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DEVELOPMENT OF A CANVA-BASED MATHEMATICS TEACHING E-MODULE TO FACILITATE JUNIOR HIGH SCHOOL STUDENTS' MATHEMATICAL CREATIVE THINKING ABILITIES ON ALGEBRAIC FORMS

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Abstract

This study aims to produce a product in the form of a Canva-based teaching e-module to facilitate creative thinking skills in algebraic form material. This study uses a Research and Development (R&D) approach with stages, namely potential and problems, data collection, product design, design validation, design revision, product testing, product revision, and final product. In the data collection process, researchers used several instruments in the form of validation sheets addressed to experts, as well as practicality questionnaires intended for teachers and students. The objects of this study were eighth grade students at the junior high school level. Based on the development results, it was obtained that the learning media in the form of teaching e-modules designed by using the Canva platform showed validation results with an average percentage value of 85.47% with valid criteria. Meanwhile, the practicality value obtained from the teacher's practicality questionnaire was with an average percentage of 87.5% with very practical criteria, and the student's practicality questionnaire with an average percentage value of 88.89% with very practical criteria. Thus, the results of the research and development of Canva-based teaching e-modules for creative thinking skills in algebraic form material for junior high school students can be concluded that from the validation results by experts and responses from teachers and students, the developed learning media is declared suitable for use in the learning process.

Keywords : e-learning module, Canva, creative thinking.

INTRODUCTION

In today's digital era, Information and Communication Technology (ICT) has had a significant impact on various aspects of life, including education. ICT is developing rapidly through the emergence of technologies such as data science and artificial intelligence, as well as the increasing use of the internet in everyday life (Ghufron, 2018). These developments encourage humans to continue to keep up with the flow of progress and be able to compete in the technological era. Technology also makes it easier to access information anytime and anywhere (Listiani, 2021), and in the world of education, this opens up broad opportunities for teachers and students to utilize digital media as a learning tool (Salsabila et al., 2020). Therefore, with digital learning features, students can easily study or review school material whenever they have free time.

As time progresses, students are more familiar and interested in visual and digital-based learning media than conventional methods (Khima Milidar, 2024). Therefore, innovation in learning media is crucial for increasing student learning interest, especially at the junior high school level. With the times, teachers are required to be innovative in designing learning processes by utilizing technology (Gazali and Pransisca, 2021). Appropriate learning strategies through methods, models, and media will create meaningful and optimal learning (Permana et al., 2016). Therefore, innovation in the use of learning media is essential to increase student learning interest and support

the achievement of more optimal competencies.

One form of innovation in education that is currently widely used is the use of e-learning modules as a learning medium. e-learning modules are digital teaching materials that enable the delivery of material in a structured, engaging manner and support student independent learning (Herawati and Muhtadi, 2018). The use of e-learning modules in mathematics learning has been proven to increase student learning effectiveness and interest (Budiarti et al., 2016). Mathematics e-learning modules are structured based on a curriculum and gradual concepts from simple to complex, to help students understand and apply knowledge in real life (Deviana and Sulistyani, 2021). Therefore, when students have a strong understanding of the material, they will be better able to face and solve various problems that arise in everyday life.

To develop engaging e-learning modules, teachers can utilize the Canva application as a design aid . Canva provides various visual features, such as animations, graphics, and templates, making it easy for teachers to create creative and practical learning materials (Syahrir et al., 2023).Using Canva not only helps teachers save time but can also enhance students' creativity and visual skills (Sepriyanti et al., 2024). Therefore, developing a Canva-based mathematics e-learning module is the perfect solution for delivering interactive and meaningful learning.

One of the goals of developing a Canva-based e-learning module is to help students hone their creative thinking skills in mathematics with attractive visual displays and varied learning activities. Students are encouraged to explore various approaches and produce unique solutions to the mathematical problems they face (Purwasih, 2020). According to (Qomariyah and Subekti, 2021), creative thinking skills include fluency, flexibility, originality, and elaboration. However, this ability is still relatively low in Indonesia (Dewi et al., 2019), due to the lack of learning that emphasizes creativity (Hidayat and Widjajanti, 2018). Therefore, the use of Canva as an interactive learning medium does not merely act as a tool for designing visual displays, but also functions as an educational tool that supports the development of students' creative thinking skills. Through the combination of aesthetic elements, interactive aspects, and flexibility presented in the e-learning module, students get the opportunity to think fluently, flexibly, and originally, while being able to develop their mathematical ideas more deeply and meaningfully.

METHOD

This study employed a *Research and Development* (R&D) approach. This R&D approach focuses on the process of designing and validating a learning product (Putri et al., 2021) . In its implementation, the researchers referred to the development model proposed by Borg and Gall (Gall et al., 2020) . The product developed in this study is an interactive learning medium in the form of a mathematics teaching e-module designed using the Canva platform for visual support and presentation.

The Research and Development (R&D) used in this study uses a development model (Sugiyono, 2017). According to (Sugiyono, 2017), research and development in the fields of education, social, and administration have not yet developed optimally.

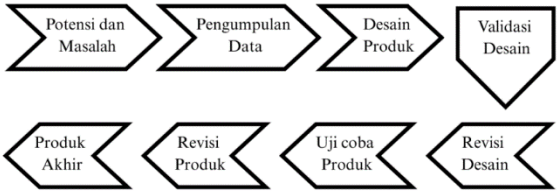


Figure 1. Researchers' modifications of Sugiyono's research steps

The subjects used in this study were 6 grade VIII junior high school students. The data collection techniques are validation sheets, practicality sheets for teachers, and practicality sheets for students. Meanwhile, the data analysis techniques used are validity analysis and practicality analysis. The validation sheet used in this study was

prepared in the form of a questionnaire, which consisted of a number of statements related to important aspects of the product being developed. This assessment is carried out based on a Likert scale with a score range of 1 to 4, where the number represents the level of suitability of each aspect to the established criteria. Meanwhile, the completeness validation questionnaire assessment scale can be seen in table 1 below.

Table 1. Product Completeness Validation Questionnaire Assessment Scale

Category	Score Value
Yes	1
No	0

According to (Rochimah, 2019) in analyzing product validity data, the following percentage calculation formula is used:

$$P(s) = \frac{S}{N} \times 100\%$$

Information :
$P(s)$= Percentage of sub-variables assessed
S = Total score for each sub-variable
N= The maximum number of scores achieved on the sub-variable

After the data is presented as a percentage, the next step is to group the results into previously determined qualitative categories, namely:

Table 2. Validity Interval Categories

Percentage	**Criteria**
$\mathbf{76\% - 100\%}$	Valid
$\mathbf{51\% - 75\%}$	Quite valid
$\mathbf{26\% - 50\%}$	Less valid
$\mathbf{0\% - 25\%}$	Invalid

(Haking and Soepriyanto, 2019)

Meanwhile, the practicality data analysis was obtained through an observation sheet used to assess the implementation of the use of e- learning modules in the learning process. The assessment of the test in this study refers to a Likert scale, where each statement is given a score according to the level of respondent's agreement. The scoring scheme used is as follows: "strongly agree" is given a value of 4, "agree" is given a value of 3, "disagree" is given a value of 2, and "strongly disagree " is given a value of 1. The practicality percentage score is calculated using the following formula:

$$P(s) = \frac{S}{N} \times 100\%$$

Information :
$P(s)$ = Percentage of sub variables
S = Total score for each sub-variable
N = Maximum number of scores

The achievement criteria in the table below can be used to measure the level of practicality of the e-learning module.

Table 3. Practicality test achievement criteria

Percentage	**Criteria**
$\mathbf{76\% - 100\%}$	Very practical
$\mathbf{51\% - 75\%}$	Practical
$\mathbf{26\% - 50\%}$	Less practical
$\mathbf{0\% - 25\%}$	Not practical

(Puspita, 2017)

RESULTS AND DISCUSSION

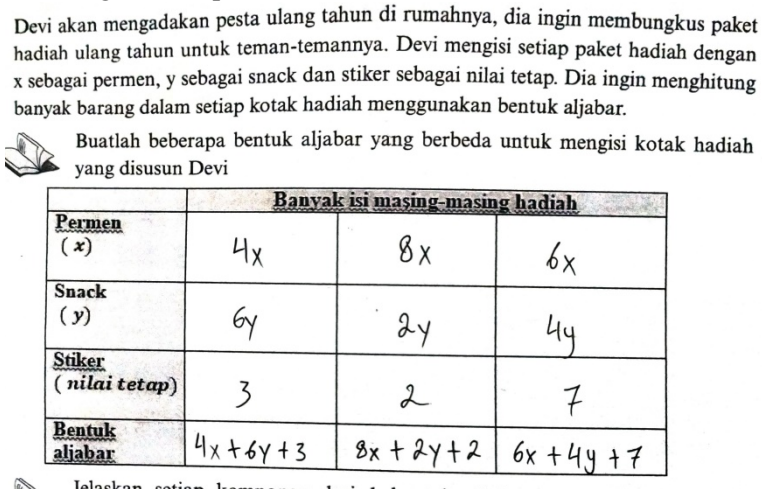
Based on the steps that have been taken, the following research results were obtained:

a. Potential and problems

In the initial stages of this research and development, researchers identified the potential within the school environment and

the challenges currently faced in mathematics learning activities. The potential identified was that the school already had the infrastructure to support technology-based learning, such as internet access, computers, and projectors. Furthermore, the teachers at the school were highly enthusiastic and motivated in developing innovative and creative learning. This presents significant potential for developing learning media that utilize information technology.

However, based on initial observations and interviews with mathematics teachers, several major issues were identified. One of the main issues was students' lack of creative mathematical thinking skills. The following is a description of students' answers on the initial test:


Devi akan mengadakan pesta ulang tahun di rumahnya, dia ingin membungkus paket hadiah ulang tahun untuk teman-temannya. Devi mengisi setiap paket hadiah dengan x sebagai permen, y sebagai snack dan stiker sebagai nilai tetap. Dia ingin menghitung banyak barang dalam setiap kotak hadiah menggunakan bentuk aljabar.

Buatlah beberapa bentuk aljabar yang berbeda untuk mengisi kotak hadiah yang disusun Devi

	Banyak isi masing-masing hadiah		
Permen (x)	$4x$	$8x$	$6x$
Snack (y)	$6y$	$2y$	$4y$
Stiker (*nilai tetap*)	3	2	7
Bentuk aljabar	$4x+6y+3$	$8x+2y+2$	$6x+4y+7$

Figure 2. Student answers on the initial test

It can be seen in Figure 2, one of the questions given to students still does not understand what the algebraic form is and when some of the students were asked, they still could not understand which were variables, coefficients and constants. So, before answering the questions given, students must be given examples or parables before answering the questions given. Furthermore, interviews with teachers revealed that conventional methods, aided by textbooks and other printed media, still predominate in mathematics learning. The limited variety of engaging learning media and the limited use of digital media make the learning process less interactive and boring for students. Therefore, innovative learning media relevant to current technological developments are needed, one example of which is the development of a Canva-based mathematics teaching e-module .

b. Data collection

Once the potential and problems have been clearly formulated, the next step is to collect the data needed for product development. Data collection is conducted through various methods, including interviews. Interviews were conducted with a 7th grade mathematics teacher at a junior high school to obtain information regarding the teacher's needs for teaching materials, experience using digital media, and difficulties encountered during the mathematics learning process.

c. Product design

The next stage is the product design stage (teaching e-module), at this stage the researcher designs and develops learning media in the form of modules that can be used as teaching materials in schools. The researcher designs the teaching e-module by compiling various components such as introduction, learning outcomes, learning objectives, Pancasila student profiles, concept maps, learning activities, and attachments in the form of LKPD, formative tests, glossaries, and bibliographies. The e-module is designed to be visually appealing using Canva, and the researcher must pay attention to the components in the teaching e-module such as the learning objectives, teaching materials, learning practice questions, and feedback as an indicator of the quality of the exercises carried out in the learning process. The

following is an illustration of the product design in the teaching e-module:

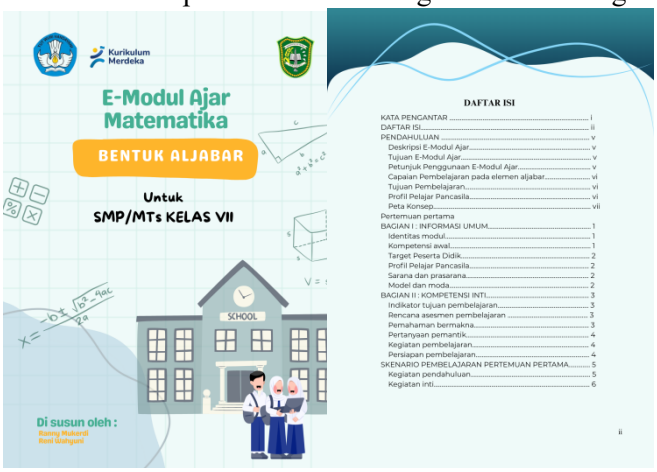


Figure 3. Design of e-modules for teaching mathematics

d. Design validation

After the mathematics teaching e-module was completed, the next stage was validation. In this step, the mathematics teaching e-module was validated by two expert validators. This validity test was conducted to refine the learning media in the form of the teaching e-module by completing the validation sheet created by the researcher and providing input on the e-module developed by the researcher. The results obtained by the two validators can be seen in Table 4 below.

Table 4. Validation results of the Canva-based mathematics teaching e-module for creative thinking skills

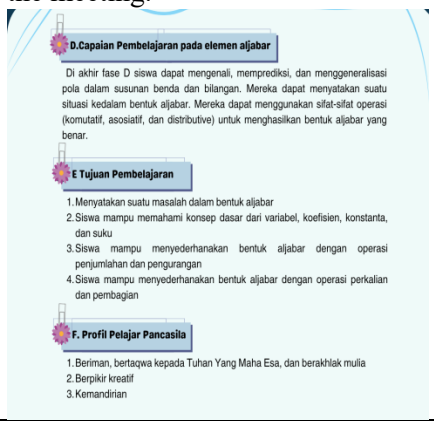
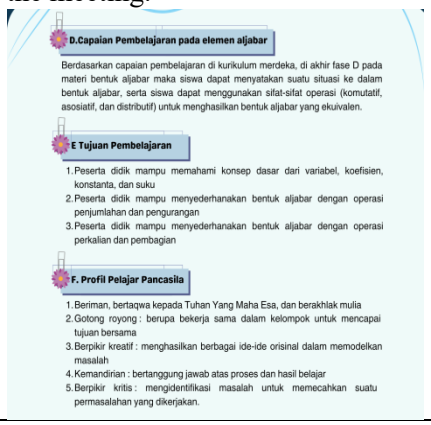
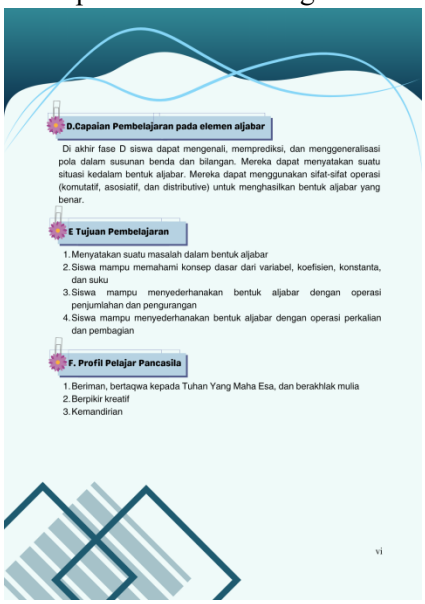
Assessment Components	Validator		Maximum score	Percentage of validators		Validator criteria		Percentage 2 validators
	1	2		1	2	1	2	
Validity of the completeness of the E-module for teaching mathematics	22	23	24	91.67%	95.83%	Valid	Valid	93.75% (valid)
Validity of the suitability of the E-module for teaching mathematics	115	132	160	71.88%	82.5%	Quite valid	valid	77.19% (valid)
Average of both validators								**85.47% (Valid)**

The validation results for the Canva-based mathematics teaching e-module for the completeness of the algebraic form material were 93.75% valid. Meanwhile, the suitability of the algebraic form material was 77.19% valid. After calculating the validation assessment, the average percentage of the two validators was 85.47%, meeting the valid criteria.

e. Design revision

During the validation phase, the researchers received several suggestions and directions from the two validators to improve the module. The suggestions and directions included improvements to the Canva-based e-learning module, including the Pancasila student profile, concept maps, text display, and adjustments to the learning scenarios.

Table 5. Revision of the design of the mathematics teaching e-module according to suggestions and directions from the validator.

No	Before Revision	After Revision
1.	The learning objective section, namely stating a problem in algebraic form, was not included in the meeting. 	The learning objective section, namely stating a problem in algebraic form, was not included in the meeting. 
2.	The Pancasila student profile section in the introduction does not correspond to the teaching module. 	The Pancasila student profile section in the introduction has been revised in accordance with the teaching module. 

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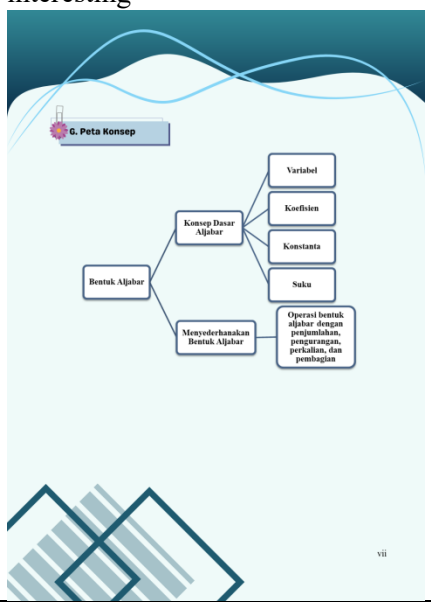
<td>3.</td>
<td>The concept map contained in the teaching e-module is less interesting
 
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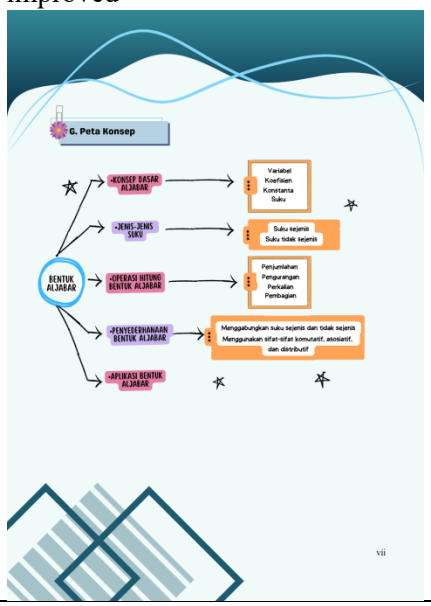
<td>The concept map contained in the teaching e-module has been improved
 
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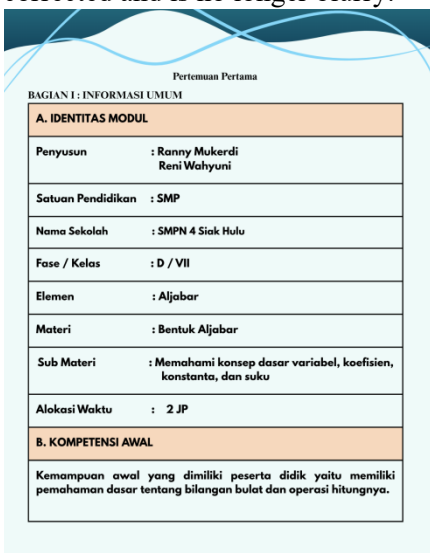
<td>4.</td>
<td>The writing in the table in the general information section is still blurry.
 
</td>
<td>The text in the general information section of the table has been corrected and is no longer blurry.
 
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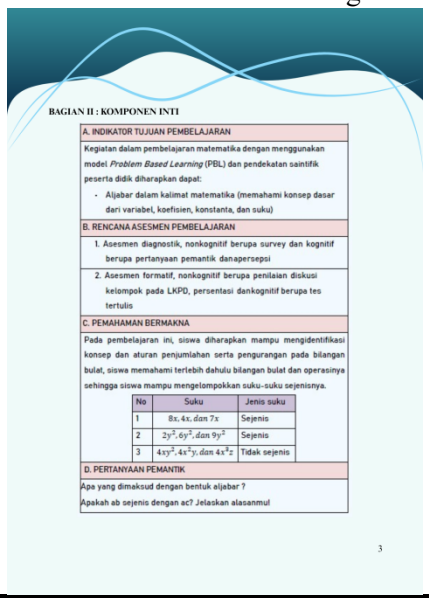
<td>5.</td>
<td>Correct the less appropriate meaningful understanding sections in the sub-material of meeting 1.
 
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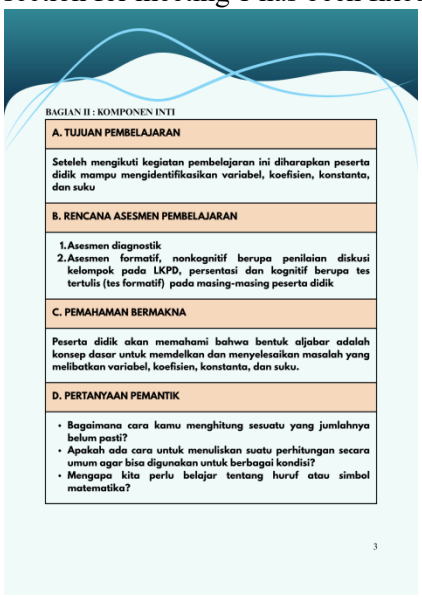
<td>The meaningful understanding section for meeting 1 has been fixed.
 
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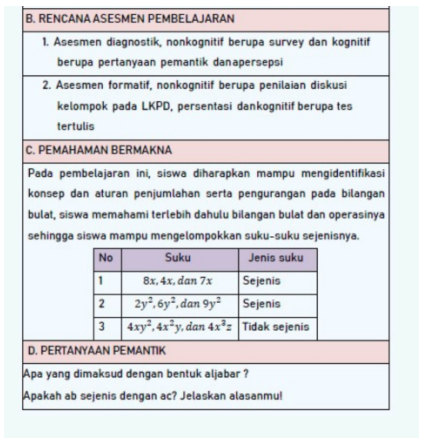
<td>6.</td>
<td>The learning assessment plan section has too many tests conducted.
 
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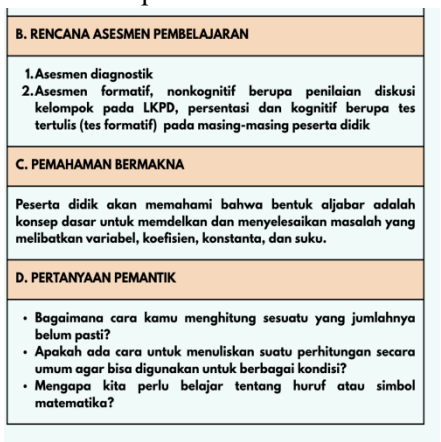
<td>Revised sections of the learning assessment plan
 
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f. Product trial

At this stage, it is the trial stage for the product or learning media in the form of a mathematics teaching e-module developed in schools. Researchers conducted a trial in a junior high school with a limited number of students, namely 6 people. After conducting a trial of the e-learning module, the researcher provided a student response questionnaire sheet aimed at obtaining practicality data from the learning media used in the form of a mathematics learning e-learning module after being tested. Furthermore, the researcher also provided a teacher response questionnaire sheet to the learning media in the form of a mathematics learning e-learning module to obtain practicality data. The following are the practicality results from the teacher response questionnaire sheet:

Table 6. Practicality results of the teacher response questionnaire

No	Aspect	Maximum score	Total score	Percentage	Criteria
1.	Feasibility aspects of e-mathematics teaching modules	24	24	100%	Very practical
2.	Display layout aspect	32	24	75%	Practical
Average				**87.5%**	**Very practical**

From the assessment of table 6, the results of the practicality of the teacher response questionnaire obtained in the aspect of the feasibility of the mathematics teaching e-module with a percentage of 100%, the criteria are very valid. Meanwhile, the aspect of the display arrangement with a percentage of 75%, the criteria are practical and suggestions given by the teacher, namely in the attachment section, are made according to the arrangement at each meeting. Thus , the average number of both aspects is at a percentage of 87.5% with the criteria are very practical.

Table 7. Practical results of student response questionnaire

No	Respondents	Maximum score	Total score	Percentage	Criteria
1.	Student 1	24	21	87.5%	Very practical
2.	Student 2	24	21	87.5%	Very practical
3.	Student 3	24	21	87.5%	Very practical
4.	Student 4	24	22	91.67%	Very practical
5.	Student 5	24	21	87.5%	Very practical
6.	Student 6	24	22	91.67%	Very practical
Average				**88.89%**	**Very practical**

From the assessment results in Table 7, taken from the validation of the practicality of the student response questionnaire in class VIII with a total of 6 students. With an average score obtained at 88.89 % with the criteria of very practical.

g. Product revision

The next stage is the product revision stage. After conducting trials, based on suggestions from the teacher's practicality sheet, the appendices (worksheets, formative tests, and homework) were moved to the section after the learning scenario in each meeting. This aims to make it easier to find and view the contents of the appendices (worksheets, formative tests, and homework).

h. Final product

After going through several stages in the development process, the final step is the final product. This stage aims to determine whether the resulting product can be used or not, which was made based on the initial design. From the results of the practicality of the mathematics teaching e-module on the student response questionnaire sheet, a percentage value of 88.89% was obtained, with the criteria of very practical. And the teacher response questionnaire sheet obtained an average percentage value of 87.5%, with the criteria of very practical. The following is a display of the final product of the mathematics teaching e-module:

Figure 4. Final product design for the mathematics teaching e-module

CONCLUSION

Based on the results of research conducted in junior high schools by developing a canva-based mathematics teaching e-module on the material of algebraic forms, its validity and practicality have been tested . The validity results from the two validators obtained an average percentage value from the two validators of 85.47 % with valid criteria. The practicality results from the teacher response questionnaire sheet showed an average percentage of 87.5% with very practical criteria, while the results of the student response questionnaire sheet obtained an average percentage value of 88.89% with very practical criteria.

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