Jurnal Ilmiah Visi
http://doi.org/10.21009/JIV.1901.10

DOI: doi.org/10.21009/JIV.1901.10

Volume 19 Issue 1
Juni 2024

p-ISSN: 1970-9176
e-ISSN: 2620-5254

Diterima	: 5 Juni 2024
Direvisi	: 27 Juni 2024
Disetujui	: 29 Juni 2024
Diterbitkan	: 30 Juni 2024

PENGEMBANGAN MEDIA KARTU BERGAMBAR BERBASIS LITERASI SAINS PADA MATERI EKOSISTEM

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Abstrak: Diketahui bahwa skor literasi sains di Indonesia dalam PISA (Programe for International Student Assement) yang dilaksanaan pada tahun 2022 berada naik 6 posisi dibanding tahun 2018. Namun, perolehan skor menurun 13 point. Hal ini perlu diperbaiki kualitas pendidikan di Indonesia, salah satu faktor yang mempengaruhinya adalah kurangnya inovasi penggunaan media pembelajaran berbasis literasi sains. Tujuan dilakukan penelitian ini untuk mengetahui karakteristik, kelayakan, dan respon terhadap media kartu bergambar berbasis literasi sains materi ekosistem kelas V sekolah dasar. Metode penelitian yang digunakan yaitu R&D dengan model ADDIE yaitu analysis, design, development, implementation, and evaluation. Untuk mengetahui kelayakan media, maka dilakukan uji validasi oleh ahli materi dan ahli media dengan menggunakan lembar validasi. Dari uji validasi ahli materi memperoleh persentase 100% dengan kategori sangat layak. Hasil uji media diperoleh persentase 100% dengan kategori sangat layak. Untuk mengetahui respon media, dilakukan pengisian angket responden oleh pendidik dan peserta didik. Hasil respon peserta didik terhadap media memperoleh persentase sebesar 92% dengan kategori sangat baik. Sedangkan hasil respon pendidik diperoleh persentase sebesar 95% dengan kategori sangat baik. Penelitian ini mendapatkan hasil bahwa, media kartu bergambar berbasis literasi sains materi ekosistem sangat layak dan sangat baik untuk digunakan sebagai media pembelajaran yang dapat menjadi ide serta motivasi pendidik untuk membuat inovasi media pembelajaran. Selain itu, dapat membantu peserta didik dalam proses pembelajaran dan menambah pengetahuan terkait keterampilan literasi sains. Penelitian selanjutnya dapat mengembangkan media kartu bergambar dengan mata pelajaran serta materi yang lainnya.

Kata-kata Kunci: Kartu bergambar, Literasi Sains, Ekosistem.

DEVELOPMENT OF PICTURE CARD MEDIA BASED ON SCIENCE LITERACY ON ECOSYSTEM MATERIALS

Abstract: *It is known that the science literacy score in Indonesia in PISA (Programe for International Student Assement) which is carried out in 2022 is up 6 positions compared to 2018. However, the score dropped by 13 points. This needs to be improved the quality of education in Indonesia, one of the factors that influence it is the lack of innovation in the use of science literacy-based learning media. The purpose of this study was to determine the characteristics, feasibility, and response to picture card media based on science literacy in grade V elementary school ecosystem materials. The research method used is R&D with the ADDIE model, namely analysis, design, development, implementation, and evaluation. To determine the feasibility of the media, a validation test was carried out by material experts and media experts using validation sheets. From the expert validation test, the material obtained a percentage of 100% with a very decent category. The results of the media test obtained a percentage of 100% with a very decent category. To determine the media response, respondents were filled out questionnaires by teachers and students. The results of students' responses to the media obtained a percentage of 92% in the very good category. While the results of the teacher's response obtained a percentage of 95% with a very good category. This study found that the picture card media based on science literacy ecosystem material is very feasible and very good to be used as a learning medium that can be an idea and motivation for teachers to make learning media innovations. In addition, it can help students in the*

learning process and increase knowledge related to science literacy skills. Further research can develop picture card media with other subjects and materials.

Keywords: *Picture cards, Science Literacy, Ecosystem.*

INTRODUCTION

The main role in forming a strong understanding of natural phenomena that occur around students can be formed in the learning of Natural and Social Sciences (IPAS). From the results of this understanding, learners can use their abilities to develop science skills early on. The skills developed can include understanding based on concepts, solving a problem, and developing critical thinking in students. It is expected to be achieved well in order to provide a full experience for learners (Nugraha, 2022). In developing these skills that can provide a full experience for students, science literacy is needed.

According Irsan, (2021) Science literacy is a knowledge skill in the context of science that starts with identifying and then making conclusions based on the facts of the matter. Science literacy skills play an important role in today's modern society. Science literacy skills play an important role in today's modern society. The phenomenon of the development of science and technology in the world which is growing very rapidly causes this scientific literacy ability to be needed. We can see from various aspects of life today that everything is based on sophisticated technology. In addition to making technology, science literacy is also needed to analyze various scientific issues so that life in the world becomes balanced.

According OECD, (2019), Science literacy has specific competencies to understand and involve each individual being able to discuss issues related to science and technology. There are three specific indicators including: (1) Explaining phenomena scientifically, (2) Evaluating and designing scientific investigations, and (3) Interpreting data and evidence scientifically. These three competencies require individual knowledge, this knowledge is not only limited to the content of the problem. But being able to understand and identify with various methods to develop science literacy. Therefore, this science literacy ability is very necessary even from the elementary school level.

Regarding science literacy at the elementary school level is an important role to prepare students with a solid understanding of scientific concepts, skills to analyze problems, and can adapt to the community environment. The Program for International Student Assessment (PISA) conducts research related to the knowledge and skills of students. The areas studied are math literacy, reading literacy, and science literacy, this activity will assess how far students can solve complex problems, think critically, and communicate effectively. This can provide information related to how the Indonesian education system to face the era of life in the future. PISA results released in 2023 obtained data that Indonesia's ranking in the field of science literacy in PISA 2022 rose 6 positions compared to 2018 from. However, Indonesia's score on science literacy dropped 13 points (PISA 2022 Results Factsheets Indonesia PUBE, 2023).

According Yusmar & Fadilah, (2023), The quality of teachers and the quality of education in Indonesia still have to be improved, this allegation is said to be a factor in the low science literacy skills in Indonesia. In addition, another factor is the lack of use of learning media used when teaching, this can also cause students to have little interest in the learning taught (Ramdani et al., 2020). The use of learning media is very important in learning activities, especially learning media based on science literacy. In addition to making the learning atmosphere in the classroom more active, the existence of learning media is also a tool for conveying information for both students and teachers.

According (Andika & Yudiana, 2022), A good solution is to combine learning with developing a learning media. In the scope of learning, learning media acts as a tool that is made in various forms in order to attract the attention of students so that it

can facilitate their learning process. By utilizing learning media that involves students, it can help them in understanding the ongoing lesson (Pranata et al., 2022). As is the case with concrete or real learning media, namely the use of science literacy-based picture cards as a support for learning in the classroom.

According Rosalina. et al., (2021), Picture card media is a simple media that can be used in any kind of learning and is easy for students to learn. In this media, there is already material content in the form of interesting pictures and there is also a little writing as a guide so that students can easily understand it. The use of picture card media can provide new experiences for students, students more easily remember learning material and can increase students' learning motivation when after and before using picture card media in learning. (Tati Hamdiah & Nita Priyanti, 2023). With the use of picture card media, educators are able to create new experiences for students to be more fun and active when learning takes place, so that students' understanding in understanding the concept of material becomes more effective.

According Mulyanti et al., (2023), The use of picture card media in primary schools to improve vocabulary acquisition skills can take place effectively during learning. Picture card media, which can be said to be graphic visual media, is a medium that is often used by educators in elementary school educational institutions. Picture card media has two sides, the front and back sides in the picture card media there are interesting pictures according to the material and there is text as a guide or material direction on the picture card. In using picture cards, it can be done by showing each card to students, so that students can use picture cards by grasping and seeing freely (Mulyanti et al., 2023).

Based on the results of observations at SDN Cipinang Besar Selatan 13 Pagi, researchers obtained data that; the use of learning media used by educators in supporting science literacy in IPAS learning, educators explain the material through several media such as software on laptops, learning using textbooks, and using several components of materials that are in accordance with the material. Educator innovation needs to be done in developing and using science literacy-based learning media that is interesting and in accordance with the material and students. This can provide a new experience and enthusiasm for learning related to the use of learning media for students in understanding science literacy.

Therefore, researchers developed a learning media with a focus on science literacy skills. Because in science literacy there are improving thinking, writing, and speaking skills. These three skills will increase the brain response of students when receiving external stimuli, students can also express their opinions freely according to the material provided. Researchers developed a science literacy-based picture card learning media ecosystem material equipped with science literacy-based teaching modules and quiz games in groups.

RESEARCH METHODS

In this study, researchers used the R&D (Research and Development) method. R&D research produces a new product that can also improve existing products and is accounted for by researchers. The R&D research method can be defined as follows formulate concepts systematically, develop and improve products, and produce products that are tested validly (Nabila et al., 2021). In this study using the ADDIE model, this model is designed in a systematic sequence.

ADDIE model, which stands for (Analysis,Design, Development, Implementation, and Evaluation). Due to the systematic arrangement, the researcher is facilitated in doing this research. Data collection is done by conducting validation tests to validators. The validators used in this study are material experts and media experts, and there is a respondent questionnaire that will be filled in by educators and students. The next step is to analyse the data. Researchers used a Likert scale to analyse the data in this study. There are 2 combinations of the Likert scale, there is a number form ("5: Very good", "4: Good", "3: Fair", "2: Less", and "1: Very less"). and the form of words (“SS: Sangat Setuju”, “ST:Setuju”, “R: Ragu-ragu”, “TS: Tidak Setuju”, dan “STS: Sangat Tidak Setuju”). In analysing this data, there are questions in the form of statements that lead to the media. To answer this, researchers used a Likert scale in the form of numbers.

This research uses qualitative and quantitative approaches. Qualitative data was obtained from input and suggestions by material expert validators and media experts. For quantitative data obtained from scores and percentages in the validation results questionnaire and response questionnaire. Next, analyse the data results with the following formula:

$$P = \frac{f}{n} \times 100\%$$

Descfription :
P : Validation Percentage
f : Number of scores from data collection
n : Maximum score

After analysing with the formula, the results of the product quality percentage will be obtained based on the feasibility level of product revision. Below is listed the percentage and feasibility of the media.

Table 1.
Percentage and Criteria for Media Feasibility

Assessment	Category
$\mathbf{81\% - 100\%}$	Very Feasible
$\mathbf{61\% - 80\%}$	Worth
$\mathbf{41\% - 60\%}$	Decent Enough
$\mathbf{21\% - 40\%}$	Less Feasible
$\mathbf{0\% - 20\%}$	Very Unfit

Next in seeing success is also obtained by knowing the responses of students and teachers.

Table 2.
Percentage and Criteria for Teacher and Learner Response.

Assessment	Category
$\mathbf{81\% - 100\%}$	Very good
$\mathbf{61\% - 80\%}$	Good
$\mathbf{41\% - 60\%}$	Fair
$\mathbf{21\% - 40\%}$	Less
$\mathbf{0\% - 20\%}$	Very less

RESULTS AND DISCUSSION

The results of research on picture card media based on science literacy of ecosystem material conducted by V grade students of SDN Cipinang Besar Selatan 13 were carried out for two days. The products produced in this research are often encountered in the form of films, books, concrete learning media, and digital media. The research uses the ADDIE approach (Analysis,Design, Development, Implementation, and Evaluation).

In the early stages of the analysis, researchers analysed the needs of teachers and students and analysed the material. To analyse the needs of teachers where teachers at the school already have experience related to making learning media. However, the use of learning media does not show the effectiveness and improvement during learning, especially for mastering science literacy skills. The use of learning media has been made well, but the concept of science literacy has not been implemented properly in the learning media. Analysis of the needs of students, still do not understand the learning delivered by the teacher and their understanding in literacy, especially science literacy, is not in accordance with the indicators of science literacy. Learners need learning media that is interesting and can change the atmosphere of learning in the classroom not monotonous. Next, material analysis was carried out, namely analysing the learning outcomes in the IPAS learning content, with the material on Ecosystem Harmonisation found in chapter two. Researchers developed from the chapter with science literacy-based picture card media on ecosystem material.

The next stage is design, at this stage what researchers do at the beginning is adjusting the learning media to the material that has been analysed. Researchers used source material from the IPAS book for grade V Elementary School. The basic design made by researchers at this stage is in the form of a Microsoft Word file containing animal records and other components related to the ecosystem. Then from these notes will be designed at the next stage. The second stage carried out is to make the design of the Learning media. In carrying out this design process, researchers will formulate what will be contained in the learning media that will be made. The process includes: (1) Creating a media packaging design. Media packaging design is made through the Canva application. The design is adjusted to the material, namely "ecosystem". The combination of fonts, colours, and image position must be considered well so that the position is not too monotonous. (2) Creating a picture card design. Picture card design is made with Canva application. The design is made according to the "ecosystem" material, the use of fonts, colours, images, and the position of each element must be

considered so that the design does not look monotonous. (3) Make a brochure design to support the picture card. Brochure design is made with Canva application. The brochure contains a preface, scanned teaching module barcode, and media description. The use of fonts, colours, images, and the position of each element must be considered so that the design does not look monotonous. (4) Making media validation instruments and response surveys.

At the development stage, researchers incorporated ecosystem material into this picture card media. In addition, researchers assembled teaching modules that were in accordance with the learning outcomes of the curriculum. The teaching module is made based on science literacy and contains related ecosystems. In addition, researchers also made science literacy-based quiz questions on question cards. The question card consists of 5 levels with each level having 5 questions. The following is the development of science literacy-based picture card media on ecosystem material, as follows.

Figure 1. Front and back of card packaging

Figure 2. Question and picture cards

In this stage, validation was also carried out by material experts and media experts, with the aim of knowing whether the science literacy-based picture card media on ecosystem material was suitable for testing or not. It is known, the results of validation by material experts and media experts both get a percentage of 100% each with a very feasible category. From the results of these two validations, it can be stated that the science literacy-based picture card media is very feasible to be tested on teachers and students.

Figure 3. Percentage Results of Validation by Material Experts

Based on the graph and table above are the results of validation by Material Experts. From the graph and table, it is obtained that, there are aspects of the curriculum, aspects of the material, and aspects of the effectiveness of use. From all these aspects, researchers get a percentage of 100% from all these aspects. The assessment for the curriculum aspect contains points of accuracy with learning outcomes and learning objectives. In this aspect, a percentage of 100% was obtained with a very feasible category. Next, the material aspect with points of suitability with the material, understanding of the material, and material coverage. The assessment of this aspect received a percentage of 100% with a very feasible category. The effectiveness of use aspect has points such as increasing interest in learning and an interactive learning atmosphere, getting a point of 100% with a very feasible category. The linguistic aspect, the use of appropriate and consistent language and card instructions are easy to understand. This assessment obtained a percentage of 100% with a very feasible category.

Next, there are the results of the validation test conducted by media experts, namely PGSD lecturers, this assessment obtained a percentage of 100% with a very feasible category.

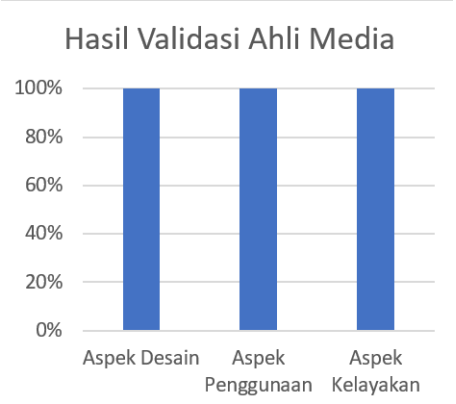

Figure 4. Percentage Results of Validation by Media Experts.

From the graph and table, it can be seen that there are design aspects, usage aspects, and feasibility aspects. The

assessment for the design aspect includes points of efficient packaging shape, easy to hold card shape, appropriate card size, appropriate image size, good image quality, and appropriate colour combination. From these points, the design aspect gets a percentage of 100% with a very feasible category. Next, in the use aspect, there is easy use, the picture is in accordance with learning, understanding the material is easy, and the supporting brochure is clear and easy to understand. This aspect gets a percentage of 100% with a very feasible category. Furthermore, there are aspects of feasibility that have media points in accordance with the learning objectives and the media is right with the material. In this aspect, it gets a percentage of 100% with a very feasible category.

The following is a table of suggestions and comments given by material and media experts when researchers conducted validation tests.

Table 3.
Suggestions and Comments from Material Experts and Media Experts.

Material Expert	Media Expert
This picture card media would be nice to use stationery, namely small markers. Aiming for interaction between students and learning media.	Picture cards with A5 size are suitable for use during learning, so that students can see the images clearly.

From this suggestion, it is known that it is important to have interaction during learning. Learning media can be said to be a teacher's tool for teaching, therefore in the need for good interaction not only with the teacher, but students with learning media also need interaction during learning (Yasir, 2017). Learning activities such as providing information and receiving information by means of responses or reactions given and finally there will be an interaction between students, teachers, and learning media. Larger picture card sizes and design variations can attract the attention of learners and make the learning atmosphere active (Asmonah, 2019). This opinion is the same as the comments from media experts that, adjustments to picture cards do need to be made so that students can more clearly see the images and understand the material properly and accurately.

Next is the implementation stage of this research piloting science literacy-based picture cards with ecosystem material. In this study, the picture cards were tested on 31 V grade students of SDN Cipinang Besar Selatan 13. The learning went well, students actively answered every question asked by the researcher. In this case, students were asked to assess the learning media using a sheet of questionnaire with the use of a Likert scale of 1 to 5. Learning begins gradually, starting from studying the components of the ecosystem to the balance and imbalance of the ecosystem. When answering a given question, learners are asked to present it in front of the class and answer with a loud voice and use picture cards. When the quiz begins, learners are also given the opportunity to discuss with their group mates, then they answer using picture cards and present them in front of the class. At this stage, teachers and students are given a questionnaire to assess the science literacy-based picture card media on ecosystem material. The following is a discussion of the results of the students' questionnaire.

Table 4.
Results of Learner Response Questionnaire

Aspect	Data collection scores	Max Score	Average per-Aspect	Category
Design	849	930	91%	Very good
Material	434	465	93%	Very good
Effectiveness of Use	427	465	92%	Very good
Total	1710	1860	92%	Very good

The average percentage for the whole was obtained at 92% with a very good category, the score obtained was 1,710. Therefore, it can be said that learning media can be successfully used in the learning process to improve science literacy skills and can provide an active learning atmosphere in the classroom.

It can be seen from the results obtained from the trial of V grade students of SDN Cipinang Besar Selatan 13 that the highest percentage is the material aspect, namely 93% with a very good category, the score obtained is 434. In the material aspect, the media makes it easy to understand the material, the suitability of the images to the material, and the use of language is easy to understand. The lowest percentage in this trial was the design aspect with a percentage of 91% with a very good category and the score obtained was 849. The design aspects include attractive picture card packaging, attractive picture cards, attractive fonts in the text, good colour combination, attractive packaging design, and high-resolution images. Next, there is the effectiveness of use aspect with a percentage of 92% with a very good category and the score obtained is 427. This aspect of the effectiveness of use includes improving science literacy skills, learning becomes active, and students' interest in learning increases.

Based on the results of the learner response questionnaire, science literacy-based picture card media on ecosystem material for grade V SD / MI students can help students to understand ecosystem material based on science literacy. Learners get a new experience by learning to use science literacy-based picture cards that make them able to discuss solving problems and dare to argue during learning.

Furthermore, there are the results of the teacher response questionnaire related to the science literacy-based picture card media on ecosystem material. The following is an explanation of the results of the teacher response questionnaire.

Table 5.
Results of Teacher Response Questionnaire

Aspect	Scores obtained	Max Score	Average (%)	Category
Curriculum	10	10	100%	Very good
Design	40	40	100%	Very good
Language	8	10	80%	Good
of Effectiveness of Use	15	15	100%	Very good
Total	67	75	95%	Very good

The average percentage for the whole obtained is 95% with a very good category, the score obtained is 67. The questionnaire assessment conducted by the teacher contains 4 aspects, namely curriculum aspects, design aspects, linguistic aspects, and aspects of effectiveness of use. The curriculum aspect contains the point of media accuracy to learning outcomes and learning objectives. The curriculum aspect gets a percentage of 100% with a good category.

Next is the design aspect with the content of points including, the point of efficient packaging shape, the shape of the card is easy to hold, the size of the card is appropriate, the size of the image is appropriate, the size of the text is appropriate, the image quality is good, ease of use, and the image is in accordance with the material. The design aspect obtained a percentage of 100% with a very good category. In the linguistic aspect with point content, the use of Indonesian language is good and appropriate and the writing of question text is easy to understand. The linguistic aspect received a percentage of 80% in the good category. In the aspect of effectiveness of use which consists of three points, namely increasing science literacy, learning to be interactive, and increasing students' interest in learning. This aspect obtained a percentage of 100% with a very good category.

Based on the results of teacher responses, science literacy-based picture card media is in accordance with the learning outcomes of this material and also in accordance with learning objectives. And the addition of literacy, especially science literacy, is very helpful for teachers to increase students' knowledge and abilities in science learning. The formation of understanding of science literacy skills is not easy to learn in a short time, therefore it needs to be assisted by the right learning media (Safitri & Sari, 2023). Regarding the physical form of this media, it looks good with a variety of images of ecosystem components available and has good image quality and size to be shown and used for learning activities. The questions and teaching modules provided are also science literacy-based in accordance with science literacy indicators. With the existence of

science literacy-based picture cards that provide new learning experiences for students, this will increase students' interest in learning as a first step to explore science literacy skills and increase active learning activities. The use of learning media that has never been done before in learning is done, this will provide new and real learning experiences for students and be more enthusiastic in learning and interacting well (Isnaeni & Hildayah, 2020)

This stage is the last stage of development research, namely evaluation, at this stage the shortcomings and advantages that have been found during the trial use of this media are written. This ecosystem material science literacy-based picture card is a learning media in the form of A5 size cards. This media contains 72 picture cards of ecosystem components and 25 science literacy-based question cards. The science literacy component in this media is located in the teaching module contained in the supporting brochure and in the question cards. Therefore, this learning media can provide science literacy-based ecosystem learning.

There were comments during the validation test, material experts and media experts gave their comments on this media. It is said that this science literacy-based picture card media is good. The combination of colours, images, and fonts is in the right portion, and must also be adjusted to the learning material, therefore the accuracy of the material and the creativity of the learning media design can determine a successful process in learning (Hidayatullah et al., 2022). In teaching activities, teachers can use this learning media according to the teaching module that has been given or according to the creativity of each teacher, but it must be based on science literacy.

This media can be used repeatedly for both teachers and students, as a tool for learning ecosystem material based on science literacy. Because ecosystem material will always exist and science literacy will also always exist and the knowledge can develop again over time.

CONCLUSION

The development of science literacy-based picture card media on ecosystem materials uses the Reseach and Development (R&D) method. This science literacy-based picture card media with ecosystem material was developed using the ADDIE model and has been tested at SDN Cipinang Besar Selatan 13. Validation by material experts showed a percentage of feasibility of 100% with a very feasible category. Validation by media experts also obtained a percentage of 100% with a very feasible category. In addition, the feasibility of the product based on validation by teachers through the respondent sheet reached 95% with a very good category. The trial conducted by V grade students of SDN Cipinang Besar Selatan 13 showed a percentage of 92% with a very good category, based on the results of the respondent questionnaire filled out by students. Learners will learn to understand the concept of material with an increase in the ability to confidently argue in accordance with the material. It can be concluded that the science literacy-based picture card media on ecosystem material is very feasible and very good to do in learning ecosystem material. Suggestions for further researchers to develop this picture card media with other design variations and other subjects.

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