers use the rules: (1) If the Sig value < Research Alpha, then reject H0; (2) If the Sig value > Research Alpha, then H0 is accepted. Based on the Table 15, the Sig value. (2 – tailed) is 0.24 so 0.24 > 0.05 means Ho is accepted. So the conclusion is that the average learning outcomes of students who study using the e-learning based Guided Discovery Learning model are not the same as the MCC 75. This means that the average learning outcomes are above the MCC 75.

Next, compare the t values: (1) If t count > t table, then H0 is rejected; (2) If t count < t table, then H0 is accepted. Based on the Independent Sample Test table above, t_{count} is 1.189, t_{table} (two-sided test: df) = (0.03:36) = 2.03, so the comparison is tcount 1.20 < ttable 2.00, so Ho is accepted. In conclusion, the average learning outcomes of students who study with the e-learning based Guided Discovery Learning model are not the same as MCC 75. Next, to find out the number of students who passed the MCC, look at the following Table 16.

Table 16. Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
SDN 2 Patalan	Group 1	<= 75	2	.10	.50	.00
	Group 2	> 75	19	.90		
	Total		21	1.00		
SDN 2 Temurejo	Group 1	<= 75	0	.00	.50	.00
	Group 2	> 75	17	1.00		
	Total		17	1.00		

Based on Table 16, it can be explained that the posttest score of the lesson plan development control class at SDN 2 Patalan of the total number of 21 students, there were 2 students or 10% who did not complete. The 2 students got a score of less than or equal to 75. Meanwhile, 19 students or 90% completed it with a score of more than 75. Meanwhile, the lesson plan development test class at SDN 2 Temurejo of 17 students all got a score above the MCC. This means that from these results all class V students at SDN 2 Temurejo are 100% complete.

Next, to test hypothesis 2, as a consideration for decision making, namely: (1) If the Sig value < Research Alpha, then reject H0; (2) If the Sig value > Research Alpha, then accept H0. Based on Table 16, the Sig value. (1 – tailed) the learning results for class V SDN 2 Patalan and class V SDN 2 Temurejo have the same value, namely 0.00. So on this basis, the decision making considerations above can be said to be 0.00 < 0.05 (probability value) Ho is rejected. This means that the number of students who have completed learning is more than 80%, so the e-learning based Guided Discovery Learning model is effective. So referring to the results of the research above, it can be temporarily concluded that the learning plan developed using the e-learning based Guided Discovery Learning model is effective, with a description of the results: *First*, the average learning outcomes of students who study with the Guided Discovery Learning model learning plan based on e-learning is not the same as the MCC 75. These results show that the average is far above the MCC. Clearly, the development of the lesson plans tested at SDN 2 Patalan had an average of 88.33, while the average posttest result for class V students at SDN 2 Temurejo was 91.47. Thus, it can be said that there is a difference between Test 1 class of lesson plan development and test 2 class of lesson plan development and Test 2 of lesson plan development carried out at SDN 2 Temurejo is better. So this is the basis that the development of lesson plans using the e-learning based Guided Discovery Learning model is final and can be used. *Second*, the number of students who have completed learning is more than 80%, so the e-learning based Guided Discovery Learning model is effective. The results of the posttest scores for Test 1 class on lesson plan development at SDN 2 Patalan, out of a total of 21 students, there were 2 students or 10% who did not complete. The 2 students got a score of less than or equal to 75. Meanwhile, 19 students or 90% completed it with a score of more than 75. Meanwhile, the Test 2 lesson plan development class at SDN 2 Temurejo of 17 students all got a score above the MCC. This means that from these results all class V students at SDN 2 Temurejo are 100% complete.

Basically, learning is said to be effective if it meets certain criteria. According to (Magdalena et al., 2020) stated that to achieve effective learning, teachers are required to create good and interesting learning designs. Five indicators of effective learning, namely management of learning implementation, communicative processes, student responses, learning activities, and learning outcomes.

The first thing teachers must pay attention to when online learning like this is the media. Because media is related to what platforms teachers can use to ensure online learning can run. Examples of various alternative media or platforms that can be used include WhatsApp, blogs, Zoom, Webex, Google Meet, Messenger, Instagram Live, YouTube Live, G Suite, Moodle, Edmudo, and many others. Some schools may even have and build their own e-learning systems. The second is method. This relates to how a teacher conveys content effectively. How can a teacher effectively develop online learning strategies (instructional strategies) that are different from offline learning? It is important to remember that various platforms, from simple ones like WhatsApp to some rather complex LMSs like Moodle and G Suite, are simply media or tools to facilitate learning. Not a determinant of success. Meanwhile, the quality of learning outcomes is still determined by the method the teacher delivers learning material. There is no direct relationship between the quality of learning outcomes and whether the platform used is cool or not. In the future, after becoming familiar with various types of online learning media, the various webinars or training held will need to increase the discussion of 'how', not just 'what'. A teacher must enrich himself with various creative ideas about how to teach students effectively by relying on internet networks and virtual communication. Regarding online learning design, it is important for teachers to ensure that there is interaction, feedback, and planned communication between

students and teachers or between one student and another during the pandemic. With effective interaction and communication, it is hoped that a sense of togetherness will grow between students and teachers. Teachers also need to design varied learning activities. Not only relying on synchronous video conferencing, but also a learning platform with asynchronous mode. Teachers also need to consider whether to use high-tech or low-tech technology which will have an impact on the use of student data. And finally, what a teacher must pay attention to is that a teacher certainly needs to enrich the material or sources (teaching materials). Teachers must also mobilize and accelerate their ability to search and even create digital teaching materials. At least good at digitizing material that was previously manual. Digital content creation training is also important. Primary school teachers need to equip themselves with video editing skills, for example. Including how to store and distribute digital content through various platforms that can not only be accessed in a limited way by students, but also by other students. Online learning can also use ICT model concepts, it is hoped that students can understand and master IT, and students and teachers can communicate well.

Meanwhile, according to (Fitriah et al., 2020) explains that the five indicators of effective learning include: management of learning implementation, communicative processes, student responses, learning activities, and learning outcomes.

Basically, learning is said to be effective if it meets certain criteria. According to (Magdalena et al., 2020) stated that to achieve effective learning, teachers are required to create good and interesting learning designs. Five indicators of effective learning, namely management of learning implementation, communicative processes, student responses, learning activities, and learning outcomes.

So, with the explanation above regarding effective learning, it can be underlined that the e-learning based guided discovery learning model is an effective learning model. This effectiveness can be seen when: the teacher manages the implementation of learning, in learning there is a communicative process between students and teachers and students and students, there is a positive response from students, meaning there is a positive response from students. The e-learning based guided discovery learning model can activate students, meaningful student learning activities occur, and student learning outcomes increase.

Many researchers have developed guided discovery learning models. One of these developments was carried out by (Nuzlia et al., 2015). The results of research show that the magnitude of the influence of using the guided discovery learning model with a scientific approach in the chemistry learning process on learning outcomes is seen using effect size. The effect size calculation result is 0.79 which is included in the medium category, so that the use of the guided discovery learning model with a scientific approach has an influence of 28.32% on the learning outcomes of class XI MIA SMAN 2 Pontianak students. The magnitude of the influence of using the guided discovery learning model with a scientific approach in the chemistry learning process on scientific attitudes can be seen using the effect size. The effect size calculation result is 0.70 which is included in the medium category, so that the use of the guided discovery learning model with a scientific approach has an influence of 25.80% on the scientific attitudes of class XI MIA students at SMAN 2 Pontianak.

Another research by (Priadi et al., 2021) states that based on the analysis of the results and discussions that have been carried out in this research, it can be concluded that there is an influence of the e-learning based guided discovery learning model on the critical thinking abilities of Class X students at SMAN 13 Bandar Lampung On the Main Material of Ecosystems. In this research, it was also stated that the E-Learning based GDL model could be used as an alternative for teaching, especially on the main topic of ecosystems. However, because learning takes a long time, good time management is needed. Apart from that, it is necessary to get used to learning using e-learning media so that students are trained and familiar with the media used.

Furthermore, (Wijaya, 2021) provides an overview of how much teacher creativity is needed in compiling and developing e-modules. E-module development can also be done with various kinds of software and of course supporting equipment is needed such as a laptop or computer (PC) and an internet network to create and access e-modules. Every teacher should develop e-modules in accordance with their scientific studies to facilitate students in the learning process. Based on the description of the results and discussion of the research that has been presented, it can be concluded that the development of an e-module based on guided discovery learning on the topic of ecosystems and the environment received a valid assessment in terms of content and constructs which include components of content, presentation, language and graphics. Second, the development of a biology e-module based on guided discovery learning is practically used by teachers and students. Third, the development of a biology emodule based on guided discovery learning is effective in improving high school students' learning outcomes as proven by obtaining a significance value of 0.00 ($p < 0.05$) and classical learning completion of 94% with very good criteria.

In line with the figures above, explains: first, the implementation of learning using the Guided Discovery Learning model shows very good results. This is illustrated through the results of observations made by an observer regarding reviewing activities for teachers and activities for students. The average percentage of activity obtained for teachers was 86% so it was classified in the very good category, then the average percentage of activity obtained for students showed an average percentage of 78% which was classified in the good category. So that these two activities can illustrate that the implementation of learning using the Guided Discovery Learning learning model obtained very good and appropriate results. Second, in improving learning outcomes reviewed in this research, there are three domains, namely: affective, cognitive and psychomotor students. In the affective domain (attitude) the average percentage was 85% which was included in the very good category. In the cognitive domain, the completeness scores of experimental class students increased from pretest to posttest. The pretest completeness score for the experimental class was 36%, then increased after being given treatment in the form of implementing the GDL learning model so that it increased to 67% with an average of 80.39 which was classified as good. And for the psychomotor domain, it shows an average percentage of 81% which is included in the very good category. From reviewing these three domains, it can be concluded that affective, cognitive and psychomotor learning outcomes in learning using the Guided Discovery Learning model have increased and students have received the proper treatment so that students are able to provide appropriate responses. Third, in the results of the independent sample t-test analysis, it is known that the value of tcount > ttable is 2.23 > 1.67 with an alpha significance level of 5%, namely 0.03 < 0.05, so it can be concluded that H0 is rejected and Ha is accepted. So it can be concluded that there is a significant influence of the Guided Discovery Learning learning model on the learning outcomes of class IV students at SDN Lakarsantri II/473.

Meanwhile Nugroho, M. M., et al. (2018) conveyed the conclusion of their research, namely that the characteristics of GDL-based modules are that they are taught and structured using a GDL-based learning model and can improve 6 Science Process Skills (SPS) indicators including classification ability, designing hypotheses, formulating variables, data interpretation, inference, making conclusions. The most prominent SPS increase was classification skills while the lowest SPS was inference skills; the feasibility of the GDL-based module in the content feasibility aspect amounted to 42.00, good category, presentation feasibility aspect amounted to 33.50, good category, language and image appropriateness aspect amounted to 25.67, very good category and graphic feasibility amounted to 114.00, category Very good; The student's SPS achievement experienced a significant increase in the "medium" category, the n-gain calculation obtained a result of 0.383, which means that the SPS is included in the "medium" category. The GDL-based module is effective for increasing SPS (Batubara, 2020).

In the development of guided discovery-based science learning tools to complete student learning outcomes on the human circulatory system material (Arumisore et al., 2018) stated that the guided discovery-based learning tools developed were declared suitable for use to complete junior high school students' learning outcomes on the Human Circulatory System material. Meanwhile, in the development of a game-based guided discovery learning model to improve the critical thinking skills of elementary school students (Cholifah & Savira Fada, 2022), it was said that there was a significant difference between the experimental group that was treated using the game-based guided discovery learning model and the control group that was not treated. According to research results, the game-based guided discovery learning model has an influence on the critical thinking abilities of grade 5 students at SD Negeri 2 Sumbertangkil in the 2021/2022 academic year with a significant value, meaning that there is a significant influence in using the game-based guided discovery learning model on students' critical thinking abilities, this increase is more effective when compared with conventional method.

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Conclusion

Based on the results of the research and discussion, this research can be concluded that the process of developing an e-learning based guided discovery learning model in thematic learning for class V elementary school includes: needs analysis, designing the model by determining the syntax of the e-learning based guided discovery learning model learning, create a guided discovery learning model product based on e-learning, carry out implementation by testing and making observations to get a good product design and finalizing the product by asking for validation from 3 experts who have been determined to get product practicality , and evaluating the results of implementing the lesson plan product, by conducting hypothesis testing to obtain the level of effectiveness of the product being developed.

Based on the steps for developing an e-learning based guided discovery learning model above, the results obtained are: *First*, the e-learning based guided discovery learning model has a high level of validity so it can be applied in designing learning in fifth grade elementary school. This level of validity is determined based on assessments by experts, where the assessments from the three experts involved reached an average of 4.00; *Second*, a practical e-learning based guided discovery learning model is used to design learning in class V elementary school. The practicality of the e-learning based guided discovery learning model was tested by testing the reliability of teacher questionnaires and student questionnaires. The reliability test from 10 teachers showed that the Alpha value was 0.963 > rtable, 0.63 (5%). Meanwhile, the reliability test of 28 students obtained an Alpha result of 0.97 > rtable, 0.37 (5%). So from that basis, it can be said that the e-learning based guided discovery learning model has high consistency or reliability, so the lesson plan developed is said to be practical used; *Third*, the guided discovery learning model can be more effectively applied to improve the quality of student learning by updating the electronic learning system or e-learning. The effectiveness of the e-learning based guided discovery learning model can be seen from the average results of student tests and the resulting learning model development syntax. The average learning outcomes of students who study with the e-learning based guided discovery learning model exceed the MCC 75, the average is 91.47. Apart from this analysis, based on the final development, the number of students who completed their studies with a score greater than the MCC of 100%. This success was supported by the syntax for developing an e-learning based guided discovery learning model.

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Author Contributions

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Conflict of Interest

Meanwhile, in terms of conflicting interests, this research is the main prerequisite for graduating from the UT Master of Education Program. The range of ideas contained in the research have all gone through a mentoring process and been defended in the trial examination. Based on the results of the trial examination and the recommendations of the examiners, this research is suitable for publication in the reputable journal Sinta 2. Furthermore, based on the advice of Supervisor II, the results of this research in the form of a scientific article were published in the UNRAM Science Education Research Journal (JPPIPA).

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