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The development of scientific literacy-based learning tools model learning cycle 7E for junior high school

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Abstract

Numerous causal factors contribute to Indonesian students' low scientific literacy skills. One of the primary causes is a lack of learning that improves pupils' scientific literacy skills. To strengthen students' scientific literacy skills, efforts must be made, including the development of scientific literacy-based learning tools. This research is development research with a purpose to produce scientific literacy learning tools based on learning cycle 7E models that valid, and practical. This research adapts the modified method of 4D development. The Product trials were carried out with 66 students who participated as a sample of this research. Based on the analysis and findings of this research, it can be concluded that the learning tools developed are valid based on expert judgment in validity test and also practical with an average percentage of the implementation of each syntax of the 7E learning cycle learning model > 75%. This research novelty was to explain the development of products of scientific literacy-based learning tools that can be practically used in a classroom. Therefore, in this research, the researcher focused on the validity and practical aspects of development products. Hopefully for further research, can also analyze the aspects of the product's effectiveness while conducting studies

Abstrak. *Banyak faktor penyebab rendahnya kemampuan literasi sains siswa Indonesia. Salah satu penyebab utamanya adalah kurangnya pembelajaran yang dapat meningkatkan kemampuan literasi sains siswa. Untuk memperkuat kemampuan literasi sains siswa, perlu dilakukan berbagai upaya, termasuk pengembangan perangkat pembelajaran berbasis literasi sains. Penelitian ini merupakan penelitian pengembangan dengan tujuan untuk menghasilkan perangkat pembelajaran literasi sains berbasis model siklus belajar 7E yang valid dan praktis. Penelitian ini mengadaptasi metode pengembangan 4D yang dimodifikasi. Uji coba produk dilakukan terhadap 66 siswa yang menjadi sampel penelitian ini. Berdasarkan analisis dan temuan penelitian ini, dapat disimpulkan bahwa perangkat pembelajaran yang dikembangkan valid berdasarkan penilaian ahli dalam uji validitas dan juga praktis dengan persentase rata-rata keterlaksanaan setiap sintaks model pembelajaran siklus belajar 7E > 75%. Kebaruan penelitian ini adalah untuk menjelaskan pengembangan produk perangkat pembelajaran berbasis literasi sains yang dapat digunakan secara praktis di kelas. Oleh karena itu, dalam penelitian ini, peneliti berfokus pada aspek validitas dan praktis dari produk pengembangan. Diharapkan untuk penelitian selanjutnya, dapat juga menganalisis aspek keefektifan produk saat melakukan penelitian.*

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A. Introduction

Scientific literacy is one of the skills in science education (Widowati et al., 2017). Scientific literacy is also a factor that influences the competitiveness of the younger generation in facing the development of the latest information technology era where competition between individuals is increasing (Ibda, 2018). This is also inseparable because scientific literacy can influence a person's decision-making, participation, and productivity (Jamaluddin et al., 2019). Apart from that, scientific literacy itself is an important skill to train to face various challenges in the Industrial Era 4.0, especially in science learning which can interact directly with everyday phenomena (Subekti et al., 2018).

According to PISA (Program for International Student Assessment), science learning must be trained in a way with involving students in scientific learning (OECD, 2023). PISA describes three scientific literacy competencies students must have: 1) explain phenomena scientifically, recognize, propose and evaluate explanations in the range of natural and technological phenomena, 2) evaluate and design scientific investigations, describe and assess scientific investigations, and propose ways to ask questions scientifically, 3) interpret data and evidence scientifically, analyze and evaluate data, state and argue in various descriptions and draw appropriate conclusions (OECD, 2019). Based on the latest PISA results, students' scientific literacy abilities in Indonesia from 2006-2022 always fluctuated, as for the assessment PISA is carried out every three years.

The highest score Indonesia's achievement in the PISA assessment occurred in 2015 with a score of 403 and ranked 62nd out of 69 participants. The score is still below the average score set by PISA, namely 500. Based on the latest assessment in 2018, Indonesia obtained a score of 396 and was ranked 71st out of 79 participants. If you look at the data from PISA, this is a decline in Indonesia's score from 2015 to 2018 (OECD, 2019). In the latest survey from PISA, Indonesia score in science literacy has fell again. if we compared to neighboring countries like Malaysia and Thailand we're still behind them with 383 score in science, meanwhile both of them are with above 400 score (OECD, 2023).

Mellyzar et al. (2018) in their research described the profile of the scientific literacy skills of class VII students on the topic of global warming, whom from the 48 students who were the research sample, data was obtained that the average scientific literacy skills of students for the three PISA scientific literacy skill indicators were still relatively low, namely <40%. This is also confirmed by Kulsum et al. (2017) where the scientific literacy skills of 40 class XI students on discussion topics related to hydropower are still relatively low with an average of 44% of all indicators tested. Meanwhile, for prospective teacher students, in the research of Sumanik et al. (2021) it is known that from 22 students in semesters 3 and 5 of Chemistry Education, data on scientific literacy skills was also obtained which was still relatively low with an average pre-test score of 38.36 and the average post-test score was 52.38.

The problem that influenced the low scientific literacy are caused by several factors, one of which is learning tools that are less than optimal for training students' scientific literacy (Andriani et al., 2021; Merta et al., 2020; Saraswati et al., 2021). Apart from that, students consider that the teaching materials used do not interest them during the learning process (Suprapto et al., 2022). This was confirmed by Dhitareka et al. (2022) who stated in their research that Indonesian science teaching materials contain a lot of science learning material but the quality of the content is still lacking. Moreover, currently, there are still no teaching materials specifically designed to develop and practice scientific literacy skills (Wahab et al., 2021)

Apart from teaching materials, students also need to be trained to use scientific literacy skills test instruments. Research by Hasasiyah et al. (2020) shows that the current problem is that the scientific literacy skills of Indonesian students based on PISA results are still in the low category because they are not trained with questions that are similar to PISA questions which are made based on indicators. scientific literacy skills. One effort to improve scientific literacy is to get them used to answering questions based on scientific literacy. The more accustomed they are to answering questions using scientific literacy indicators, the better their ability to understand and interpret questions using these scientific literacy indicators (Arrohman et al., 2022; Zahara et al., 2022). It is hoped that the selection and use of appropriate science teaching materials will increase students' abilities in conceptual knowledge related to science, which is also expected to slowly influence their scientific literacy abilities.

Based on the previous research, it is found positive results in terms of the development of students' abilities after using teaching materials based on scientific literacy (Fakhriyah et al., 2019). Then it strengthened by other research that learning carried out using scientific literacy-based teaching materials can significantly increase students' understanding (Nafaida, 2018). Apart from using teaching materials based on scientific literacy, science learning must also facilitate students in scientific research activities. Where scientific investigation activities can train students to build their understanding so that learning becomes more meaningful and interesting for them (Sari et al., 2019; Wahab et al., 2023)

To create meaningful and interesting learning for students, teachers are expected to be able to choose learning models that are interactive, innovative, and can help students during the learning process to improve scientific literacy skills, one of which is the 7E learning cycle learning model, where the learning cycle learning syntax 7E can facilitate students in improving learning outcomes (Purba et al., 2021). The syntax of learning cycle 7E itself consists of elicit, engage, explore, explain, elaborate, evaluate, and expand (Eisenkraft, 2003). The 7E learning cycle learning model can facilitate aspects of scientific literacy in the learning process, it can also make the learning process more meaningful so that it can influence the development of students' scientific literacy skills (Andani & Utami, 2019; Qulud et al., 2015). Several more studies' findings support this statement.

According to research by Purwitasari et al. (2023), the learning cycle model 7E can be very usefull in learning to improving student scientific literacy. Each of learing syntax, can be facilitated for scientific literacy training, and it also accommodate the scientific literacy indicators from PISA (OECD, 2023). It strengthened by Winda in his research that stated the teachers and students can learn more about improving scientific literacy abilities by using the 7E learning cycle model. A good learning environment for communicating with teachers and other students can be established using the 7e learning cycle. Additionally, he mentioned that this strategy can encourage students to participate more actively in their education, which can help them become more scientifically literate (Winda et al., 2023).

Based on the background of the problem above, the researcher wishes to conduct research entitled "The Development of Scientific Literacy-Based Learning Tools Model Learning Cycle 7E in Junior High School". Meanwhile, in this research, the researcher aims to show the validity and practicality of a product from the development of scientific literacy-based learning tools using the 7E learning cycle model. Researchers hope that this research will be carried out with a positive impact on the development of students' scientific literacy skills. What's more, if it can have a positive impact regionally and nationally.

B. Material and method

This research is development research which will then develop junior high school science learning tools based on scientific literacy with the 7E learning cycle model on the solar system material to improve students' scientific literacy skills. The products that have been developed in this research are syllabus, lesson plan, learning module, and scientific literacy test assessment. The research instrument that used are validity test questionnaire, and also learning implementation test questionnaire.

This research will use a modified 4D development model with step Define, Design, Develop, and Disseminate (Thiagarajan et al., 1974). Due to a limitation, this dissemination stage only implemented in a limited way, with sharing the products to the teachers from two schools that became research places to be used in the classroom by themselves. In this research, after the final product has been created, the researcher used the expert validator to test the product validity and then does field trials to test the product practically. Procedures in this development research, there are several procedural stages in this research, as follows:

1) Define: this stage aims to determine what is needed in the development process through literature and preliminary analysis. Through literature and preliminary analysis, materials are obtained that can determine the constraints for existing teaching materials. This stage is divided into four steps, the first one is initial problem analysis, then the second one is learner analysis, after that analysis of learning materials, and the last one is formulating learning objectives
2) Design: at the design stage, product development is carried out in stages starting from media selection, format selection, and also content preparation. At this stage will be generated the first draft of the product that has been developed. Then, the first draft in the next stage will be get some review from the expert, to get feedback and then after being revised will become a final draft of the product that will be tested for validity test from the validator. The draft learning tools produced are syllabus, learning implementation plans, textbooks, and also test instruments.
3) Develop: in this stage aims to develop the prototype product that has been produced until it becomes the final product from the results of the development that has been carried out. The steps are as follows: the first step is an expert review, in this research the researcher tries to find feedback regarding the suitability of the initial development design, and also the material being developed by two experts in science education. The feedback obtained will be used as material for improvement. After the revisions are completed, a second draft produced will be tested for validity by the validators. In this research the researcher used five validators in validity test, there are three experts as a lecture in science education and also two teachers as educational practitioners in the field. After the validity test, the researcher will finish the revision given by the validators to improve the product quality before becomes the final draft that will be tested in the classroom. After the final draft is produced, the researcher continues to field trials to test the practically of learning tools

In the research by Anggraeni et al. (2022) and Wahab et al. (2021), trials design will be carried out in two different classes from different schools. Trials are carried out to test the practicality of the products that have been developed. The trials were carried out using junior high school science learning tools products based on scientific literacy and the learning cycle 7E learning model. This is in accordance with Ravista et al. (2021) that the products practicality must be obtained from the learning process assessment between teacher and students to consider products developed are easilty to used.

The trial was carried out in class VII junior high school, where the toolss that had been developed would be used in the learning process for 4 meetings. These trials were carried out to determine the level of practicality of the tools that had been developed by researchers. The practicality test is determined using assessments obtained through the learning implementation questionnaire research instrument.

The research subjects in this research are the students from junior high schools 2 and 5 in Banjarmasin, there are a total of 66 students as a subject. This research used a purposive sampling technique to obtain the necessary data, while this sampling technique is a sampling technique with specific considerations (Sugiyono, 2013). The differences in background and also the environment of these two schools are the main reasons for the researcher to choose both of them. The data that will be obtained in this research is validity data obtained from the results of expert validity tests, then practicality data obtained during testing from the percentage of learning implementation. The research instruments used by researchers in this development research are: 1) validity questionare, and also 2) learning implementation questionnaire.

The validity test of the learning tools was carried out using a validation questionnaire that had been prepared previously. The validity test was carried out by 5 validators consisting of 3 experts in the field of Science Education, then 2 practitioners as science teachers at schools. Validation is carried out by providing the tools documents that have been developed along with the validation instruments that have been prepared for the validators. The analysis technique used in this validity test uses Aiken's V validity method.

The analysis of the level of validity in this research is an analysis of data from the validation of learning tools and observation questionnaires using the validity method (Aiken, 1985) to calculate content validity which is obtained from the results of expert assessments regarding the extent to which the items represent the values being measured. The calculate content validity using Formula 1.

$$V = \frac{\Sigma s}{[n(c-1)}$$ ……………………………. Formula 1

Description:
S= the scale given by the validator is the lowest scale
C= highest rating scale
N= number of validators

The validity criteria in this analysis refer to Aiken's V critical value table. If the V Value obtained is still below the minimum value on Aikens critical value with the same number of validators, in this research, researcher used 5 validators with 5 Likert scale. The Aikens critical value can be seen in Table 1.

Table 1 Aikens V critical value

Number of validators	Aikens critical value
5	0.80
6	0.79
7	0.75
8	0.75

(Source: Aiken, 1985; Puspita et al., 2022)

Practicality analysis in this research uses learning implementation questionnaire. This questionnaire will later be presented using the Guttman scale, where the answer "Yes" will be calculated with a score of "1" while the answer "No" will be calculated with a score of "0". The practicality calculates using Formula 2.

$$(p) = \frac{total\ score\ obtained}{maximum\ score}\ x\ 100\%$$ ……… Formula 2

The learning tools developed are said to be practical if the minimum average percentage obtained is 75% or more (Purwanto, 2012; Puspita et al., 2022).

C. Results and discussion

Result of Validity Test

This analysis of validity test aims to test the level of content validity of the product that has been developed. The validity of an item is determined based on the V value obtained from each item, which is then compared with the V value in Aiken's V table which corresponds to the number of scales and rates used. Based on Aiken's V Table, with the number of validators and scales used, as well as a significance level (chance of error) of 5%, the minimum V value that must be obtained to be said to be valid is 0.80 (Aiken, 1985; Puspita et al., 2022).

Validity tests conducted on the learning syllabus were conducted by considering 9 items that were aspects of the assessment, and after the validity test, the 9 items obtained valid results. The 9 items that used in validity test of syllabus are: completeness of syllabus; suitability of learning activities with basic competencies; indicators are in accordance with basic competencies; learning activities are in accordance with learning cycle 7E model; adequacy of time allocation; learning resources are in accordance with the main material; assessment designed is able to measure the achievement of student learning; using a good and correct language; and there's no typos. As for the recapitulation results of the validity test of the learning syllabus they can be seen in Figure 1.

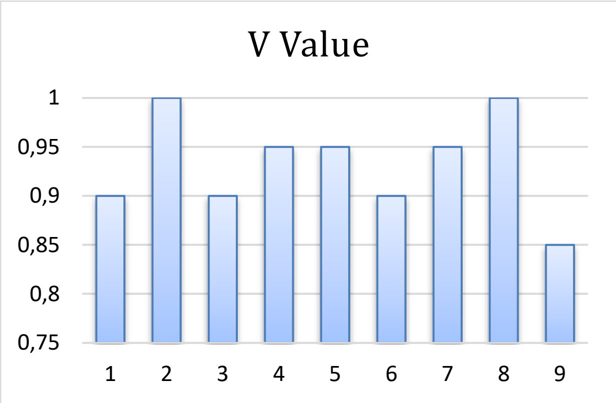

Figure 1 Recapitulation of syllabus validity test

Based on Figure 1, it is known that each item has a V value ≥ 0.80 so all of these items can be said to be valid based on the results of the validity tests carried out There were several notes given by the validator for correction, where there were writing errors in the writing section of the learning time allocation, then correcting typing errors in the Education unit, and several typing errors in the syllabus text for the learning material section.

In testing the validity of the lesson plan, there are several aspects to pay attention according to Kelana & Pratama (2019) and Akbar (2017) which has been generalized as follows, the first aspect, it is an aspect related to the indicators formulated in the lesson plan, this aspect consists of 6 items. Then, the second aspect is an aspect related to the content of the lesson plan presented, where this aspect consists of 8 items. Furthermore, the third aspect is the language aspect which consists of 3 items, then the fourth aspect is the time-related aspect which consists of 2 items. The fifth aspect is an aspect related to learning methods/activities designed in the lesson plan, this aspect consists of 5 items. Meanwhile, the last aspect is an aspect of describing the quality of the lesson plan in general, which consists of 2 items.

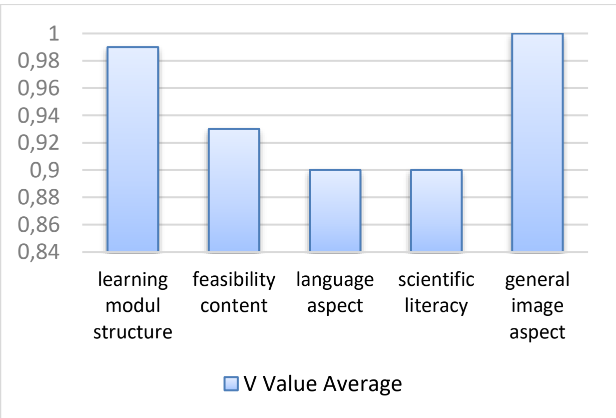

Figure 2 Recapitulation of lesson plan validity test

The assessment of this lesson plan aims to measure the suitability of the learning process design and scenarios that have been created to be able to train students' scientific literacy skills. Apart from that, it is also to measure the suitability and accuracy of the syntax of the model used, in this case, the 7E learning cycle model previously proposed by (Eisenkraft, 2003), which contains 7 stages of the learning process.

Based on Figure 2, it was found that all items were valid, as seen from the average V value obtained for each aspect ≥ 0.80, with this, all items could be said to be valid (Aiken, 1985). However, there are several suggestions for improvements provided by the validator for improvement. Some of them include writing learning objective numbers that do not match the numbering in the indicators section, then there are suggestions for improving operational verbs and writing learning objectives, as well as adding subject matter topics at each meeting and additional reflection activities at the end of learning.

Several aspects of assessment are contained in the learning module validation instrument, the first aspect is an aspect related to the structure of the learning module. Furthermore, the second aspect is an aspect concerning the feasibility of the contents of the learning module, then the third aspect is an aspect that includes aspects related to language. Then the fourth aspect is an aspect of scientific literacy and the fifth or last aspect is an aspect of the general description of the quality of the learning module (Kelana & Pratama, 2019).

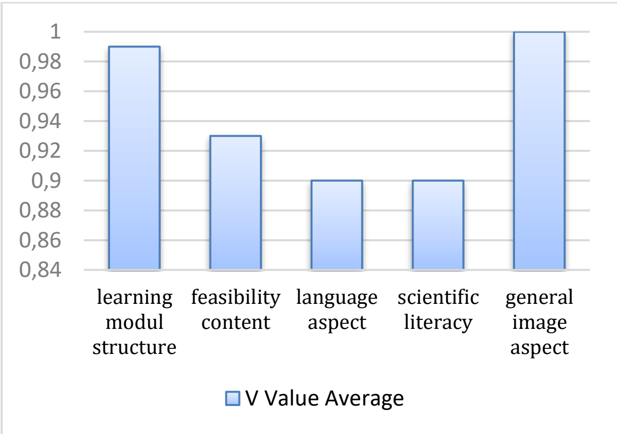

Figure 3 Recapitulation of learning module validity test

Based on the results of the recapitulation of the validity test of the learning module in the Figure 3, the results obtained that each item in each aspect can be said to be valid, as seen from the average V value obtained for each aspect ≥ 0.80. This is because based on the calculation results, the V value obtained for each item on the instrument is > 0.80 so it can be said to be valid (Aiken, 1985).

The developed scientific literacy test instrument consists of 20 questions with details of 3 questions with environmental pollution material, 3 questions with global warming material, 11 questions with solar system material, and 3 questions with environmentally friendly technology material, these topics also used by (OECD, 2023). The validity test of this science literacy test instrument consists of 4 aspects. Where the first aspect is the material aspect, then the second aspect is the construction aspect, the third aspect is the language aspect, and the last aspect is the general quality aspect of the test instrument in general (Akbar, 2017). This assessment aims to measure the suitability of the test instrument made with the indicators of science literacy skills taught.

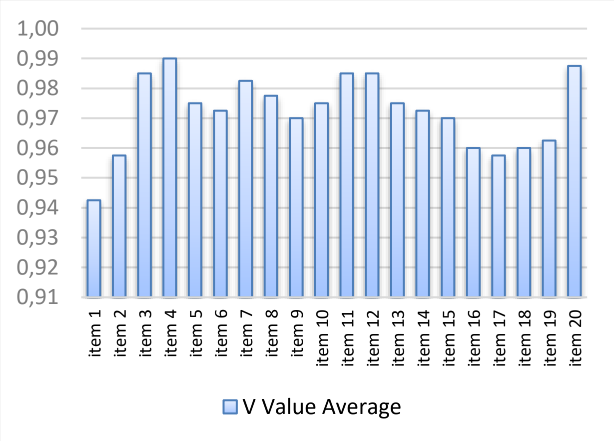

Figure 4 Recapitulation of Scientific Literacy Validity Test

Based on Figure 4, it can be said that each question on the developed science literacy test instrument is valid, as seen from the average V value obtained ≥ 0.80 (Aiken, 1985). The improvements suggested by the validator include the addition of a little descriptive information to question number 2 in the environmental pollution handling narrative, which was previously incomplete in its presentation so as not to lead students' answers too much. Furthermore, improvements to the sentence in the information editorial for question number 6 which contains ineffective sentences. Then improvements to typos in question number 17, as well as improvements to ineffective editorial sentences in number 19.

In this research, the resulting development product is a junior high school science learning tools based on scientific literacy using the 7E learning cycle model which is developed by containing junior high school science subject matter for grade VII about the solar system consisting of a syllabus, lesson plans, learning modules, and worksheets, as well as scientific literacy test instruments. This learning tools is compiled by considering the indicators of scientific literacy-based teaching materials proposed by Chiapetta. Four main criteria cover various indicators of scientific literacy-based teaching materials, namely science as the body of knowledge, science as a way to investigate, science as a way to think, and the interaction of science, technology, and society (Chiapetta et al., 1991).

The selection of the material was determined after conducting an initial analysis at the define stage. Based on the results of the analysis conducted by the researcher, it is known that the current solar system material still does not include the 4 main criteria for science literacy-based teaching materials mentioned above (Fahmi et al., 2022; Wahab et al., 2021). The researcher also conducted a literature study on several other science books to see the presentation of other solar system materials as a benchmark or comparison with those used in current school books

Through this study, the researcher feels that the solar system material used in current school books can still be developed further by adding material related to space exploration technology (Wahab et al., 2021) to meet the criteria for science literacy-based teaching materials related to science as a way to investigate (OECD, 2019). Where the solar system material in schools currently still does not cover these materials and aspects (Dhitareka et al., 2022). Moreover, the solar system material is also one of the materials contained in the PISA framework, which is used to conduct assessments related to students' scientific literacy abilities globally (OECD, 2023).

The resulting learning syllabus contains core competencies and basic competencies, which are equipped with the main learning materials along with achievement indicators, learning activities, then assessment components, and time allocation and learning resources used. The learning syllabus that has been developed is validated by considering several assessment aspects.

Based on the results of the validity test conducted by 5 validators, positive results were obtained where all assessment items were valid based on the validation results by the validators. Based on the recapitulation data that can be seen in Figure 1 where each assessment item obtained a V value of more than 0.80, it can be said to be valid (Aiken, 1985; Istyadji et al., 2022; Yani et al., 2020).

In this syllabus that has been developed, the researcher focusing to develop a syllabus that can guide the user to understand the outcome target that has been planned. Syllabus also must be clearly stated the learning outcome that become a focus (Istiqamah, 2019; Setiawan et al., 2021). In this research, the syllabus must be contained the learning outcome that based on scientific literacy and the detail explanation of it because the learning tools that have been developed are scientific literacy based (Siregar et al., 2020).

The lesson plan produced is a further elaboration of the previously created syllabus. The lesson plan is designed to direct students' learning activities to achieve the expected basic competencies (Asy'ari et al., 2019). The lesson plan that has been developed is measured for its validity level by considering 6 aspects contained in the validation sheet. Based on the results of the validity test conducted by 5 validators, positive results were obtained where all assessment items were valid based on the validation results by the validators. Based on the recapitulation data that can be seen in Figure 2 where each assessment aspect obtained an average V value of more than 0.80, it can be said to be valid (Aiken, 1985; Istyadji et al., 2022; Yani et al., 2020).

In this lesson plan, the researcher focused to developed the lesson plan based on learning cycle 7E model syntax that can usefull to train the students' scientific literacy (Purba et al., 2021). The better the quality of the lesson plans produced, the easier it will be to deliver the material because it well preparation before (Fahrurrozi & Mohzana, 2020; Monitasari & Martini, 2021). In this case, the lesson plan that already produced will be easily to used and also can facilitated the learning process to train the scientific literacy skills.

The developed learning module is measured for its validity level by considering 5 aspects contained in the validation sheet. Based on the results of the validity test conducted by 5 validators, positive results were obtained where all assessment items were valid based on the validation results by the validators. Based on the recapitulation data that can be seen in Figure 3 where each assessment aspect obtained an average V value of more than 0.80, it can be said to be valid (Aiken, 1985; Istyadji et al., 2022; Yani et al., 2020).

The learning module that developed, are focusing to improve the ordinary material that usually found in school book. This learning moduls is compiled by considering the indicators of scientific literacy-based teaching materials proposed by Chiapetta. The main criteria cover various indicators of scientific literacy-based teaching materials, namely science as the body of knowledge, science as a way to investigate, science as a way to think, and the interaction of science, technology, and society (Chiapetta et al., 1991). The researcher used solar system material in this research. There's still a indicator that didn't included in ordinary solar system material and it was science as a way to investigate aspect (Wahab et al., 2021). After fullfiling the miss indicator, the researcher hopes this improved material can trained students scientific literacy a way better.

The developed test instrument is measured for its validity level by considering 4 aspects contained in the validation sheet. Based on the results of the validity test conducted by 5 validators, positive results were obtained where all assessment items were valid based on the validation results by the validators. Based on the recapitulation data that can be seen in Figure 4 where each assessment aspect obtained an average V value of more than 0.80, it can be said to be valid (Aiken, 1985; Istyadji et al., 2022; Yani et al., 2020)

The researcher developed the scientific literacy test to trained the students' scientific literacy skills. According to Wahab et al. (2023) the main problems that occur in the field is that the students are never trained with scientific literacy-based question, either in the end of each lesson, neither at the final exam. It also strengthened by the related research (Jamaluddin et al., 2019; Saraswati et al., 2021; Sumanik et al., 2021). Each question that developed, are adapted to PISA test with the indicators of scientific literacy skills (OECD, 2019, 2023). Hopefully with these products, it will also motivate the others teachers to become more literated in scientific literacy domain, because they need to become literated first before, then influenced the students with their skills (Merta et al., 2020; Mellyzar et al., 2018).

This result is in line with a similliar research that conducted from Andani & Utami (2019); Arrohman et al. (2022); Sugiman et al. (2019); Purba et al. (2021) which states that the development learning tools based on learning cycle are suitable to use in the classroom and learning process to create a new learning environment. According to the validity test, it also can state that the learning tools that have been developed with learning cycle 7E model can facilitated the students to develop their scientific literacy. This finding also in line with several previous research (Purwitasari et al., 2023; Qulud et al., 2015; Winda et al., 2023) that stated the same things.

Result of Practicality Test

Based on the practicality test of learning toolss at SMPN 2 and SMPN 5 Banjarmasin, positive results were obtained and no significant percentage differences were found between the two trial results. This practicality test was measured using a practicality questionnaire filled out by observers during the learning activities. This practicality questionnaire was filled out as many times as the number of meetings in the trial of the developed learning tools, in this case as many as 4 meetings. The recapitulation of the practicality questionnaire during the practicality test process can be seen in the Table 2.

Table 2 Practicality test results on SMPN 2

Syntax	Learning Implementation Score			
	1st meet	2nd meet	3rd meet	4th meet
Elicit	100%	100%	100%	100%
Engage	75%	100%	100%	100%
Explore	100%	100%	100%	100%
Explain	100%	100%	100%	100%
Elaborate	100%	100%	100%	100%
Evaluate	100%	100%	100%	100%
Extend	100%	100%	100%	100%
Average	**96%**	**100%**	**100%**	**100%**

The level of implementation of the 7E learning cycle syntax has been implemented, with an average percentage acquired at each meeting reaching more than 75%, according to the data from the practicality test results at SMPN 2 Banjarmasin.

Furthermore, the practicality test was also conducted at SMPN 5 Banjarmasin. This practicality test was conducted using a similar method as before. Where the level of practicality was measured using a questionnaire of implementation filled out by the observer according to the conditions that occurred in the class, the results can be observed in the Table 3.

Table 3 Practicality test results on SMPN 5

Syntax	Learning Implementation Score			
	1st meet	2nd meet	3rd meet	4th meet
Elicit	100%	100%	100%	100%
Engage	75%	100%	100%	100%
Explore	100%	100%	100%	100%
Explain	100%	100%	100%	100%
Elaborate	100%	100%	100%	100%
Evaluate	100%	100%	100%	100%
Extend	100%	100%	100%	100%
Average	**96%**	**100%**	**100%**	**100%**

Based on the data from the results of the practicality test at SMPN 5 Banjarmasin that have been obtained, the level of implementation of the 7E learning cycle syntax has been implemented with an average percentage of each syntax obtained at each meeting also reaching a minimum percentage of 75% or more than 75%.

Based on the two trial results, it can be seen that the level of implementation of learning at each meeting has exceeded the minimum percentage set. So that the learning tools product that has been developed can be said to be practical based on the practicality test which is measured using the learning implementation observation sheet filled out by the observer. However, the data from two classes looks simmiliar because there's a limitation from this test due to a format of instrument that used during the test. This is the reason why this research cannot explain in more detail regarding the implementation of the practicality test.

The learning tools that had been developed can be said to be practical if based on the results of the practicality test, it obtains a percentage of implementation of 75% or more. The practicality test of the learning tools is carried out using a learning implementation questionnaire as a tool to measure the level of implementation of the learning process during the trial process. The implementation questionnaire used has been validated in advance so that it can be used to measure the level of practicality of the learning tools. The implementation questionnaire is filled out by observers who observe the learning process during the trial. Data collection for the practicality test of the learning tools is carried out as many as the number of meetings to conduct the trial, namely 4 meetings. The implementation questionnaire itself consists of several syntaxes of the 7E learning cycle learning model and learning scenarios that have been prepared before.

Based on the results obtained from the results of the trial of the practicality of learning toolss at SMPN 2 Banjarmasin, positive results were obtained with a level of implementation that was almost fully implemented. At the first meeting, only one activity could not be implemented, namely providing stimulus by showing several information displays related to learning materials due to technical constraints on the unavailable projector. As an action to address this, the researcher replaced it by providing stimulus in another way, by using images made manually on the board. However, there are still some notes from observers to be able to be better in time management, this is because in the SMPN 2 trial class when the group division process was still often difficult to organize and tended to be noisy, especially in early meetings.

Meanwhile, the practicality test data in the SMPN 5 Banjarmasin trial class, also got the same positive results as the previous trial class. Where the planned learning activities can be implemented. Unlike the previous trial class, the trial class of SMPN 5 Banjarmasin did not receive any special notes from the observer regarding the implementation of learning during the 4 meetings. Students followed the learning activities well with enthusiasm and sincere desire. This condition is slightly different from the previous trial class which generally at the beginning of learning tends to be difficult to condition to be conducive.

The researcher also included a few remarks on how the practicality test findings for the two trial classes were identical. This is possible since the implementation questionnaire employed the Guttman scale as an assessment guideline. So, looking at the data from the two trial classes, it is difficult to draw any additional interpretations to study the findings of the implementation test data. The assessment using the Guttman scale limits the interpretation to explaining whether or not the activity was implemented.

The researcher believes that using the Likert scale in the learning implementation questionnaire would be preferable if comparable research is done in the future. Compared to the Guttman scale, the Likert scale provides a more detailed explanation of the circumstances surrounding the trial. In addition, compared to the Guttman scale, which is restricted to the question of whether the action was carried out, the Likert scale's scale levels enable us to derive a more comprehensive understanding of the data. This restriction serves as a warning to researchers to perform development product trials more details in the future.

We can use this research findings in practicality test for an example. Actually, there's a bit diffrences between the two trial classes when the pracitality test was held. But due to the guttman scales that used, it hards to see the different that happens on the field. Like in the first trial class, it's a bit noisy and more difficult to create a good learning atmosphere, but at the end each of syntax still can be implemented but not perfectly. If we only used guttman scale, the result only seen wheter its implemented or not. But, if we used likert scale, it'll be more details. Like if its implemented but not in perfectly, the score that will be obtained its different with the syntax that implemented in perfectly. There are various studies that do this for example (Hairunnisa et al., 2022; Yani et al., 2020). This research result can be an example to be implemented in classroom as one way of action that can be taken to developing student scientific literacy, with the developed learning tools with scientific literacy content that adapted with a learning model.

D. Conclusion

Based on the analysis of the results of this research, the following conclusions can be obtained the developped learning tools based on the scientific literacy model learning cycle 7E can be declared valid based on the validity test by experts, and practical to be used in science learning based on the practicality test with an average percentage of implementation of each syntax of the learning cycle 7E learning model >75%. For further research, the researcher gives an advice to the other researcher to also add the aspects of the product's effectiveness while conducting studies. Also, the researcher hopes that findings and results of this study can be used as a way to develop students' scientific literacy skills in the future.

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