JIPVA (JURNAL PENDIDIKAN IPA VETERAN)

Volume 7 - Nomor 2, 2023

Available at http://e-journal.ivet.ac.id/index.php/jipva

ISSN : 2598-5876 (print), 2598-0904 (online)

Development of E-Module Flipbook Based on Discovery Learning to Increase Learning Motivation

Isnanik Juni Fitriyah[1]*, Salma Nur Salsabila Sahda[2]
[1.2]Departemen Pendidikan IPA, FMIPA, Universitas Negeri Malang, Malang, Indonesia
*Coressponding author email: isnanik.fitriyah.fmipa@um.ac.id

Article info

Received : 20 August 2023
Revised : 07 Nov 2023
Accepted : 30 Nov

Keywords:
Discovery Learning
E-module
Flipbook
Motivation

ABSTRACT

In the implementation of science learning, conventional teaching materials and lecture methods that are commonly used by teachers in schools have not been effective in increasing students' learning motivation. This study aims to develop e-module flipbooks based on discovery learning that are valid, practical, and effective in increasing learning motivation and knowing the completeness of student learning outcomes. The ADDIE model applied includes analyzing, designing, developing, implementing, and evaluating steps. Quantitative data were obtained from media and material validation tests, practical tests of teachers and students, and tests of the effectiveness of learning motivation and completeness of learning outcomes. The percentage of media and material validation test results obtained was 95.2% and 95.9%. The practicality test results for teachers and students were 93.5% and 84.4%. The paired sample t-test shows that there is a difference in learning motivation with sig. 0.000 the results of the N-gain test obtained moderate criteria and complete learning outcomes of 83%. Thus, the discovery of learning-based e-module flipbook products are valid, practical, and effective in increasing students' learning motivation and completing learning outcomes

https://doi.org/10.31331/jipva.v7i2.2738

How to Cite: Fitriyah, I. J. & Sahda, S. N. S. Development of E-Module Flipbook Based on Discovery Learning to Increase Learning Motivation. *JIPVA (Jurnal Pendidikan IPA Veteran), 7(2), 66-88.* doi: https://doi.org/10.31331/jipva.v7i2.2738

INTRODUCTION

Learning can be interpreted as a process of interaction between students, educators and learning resources in a learning environment (Djamaluddin & Wardana, 2019). In its implementation, supporting learning tools are needed, one of which is teaching materials. In the learning process that is not varied in the use of media and teaching materials will be less effective in growing student learning motivation (Rahmat, 2015). In fact, teachers tend to make conventional teaching materials provided by the government such as LKS or printed books as the only source of learning (Handayani, 2019; Riwu et al., 2019; Sulistyosari, 2018). These teaching materials tend to have a less attractive appearance, dominant text, few images and illustrations available to make students' interest in reading and learning it less (Putra et al., 2018; Utami et al., 2020).

Apart from teaching materials, the methods used by teachers also have an important role in creating an effective learning process. Learning can take place less effectively when teachers apply conventional learning methods (lectures). Learning with this method tends to be teacher-centered which makes students less actively involved in the learning process. If the teacher only conveys concepts abstractly, students tend to memorize the contents of the textbook without understanding the meaning and it is difficult to have a concrete picture of the learning and (Grace, 2015).

Learning that has broad material and abstract concepts is science (Liliasari et al., 2016). One of the science learning materials that contains natural phenomena with a wide scope is the material on interactions between living things and their environment (Paradise et al., 2020). According to Fazlina et al., (2019) The material of interaction of living things is biological material that is difficult for students to understand because there are concepts of ecosystems and energy flows that are abstract and need deep understanding. The use of media assistance, images, and illustrations is expected to help students in learning this material (Chaifa et al., 2017). This is in accordance with the conditions that exist in grade VII students at SMP Negeri 1 Pakisaji which states that the material of interaction between living things and their environment is difficult if only learned through LKS books.

Science subjects are considered difficult by students because of the less varied learning methods and teaching materials and lack of visualization to support the concept of the material in the required learning (Yudasmara & Purnami, 2015). According to Ragatz in (Sofdita, 2023) Teachers more often only deliver material and students tend to be reluctant to ask if there is material they do not understand. This tendency proves that students only act as listeners which makes them passive (Adnyani et al., 2020). In line with Harahap (2020) and Hidayat et al., (2020) which states that the lack of activity of students in science learning activities is caused by two factors. The first factor, the teacher uses the lecture method so that the role of the teacher is too dominating and learning takes place in one direction (Rosidha, 2020). The second factor is the lack of variety of media used by teachers in science learning activities (Fatimah & Widyatmoko, 2014; Shofiyah & Wulandari, 2018; Sunami & Aslam, 2021). In applying science learning, students should be actively involved in information discovery with experiments and observations (Guswita et al., 2018; Juhji, 2016). If teachers only use the lecture method, they tend to memorize and forget quickly. Learning in this way makes a boring impression so that it results in low student learning motivation and has an impact on learning outcomes (Adnyani et al., 2020; Yusuf et al., 2021).

Learning motivation is the entire driving force in students that causes and directs learning activities so that the desired goals are achieved (Sardiman, 2016). Mc. Donald in Sardiman (2016) said that motivation brings energy changes in a person which then makes someone do something. Motivation plays a role in bringing out feelings of pleasure and enthusiasm in learning. In measuring learning motivation, students can use several indicators including diligent in doing tasks, tenacious in facing difficulties, showing interest in learning, happy to work on their own accord, prefer new things, can maintain their opinions, firm in stance, and happy to solve problems (Sardiman, 2016)

Vienna Sanjaya in (Emda, 2017) states that learning motivation is an important aspect of the learning process. The learning process and outcomes will be optimal if there is the right

learning motivation (Sardiman, 2016). It often happens that the lack of student achievement is not caused by low cognitive, but rather their lack of motivation in learning (Emda, 2017). Sardiman (2016) emphasized that learning failure can occur because teachers fail in raising the enthusiasm of students to want to learn. Effective learning and achieving learning objectives well occur if students have high learning motivation so that teachers must make maximum efforts so that students are motivated to learn (Emda, 2017).

Based on the results of interviews with science teachers at SMP Negeri 1 Pakisaji Malang Regency, the science learning method used by teachers in class VII is the lecture method and teaching materials or media used by teachers and students are still only sourced from LKS provided by the government. The lack of variety of teachers in teaching makes student learning activities low. In accordance with what the teacher said that student learning motivation only occurs briefly at the beginning of the material, but as the material progresses, student learning motivation tends to decrease so it needs to be improved.

Then supported by the results of the analysis of student needs which showed that almost all students found it difficult to learn the topic of interaction between living things and their environment if only through LKS. Students prefer to learn with pictures, videos and interesting learning activities rather than learning only through LKS and listening to the material. This causes students to not feel there is enough enthusiasm for learning in learning science. If the motivation of learning students is low, it will have an impact on their learning outcomes, because motivation has a big role in a person's learning outcomes. The greater a person's learning motivation, the better the learning outcomes achieved (Husna et al., 2017).

In overcoming these problems, computer-based multimedia teaching materials can be a solution because they are able to make learning more interesting and the material is clearly visualized so that it can motivate and facilitate student learning (Rahmat, 2015). This is supported by Permendikbud No. 22 of 2016 that the use of ICT media needs to be used for effective and efficient learning (Depdiknas, 2016). In addition, the 21st era now requires education to develop by utilizing computer technology (Sole & Anggraeni, 2018).

One of the teaching materials that can be developed by utilizing a computer is an electronic module. Module is a written record of the teacher to facilitate or enrich the material in the learning process (Wasisto A, 2016). E-modules or electronic modules are the smallest units of subjects presented in electronic format to help the learning process by covering learning objectives and material descriptions (Meldawati, 2022). Electronic module can increase student motivation and achievement (Nanang & Prasetyo, 2015). In this study e-module is presented in the form of *flipbook* Using the App *heyzine*. With the existence of e-module *flipbook* can make students more enthusiastic about learning and the concept of material that is difficult to meet directly can be visualized more clearly. This is in line with Soedjana's research in Erniwati et al., (2022) that *flipbook* can foster interest and motivation to learn.

Suparman in Sihotang &; Sibuea (2015) Stating teaching materials must adjust the abilities and characteristics of students. Therefore, the selection of the right learning model in the science e-module is very necessary in order to achieve success in learning objectives (Ardianto & Rubini, 2016; Elisabet et al., 2019). Therefore, the right learning model is needed in e-module teaching materials that actively involve students and increase learning motivation

in accordance with the problem conditions in grade VII students at SMP Negeri 1 Pakisaji Malang Regency.

One of the learning models that teachers can apply to actively involve students and can generate their learning motivation is *Discovery Learning* (J. Sari et al., 2017). According to Dehong et al., (2020) *Discovery learnin*g is a learner-centered learning model where the teacher as a facilitator who assists students to find and apply knowledge concepts independently. Learning model *Discovery Learning* includes several syntaxes consisting of stimulation, problem identification, data collection, data processing, verification and generalization (Dehong et al., 2020). This learning model can facilitate students in interacting with their environment (Jalil, 2016). Teaching materials *flipbook* type *Discovery Learning Increases Student Learning Motivation* (Erniwati et al., 2022).

The development of e-modules has been carried out by previous researchers, namely research by Mokodompit et al., (2022) by using *articulate storyline* on sound material in grade IV elementary school and research by (Meldawati, 2022) with problem-solving based mathematics subjects in class VIII MTsN. From these two studies, valid and practical e-modules have been produced. Moreover Nisa et al., (2019) Also developed physics-based modules *Problem Based Larning* to improve students' critical thinking skills. The developed modules have been feasible, practical and effective in use. The difference between the above research and this research is the scope of the material, learning model, presentation and research objectives. In addition, this study was tested to the level of effectiveness in increasing student motivation and developed more innovatively in accordance with suggestions and recommendations from previous research. Thus, this study aims to develop e-module flipbooks based on discovery learning that are valid, practical, and effective in increasing learning motivation and knowing the completeness of student learning outcomes.

METHOD

Types of Research

In the development of e-module, this method refers to *Research and Development* or *R&D.* This method is used with the aim of producing a specific product and tested for effectiveness so that it can function properly against the target (Sugiyono, 2017). The model used in this study is ADDIE *(Analyze, Design, Development, Implementation, and Evaluation*) (Sugiyono, 2017; Tegeh et al., 2014). Development research with the ADDIE model is carried out sequentially and the evaluation results from each previous stage become the initial product for the next stage (Wijayanti et al., 2016). The stages of the ADDIE research and development model are more complete and simple than other models (B. K. Sari, 2017). The following diagram of the stages of the ADDIE model is presented in Figure 1.

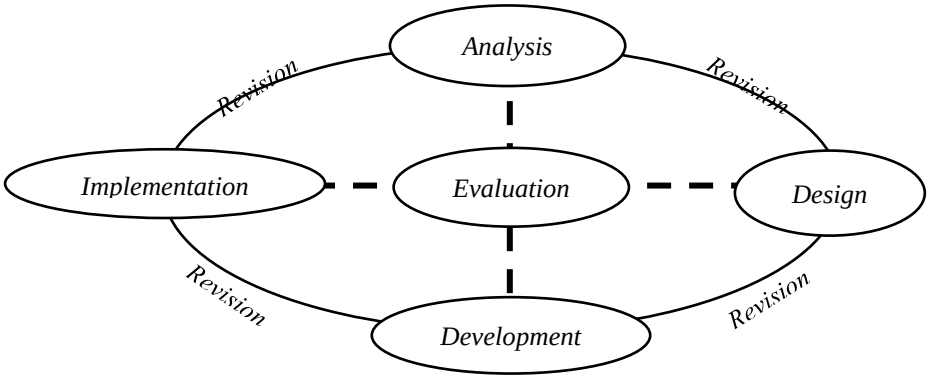

Figure 1. Diagram ADDIE (Branch, 2009)

Time and Place of Research

This research was conducted in stages from January 2023 to April 2023 at SMP Negeri 1 Pakisaji, Malang Regency.

Population and Sample

The population in this study was all grade VII students of SMP Negeri 1 Pakisaji, Malang Regency. The sampling technique uses *purposive sampling*. So this research was carried out on 31 students of grade VII D SMP Negeri 1 Pakisaji Malang Regency in the even semester.

Research Procedure

Based on the research diagram in Figure 1. This research procedure begins with the analysis stage where at that stage it is carried out by conducting an interview with one of the class VII science teachers at SMP Negeri 1 Pakisaji, Malang Regency to find out the conditions and obstacles experienced during science teaching and learning activities and the characteristics of grade VII students when participating in science learning. In addition to conducting interviews with science teachers, researchers distributed needs analysis questionnaires to grade VII D students to find out their conditions and difficulties in learning science, especially on the material of interaction between living things and their environment. After going through the analysis stage, the second stage is carried out, namely the design stage. The design stage is carried out by designing e-modules using the Canva graphic design application and presented in the form of *a flipbook* using the *heyzine application*.

Next, the development stage continued by realizing the design of a discovery learning-based flipbook e-module product in the form of a link which was then tested for feasibility by material and media validators. Feasibility test or validation is intended to determine the validity of the media that has been developed. The implementation stage is the stage carried out by applying discovery learning-based flipbook e-modules to grade VII D students in learning activities by conducting practicality tests and effectiveness tests. The practicality test was carried out with the aim of determining the response of science teachers and grade VII D students after using discovery learning-based flipbook e-modules. Then the effectiveness test is carried out to determine the effectiveness of the media developed in learning. The evaluation stage is carried out after each previous stage is carried out.

Data, Instruments and Data Collection Techniques

In this study, qualitative and quantitative data were used. Qualitative data are obtained from criticism and suggestions for improvement from experts, teachers and learners. The results of the data are used as consideration for revision. While quantitative data is obtained from the

results of the assessment of experts, teachers and students, the results of increasing student motivation and the completeness of learning outcomes after using discovery *learning-based flipbbok* e-modules in learning activities.

The instruments used in this study are test instruments in the form of evaluation questions and non-test instruments in the form of validation questionnaire sheets, teacher and student response questionnaires and student learning motivation questionnaires. Evaluation questions are given to students at the end of learning to find out the completeness of learning outcomes after using discovery learning-based *flipbbok* e-module. For the evaluation questions to be valid and reliable, before being tested to students, the questions are analyzed first using validity tests and reliability tests. Material and media validation questionnaire sheets are given to material and media experts so that the developed media can be said to be suitable for use. The media validation questionnaire uses four indicators adapted from Qisthi (2020) research into objectives, characteristics, multimedia, and flipbook. Through these indicators, 21 statements were formed. In the material validation questionnaire, researchers applied indicators of appropriateness of content, appropriateness of presentation, appropriateness of grammar, and suitability of the model (Muslimah, 2021). Apart from that, in the material validation questionnaire, there is also validation of the correctness of the concept to test whether the material concept presented is correct or not. Next, in the teacher response questionnaire, the researcher modified the indicators from Mahara (2022), namely appearance and use, media components, presentation of material, and questions and grammar. Meanwhile, the student response questionnaire uses indicators of display and use, media components, presentation of material, and questions and grammar (Sholihah, 2021). Even though the teacher and student response questionnaire indicators are the same, the aspects assessed are different. Response questionnaires were given to teachers and students after carrying out learning using discovery *learning-based flipbook e-modules*. The response questionnaire was used to obtain practical data on the discovery learning-based flipbook e-module media when used in learning.

In the motivation assessment there are several indicators that researchers adapted based on Sardiman (2018), namely being diligent in carrying out tasks, tenacious in facing difficulties, showing interest in learning, enjoyed to work of their own accord, preferring new things, being able to defend their opinions, being firm in their stance, and enjoy solving problems. Student motivation questionnaires are given before and after the implementation of learning activities using discovery learning-based flipbbok e-modules to determine the increase in student learning motivation. The results of filling out this questionnaire are used to measure the effectiveness of the product developed.

Data Analysis Techniques

Data analysis techniques are carried out by qualitative descriptive analysis, calculating the percentage of material and media validation, responses by teachers and students, normality *tests, paired sample t-tests*, N-gain *tests* to determine the effectiveness of using e-modules in increasing student learning motivation and validity and reliability tests on evaluation questions given at the end of learning activities. The *Likert scale* is used to fill out media validation questionnaires, material validation on aspects of content feasibility, presentation feasibility, grammatical feasibility and conformity with *discovery learning models as* well as product response questionnaires by teachers and students. The *Likert* scale is expressed in 1-4 points

accompanied by comments and suggestions. The 4-point *Likert* scale criterion is shown in Table 1.

Table 1. Scale Criteria *Likert* (Mawardi, 2019)

Score	Information
4	Totally Agree
3	Agree
2	Disagree
1	Strongly Disagree

On the correctness aspect of the concept in the material validation sheet using the *Guttman* scale which has true and false criteria stated in Table 2.

Table 2. Scale Criteria *Guttman* (Sugiyono, 2013)

Score	Information
1	Yes
0	Not

Furthermore, the data from validation test scores from experts and practicality tests by teachers and students are processed into percentage form with the equation 1 Yusuf in (A. N. Sari & Hamimi, 2022).

$$P = \frac{\sum x_i}{\sum x} \times 100\% \quad (1)$$

P = Percentage

$\sum x_i$ = Score obtained

$\sum x$ = Maximum score

The percentage result of the validity and practicality test can be obtained from Equation 1 above. Then based on the percentage results, the results of the validity and practicality test can be concluded through the criteria in Table 3. and Table 4.

Table 3. Validity Assessment Criteria (Akbar, 2013)

Percentage	Level of Validity
81%-100%	Very valid
61%-80%	Valid
41%-60%	Less valid
21%-40%	Invalid
0%-20%	Very invalid

Table 4. Practicality Assessment Criteria (Akbar, 2013)

Percentage	Level of practicality
81%-100%	Very practical
61%-80%	Practical
41%-60%	Less practical
21%-40%	Impractical
0%-20%	Very impractical

The Likert scale is used to measure the perceptions, attitudes, and opinions of a person or group regarding a problem or product developed (Sugiyono, 2016). Measurement of learners' learning motivation is measured using questionnaires expressed in the Likert scale of alternative answers 1-5. With the availability of alternative neutral answers, researchers want to provide space and not be too binding on learners to choose only one pole of answer choice. In this effectiveness questionnaire there are positive and negative statements. The following are alternative answers from the student motivation questionnaire in Table 5.

Table 5. Djaali's Likert Scale Criteria in (Saftari & Fajriah, 2019)

Alternative Answers	Positive Statements	Negative Statements
Totally Agree	5	1
Agree	4	2
Nervous	3	3
Disagree	2	4
Strongly Disagree	1	5

After obtaining the results of student motivation scores before and after learning activities, the data was analyzed through normality tests using the help of the SPSS program. If the data is normally distributed, the test can continue *Paired Sample T-Test* To find out the average difference before and average after treatment (Widiyanto, 2013).

Furthermore, to find out the results of student motivation in each indicator, the data is analyzed based on equation 2 (Awwaliyah et al., 2021).

$$X = \sum X_n \tag{2}$$

Then to find out the increase in student motivation before and after using e-modules *flipbook* Based *Discovery Learning*, data from the results of student learning motivation are analyzed using formulas *N-gain* (g) in equation 3 (Awwaliyah et al., 2021) and value interpretation *N-gain* (g) presented in the criteria in Table 6.

$$< g >= \frac{Skor\ akhir - Skor\ awal}{Skor\ maksimum - Skor\ awal} \tag{3}$$

Table 6. Test Interpretation *N-gain* (Hake, 1999)

N-gain *Test Results*	Criterion
$\leq 0{,}30$	Low
$0{,}30 < 0{,}70$	Keep
$\geq 0{,}70$	Tall

If the N-gain test results are low then it can be said to be ineffective, if it is being said to be effective and if high it can be declared very effective in increasing student learning motivation (Oksa & Soenarto, 2020).

Before being tested on the research sample, the evaluation questions are tested for validity and reliability first. The validity and reliability test of the questions is carried out through SPSS application. Then the results of student scores from evaluation questions are processed in the form of a percentage of class completeness which is calculated classically using equation 3 (David &; Rahmadana, 2015)

$$\%P = \frac{F}{n} \times 100 \quad (4)$$

Information:

$\%P$ = percentage of students completed

F = number of students completed

n = number of students

Students are said to be classically complete if a percentage of completeness is obtained of ≥75% of students who are complete (Y. Sari et al., 2019).

RESULT AND DISCUSSION

This section discusses the results of e-module development *flipbook* Based *Discovery Learning* from each stage of the research conducted. At the analysis stage (*Analysis*) obtained the results of a needs analysis from teachers at SMP Negeri 1 Pakisaji that science learning is still carried out conventionally with the lecture method. The lecture method tends to make learners less actively involved in learning activities (Harahap, 2020; Hidayat et al., 2020). This can result in low student motivation and have an impact on learning outcomes (Yusuf et al., 2021). In addition, in the implementation of class VII science learning at SMP Negeri 1 Pakisaji, both teachers and students use learning resources only through LKS so that they have never used e-module teaching materials. Rahmat (2015) the limited media or teaching materials used by teachers in science learning are less effective in fostering student learning motivation.

Powered from results *need assessment*, students like activities that make them active in science learning activities, but teachers still apply the lecture method from the beginning to the end of learning. Then all students said they liked one of the materials in science learning, namely the interaction material between living things and their environment, but 77% of all class VII D students stated that the material was difficult to learn if only through LKS. Therefore, 29 out of 31 students stated that there was no maximum encouragement or enthusiasm in learning science. This is in line with statements by Adnyani (2020) and Rahmat (2015) that learning with the lecture method and the lack of teacher variation in using teaching materials are less effective in increasing student learning motivation. Less learning motivation will have an impact on learning outcomes (Husna et al., 2017).

After carrying out the requirements analysis, the next stage is the design stage (*Design*). This stage is carried out by designing e-modules in the form of *flipbook* Based *Discovery Learning* Based on the results of the needs analysis.

The product created is a flipbook e-module interactions between living things and their environment as innovative teaching material for seventh grade junior high school students. The module presented in electronic form in the form of a flipbook. So that e-modules can be accessed easily, resembling the appearance of a real book when read. The flipbook application used by researchers is heyzine. This application has the advantage that it can embed videos from files or YouTube, the display is simple and attractive, and it is free. However, the flipbook e-module cannot be accessed offline. Using flipbook e-module in learning is simple, the teacher needs to prepare devices such as cellphones, laptops for each group and an LCD projector. Because the flipbook e-module uses a discovery learning model, the teacher only acts as a facilitator, and students will be actively involved in group activities in the e-module.

E-modules are created using the Canva graphic design application available various designs *Template*, illustrations and *Font* interesting. Canva is a design application with features that are simple to use, so researchers can easily design e-modules that are in accordance with the material of interaction between living things and their environment while being interesting for students. E-modules are structured with a learning model *Discovery Learning* which consists of several syntax, namely stimulus (*stimulation*), identify the problem (*identification*), data collection (*Data Collection*), data processing (*Data Processing*), verify (*verification*) and generalizations (*generalization*) (Dehong et al., 2020).

When the design of the e-module in Canva has been completed, the process is carried out at the development stage *(development*) by uploading *File* e-modules in the heyzine application to display e-modules in the form of *flipbook*. Upload process *File* from Canva to the Heyzine app is very easy because Canva has provided Heyzine features *flipbook* inside. *Flipbook* be *Software* which can convert PDF files (*Portable Document Format*) becomes a book that can be flipped back and forth like reading a book on a monitor, so it is in demand by many people (Hardiansyah & Sumbawati, 2016). *Software* This can help increase students' motivation to learn and make it easier for them to learn events that cannot be presented in the classroom (Nuryani & Surya Abadi, 2021; Ramdania et al., 2018). In addition to being able to add images and audio, heyzine can display live video and embed *Link* which can be directly in-*Click* to access (Erawati et al., 2022). In this application *also* There are features available that provide several types of *Page effect* and *Background* thus making the E-Module display more attractive. Display *Cover* e-modules *flipbook* Based *Discovery Learning* shown in Figure 2.

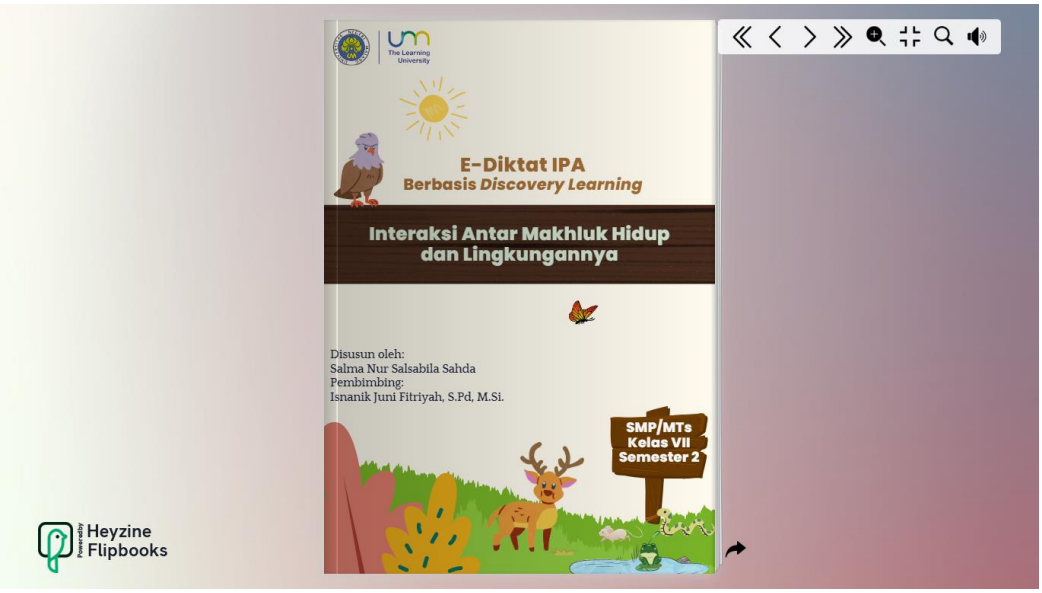

Figure 2. *Discovery Learning* Based *Flipbook E-module Cover Display*

The discovery learning-based *flipbook* e-module contains 38 pages composed of the introduction, content and closing. The introduction includes an introduction, table of contents, list of figures and tables, description of the e-module and its purpose. The display of the introductory part of the table and the description of the e-module are presented in Figure 3.

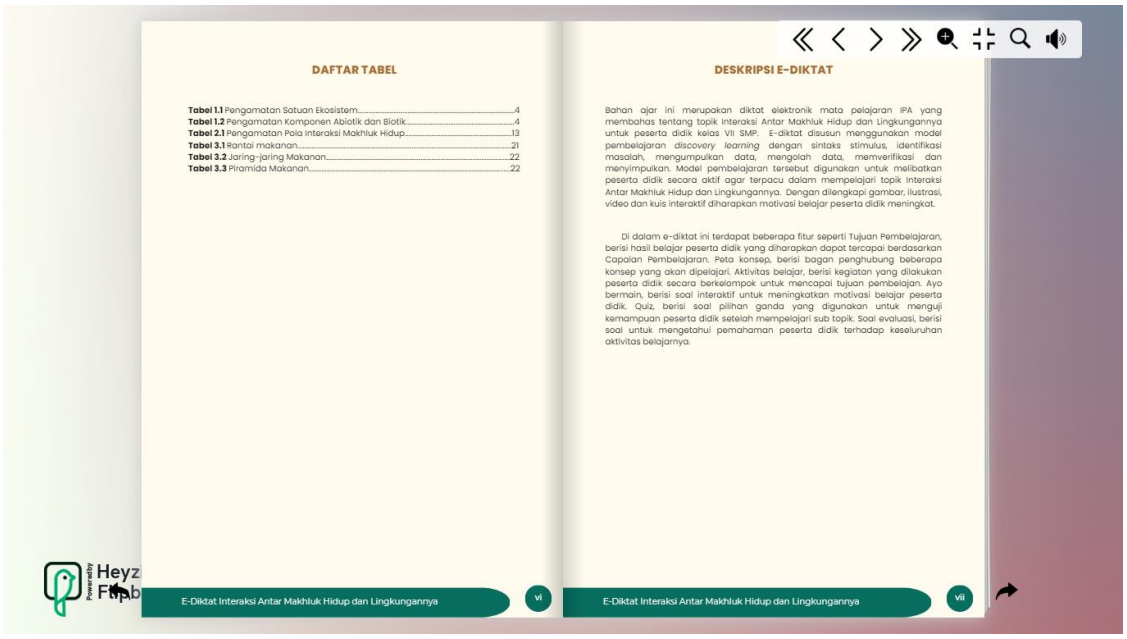

Figure 3. Discovery Learning-Based *Flipbook* E-module *Introduction Section Display*

Then in the content section written the learning achievements and objectives that will be learned by students, concept maps and three sub-topics that will be discussed in the e-module, namely the units and components that make up the ecosystem, the interaction patterns of living things and the relationship of interdependence of living things. In the sub-topic of units and components that make up ecosystems in the problem identification syntax, students are give a video showing the grassland environment with various biotic and abiotic components. Then they write down questions and hypotheses related to the video in hope these questions can be conveyed to the learning objectives. Next, at the data collection stage, students observation in the school environment and write the results in a table. At the data processing stage, students discuss with groups to answer several questions. Then they summarize the results at the verification and conclusion stages. Next, in the sub-topic of interaction patterns of living things, problem identification stage, the teacher presents a video about someone who is infected with mosquitoes. Then they write down questions and hypotheses related to the video. At the data collection they observed various interactions of living things via video and wrote down the results in a table. At the data processing stage, students to discuss questions in groups and isolate them at the verification and conclusion stages. The last sub-topic discusses the interdependence of living things. In the problem identification stage, the teacher presents a video about the existence of rat pests in the surrounding environment. Students discuss to write questions and hypotheses from what they see in the video. Then the stage of collecting data from students in groups with the teacher's support is simulating food chains and food webs using simple equipment. Other students write their results in a table. Next, at the data processing stage, they discuss to answer questions. Then at the verification and conclusion stage they explain the results and the teacher provide explanation regarding what they have learned at the meeting. After all stages of Discovery Learning completed, each meeting participant, students elaborate on the concept through presentation of material and formative tests. The display of the content section of the sub-topic of interaction patterns of living things is presented in Figure 4.

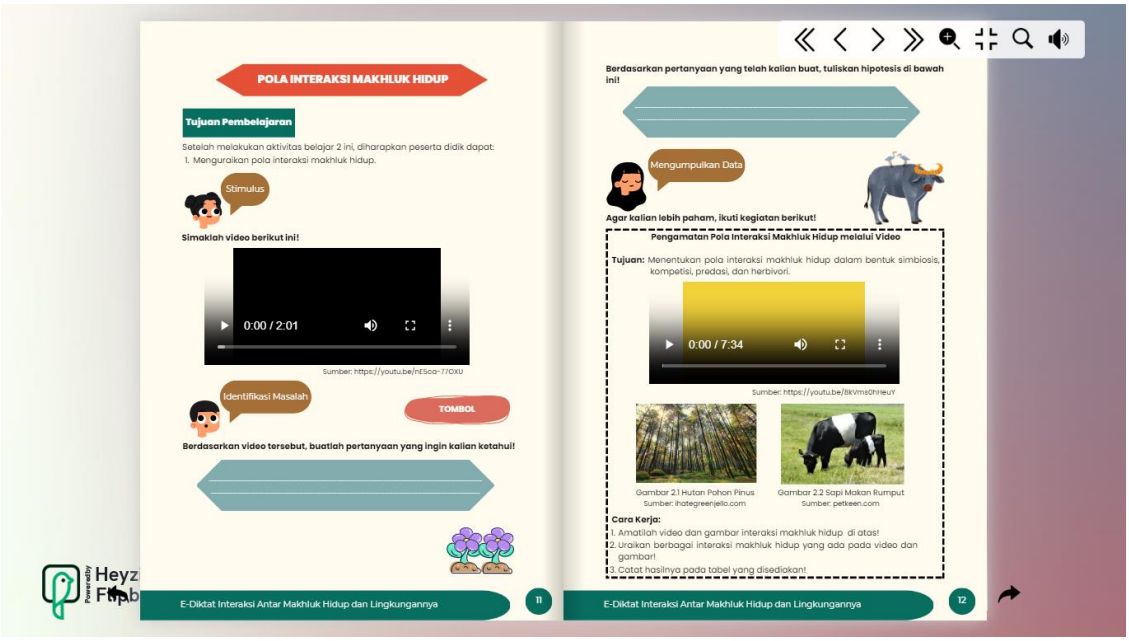

Figure 4. Discovery Learning *Based* Flipbook E-module *Content Section Display*

Each sub-topic is accompanied by learning objectives, presented step by step according to the syntax of *the discovery learning model and* equipped with material descriptions, "let's play!" and quizzes. The work on learning activities and "let's play!" activities is carried out through the liveworksheet application, while quizzes are carried out through the quizizz *platform*.

After the three sub-topics are completed, then an evaluation question is given to determine the completeness of learning in students. When students have completed the evaluation questions, they can access the answer key as feedback through *Qr-code* and reflection on learning activities that have been carried out through the *link*. The e-module ends with a concluding section consisting of a glossary, bibliography and author profile.

Before e-modules are implemented to students, discovery learning-based *flipbook e-modules are* validated first in media and material. Media and material validation tests are carried out through validation sheet questionnaires. Media and material validation is carried out by one validator, namely a lecturer of the Science Education study program, State University of Malang who is an expert in their field. When collecting data, one validator for each media and material was used due to the limited time the researcher had. Apart from that, this media does not only receive assessments through validators but also teachers and students so that the assessment is deemed sufficient. The media validation sheet contains aspects of appearance and use which are divided into 21 assessment items. The results of media validation are presented in Table 7.

Table 7. Media Validation Results

Validation	Percentage of Validity	Category
Media Validation	95,2%	Highly Valid

Based on Table 7, it can be seen from 21 points of assessment aspects, a media validity percentage score of 95.2% was obtained. The results are then categorized based on validity criteria according to Akbar (2013) that the percentage score of 81%-100% indicates that the developed media is very valid. In the comments and suggestions column, media validators provide good comments and are instructed to proceed at the next stage. The general assessment as a conclusion of the media validation test is stated to be usable without revision so that the media is very suitable for use.

The material validation was carried out by one lecturer of Science Education, State University of Malang who is an expert in his field. The material validation test uses a material validation sheet instrument consisting of aspects of content feasibility, presentation feasibility, grammatical feasibility, conformity with *the discovery learning* model and concept correctness. Each of these aspects is broken down into several statements that represent these aspects. The results of material validation are presented in Table 8.

Table 8. Material Validation Results

Validation	Aspects	Percentage of Validity	Category
Material Validation	Content Eligibility	88,3%	Highly Valid
	Eligibility of Presentation	100%	Highly Valid
	Grammatical Eligibility	100%	Highly Valid
	Compatibility with *the Discovery Learning Model*	95,8%	Highly Valid
	Correctness of the Concept	95,8%	Highly Valid
Average Score		95,9%	Highly Valid

Based on Table 8, a validity percentage of 88.3% was obtained in the aspect of content eligibility with a very feasible category. The category is very valid because the content of the material, images, videos, illustrations presented is clear and good. However, the content feasibility aspect gets a slightly lower validity percentage than other aspects because based on comments and suggestions from validators, the questions developed can better adjust the cognitive level on learning outcomes and C4.

In the aspect of feasibility of presentation and feasibility of grammar get a percentage of validity of 100% which can be categorized as very valid. This is because the material, learning activities and questions have been presented very well and in accordance and clear grammar used. In the comments and suggestions, validators provide suggestions to pay attention to the developed questions and look back at punctuation and sentence systematics.

In the aspect of conformity with *the discovery learning model*, it obtained a percentage of 95.8% with a very valid category. The percentage results in the aspect of conformity *with the discovery* learning model were obtained because almost all stages of learning activities presented in the e-module were correct and in accordance with the syntax of the learning model used. However, there are comments and suggestions related to data processing activities from validators who state that it is better at this stage to prioritize the data obtained at the data collection stage and not displayed separately. Then enrichment questions can be added from the data collection results.

In addition, validators also provide several comments and suggestions for other improvements to e-modules in general, namely changing the redaction of some words and sentences to make it easier to understand, not covering the learning objectives of overall learning outcomes and the use of punctuation in sentences and indented writing systematics in the first paragraph. Some of these improvements have been revised by researchers, but for improvements to learning objectives that have not covered thoroughly, it is not being done at this time because the material in the e-module is focused on the topic of interaction between living things and their environment and limited time in research. As for the systematics of indented writing in the first paragraph, the researcher refers to the book by Trim (2017) That the first paragraph in the writing of the book is not typed indented because the reader basically already recognizes the passage is a paragraph.

In the last aspect, namely the correctness of the concept, it obtained a validity percentage of 95.8% with a very valid level. This is because of the 24 concepts, there is one conception that is incorrect. In addition, material validators also suggest improvements to the concepts of ecosystems and parasitism. Based on the results of material validation with the five aspects described above, an average score of 95.9% was obtained with a very valid category. Thus, the *discovery learning-based* flipbook *e-modules* developed can be used with minor revisions.

After revision based on comments and suggestions from material and media expert validators, then proceed to the implementation stage (*Implementation*). This stage was carried out by piloting discovery learning-based flipbook e-modules *to* 31 grade VII D students at SMP Negeri 1 Pakisaji, Malang Regency to determine their response and effectiveness in increasing student learning motivation.

A practicality test was conducted to determine the response of teachers and students after carrying out learning using discovery learning-based flipbook e-modules . The practicality test by science teachers at SMP Negeri 1 Pakisaji was carried out using a response questionnaire sheet containing four aspects in it. Based on Table 9, the percentage of practicality is 87.5% in the aspect of appearance and use, 91.6% in the aspect of media components, 95% in the aspect of presenting material and questions and 100% in the aspect of grammar. From the results of the scores of these four aspects, an average percentage of teacher practicality of 93.5% was obtained so that it can be concluded that discovery learning-based flipbook e-modules are very practical to use in learning. In addition to quantitative data, in the teacher practicality test, qualitative data in the form of comments and suggestions were obtained. The teacher gave suggestions so that in the future the *discovery learning-based* flipbook *e-modules* developed can be accessed offline. This can be used as an improvement but cannot be implemented because the offline access feature can be used for users who have subscribed. The results of the teacher practicality test are presented in Table 9.

Table 9. Teacher Practicality Test Results

Ket.	Aspects	Practicality Percentage	Category
Teacher	Display and Use	87,5%	Very Practical
	Media Components	91,6%	Very Practical
	Presentation of Material and Questions	95%	Very Practical
	Grammar	100%	Very Practical
Average Score		93,5%	Very Practical

The next practical test was carried out on 31 grade VII D students at SMP Negeri 1 Pakisaji. The instrument used is in the form of a response questionnaire sheet which contains five aspects, namely appearance and use, media components, presentation of material and questions and grammar. This aspect is the same as the aspect used by the teacher practicality test, but the statement given is written slightly differently according to the role of the teacher and students. Based on Table 10, in the aspect of appearance and use, the percentage of practicality was 84.8%, the aspect of the media component was 82.7%, the aspect of presenting the material and questions was 84.5% and the grammar aspect was 85.8%. Thus, an average score of practicality percentage of 84.4% was obtained so that discovery learning-based flipbook e-modules were categorized as very practical to use in learning. According to students, they like learning activities using laptops, learning with discovery learning-based flipbook e-modules is easier because of videos. In addition, students also conveyed suggestions that e-module *flipbooks* based *on discovery learning* should be developed with an *offline system*. This is due to the inadequate internet network in schools so that the video playback process in discovery learning-based flipbook e-modules *is* not so smooth. The results of the learners' practicality test are presented in Table 10.

Table 10. Student Practicality Test Results

	Aspects	Practicality Percentage	Category
Learners	Display and Use	84,8%	Very Practical
	Media Components	82,7%	Very Practical
	Presentation of Material and Questions	84,5%	Very Practical
	Grammar	85,8%	Very Practical
Average Score		84,4%	Very Practical

The effectiveness test was carried out through a learning motivation questionnaire instrument given before and after learning was applied using e-modules *flipbook* Based *discovery learning.* The results of effectiveness data are obtained from the Normality test, the test *Paired Sample T.test* and N-gain test. The data normality test aims to find out whether the data obtained is normally distributed or not (Sugiyono, 2017). The normality test method used in this study is the test *Shapiro-Wilk* because according to Ayuningtyas in Oktaviani &; Notobroto (2014) Normality tests with <50 data counts are more efficient using tests *Shapiro-Wilk.* Based on the normality test results in Table 11, the value of sig. The data on learners' learning motivation before treatment was 0.810 and after treatment was 0.170. The data can be said to be normally distributed if the value of sig. >0.05 (Oktaviani & Notobroto, 2014). Hence the value of sig. In the normality test has met the requirements for normal distribution, the next test can be carried out, namely the test *Paired Sample T.test.* The normality test results are presented in Table 11.

Table 11. Normality Test Results

Data	Sig.	Criterion
Motivation Before	0,810	Usual
Motivation After	0,170	Usual

On test results *Paired Sample T.test* Aims to examine the effectiveness of a treatment with marked average differences between before and after treatment. What is the value of sig. obtained <0.005 then there is a significant difference (Widiyanto, 2013). Based on Table 12, test results *Paired Sample T.test* obtained by 0.000 which means the value is <0.005 so that it can be said that there is a significant difference between the learning motivation of students before and after treatment. This indicates that the use of e-modules *flipbook* Based *Discovery Learning* Have a meaningful influence on students' learning motivation. Thus it can be concluded that the use of e-modules *flipbook* Based *Discovery Learning* can increase student learning motivation. In addition to the sig value. also obtained value *mean difference* amounted to 25.9032. Test results *Paired Sample T.test* presented in Table 12 below.

Table 12. Test Results *Paired Sample T.test*

Data	Sig. (2 tailed)	Mean Difference
Before and After Motivation	0,000	25,9032

Then to see the development of student motivation before and after doing learning activities with e-modules *flipbook* Based *Discovery Learning*, an analysis of the sum of frequencies on each indicator of learning motivation was carried out. Based on Figure 5 shows an increase in student motivation before and after learning to use e-modules *flipbook* Based *discovery learning.* A significant increase occurred in the tenacious indicator facing difficulties by 27% and the indicator of pleasure in solving problems by 25%. This shows that by using e-modules *flipbook* Based *Discovery Learning* Students become not easily discouraged when facing difficulties and are motivated in solving problems on problems related to the topic of interaction between living things and their environment. The results of the recapitulation of learners' learning motivation in the diagram are presented in Figure 5.

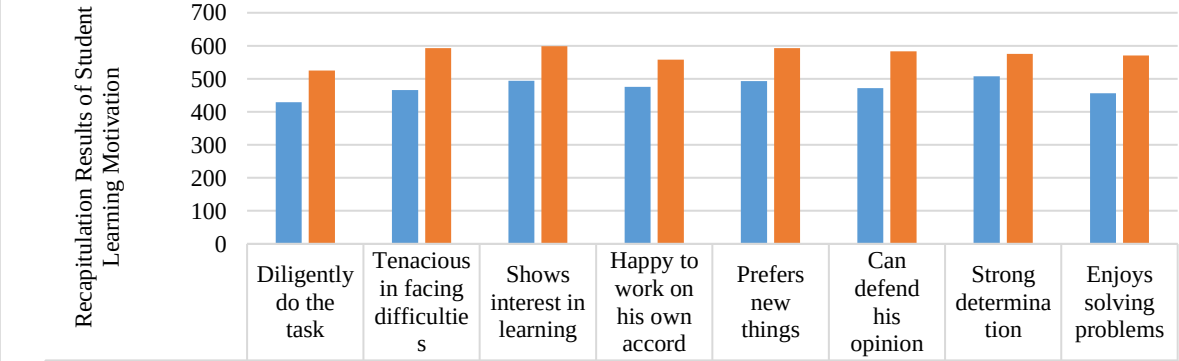

Figure 5. Student Learning Motivation Results

Next is the test *N-gain* to determine the level of effectiveness before and after using e-modules *flipbook* Based *Discovery Learning* in increasing the motivation to learn learners. Based on the data of Table 13, the average of the N-gain test is 0.32 which is in the range (0.30 < 0.70), so according to Table 7. the N-gain value obtained belongs to the medium criterion. Thus, the use can be concluded that the use of e-modules *flipbook* Based *Discovery Learning* Effectively increase student motivation (Oksa & Soenarto, 2020). This is in line with research

conducted by (Awwaliyah et al., 2021; Erniwati et al., 2022; Oksa & Soenarto, 2020) that the use of electronic teaching materials can effectively increase student learning motivation. Test results *N-gain* presented in Table 13.

Table 13. The Value of Learning Motivation Before and After Learning Implementation

	Before	After	N-gain	Criterion
Highest	162	181	0,5	Keep
Lowest	88	125	0,33	Keep
Average	122,39	148,29	0,32	Keep

After implementing the flipbook e-module for students, components in the media that are considered to increase learning motivation are activities that actively involve students in data collection syntax as abiotic and biotic observations in the school environment, observing contextual events via video, and simulating dependency relationships and between living creatures with simple equipment. Students looked enthusiastic when working on the formative assessment activity "let's play" via live worksheet. Contextual pictures, illustrations, videos, and view on the flipbook increase students' interest in learning.

Then to find out the completeness of student learning outcomes, evaluation questions are used. Before being given to students, evaluation questions are tested for validity and reliability using SPSS. The questions are tested for validity and reliability first so that the questions used are valid in measuring and can produce consistent data (Sugiyono, 2016). The evaluation questions consist of 15 multiple-choice questions and 5 description questions. After being tested for validity and reliability, out of 15 multiple-choice questions, there are 8 valid and reliable questions. While of the 5 description questions, all five are valid and reliable. The question is said to be valid if the value of sig. <0.05 and the value of. Valid questions are continued for reliability tests, questions can be said to be reliable if the value $r_{hitung} > r_{tabel}$*Cronbach alpha* >0.6 (Sujarweni, 2014). Multiple choice questions and descriptions are tested for validity and reliability separately, so based on Tables 14 and 15 it can be known that eight multiple-choice questions and five description questions get scores *Cronbach alpha* 0.673 and 0.721 mean that the question is reliable. Thus, it can be concluded that eight multiple-choice questions and five description questions are valid and reliable so that they can be used by students. The reliability test results are presented in Tables 14 and 15.

Table 14. Reliability Test Results of Multiple-Choice Evaluation Questions

Cronbach's Alpha	N of Items
0,673	8

Table 15. Reliability Test Results of Description Evaluation Questions

Cronbach's Alpha	N of Items
0,721	5

After the evaluation questions have been tested for validity and reliability, the next step of the evaluation questions is given to students. From the results of working on student evaluation questions, an average score of 80.4 was obtained and the percentage of complete students was 83%. Thus, it can be concluded that students are complete in achieving learning objectives classically because a percentage of completeness is obtained of >75% (Y. Sari et al., 2019). According to Arikunto in Sari &; Ismayani (2019) The value can be categorized as very good when it has reached 80. So it can be said that along with increasing learning motivation, the use of e-modules *flipbook* Based *Discovery Learning* It can also make students classically complete in achieving learning objectives with a percentage of 83%. This is in line with the statement that if the motivation to learn students is in good condition, the better the learning outcomes obtained (Chulsum, 2017; Feng et al., 2013). According to Emda (2017) learning can run effectively if students have good learning motivation, because learning motivation is one of the keys to the success of achieving learning goals in the classroom.

CONCLUSION AND SUGGESTION

Conclusion

The development of discovery learning-based flipbook e-modules to increase the learning motivation of grade VII junior high school students obtained results including: 1) valid in media and material validation tests because based on expert assessments, an average percentage of 95.2% and 95.9% was obtained with very valid categories so that they are suitable for use; 2) practical on teacher and student practicality tests with an average percentage of 93.5% and 84.4% so that discovery learning-based flipbook e-modules are very practical to use in learning; 3) effective because of the difference between the results of student learning motivation before and after using discovery learning-based flipbook e-modules on the Paired Sample t-test and obtained an average N-gain of 0.32 with moderate criteria and complete learning outcomes in students of 83%.

Suggestion

Based on the results of the study, it is expected that discovery learning-based flipbook e-modules will be developed offline so that teachers and students can use them more flexibly and efficiently. Then the scope of the material can be added so that students can learn the material more complex and achieve learning objectives on overall learning outcomes. Furthermore, further research is needed on flipbook e-module products with other learning materials and models so that the product can be developed more optimally and more input data about flipbook e-module.

BIBLIOGRAPHY

Adnyani, N. K. M., Pudjawan, K., & Japa, I. G. N. (2020). Motivasi dan Hasil Belajar IPA dalam Pembelajaran Scramble Berbantuan Kartu Pertanyaan. *Jurnal Ilmiah Sekolah Dasar*, *4*(2), 270. https://doi.org/10.23887/jisd.v4i2.25622

Akbar, S. (2013). *Instrumen Perangkat Pembelajaran*. PT Remaja Rosdakarya.

Ardianto, D., & Rubini, B. (2016). Literasi Sains Dan Aktivitas Siswa Pada Pembelajaran Ipa Terpadu Tipe Shared. *USEJ - Unnes Science Education Journal*, *5*(1), 1167–1174.

Awwaliyah, H., Rahayu, R., & Muhlisin, A. (2021). Pengembangan E-Modul Berbasis Flipbook Untuk Meningkatkan Motivasi Belajar Siswa Smp Tema Cahaya. *Indonesian Journal of Natural Science Education (IJNSE)*, *4*(2), 516–523. https://doi.org/10.31002/nse.v4i2.1899

Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. Springer.

Chaifa, D. E., Diantoro, M., & Mahanal, S. (2017). Profil Kemampuan Representasi Peserta Didik Smp Pada Materi Interaksi Mahluk Hidup Dengan Lingkungan. *Seminar Nasional Pendidikan Biologi Dan Saintek II*, 628–636.

Chulsum, U. (2017). Pengaruh Lingkungan Keluarga, Kedisiplinan Siswa, Dan Motivasi Belajar Terhadap Hasil Belajar Ekonomi Siswa Di Sma Negeri 7 Surabaya. *Jurnal Ekonomi Pendidikan Dan Kewirausahaan*, *5*(1), 5. https://doi.org/10.26740/jepk.v5n1.p5-20

Daud, F., & Rahmadana, A. (2015). Pengembangan Media Pembelajaran Biologi Berbasis E-Learning pada Materi Ekskresi Kelas XI IPA 3 SMAN 4 Makassar. *Jurnal Bionature*, *16*(1), 28–36. https://ojs.unm.ac.id/bionature/article/view/1566/630

Dehong, R., Kaleka, M. B. U., & Rahmawati, A. S. (2020). Analisis Langkah-Langkah Penerapan Model Discovery Learning Dalam Pembelajaran Fisika. *EduFisika*, *5*(02), 131–139. https://doi.org/10.22437/edufisika.v5i02.10533

Depdiknas. (2016). *Permendiknas No 22 Tahun 2016 Tentang Standar Isi*. https://peraturan.go.id

Djamaluddin, A., & Wardana. (2019). Belajar Dan Pembelajaran. In *CV Kaaffah Learning Center*.

Elisabet, E., Relmasira, S. C., & Hardini, A. T. A. (2019). Meningkatkan Motivasi dan Hasil Belajar IPA dengan Menggunakan Model Pembelajaran Project Based Learning (PjBL). *Journal of Education Action Research*, *3*(3), 285. https://doi.org/10.23887/jear.v3i3.19451

Emda. (2017). *Kedudukan Motivasi Belajar Siswa dalam Pembelajaran*. *5*(2).

Erawati, N. K., Purwati, N. K. R., & Saraswatı, I. D. A. P. D. (2022). Pengembangan E-Modul Logika Matematika Dengan Heyzine Untuk Menunjang Pembelajaran Di Smk. *Jurnal Pendidikan Matematika*, *8*(2), 71–80.

Erniwati, E., Sudding, S., & Anwar, M. (2022). Pengembangan E-Modul Berbasis Flipbook dalam Model Discovery Learning untuk Meningkatkan Motivasi dan Hasil Belajar Peserta Didik (Studi pada Materi Pokok Laju Reaksi). *Chemistry Education Review (CER)*, *6*(1), 58–71. https://doi.org/10.26858/cer.v5i2.32722

Fatimah, F., & Widyatmoko, A. (2014). Pengembangan Science Comic Berbasis Problem Based Learning Sebagai Media Pembelajaran pada Tema Bunyi dan Pendengaran Untuk Siswa Smp. *Jurnal Pendidikan IPA Indonesia*, *3*(2), 146–153. https://doi.org/https://doi.org/10.15294/jpii.v3i2.3114

Fazlina, S., Sumarmin, R., Putri, I. L. E., & Yogica, R. (2019). Pengembangan Handout Dengan

Tampilan Majalah yang Dilengkapi Peta Konsep Tentang Interaksi Makhluk Hidup dan Lingkungannya untuk Peserta Didik Kelas VII SMP. *Bioeducation*, *3*(1), 73–80.

Feng, H.-Y., Fan, J.-J., & Yang, H.-Z. (2013). The Relationship of Learning Motivation and Achievement in EFL: Gender as an Intermediated Variable. *Educational Research International*, *2*(2), 50–58. www.savap.org.pkwww.erint.savap.org.pk

Firdaus, F. Z., Pursitasari, I. D., Permana, I., & Suhardi, E. (2020). Pengembangan Bahan Ajar E-LITE'S untuk Meningkatkan Literasi Sains pada Siswa Sekolah Menengah Pertama. *Pancasakti Science Education Journal*, *5*(9), 4–11.

Guswita, S., Anggoro, B. S., Haka, N. B., & Handoko, A. (2018). Analisis Keterampilan Proses Sains Dan Sikap Ilmiah Peserta Didik Kelas XI Mata Pelajaran Biologi Di SMA Al-Azhar 3 Bandar Lampung. *Biosfer: Jurnal Tadris Biologi*, *9*(2), 249–258. https://doi.org/10.24042/biosfer.v9i2.4025

Hake, R. R. (1999). *Analyzing Change/Gain Scores*. https://doi.org/10.24036/ekj.v1.i1.a10

Handayani, N. (2019). Pengembangan Bahan Ajar PAI Menggunakan Model Problem Based Learning (PBL) Untuk Hasil Belajar Siswa Kelas VIII Di SMPN 16 Kota Bengkulu. In *Fakultas Tarbiyah dan Tadris*. IAIN Bengkulu.

Harahap, S. R. (2020). Konseling: Kebiasaan Belajar Siswa Dimasa Pandemi Covid-19. *Al-Irsyad*, *10*(1), 30–35. https://doi.org/10.30829/al-irsyad.v10i1.7639

Hardiansyah, D., & Sumbawati, M. S. (2016). Pengembangan Media Flash Flipbook dalam Pembelajaran Perakitan Komputer Untuk Meningkatkan Hasil Belajar Siswa Kelas X TKJ SMK Negeri 7 Surabaya. *Jurnal IT-Edu*, *1*(2), 5–11.

Hidayat, D. R., Rohaya, A., Nadine, F., & Ramadhan, H. (2020). Independent Learning of Students in Online Learning During The Covid-19 Pandemic. *Perspektif Ilmu Pendidikan*, *34*(2), 147–154.

Husna, N., Normelani, E., & Adyatma, S. (2017). Hubungan Bermain 6ames dengan Motivasi Belajar Siswa Sekolah Menengah Pertama (SMP) di Kecamatan Banjarmasin Bara. *Jurnal Pendidikan Geografi*, *4*(3), 1–64.

Jalil, M. (2016). Pengembangan Pembelajaran Model Discovery Learning Berbantuan Tips Powerpoint Interaktif Pada Materi Interaksi Makhluk Hidup Dengan Lingkungan. *Refleksi Edukatika*, *6*(2), 130–137. https://doi.org/10.24176/re.v6i2.604

Juhji. (2016). *Peningkatan Keterampilan Proses Sains Siswa*. *2*(1), 58–70.

Liliasari, Supriyanti, S., & Hana, M. N. (2016). Students ' Creative Thinking Enhancement Using Interactive Multimedia of Redox Reaction. *Jurnal Pengajaran MIPA*, *21*, 30–34.

Mahara, E. (2022). *Pengembangan Media Flipbook Berbasis Literasi Sains pada Materi Koloid Di SMA Negeri 1 Bandar*. https://repository.ar-raniry.ac.id/id/eprint/23310/1/Elvi Mahara, 180208031, FTK, PKM, 081262062455.pdf

Mawardi, M. (2019). Rambu-rambu Penyusunan Skala Sikap Model Likert untuk Mengukur Sikap Siswa. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *9*(3), 292–304.

https://doi.org/10.24246/j.js.2019.v9.i3.p292-304

Meldawati. (2022). *Pengembangan E-Diktat Berbasis Pemecahan Masalah Matematika pada Materi Relasi dan Fungsi Kelas VIII di MTsN 2 Banjar Tahun Ajaran 2021/2022*. Universitas Islam Negeri Antasari Banjarmasin.

Mokodompit, Ek. S., Putra, A. P., & Anas, T. (2022). *Pengembangan E-Diktat Berbasis Articulate Storyline Materi IPA Kelas IV Di SDN Gedog 1 Kota Blitar*. Universitas Negeri Malang.

Muslimah. (2021). *Pengembangan Modul Matematika Bermuatan High Order Thinking Skill (HOTS) Menggunakan Metode Pembelajaran Scaffolding Pada Materi Sistem Persamaan Linear Tiga Variabel (SPLTV) Kelas X SMA Negeri 10 Banjarmasin Tahun Pelajaran 2020/ 2021* [UIN Antasari]. http://idr.uin-antasari.ac.id/id/eprint/16638

Nanang, O. :, & Prasetyo, D. (2015). Pengembangan Diktat Las SMA untuk Meningkatkan Prestasi Belajar Siswa di SMK Negeri 3 Yogyakarta Developing Smaw Textbook To Improve Student's Academic Achievement at Smk Negeri 3 Yogyakarta. *Jurnal Pendidikan Vokasional Teknik Mesin*, *3*(8), 535–542.

Nisa, K., Ashari, A., & Kurniawan, E. S. (2019). Pengembangan Diktat Fisika Berbasis Problem Based Learning untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik. *Radiasi : Jurnal Berkala Pendidikan Fisika*, *12*(1), 20–27. https://doi.org/10.37729/radiasi.v12i1.22

Nuryani, L., & Surya Abadi, I. G. (2021). Media Pembelajaran Flipbook Materi Sistem Pernapasan Manusia pada Muatan IPA Siswa Kelas V SD. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *5*(2), 247. https://doi.org/10.23887/jipp.v5i2.32934

Oksa, S., & Soenarto, S. (2020). Pengembangan E-Modul Berbasis Proyek Untuk Memotivasi Belajar Siswa Sekolah Kejuruan. *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, *4*(1), 99–111. https://doi.org/10.21831/jk.v4i1.27280

Oktaviani, M. A., & Notobroto, H. basuki. (2014). Perbandingan Tingkat Konsistensi Normalitas Distribusi Metode. *Jurnal Biometrika Dan Kependudukan*, *3*(2), 127–135.

Qisthi, L. M. (2020). *Pengembangan Media Flipbook Materi Personal Higiene pada Mata Pelajaran Keamanan Pangan untuk Siswa Kelas X di SMKN 2 Godean* [Universitas Negeri Yogyakarta]. http://eprints.uny.ac.id/id/eprint/67618

Rahmat, S. T. (2015). Pemanfaatan Multimedia Interaktif Berbasis Komputer Dalam Pembelajaran. *Jurnal Pendidikan Dan Kebudayaan Missio*, *7*(2), 196–208. http://www.uic.edu/depts/

Ramdania, Sutarno, & Waslaluddin. (2018). Penggunaan Media Flash Flip Book Dalam Pembelajaran Teknologi Informasi Dan Komunikasi Untuk Meningkatkan Hasil (Studi Eksperimen Kuasi Terhadap Siswa Kelas XII Di Madrasah Aliyah Al-Hidayah Cikancung) Belajar Siswa. *Pendidikan Ilmu Komputer FPMIPA UPI*, *2*(3), 1–6.

Riwu, I. U., Laksana, D. N. L., & Dhiu, K. D. (2019). Pengembangan Bahan Ajar Elektronik Bermuatan Multimedia Pada Tema Peduli Terhadap Makhluk Hidup Untuk Siswa Sekolah

Dasar Kelas Iv Di Kabupaten Ngada. *Journal of Education Technology*, *2*(2), 56. https://doi.org/10.23887/jet.v2i2.16182

Rosidha, A. (2020). Peningkatan Aktivitas dan Hasil Belajar Siswa pada Mata Pelajaran Biologi Melalui Model Pembelajaran Make and Match Berbasis Media Karu Pintar. *Jurnal Paedagogy*, *7*(4), 393. https://doi.org/10.33394/jp.v7i4.2946

Saftari, M., & Fajriah, N. (2019). Penilaian Ranah Afektif Dalam Bentuk Penilaian Skala Sikap Untuk Menilai Hasil Belajar. *Edutainment : Jurnal Ilmu Pendidikan Dan Kependidikan*, *7*(1), 71–81. https://doi.org/10.35438/e.v7i1.164

Sardiman, A. M. (2016). *Interaksi & motivasi belajar mengajar*. Rajawali Press.

Sari, A. N., & Hamimi, E. (2022). *Pengembangan Model Materi Energi Berbasis Explicit Scientific Inquiry Instruction (ESII) Berpendekatan STEM Untuk Meningkatkan Kemampuan Argumentasi Ilmiah Siswa*. Universitas Negeri Malang.

Sari, B. K. (2017). Desain Pembelajaran Model Addie Dan Implementasinya Dengan Teknik Jigsaw. *Prosiding Seminar Nasional Pendidikan*, 87–102.

Sari, J., Bahar, A., & Handayani, D. (2017). Studi Komparasi Antara Model Pembelajaran Discovery Learning Dan Group Investigation Terhadap Hasil Belajar Kimia Siswa. *Alotrop*, *1*(1), 60–65. https://doi.org/10.33369/atp.v1i1.2720

Sari, Y., Ismayani, A., & Zulfadli. (2019). Penerapan Media Pembelajaran Kartu Kimia Pada Materi Koloid Kelas XI IPA SMA Negeri 1 Darussalam Aceh Besar. *Jurnal Ilmiah Mahasiswa Jurusan Pendidikan Kimia (JIMPK)*, *4*(4), 59–65.

Shofiyah, N., & Wulandari, F. E. (2018). Model Problem Based Learning (PBL) dalam Melatih Scientific Reasoning Siswa. *Jurnal Penelitian Pendidikan IPA*, *3*(1), 33–38. https://doi.org/https://doi.org/10.26740/jppipa.v3n1.p33-38

Sholihah, H. M. (2021). *Pengembangan Multimedia Interaktif Berbasis Aplikasi Android untuk Memfasilitasi Kemandirian Belajar Siswa*. Universitas Negeri Malang.

Sihotang, C., & Sibuea, A. M. (2015). Pengembangan Buku Ajar Berbasis Kontekstual Dengan Tema "Sehat Itu Penting." *Jurnal Teknologi Informasi & Komunikasi Dalam Pendidikan*, *2*(2), 169–179. https://doi.org/10.24114/jtikp.v2i2.3293

Sofdita, H. (2023). *Pengembangan Media Pembelajaran Kartu Tanya Biologi pada Materi Interaksi Makhluk Hidup dan Lingkungannya Kelas VII SMP/MTs*. Universitas Lampung.

Sole, F. B., & Anggraeni, D. M. (2018). Inovasi Pembelajaran Elektronik dan Tantangan Guru Abad 21. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *2*(1), 10. https://doi.org/10.36312/e-saintika.v2i1.79

Sugiyono. (2013). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. CV. Alfabeta.

Sugiyono. (2016). *Metode Penelitian & Pengembangan Research and Development*. Alfabeta.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D*. Alfabeta.

Sujarweni, W. (2014). *Metodologi penelitian : lengkap, praktis, dan mudah dipahami*. Pustaka Baru Press.

Sulistyosari, Y. (2018). Kreativitas Guru Dalam Mengembangkan Bahan Ajar IPS Pada SMP/MTs Se-Kecamatan Ngadirejo Kabupaten Temanggung. *Harmony*, *3*(2), 178–189.

Sunami, M. A., & Aslam, A. (2021). Pengaruh Penggunaan Media Pembelajaran Video Animasi Berbasis Zoom Meeting terhadap Minat dan Hasil Belajar IPA Siswa Sekolah Dasar. *Jurnal Basicedu*, *5*(4), 1940–1945. https://jbasic.org/index.php/basicedu/article/view/1129

Tegeh, I. M., Jampel, I. N., & Pudjawan, K. (2014). *Model Penelitian Pengembangan*. Graha Ilmu.

Trim, B. (2017). *200+ Solusi Editing Naskah dan Penerbitan*. Bumi Aksara.

Wasisto A. (2016). *Pembuatan Buku, Modul, Diktat dan Nilai Angka Kreditnya*. Pustaka Pelajar.

Widiyanto, M. A. (2013). *Statistika Terapan. Konsep dan Aplikasi dalam Penelitian Bidang Pendidikan, Psikologi dan Ilmu Sosial Lainnya*. PT Elex Media Komputindo.

Wijayanti, N. P. A., Damayanthi, L. P. E., Sunarya, I. M. G., & Putrama, I. M. (2016). Pengembangan E-Modul Berbasis Project Based Learning Pada Mata Pelajaran Simulasi Digital Untuk Siswa Kelas X Studi Kasus Di Smk Negeri 2 Singaraja. *Jurnal Pendidikan Teknologi Dan Kejuruan*, *13*(2), 184–197. https://doi.org/10.23887/jptk.v13i2.8526

Yudasmara, G. A., & Purnami, D. (2015). Pengembangan Media Pembelajaran Interakif Biologi Untuk Meningkatkan Hasil Belajar Siswa Smp. *Jurnal Pendidikan Dan Pengajaran*, *48*(1–3), 1–8. https://doi.org/10.23887/jppundiksha.v48i1-3.6923

Yusuf, A., Suardana, I. N., & Selamet, K. (2021). Pengembangan Media Pembelajaran Flashcard Ipa Smp Materi Tata Surya. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *4*(1), 69–80. https://doi.org/10.23887/jppsi.v4i1.33181

PROFIL SINGKAT

Isnanik Juni Fitriyah, born in Jombang, June 1, 1984, earned a Bachelor of Education (S.Pd) majoring in Chemistry Education in 2006 and a Master of Science (M.Si) majoring in Chemistry at Institut Teknologi Sepuluh Nopember in 2011. Currently working as a lecturer in the Science Education study program FMIPA Universitas Negeri Malang. Email: isnanik.fitriyah.fmipa@um.ac.id

Salma Nur Salsabila Sahda, born in Blitar, July 24, 2001, is currently completing her Bachelor of Science Education study at Universitas Negeri Malang. Email: salma.nur.1903516@students.um.ac.id