

## Scratch E-Modul: Inspecting Expert Validation

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### ABSTRACT

Learning that is obtained quickly is always associated with technological developments. Scratch is a simple coding application that can be used in learning systems. This study aimed to analyze the validity of a Scratch-based E-Module learning media on the earth and the universe for grade 5 elementary schools, making the learning process more meaningful. This study used a research and development (R&D) design with a quantitative descriptive approach where experts assessed the learning media that has been developed. The experts involved in this study were 9 people, including five lecturers and four certified teachers. Data were obtained using a validity test instrument to assess the E-module learning media that has been developed through meetings and explanations on how this learning media is operated. Then, the experts filled the instrument out through the Google form prepared by researchers. Data were analyzed using SPSS version 23 and presented descriptively. The results show that the Scratch-Based E-Module has a validity value of 77% with very valid criteria. This demonstrates that the Scratch-Based E-Module is credible and useful for education, as stated by experts in the field. This Scratch-Based E-Module can therefore be implemented. Educators and scholars alike can benefit from this Scratch-Based E-Module.

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## 1. INTRODUCTION

The Industrial Revolution 5.0 is a call to put sustainability ideas into practice, integrating human values with technology (Sharif, 2020; Sindhvani et al., 2022). The phenomenon can be seen when The undeniable significance of e-learning in education has led to a massive growth in the number of courses and systems (Al-Fraihat et al., 2020). Industry 4.0 has been considered as a new industrial stage (Haseeb et al., 2019) where several new technologies converge to provide digital solutions (Benitez et al., 2020; Frank et al., 2019; Hariharasudan & Kot, 2018), and almost all activities cannot be separated from digital technology (Farida, 2019). Technology is developing rapidly and significantly Daniel (2020), so various aspects of human life are also changing rapidly, including aspects of education.

Adjusting aspects of education and technological developments is a challenge and this should be done in line with the easy access to technology and information today. The rapid development of

technology has had an extraordinary impact on the education sector (Sari et al., 2019; Silitonga, 2018). Technology and information can improve the quality of education and should undergo changes so that they are not monotonous (Huynh et al., 2020).

Qualified mastery of technology is obtained through various processes that must be tested and evaluated sustainably in order to create an education system that is more oriented towards mastery of technology at both the elementary, middle and high levels (Huynh et al., 2020). The link between education and the process of imparting knowledge should receive more proportional attention, especially in teaching materials, so that education does not only contribute to mastery of technology but also prepares generations who are aware of technology (Mulyani & Haliza, 2021). Among the technological devices that is currently developed in the educational setting is the Scratch program.

Scratch is a visual programming language, namely making projects using an intermediary in the form of images (Jannah et al., 2021). Visual programming is aimed primarily at children (child-friendly), and designed to introduce programming to students in easier ways to think about, more meaningful, and easier to understand (Liao, 2022). The teaching design of Scratch programming education is dominated by game-based learning and there are four teaching models, namely teaching design development, teaching artistic design, teaching manual production, and teaching 3D printing (Yu et al., 2019). The idea used in the Scratch application is to convert the language of the code and syntax forms. The code is synthesized by dragging and stacking graphic tiles according to the instructions of Stoumpa et al. (2022) into easy and attractive object forms to use for learning (Poobalan et al., 2019). Thus, scratch becomes a good alternative media to be used in an effective learning process.

Scratch is designed to introduce computer programming concepts in a simple way so that anyone from various backgrounds can understand it, and it can be used to create applications, animations, and games (Fagerlund et al., 2021). Scratch is a high-level block-based visual programming language. Learning by using educational games will involve students in learning activities (Ortiz-Colón & Romo, 2016; Topalli & Cagiltay, 2018). Providing educational games to students will bring out all their abilities to solve the challenges in the game, and provide teachers with an effective approach to enhance students' learning satisfaction (Chang et al., 2020). Completing challenges in educational games can stimulate students to think critically and think computationally. Students will need these skills in the 21st century (Threekunprapa & Yasri, 2020; Widiningrum et al., 2021).

According to IWATA et al. (2022) computational thinking helps in understanding code. Within Bloom's framework of computational thinking there are three learning domains. First, mental knowledge and understanding is the main goal in the cognitive domain; motivation and attitude are the main tasks in the affective domain; and social and communication skills are key outcomes in psychomotor skills training (Tang et al., 2020). Not only beneficial for students, scratch also helps school teachers carry out professional development in educational games and improve their performance in computational thinking concepts, energy knowledge, and programming attitudes (Stephens et al., 2022; Tsai et al., 2021; Zhang, 2022).

Based on previous research Satriana et al. (2019), scratch makes students' interest in learning increase to a percentage of 81.2%. It shows that the average student interest in learning has increased and the result shows that students are very interested in using the scratch application. Games in scratch produce cognitive and affective learning outcomes, which further it can affect the development of students' critical thinking skills (Fajari, 2020; Gatti et al., 2019; Khoiriah et al., 2016). According to research by Nurhopipah (2021), as much as 88% student enthusiasm indicates that students like and enjoy the learning process using scratch and shows that the activity has been well and satisfactorily applied.

In light of the foregoing, it is clear that the Scratch learning medium plays a crucial role in the classroom as a whole. Scratch-based learning modules can give students fresh perspectives on the learning process. Chairunnisak (2020) and Sukirman (2021) both stress the need of teaching pupils how to code using the open-source language Scratch. Scratch's dual online/offline usability is a boon to the burgeoning field of distant education (Gunadi, 2021). This underlies the research team to focus on the

study of the analysis of expert knowledge about the Scratch learning media, which can be used as a learning media that accompanies current technological developments.

## 2. METHODS

This study is a Research and Development using a quantitative descriptive approach, where experts were asked to test the validity of the Scratch-based E-Module product on the topic of earth and the universe that researchers has made so that later this product can be used in the learning process. The development of Scratch-based E-Modules was carried out using the ADDIE development model (Analysis, Design, Develop, Implementation, Evaluation) by Walter & Carey (2005). Walter & Carey (2005) said that ADDIE development is a very systematic instructional development model. This Research and Development research stage begins with the development process to the product dissemination process. Product dissemination is conducted by carrying out a continuous improvement process until the product quality standards developed are achieved, namely effective, efficient, and quality (Musaddat et al., 2021). The research subjects of this study were experts from 5 expert lecturers and 4 expert teachers to get validity from Scarcth-based E-Modules.

Scratch-based E-Module Media and instrument of research is designed by carrying out Analysis, Design and Development activities. The following is the flow of the ADDIE development model at each stage which is briefly explained in Figure 1.

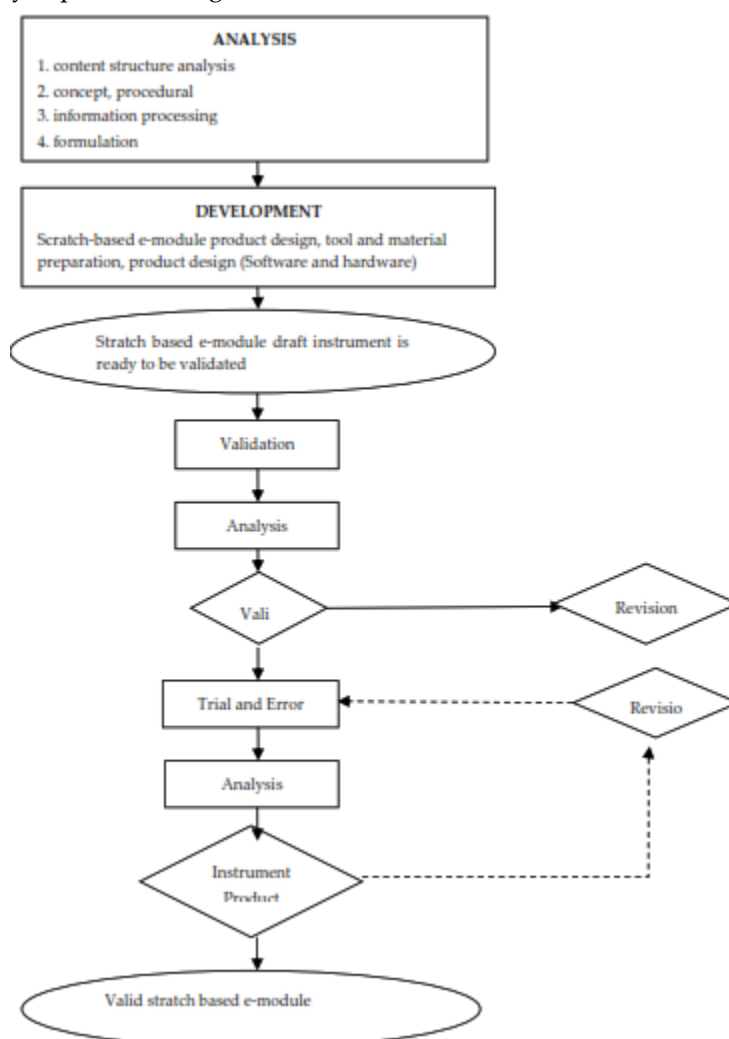


Figure1. Scratch-based E-Module Development Flow

The instruments used to collect data were validation sheets for the development of Scratch-based E-Modules and questionnaires. The validation sheet aims to determine the validity of the developed Scratch-based E-Module. Questionnaire sheets were used to obtain data on the usefulness of the Scratch-based E-Module by Experts. The following describes the characteristics of the Scratch-based e-module designed and simulation by the researcher. For design validation were carried out by 5 expert lecturers and 4 expert teachers. This design validation was done to ensure the quality of the design and products produced before being tested and distributed.

The first-page section contains the title of the Scratch-based e-module material. There is a simulation video that provides an overview of the e-module content. This table of contents involves the scope of e-module material presented to educators and students. The design of table of contents in the textbook can be seen in Figure 2.

<b>DAFTAR ISI</b>	
<b>Kata Pengantar .....</b>	<b>ii</b>
<b>Tentang E-Modul.....</b>	<b>iii</b>
<b>Scratch.....</b>	<b>iii</b>
<b>Berpikir Komputasi .....</b>	<b>vi</b>
<b>Literasi Sains .....</b>	<b>vii</b>
<b>Daftar Isi.....</b>	<b>x</b>
<b>Kompetensi Isi dan Kompetensi Dasar .....</b>	<b>ix</b>
<b>Subtema 1:</b>	
<b>Siklus Air .....</b>	<b>1</b>
<b>Scratch .....</b>	<b>6</b>
<b>LKPD .....</b>	<b>7</b>
<b>Subtema 2:</b>	
<b>Peristiwa Alam .....</b>	<b>11</b>
<b>Scratch .....</b>	<b>16</b>
<b>LKPD .....</b>	<b>17</b>
<b>Subtema 3:</b>	
<b>Manusia dan Lingkungan .....</b>	<b>21</b>
<b>Scratch .....</b>	<b>25</b>
<b>LKPD .....</b>	<b>31</b>
<b>Subtema 4:</b>	
<b>Usaha dan Pelestarian Alam.....</b>	<b>35</b>
<b>Scratch .....</b>	<b>39</b>
<b>LKPD .....</b>	<b>44</b>
<b>DAFTAR PUSTAKA.....</b>	<b>51</b>
<b>GLOSARIUM.....</b>	<b>56</b>
<b>BIODATA PENULIS.....</b>	<b>62</b>

**Figure 2.** Table of Contents in E-Module

The materials contain of teaching materials that are equipped with a QR-Code which will then be linked to the learning video. The material design presented in the E-Module is shown in Figure 3.



Figure 3. The material presented in the E-Module

The aspects included in this scratch-based E-Module are content component aspects, language aspects, presentation aspects, graphical aspects, program aspects and the role of media. The following is a table of aspects of the scratch-based E-Module:

Table 1. E-Moduls Aspects

E-Module Aspects	Number	Number of Statements
Number of statements	1,2,3,4,5,6,7	7
Language Aspects	8,9,10,11,12,13	6
Presentation Aspects	14,15,16,17	4
Graphical Aspects	18,19,20,21,22,23	6
Program Aspects	24,25,26,27,28	5
The Role of Media	29,30,31,32	4

Table 1 above describes the E-Module aspects and the number of statements from each aspect. Those are to be assessed: (1) 7 questions of content components, (2) 6 questions of linguistic aspects, (3) 4 questions of presentation aspects, (4) 6 questions of graphical aspects, (5) 5 questions of program aspects, and (6) 4 questions the role of the media. This study uses several descriptive statistical approaches. The data used is primary data. To collect the data, the researchers delivered a questionnaire to teachers in Pekanbaru using google form. In this study the validator of the use of the Scratch-based E-Module were 9 validators consisting of 4 teachers and 5 lecturers, as presented in Figure 4 below.

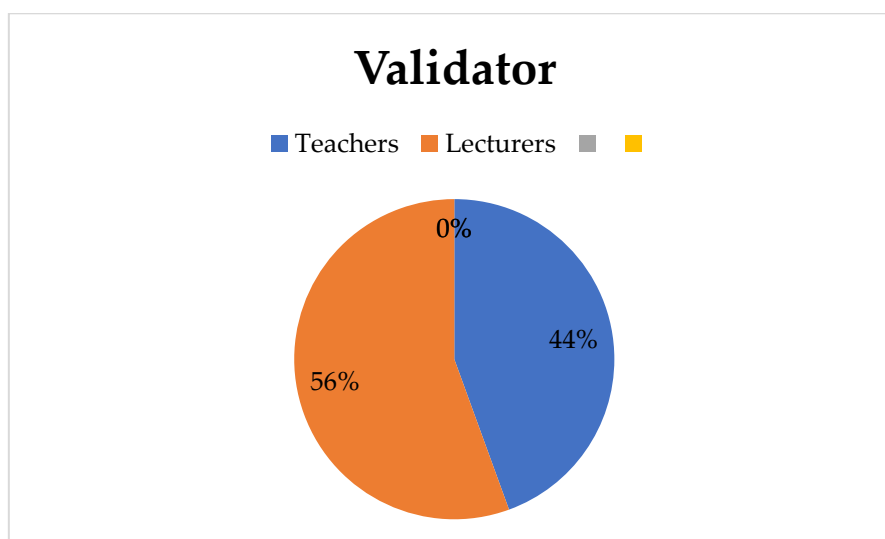


Figure 4. Validator Team Diagram

The validators are experts in education, educational technology, and languages. Furthermore, validation of the e-module was carried out by experts. Scratch is created as a learning platform which is packaged in an attractive and easy way to introduce children to the world of programming without having to learn coding first. By teaching programming to young age children, it is hoped that children will get used to learning to think logically and can become reliable programmers in the future. The following is an overview of scratch products.

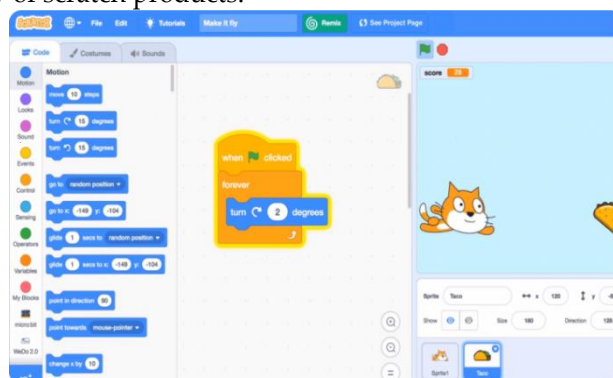
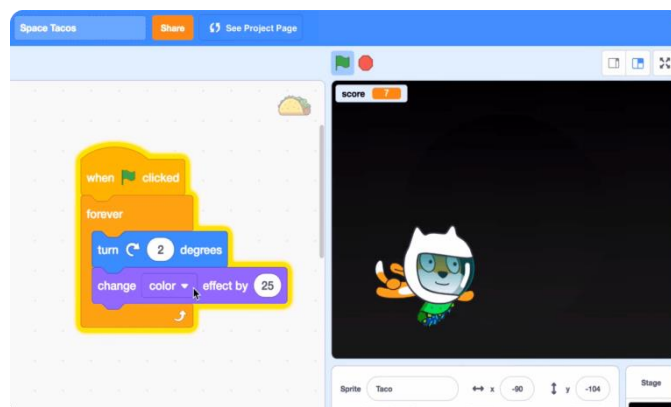


Figure 5. Scratch appearance

The interactive design in Scratch is in the form of blocks in the tool. The children are able to drag and drop the blocks on the workspace. This activity is carried out so that the children know the function of each block. They can also learn to think logically by combining several commands in available blocks. At the time of running these commands the child seems to be invited to play combining puzzles. There is also a Share feature inside Scratch which allows us or our children to upload projects results directly they have made in Scratch, so that all members of the Scratch community can see the results immediately.



**Figure 6.** Scratch appearance

Making games or projects on Scratch is a real-time condition, which the children can compile, edit, and execute commands at the moment they operate it. On that process, the children can immediately find out from the orders that have been prepared, whether it is appropriate or not. If the commands are not appropriate, the children can edit or replace as desired. This is also easier for parents or trainers to examine children's projects, because they can immediately see the results of the games, animations, music, and presentations.

Guided discovery-based e-Modules are an effective tool to assist students in learning subjects (Handayani et al., 2021). In previous research, Hadianto & Festiyed (2020) stated that the use of E-Modules can improve student learning outcomes and the level of validation is very high Adriani et al (2021). Interactive e-modules are learning media that present material in the form of images, text, video and audio through electronic formats. There are three criteria in developing interactive e-modules, such as material aspects, learning design, and media aspects (Qotimah, 2022). The influence of technology in education can be seen in the teaching and learning process which used to be teacher-centered. Further, this also creates changes in curriculum reconstruction in order to prepare excellent human resources so that human resources can compete globally. Indonesia is dominated by generations X, Y (Millennial), Z, who are accustomed to technology. Digital competencies are used as a vital set of skills, to support the wider use of educational technology in teaching and learning purposes (Bond et al., 2018; Hernayati et al., 2021). Gamification technology has great advantages to solve problems because it can enhance student learning motivation (Papadakis & Kalogiannakis, 2018).

Need analysis, design and planning used document analysis, structural, procedural and technology processing related to the development of Scratch-based E-Modules. Assessment of product development is carried out assessments by experts. The results of the analysis are used as the basis for the revision of the product prototype, which is descriptive analysis.

### 3. FINDINGS AND DISCUSSION

The researchers conducted a validity search by experts on Scratch as a learning medium. The validity aspects included content component aspects, language aspects, presentation aspects, graphical aspects, program aspects, and the role of the media. The validation results for content component aspects can be seen in the following Table 2.

**Table 2.** E-Module Validation Result on Content Component Aspect by Experts

No	Rated Aspects	Average (%)	Category
1	The material presented includes all the material in the demands of the Independent Learning program	80%	Very Valid
2	The indicators and objectives presented includes all the materials in the demands of the Independent Learning Program	50%	Quite Valid
3	The material presented contains an introduction of examples, cases, and exercises	66%	Valid
4	The concepts and definitions presented are clear and vivid, and in accordance with the concept definitions that apply in the learning material	80%	Very Valid
5	The examples and questions presented are in accordance with the material and actuality to enhance students' understanding	66%	Valid
6	Images, diagrams, and illustrations presented are in accordance with the material and actuality to enhance students' understanding.	80%	Very Valid
7	There is information on the latest material references from the material presented	70%	Very Valid
<b>Average</b>		<b>70%</b>	<b>Valid</b>

As shown in Table 2, the value of each indicator on the content component aspect appears in ranges from 50% to 80% with a valid category. Overall, the average value of e-module validity from this aspect is 70 with a valid category. It can be concluded that from the component aspect, the content of the designed e-module is valid according to experts. From table 2, the valid category indicates that the content of the material inside the Scratch-Based E-Module is good and complete according to the validator. Scratch-based e-modules fulfill aspects of assessment, including material, indicators and objectives, concepts and definitions, images, diagrams, and information presented to enhance students' understanding in learning. The content component is a component designed to achieve the goal component. The material components or content components contain study materials consisting of knowledge, values, experiences, and skills that are developed into the learning process to achieve the goal components (Bisri, 2020).

Valid criteria for the content components of this e-module indicate that the product is feasible to use, although it still needs to be improved according to criticism and suggestions from each validator (Nugroho & Airlanda, 2020). In terms of the indicators and objectives of the e-module presented, which included material in the demands of the independent curriculum, it needs to be improved in its assessment. Based on education in Indonesia, the independent curriculum must be implemented properly in order to produce the best graduates, and produce a noble, independent, reasoning critically, being creative, working together, and having a sense of diversity student (Sumarsih et al., 2022).

The validation results for language component aspects by experts can be seen in the following Table 3.

**Table 3.** E-Module Validation Result on Language Component Aspect by Experts

No	Rated Aspects	Average	Category
8	The language used has the correct sentence structure (word order)	78%	Valid
9	The language used is able to provide an understanding of the material presented	87%	Very Valid
10	The language used is in accordance with students' intellectual development	82%	VeryValid
11	The language used is in accordance with students' emotional development	53%	Quite Valid
12	The language used is in accordance with the sequence and cohesiveness between paragraphs	53%	QuiteValid
13	The concept is presented sequentially and systematically	53%	QuiteValid
<b>Average</b>		<b>68%</b>	<b>Valid</b>

In addition to content component aspects in the e-module, language component aspect is explained. Table 3 shows the value of each indicator on the aspect of the language component which is ranges from 53% to 87% with a valid category. Overall the average value of e-module validity from this language component aspect is 68% with a valid category. It can be concluded that the language component aspect is valid according to experts. In addition, another aspect appeared is the presentation component aspect in the e-module.

The valid category in the table above shows that the use of language in the Scratch-Based E-Module is included to be good and easy to understand. Beside, the data analysis appears to be valid because it meets the assessment aspects, including the language used is able to provide an understanding of the material and students' intellectuals, the sentence structure is appropriate, and the language used is able to provide an understanding of the material presented. However, there are also several aspects that need to be improved in their assessment, such as the language used in students' emotional understanding, the coherence and cohesiveness of paragraphs and the presentation of concepts systematically. Language as a communication tool is the main medium of interaction. Moreover, it is a tool of conveying news, assessments, an overview of various matters that play a role in shaping public opinion (Juanda & Azis, 2019).

According to Fahmi & Saleh (2017), the language used must be in accordance with students' social emotional maturity with discourse, text, pictures and illustrations which describe concepts ranging from the nearest (local) environment to the global environment. Based on the statement (Anggraini & Syahbrudin, 2021), the linguistic feasibility components include: conformity with Indonesian language rules, conformity with the development of students, communicative, straightforward interactive, and dialogue, flow of thinking and coherence, appropriateness, the use of terms and symbols. The presentation feasibility component relates to presentation techniques, presentation of learning, and supporting material for presentation. Then the linguistic dimension according to Murcia & Freeman (1999) in Utami (2017) is not merely a set of forms but there are three-dimension involvement refers to linguistics, namely (morphology) syntax, semantics, and pragmatics. It means that the grammatical structure does not only have a morphosyntactic form, but also semantics form (to express meaning) in the appropriate context (pragmatics).

The validation results for presentation component aspects by experts can be seen in the following Table 4.

**Table 4.** E-Module Validation Result on Presentation Component Aspect by Experts

No	Rated Aspects	Average	Category
14	The components presented can help improve computational thinking in the material	42%	Quite Valid
15	The components presented can help improve basic education science literacy in the material	78%	VeryValid
16	The available components can be used to train the ability in understanding and applying concepts related to the material	57%	Quite Valid
17	The suitability between the learning objectives and the tasks/exercise questions is consistent	78%	Valid
<b>Average</b>		<b>63%</b>	<b>Valid</b>

As shown in Table 4 the value of each indicator on the presentation component aspect appears in ranges from 42% to 78% with a valid category. Overall the average value of e-module validity from this presentation component aspect is 63% with a valid category. It can be concluded that from the component aspects of the designed e-module presentation are valid according to experts.

In terms of presentation, the valid category on Scratch-Based E-Module means good and interesting. The presentation component is considered an important component in attracting students' interest in learning. There are several indicators assessed by experts. First, e-module component presented can help improve computational thinking. The young-age children need to get to know how important Computational Thinking as a computer-based problem solving method. One of the steps that can be taken to achieve this goal is by incorporating Computational Thinking teaching into formal education, namely through school teachers and educational institutions (Sukamto et al., 2019). Computational thinking is a thought process that allows someone to understand a complex problem and be able to solve it in the problem-solving process (Julie et al., 2022). Then according to Binti Nor & bint Khalid (2022), Computational thinking is a scientific discipline for solving problems in daily life. Computational thinking is useful as a principal and an asset for Indonesian children to compete in the global era (Rozady & Koten, 2022). In the E-module, this aspect assessment category is quite valid, further the assessment process needs to be improved.

The next aspect, other components in e-module is presented to help improve basic education science literacy in the material. As is well known, scientific literacy in Indonesia has low rank in the Program for International Student Assessment (PISA). Besides, the characteristics of 21st century are different from previous centuries where in the 21st century, technology is growing rapidly. As consequences, a country needs to be ready and get survived by preparing the best quality human resources (Pertiwi et al., 2018). The assessment category of this aspect is very valid. It means that e-modules have greatly supported scientific literacy skills. Furthermore, E-module should be presented in an attractive appearance to attract the students' attention while studying it so that the students feel more motivated to learn (Fitriani et al., 2017).

Beside the presentation component aspect of e-module, other aspect appeared is graphical component aspect of e-module. The validation results for graphical component aspects by experts can be seen in the following Table 5.

**Table 5.** E-Module Validation Result on Graphical Component Aspect by Experts

No	Rated Aspects	Average	Category
18	It has an interesting learning media design	77%	Valid
19	It has an interesting learning media design	69%	Valid
20	It displays a good center point	79%	Valid
21	The menu structure presented is consistent	73%	Valid
22	It has appropriate use of color, text and background design	73%	Valid
23	The appearance of learning media has different characteristics from other modules	60%	Valid
<b>Average</b>		<b>72%</b>	<b>Valid</b>

Table 5 shows the value of each indicator on the the graphical component aspect which ranges from 73% to 79% with a valid category. Overall the average value of e-module validity from this graphical component aspect is 72% with a valid category. This result is valid according to experts. In addition to the graphical component aspects of the e-module, another aspect that is seen is the graphical component aspects of the e-module.

Graphical aspect assessment is considered as valid because the e-module is feasible to use, this scratch-based e-module has an attractive media design, and the appearance of the module is different from the others, including its color presentation, appearance and background design. Graphical aspects are aspects related to appearance such as the use of fonts, layouts or layouts, illustrations, pictures, photos, and display designs (Hersandi et al., 2017). According to Fadieny & Fauzi (2021) graphical components include: letter size/format, cover design, content section design, and design display quality. Interesting media is one of the main factors that influence students' interest and motivation in learning (Erwin & Gratitude, 2019). The validation results for program component aspects by experts can be seen in the following Table 6.

**Table 6.** E-Module Validation Result on Program Component Aspect by Experts

No	Rated Aspects	Average	Category
24	Scratch learning media is easy for users to operate	88%	VeryValid
25	Scratch's navigation structure is easy for students to remember	56%	Quite Valid
26	Scratch learning media has a high level of reliability	67%	Valid
27	The navigation (Scan QR-Code) button is consistent throughout the content of Scratch learning media	61%	Valid
28	It is ease of getting the latest information	63%	Valid
<b>Average</b>		<b>67%</b>	<b>Valid</b>

Table 6 shows the value of each indicator on the aspect of the program component which is ranges from 56% to 8% with a valid category. Overall the average value of e-module validity from this program component aspect is 67% with a valid category. It can be concluded that the program component aspect is valid according to experts. In addition to the program component aspects of the e-module, another aspect that is seen is the program component aspects of the e-module.

The valid category in Table 6 above shows that in terms of the program, the Scratch-Based E-Module is already good and can be used properly in the learning process. The evaluation aspects of program component, consisting of Scratch learning media is easy for users to operate, and convenience is one of the concerns in using technology. According to A. B. Pratama & Suputra (2019) perceived ease

of use is defined as the extent to which a person believes that using a particular technology system will be free from an effort and the person also believe that technology is easy to understand. Scratch learning media has a high level of reliability, which can help students to have abilities in the programming process such as showing in detail various coding patterns and code constructions in various projects during programming (Fagerlund et al., 2020). Scratch uses a programming language that is easier to understand and can change students' mindsets about programming languages which they first find difficult and complicated into programming languages that are simple and fun Khalil & Wardana (2022). For example, to create stories, animation, games, music, and interactive art, a program is developed for children consisting of different code blocks and easy-to-understand graphics and the ability to add sound (Zubaidi et al., 2021). Scratch's focus is on creating multimedia products, and sharing them in a large and active online community guided by the project's website. This is not only intended to enable and develop children's creativity, but also to introduce them to programming, in a fun way (A. Pratama, 2018). Scratch also makes it easier to obtain the latest information. Some researchers state that in using Scratch media students become more interested and want to learn more about coding in the hope that coding material can also be included in the curriculum (Mayanda Mega Santoni et al., 2021).

The validation results for the role of media component aspects by experts can be seen in the following Table 7.

**Table 7.** The Validation Results of E-Module on Component Aspects of the Role of Scratch Learning Media by Experts

No	Rated Aspects	Average	Category
29	Scratch Learning Media can improve computational thinking	78%	Very Valid
30	Scratch Learning Media can improve basic educational science literacy	73%	Valid
31	Scratch Learning Media can increase learning motivation	93%	Very Valid
32	Scratch Learning Media can improve student understanding	91%	Very Valid
<b>Average</b>		<b>84%</b>	<b>Valid</b>

As shown in Table 7, the value of each indicator the role of Scratch learning media component aspect appears in ranges from 42% to 78% with a valid category. Overall the average value of e-module validity from the aspect of the role of Scratch learning media is 63% with a valid category. It can be concluded that from the aspect of the designed e-module program components are valid according to experts. Based on the validity categories in the content aspect, language aspect, presentation aspect, graphical aspect and program aspect which have been described above, the overall validity of the e-module can be seen in the following Table 8.

**Table 8.** E-Module Validation Results on all component aspects by experts

No	Aspects	Average	Category
1	Content	76%	Valid
2	Language	77%	Valid
3	Presentation	78%	Valid
4	Graphical	76%	Valid
5	Program	75%	Valid
<b>Average</b>		<b>77%</b>	<b>Valid</b>

As shown in Table 8, the overall average e-module validation is 77% with a valid category. It means that the e-module is valid according to the experts so that it can be proceeded to the next stage, namely the assessment stage. The Scratch-Based E-Module was stated as a valid e-module by the validators

through several observed components, namely content components, language components, presentation components, graphical components and program components. For the content component of the Scratch-Based E-Module, it obtains an overall validity value of 76% in the Valid category. The valid category indicates that the content of the material inside the Scratch-Based E-Module is good and complete according to the validator. In the language component of the Scratch-Based E-Module, it obtains an overall validity value of 77% in the Valid category.

It means that the use of the language in the Scratch-Based E-Module is included to be good and easy to understand. The presentation and e-module graphical components obtained an average sequentially 78% and 76% with the valid category. It means that the terms of presentation, design, suitability of the use of colors, writing and background design and menu structure, Scratch-Based E-Modules are considered to be good and attractive. For the Scratch-Based E-Module program component, the overall score is 75% in the Valid category. It indicates the terms of the program, the Scratch-Based E-Module are already good and can be used properly in the learning process. This result is supported by Soewondo & Yuliani (2019) which states that an e-module is considered to be valid if four development requirements obtain a validity score > 2.50 with a valid category.

#### 4. CONCLUSION

From the analysis of the results of this research, the researchers conclude that the average score of overall aspects components obtains a 77% validity value with Very Valid criteria. This shows that according to experts, the Scratch-Based E-Module is valid and can be used in the learning process. Thus, this Scratch-Based E-Module is appropriate and it is feasible to use. Scratch Based E-Module is considered as a valid e-module.

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