PPSDP International Journal of Education
Volume 2 (2) (Special Issue) 05-06 July 2023, 15-26
1st PPSDP International Conference on Educational Sciences (IConEds 2023)
E-ISSN 2829-5196, P-ISSN 2830-3229

Developing Science-Based Modules with MIKiR and Literacy Learning in the Grade V

Ahmad Ilham Asmaryadi[1]
[1]Universitas Dharmas Indonesia, West Sumatra, Indonesia

Corresponding author e-mail: ilhamasmaryadi@undhari.ac.id

Abstract: The background problem in this research is the inactivity of students during learning activities, especially in science lessons, which is caused by the lack of learning resources used by educators. This is because the teacher does not have teaching materials such as modules so that the learning process only takes place using teacher books and student books. The efforts made by the author to provide solutions to the problems that occur at Elementary School by producing a companion module for science based on MIKiR learning and literacy. The importance of developing teaching materials for companion modules in learning activities experienced by educators and students. This research is a development research using the ADDIE form. This research was carried out in several stages, namely the Analysis, Design, Development, Implementation, and Evaluation stages. The results of the validation research by three validators have a score of 86% which can be categorized as very valid. The results of the practicality assessment of the companion module conducted by the teacher and fifth grade Elementary School students got a score of 90.39% which was categorized as very practical. The results of the effectiveness carried out by fifth grade Elementary School students obtained a percentage of completeness 80% with a very effective category. It was concluded that the development of a science companion module based on experience, interaction, communication, reflection (MIKiR) and literacy learning had valid, practical, and effective criteria.

Keywords: ADDIE, Development, Literacy, MIKiR, Module

A. Introduction

Education is a cognitive science, skills, and habits of a group of people that are passed down from one generation to another during learning, education, and training. Nurkholis (2013) states that education is something that is needed when getting balance and perfection in individual or community development through a learning process. Education in the era of the industrial revolution 4.0 is seen as the development of three basic competencies in the 21st era, namely being able to think critically, act and live on earth (Chalkiadaki, 2018). A learning system during the 4.0 revolution that applies creativity, critical thinking, collaboration, communication

skills, social skills, and attitude skills, as well as several components in teaching (Putriani & Hudaidah, 2021).

The 2013 curriculum is an integrated curriculum that will instill several scientific disciplines per subject or field of study with the intention of providing meaningful and broad knowledge for students (Stuckey et al., 2013). Meanwhile according to Hidayani (2016) "The curriculum is a useful knowledge instrument, it will make Indonesian people have spiritual, cognitive competence, and skills, therefore making individuals and national colors useful, creative, innovative, and affective. The curriculum is a number of lessons that must be carried out and studied by students in obtaining some understanding of knowledge. In addition, the 2013 curriculum can produce Indonesian individuals who are useful, creative, innovative, and affective with integrated spiritual, skill, and cognitive strengthening (Erwin Akib et al., 2020).

Teaching materials are the most important thing in the effectiveness of a lesson (Ulandari et al., 2019). Learning resources are anything that can help teachers and students during the teaching and learning process, both written and non-written, and can create a more enjoyable learning atmosphere (Adiyono et al., 2022). Teaching materials are a collection of teaching materials arranged sequentially and explaining concepts that direct students to achieve a competency. In addition, teaching materials are a set of materials derived from various learning references (Puspitarini & Hanif, 2019).

Science learning is also known as scientific designation. The scientific word comes from the Latin word Scientia which means "I know". In English, the scientific word comes from the word Science which means knowledge. Science so that it develops into social science in Indonesian is known as Social Sciences and natural science in Indonesian is known as Natural Sciences. Natural Sciences is a set of theories arranged in a structured manner, the implementation of which is generally specific to natural phenomena, born and developed with factual techniques such as research or experimentation also requires factual characteristics such as curiosity, being open, honest, and so on. Natural Science is a scientific discipline that has characteristics like other scientific disciplines (Ding et al., 2018). Each scientific discipline has general characteristics, also has special components.

Based on the results of an interview with the teacher of grade V Elementary School, which relates to learning Natural Sciences grade V Elementary School, information was obtained that there were problems when learning Natural Sciences. It can be seen that educators do not yet have a companion module in science learning, the learning procedure is only teacher-centered and takes place using the teacher's book, student book and LKS. So that students' interest in learning in the subject of Natural Sciences does not look good because the explanation of the material only focuses on

the teacher. This can be seen from the absence of a learning process that directly involves students so that students experience difficulties in understanding learning. Therefore, it also makes students lack learning resources so that it can cause the learning process to not develop. The material available in the book is still very broad for students to understand. Therefore, the material in the teacher's book does not explain in detail and makes students confused when learning activities take place.

Students are still not active during learning activities because they have not implemented a method, model, approach or media which results in students getting bored during the learning process. This is caused by low student understanding, lack of understanding during the learning process, especially science content given by educators and students having difficulty answering questions shared by teachers or educators, therefore it can make students less enthusiastic about learning activities so as to create student learning outcomes students are still low in learning, especially in the content of Natural Sciences, it can be seen from the results of the Semester Final Examination, there are 5 out of 15 students whose scores are still incomplete.

Table 1. Final Examination Scores Semester Science Subject Grade V Elementary School

Mark	KKM (70)	Grade V	Percentage
>70	Completed	10 students	66,6 %
<70	Not Completed	5 students	33,3 %
	Amount	15 students	100 %

Source: Grade V teacher at Elementary School, Dharmasraya Regency.

In table 1 above, it can be observed that out of 15 students, as many as 5 people (33.3%) did not complete the final semester exams. While 12 people (66.6%) were declared complete. This means that there are some students experiencing problems when learning science, resulting in low test scores.

Based on the problems above, it is necessary to have a solution to fix it, namely through the development of a science companion module based on MIKiR and literacy learning. According to Alpusari et al. (2020), MIKiR learning is a learning process that can encourage student activity. MIKiR stands for Experience, Interaction, Communication, and Reflection. The activity of the factors can occur several times in learning activities. Experiencing in the learning procedure is an activity that connects students directly during the learning process, so it can create more meaningful learning (Rapanta et al., 2020). Interaction, namely learning activities can create reciprocal relationships and exchange opinions and knowledge that are owned by one another, the procedures that exist during the learning process.

Literacy is the ability to understand an event in life. If someone's literacy skills are lacking, they will experience failure or difficulty. So, it is mandatory for an educator to develop literacy in the learning process.

Reading is one of the most important obligations in life. All learning procedures are based on reading comprehension. Through reading comprehension, it will cultivate in each child or student, that the level of success in Elementary School or in the community environment will also create better opportunities for success. The lack of reading literacy in this country can make our human resources not compete because of low scientific and technological skills, which results in low interest and understanding of reading and writing. Reading and writing are not yet a necessity of life and have not formed the nation's culture. The number of libraries and sources to meet the need for reading guidance as a basis for education, issues of reading culture have not been considered as critical problems, while many other problems have been considered fundamental.

Based on the explanation above, the author can provide solutions or solutions to problems that occur in Elementary School by producing a science companion module teaching material based on MIKiR and Literacy learning. The importance of developing teaching materials is seen from the difficulties in learning activities experienced by educators and students. In addition, students also lack reference material sources which result in the learning process not developing, and have never been developed in the form of a science companion module as an additional reference in the learning process. Therefore, the authors hope that with the development of a science companion module based on MIKiR and Literacy learning in grade V Elementary School it can solve existing learning problems.

B. Methods

In this study the media created was a MIKiR-based Natural Sciences learning tool and literacy which was an approach that directly involved students, and the material contained in theme 1 healthy food, KD 3.3 "Explains the digestive organs and their functions in animals and humans and how to maintain health" human digestive organs" in grade V Elementary School 17. The type of research used in this development research is ADDIE which was described by Dick and Carry in (1996) to develop a learning system, which has 5 levels, namely: (1) Analysis stage (Analyze); (2) Design (Design); (3) Development (Develop); (4) Implementation; (5) Evaluation. The following are the stages of the method used in this research, namely the ADDIE form, which is as follows:

A Analysis	needs analysis to determine the right problems and solutions and determine student competence
D Design	determine specific competencies, methods, teaching materials, and learning strategies.
D Development	produce programs and teaching materials that will be used in learning programs.
I Implementation	carry out the learning program by applying the design or specification of the learning program.
E Evaluation	evaluate learning programs and evaluate learning outcomes.

Figure 1. Research Stage

Using this form of ADDIE development can provide opportunities for evaluation by increasing the effectiveness of students in the learning process. Using the ADDIE development model with science learning tools material contained in theme 3 healthy food KD 3.3 "Explaining the digestive organs and their functions in animals and humans and how to maintain the health of the human digestive organs", based on MIKiR learning and literacy.

This study aims to obtain a data. The data used in this research is primary data, which is data obtained from the results of verification and practicality of science companion modules carried out by experts and practitioners in the form of validation results and practicality of companion modules.

Then the data analysis technique was carried out with validity analysis, practicality analysis and effectiveness analysis. The first is the validity analysis carried out using a Likert scale of 1-4 which can be seen in the following table:

Table 2. Scoring Using a Likert Scale

Mark	Category
1	Don't agree
2	Disagree
3	Agree
4	Strongly agree

The value that has been obtained is searched for in percentage using the following formula:

$$V = \frac{f}{n} x100\%$$

Description:
V: validity value
F: the value obtained
n: maximum value

The validation results from the validator obtain the final value obtained on a scale (0-100) which can be seen in the following table:

Table 3. Validity Categories

Interval	Category
$0 \leq v \leq 20$	Invalid
$20 < v \leq 40$	Less valid
$40 < v \leq 60$	Pretty valid
$60 < v \leq 80$	Valid
$80 < v \leq 100$	Very valid

The second step is a practicality test that is used to find out the practicality of the companion module. This test can be generated from the observation instrument of the implementation of the learning device in the questionnaire sheet, the actions of the teacher and the actions of the students are related to the practicality of using the learning device that has been made. Scoring for each category is carried out using a Likert scale with the following table:

Table 4. Practicality Scoring Using a Likert Scales

Score	Category
1	Disagree
2	Disagree
3	Agree
4	Strongly Agree

Calculation of the final score data in each category was analyzed on a scale (0-10) using the equation.

$$p = \frac{f}{n} = 100\%$$

Description:
p = practicality value
f = value obtained
n = maximum value

The companion module practicality category is based on the final value which can be seen in the following table:

Table 5. Practicality Categories

Interval	Category
$0 \leq p \leq 20$	Not practical
$20 < p \leq 40$	Less practical
$40 < p \leq 60$	Practical enough
$60 < p \leq 80$	Practical
$80 < p \leq 100$	Very practical

The third analysis is an analysis of the effectiveness of teaching materials for science companion modules based on experience, interaction, communication, reflection (MIKiR) and literacy learning carried out in giving questions to students which will be carried out after implementing MIKiR and literacy learning-based companion modules, and the impact of effectiveness can be seen based on the analysis of the student's test results. Analysis of the effectiveness of learning tools is measured by increasing student learning outcomes as assessed by cognitive results (knowledge). To find out the results of the test, previously they had to implement the companion module which was implemented in grade V. After implementing the companion module students will be given test questions to see the effectiveness of the Science companion module in learning procedures, especially in grade V Elementary School.

The minimum completeness category (KKM) that has been set is 70, if student learning outcomes reach a completeness level of 70 then this module is said to be very effective because it meets predetermined standards. The calculation of the final result data at each level is analyzed on a scale (0-100) carried out using the following provisions:

$$\frac{Score\ obtained}{Amount\ score} x\ 100\%$$

Table 6. Effective Category

Interval	Category
$0 \leq e \leq 20$	Not effective
$20 < e \leq 40$	Less effective
$40 < e \leq 60$	Effective enough
$60 < e \leq 80$	Effective
$80 < e \leq 100$	Very effective

Modified from Sugiyono, 2015

Based on the results of table 6, it can be concluded that the IPS module is said to be effective if the target for achieving the effectiveness value is at a percentage of 50% - 100.

C. Results and Discussion

The results of this research were obtained on the results of validity tests, practicality trials and effectiveness tests. Data on the validity test results were obtained from the validation score of the companion module which was carried out by three expert validators, namely Mr. Rosyid Mahmudi, M.Si, Mrs. Sonia Yulia Friska, M.Pd, and Mr. Dr. Amar Salahuddin, M.Pd.

Table 7. Validation Results of the Science Companion Module

No	Validator	Rated aspect	Results	Description
1.	Validator 1	Fill	93 %	Very Valid
2.	Validator 2	Fill and Construction	85%	Very Valid
3.	Validator 3	Language	79%	Valid
Average			87%	Very Valid

Based on the table above, it can be concluded that the value of the validity carried out by experts can be seen: validator 1 Dr. Moh. Rosyid Mahmudi, M.Si. with a score of 93% is categorized as very valid, validator 2 Dr. Sonia Yulia Friska, M.Pd. with a result of 85% is categorized as very valid, and validator 3 Dr. Amar Salahhudin, M.Pd. with a result of 79% is categorized as valid. Thus, the results of the research on the validity of the science companion module that had been designed by the author obtained a final score of 86% (very valid) and therefore it was implemented in Elementary Schools.

After carrying out the validation stage, then the product trial stage is carried out which is carried out when measuring the feasibility of the developed teaching materials can be carried out during the learning process. Product trials were carried out in grade V at Elementary School on May 23-24 2022. The products tested on students were products that had been revised based on suggestions from the validator. At this stage practicality and effectiveness tests were carried out. The practicality test aims to determine the ease and implementation of the developed module, while the effectiveness test aims to determine student learning outcomes after implementing the Science companion module. The following are the results of the practicality of the companion module from teachers and students.

Table 8. Practicality Data of the Science Support Module

No	Practitioner	Results	Category
1.	Grade V teacher	94%	Very Practical
2.	Grade V students	87%	Very Practical
	Final score	90,5%	Very Practical

Based on the table above, it can be seen that the results of practicality carried out by practitioners are as follows: Grade V educator practitioners with a percentage of 94% in the very practical category, Grade V students with a percentage of 87% in the very practical category, so that the companion module developed can be used by teachers and participants learn during the learning process. So, the results of the practicality assessment of the companion module that has been designed by the author get a final score of 90.5%. Then the use of companion modules can be applied in elementary school.

After carrying out the next practicality test stage, the effectiveness test stage was carried out by fifth grade students at Elementary School. The trial was carried out by giving test questions to all 15 students in grade V, totaling 15 students, to determine the effectiveness of the modules used on the second day of the trial. The following is the test results of students.

Table 9. Data on the Effectiveness of the Assistance Module

No	Criteria	The Number of Students	Percentage
1.	Completed Students	12 people	80 %
2.	Incomplete Students	3 people	20 %

Based on the table above, it can be concluded that the learning outcomes of the students have reached KKM 70, as follows: completeness of student results at an average of 80% with a very effective category because the companion module can give the same value to the learning objectives as the learning test results student. So that the incompleteness of students with a score of 20% is categorized as ineffective because the test results during the trial prove that students have not met the minimum completeness. Therefore, the companion module is feasible to be applied during the learning process.

Based on the assessment of the three validators, the science companion module based on MiKiR learning and literacy has an average of 87%. In accordance with the validation assessment category modified by (Sugiyono, 2015), an average of 87% is in the range which is included in the very valid category. The validation assessment is emphasized on content validation, language and construction. According to Sugiyono (2015) explained that the percentage of the validator's assessment of the

companion module must at least reach a value of 61-80% so that it is feasible to be tested. Valid is the similarity of the data collected and the actual data, which occurs in the object under study based on its use. The usual feasibility of a measuring instrument that can be said to be feasible from an observable point of view is 1) Judging from the feasibility of the content of the material that is already in the companion module related to Core Competencies, Basic Competencies, Indicators and learning objectives, and the suitability of the content located in the curriculum; 2) In terms of construction related to a companion module image that the author made in all the procedures for making companion modules; 3) In terms of language, it will be related through the language provisions used in Indonesian Spelling. The results of the assessment on the companion module developed did not reach 100%, so the researcher indicated that the module development was in the framework of perfection by obtaining valid modules used during the learning process.

The results of the practicality of the companion module from teachers and students, the companion module gets a value of teacher practitioners, namely 94% and the results of student practitioners obtaining grades that have been made produce a value of 87% and are included in the very practical category, so an average score of 90.5 is obtained %. Companion modules can help educators and students to be more motivated during the learning process, and focus on the learning process.

The results of the companion module effectiveness sheet can determine the extent to which the level of effectiveness of this opinion is in line with the theory which states that the effectiveness of learning procedures is successful in making students achieve their learning objectives with maximum results. This understanding is in line with existing research findings. Therefore, the same companion module is made at the level of student knowledge. The results of the effectiveness of the companion module were obtained from the results of student tests after implementing the companion module which included 20 questions. The results of the effectiveness of obtaining completeness 86.66% can be categorized as very effective. The companion module can be said to be effective in terms of student learning outcomes which will increase.

D. Conclusion

Based on the conclusions above for the companion module and the trials that have been carried out on the science companion module for grade V Elementary School, the following conclusions are drawn:

1. In this development, learning media has been designed in the form of a grade V Elementary School Science companion module which was assessed by a team of experts/experts totaling three experts indicating that the companion module developed obtained a score of 87% categorized as very valid, so the companion

module is feasible to be implemented by teachers and students during the learning process.

2. Practicality can be seen in the results of the analysis of the teacher's response questionnaire and the student response questionnaire showing that the companion module for grade V Elementary Schools obtains an average percentage of 90.5% in the very practical category, so the companion module can facilitate educators and students in the learning process.
3. The effectiveness seen from the student learning outcomes test obtained the percentage of the average grade completeness score of 86.66% in the very effective category, so by using companion modules so that it can help students achieve a learning goal.
4. The results of the analysis of validity, practicality, and effectiveness show that the science companion module for grade V Elementary Schools can be said to be very valid/proper, practical, and effective.

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