

Development of Creative Problem Solving (CPS)-Based Articulate Storyline Media to Develop Students' Creative Thinking Ability SPLDV Class VIII Material

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Abstract

This study aims to develop Articulate Storyline learning media based on Creative Problem Solving (CPS) to develop students' creative thinking skills in grade VIII SPLDV materials in a valid, practical and effective manner. The development model used in this research is the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). This research was conducted on class VIII students of Middle School. The data analysis technique used in this study is the validity, practicality and effectiveness analysis of the media. The results showed that for the acquisition of scores from media experts it was 94% with very valid criteria, then for the acquisition of an average score from material experts it was 100% with very valid criteria, and for the practicality of the media it was obtained from the acquisition of scores from student response questionnaires that were equal to 85.5% with very practical criteria. The use of this media also affects the improvement of students' creative thinking abilities, this can be shown from the results of the N-Gain test that has been carried out, where the score obtained is 0.7541, which is > 0.7 which is included in the high criteria. These results indicate that the developed Articulate Storyline based Creative Problem Solving (CPS) media includes valid, practical and effective criteria for developing students' creative thinking abilities.

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INTRODUCTION

The ability to think creatively, especially in the field of education, is still a very interesting topic. The results of research by the Partnership for 21st Century Skill (P21) suggest developing creative thinking skills, where in the field of education in the 21st century these abilities are one of the abilities that must be developed (Umar & Ahmad, 2019). According to Ulandari, Putri, Ningsih, & Putra (2019) states that the ability to think creatively is the ability to produce something new or be able to develop ideas that have been made by others which later the idea becomes a better idea. Based on the explanation from Tanjung (2018), which is to explain that if a person does not have the ability to think creatively, then they will not be able to become competitors or will not be able to compete with others and will always be left behind. In learning activities, teachers should be able to involve all students to play a role in the study of the material taught. In addition to being

able to make students play an active role, it can certainly train students to reason, analyze and improve students' creative thinking skills to be able to solve a problem (Badjeber et al., 2018). The indicators of creative thinking ability that are often used according to Darwanto (2019), are as follows: Fluency, Flexibility, Originality and Elaboration.

Creative Problem Solving (CPS) learning is applied as an effort to overcome problems related to the student's creative thinking process, one of which is to apply innovative learning models that can motivate students, train and be able to follow the development of science and technology (A. D. Sari & Noer, 2017). The appropriate learning model to develop students' creative thinking skills is the Creative Problem Solving (CPS) learning model (Faturrohman & Afriansyah, 2020). The Creative Problem Solving (CPS) learning model is a learning model that focuses on teaching and problem-solving skills, which is followed by strengthening the skills possessed (Pepkin in Wahyuni, Mariyam, & Sartika, 2018). Research from Sari & Noer (2017) shows that the steps to implement the Creative Problem Solving (CPS) model are as follows: 1.) Clarify the problem, 2.) Disclosure of opinions, 3.) Evaluation and selection and 4.) Implementation.

Research conducted by Muti & Budi (2019) explained that as an effort to facilitate the delivery of material carried out by teachers and be able to apply the Creative Problem Solving (CPS) learning model well, learning media assistance is needed. Seeing how big the role of technology in the field of education is as an effort to develop the quality of mathematics learning, in this research a process of developing learning media that can be applied to support student learning activities will be carried out and is expected to be able to develop their creative thinking skills (Pratama, 2019). The learning media is the Articulate Storyline which will be used to develop students' creative thinking skills in SPLDV material. Articulate Storyline is one of the applications that can be used to design interactive programs that can later be published by programmers (Khusnah, Sulasteri, Suharti, & Nur, 2020). Articulate Storyline is good for learning media that can compete with adobe flash media, because articulate storyline itself does not need to use programming languages or scripts in making its media. The command to create animations can be applied using the "trigger" menu so that it can make it easier for teachers to create interactive media that will later be used for teaching needs (Mallu & Samsuriah, 2020).

RESEARCH METHOD

This research uses the application of research and development (R&D) methods. This study applies the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). This research was conducted at Diponegoro Kandangan Junior High School and tested on class VIII students in semester 1. There are 2 data collection techniques in this study, namely questionnaires and tests. The instruments in this study used questionnaires and test questions in the form of pretest and posttest which were used to develop students' creative thinking skills. The questionnaire provided contains questions related to media appearance, material and media practicality. The type of test instrument to be used is a written test (description). The test questions given are 4 questions, consisting of 2 pretest

questions and 2 posttest questions. There are three data analysis techniques in this study, namely validity analysis, practicality analysis and effectiveness analysis.

The validation questionnaire uses a likert scale assessment to produce data that will later be determined by the average value using the following formula:

$$\text{Presentase Score } (P) = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\%$$

After obtaining the results of the expert validation percentage value, then the validity of the media is determined based on the following table of criteria:

Table 1 Media Validity Criteria

Persentase	Criteria
$80\% < P \leq 100\%$	Highly Valid
$60\% < P \leq 80\%$	Valid
$40\% < P \leq 60\%$	Quite Valid
$20\% < P \leq 40\%$	Less Valid
$0\% \leq P \leq 20\%$	Invalid

Source: Bintiningtiyas et al., (2016)

The media practicality questionnaire is made using a likert scale assessment, where the questionnaire will be given to students to produce data which will later be determined by the average value using the following formula:

$$\text{Presentase Score } (P) = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\%$$

After obtaining the results from the expert validation percentage value, then the practicality of the media is determined based on the following table of criteria:

Table 2 Media Practicality Criteria

Persentase	Criteria
$80\% < P \leq 100\%$	Very Practical
$60\% < P \leq 80\%$	Practical
$40\% < P \leq 60\%$	Quite Practical
$20\% < P \leq 40\%$	Less Practical
$0\% \leq P \leq 20\%$	Impractical

Source: Bintiningtiyas et al.,(2016)

The results of the pretest and posttest from students will determine the effectiveness of the learning media used in this study. Data analysis will be performed using the Paired Sample t-Test. Data analysis will be performed using the Paired Sample t-Test. There are two hypotheses that will be used in this study are the following :

H_0 : there is no significant difference before and after applying Creative Problem Solving (CPS)-based Articulate Storyline media

H_1 : there are significant differences before and after applying Creative Problem Solving (CPS)-based Articulate Storyline media

Analysis of the improvement of students' creative thinking ability can be calculated using the N-gain formula with the following criteria:

Tabel 3 Kriteria N-gain

N-gain	Criteria
$0.7 < N - \text{gain} \leq 1$	Tall
$0.3 < N - \text{gain} \leq 0.7$	Keep
$N - \text{gain} < 0.3$	Low

(Source: Irhamna, Rosdianto, & Murdani, 2017)

RESULTS AND DISCUSSION

The results of this study explain the process of developing Creative Problem Solving (CPS)-based Articulate Storyline media to develop students' creative thinking skills in SPLDV material. This research applies the ADDIE (Analysis, Design, Development, Implementation and Evaluation) development model which will be explained in detail in the following presentation:

1. *Analysis*

Based on the needs analysis obtained during the question and answer with the mathematics teacher at Diponegoro Junior High School, it was found that the learning commonly used by teachers when teaching was to use the lecture and discussion method. For the use of manipulative learning media, it is applied to students only on certain materials, while the use of interactive learning media is only limited to Powerpoint media and its use is somewhat less effective for mathematics learning because students pay less attention during learning. The use of Articulate Storyline media has never been used at Diponegoro Junior High School, therefore researchers apply Articulate Storyline media as a medium for learning mathematics in students. Then for the curriculum used at Diponegoro Junior High School, namely using the 2013 curriculum and researchers using basic mathematics competencies of junior high school class VIII points 3.5 and 4.5 with learning indicators including understanding the concept of SPLDV, application of SPLDV to contextual problems and solving SPLDV problems.

2. *Design*

The design stage is the design stage of the Articulate Storyline media which will be used as a learning medium. Researchers will make a preliminary design design on the Articulate Storyline application. At the beginning of the media, the researcher creates a start page containing the media title using a supportive background, the title of the material to be studied and a login page to enter the main menu. Furthermore, on the main menu there is a menu to go to the material section, presentation of problems and evaluation questions. For the presentation of problems containing contextual problems of SPLDV material which will later be presented to students with a Creative Problem Solving (CPS) learning model. The slide section contains media instructions, basic competencies and indicators, as well as video explanations of SPLDV material. At the end of the slide, there are evaluation questions that will be given to students to see their creative thinking skills.

3. *Development*

The results in the development of media that have been made are the results obtained after the researcher has finished validating the media to validators. Media is developed based on suggestions and comments that have been provided by material validators and media validators. The validity of learning media is assessed by validators based on aspects of media feasibility as well as comments and suggestions related to the content of learning media. Media validation carried out by media experts and material experts is needed to find out the quality

of learning media that has been made based on the aspect of media validity. The results of media validation will be used as a reference in the process of improvement and development of the learning media itself. The media will be improved and developed until the media is valid and feasible to be applied in the learning process. Below is a table of the results of media validation and material validation that has been obtained by researchers :

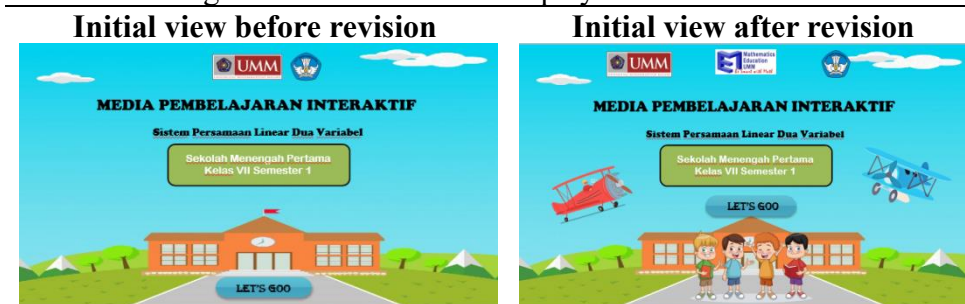
Table 4 Media and Material Validation Results

Media	Validator	Average Score	Criteria	
Aspect :				
1. Media display	94%	94%	Very valid	
2. Media Structure				
3. Use of media				
Material	Validator 1	Validator 2	Average Score	Criteria
Aspect :				
1. Presentation	100%	100%	100%	Very valid
2. Material				

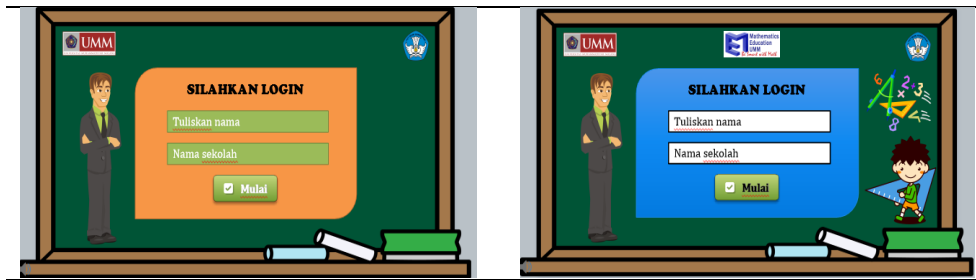
Based on the table above, the results of the media validation questionnaire assessment obtained a score percentage value of 94% and the results of the material validation questionnaire assessment obtained a score percentage value of 100% (for the results of the assessment by validators in detail can be seen in appendix 1 and 2). The following is the result of the development of Articulate Storyline learning media based on Creative Problem Solving (CPS) which has been improved based on comments and suggestions that have been given by previous media experts :

a. Initial View

At the beginning of the media display, there is a media title and a login page to go to the main menu accompanied by a music background. In this initial display, there is also the Kemendikbud logo and the UMM logo. It can be seen in the image below for the initial display of the media.



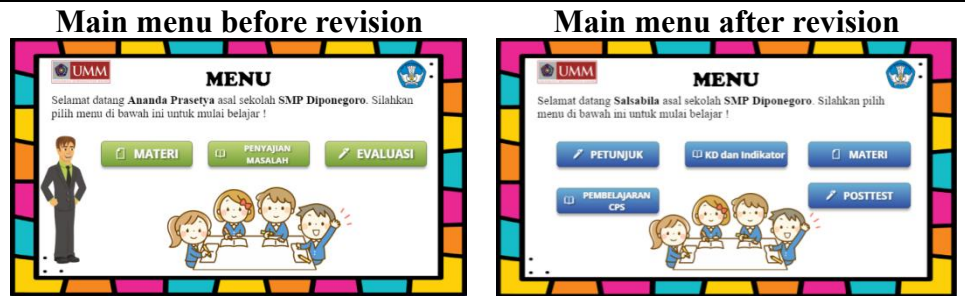
Advice from media experts to add characters to the title page, on this page researchers add schoolboy characters and images of more attractive media display planes and also add the logo of the UMM Mathematics study program



Advice from media experts to change the appearance of the color, on this page the researcher changed the color of the login page which was originally orange to blue. In addition, it also adds characters on the right and adds the logo of the UMM Mathematics study program to make the media look more attractive.

b. Main Menu Display

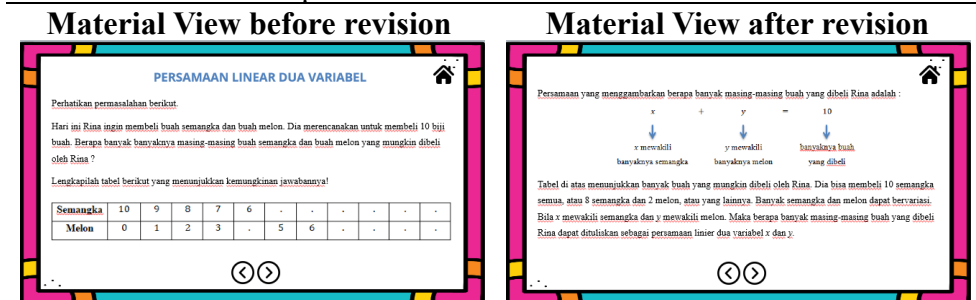
In the main menu section, there are several menu options that can be controlled by students including media instructions, KD and indicators, materials, CPS learning and posttest questions. For its appearance, it can be seen in the image below.



Media experts give suggestions to add a menu that originally only had three menus, namely material, problem presentation and evaluation is now five menus, namely media instructions, KD and indicators, materials, CPS learning and posttest. In addition, the menu color that was originally green was changed to blue.

c. Material View

In the display section of the material no changes need to be made based on the advice of media experts.



SISTEM PERSAMAAN LINEAR DUA VARIABEL (SPLDV)

Sistem persamaan linear dua variabel merupakan kumpulan dari dua atau lebih persamaan linear dua variabel dalam variabel yang sama. Perhatikan contoh berikut ini :

$$2x + y = 3 \text{ (persamaan 1)}$$

$$x - 3y = 5 \text{ (persamaan 2)}$$

Dalam sistem persamaan, nilai x dan y yang membuat kedua persamaan menjadi pernyataan yang benar disebut penyelesaian dari sistem persamaan. Kegiatan menemukan penyelesaiannya adalah menyelesaikan sistem persamaan.

1. Metode Grafik

Untuk menyelesaikan sistem persamaan linear dua variabel dengan menggunakan grafik, langkah-langkah yang harus dilakukan adalah sebagai berikut :

Langkah 1 : Gambarkan grafik kedua persamaan dalam satu bidang koordinat
Langkah 2 : Perkirakan titik potongnya kedua grafik
Langkah 3 : Periksa titik potong kedua grafik dengan mensubstitusikan nilai x dan y ke dalam setiap persamaan

2. Metode Substitusi

Perhatikan bagaimana menentukan penyelesaian dari sistem persamaan linear dua variabel berikut

$$2x + y = 3$$

$$x - 3y = 5$$

Dari persamaan $2x + y = 3$, kita dapat menentukan nilai y dengan mengganti (mensubstitusikan) bentuk persamaan y seperti berikut

Ubah persamaan $2x + y = 3$ menjadi $y = 3 - 2x$

Substitusikan $3 - 2x$ untuk y ke persamaan $x - 3y = 5$

$$x - 3y = 5$$

$$x - 3(3 - 2x) = 5$$

$$7x - 9 = 5$$

$$7x - 9 + 9 = 5 + 9$$

$$7x = 14$$

$$x = 2$$

3. Metode Eliminasi

Selesaikan sistem persamaan berikut dengan menggunakan metode eliminasi

$$2x + y = 4$$

$$2x - y = 0$$

Penyelesaian :

$2x + y = 4$	$2x + y = 4$
$2x - y = 0$	$2x + (2) = 4$
$\underline{2y = 4}$	$2x = 2$
$y = 2$	$x = 1$

4. Metode Eliminasi Substitusi

Penyelesaian dengan metode ini menggunakan gabungan antara metode substitusi dengan metode eliminasi yang dapat digunakan untuk menyelesaikan persoalan sistem persamaan linear dua variabel

d. CPS Learning Step View

In this section of the display no changes need to be made based on the advice of media experts.

Problem presentation view

Herman akan berangkat ke tempat wisata yang berada di Malang dan ia akan mengajak saudara-saudaranya dari Surabaya yang berjumlah 13 orang dewasa dan anak 8 anak-anak. Mereka berangkat dengan menggunakan 2 bus yang sudah disediakan sebelumnya. Berikut ini adalah daftar harga tiket masuk tempat wisata yang berada di Malang.

Harga Tiket		
Pasasi	Calon Konde	Paralayang
Dewasa	Rp 30.000,00	Rp 35.000,00
Anak-anak	Rp 15.000,00	Rp 10.000,00

Sedangkan Herman membawa uang Rp 800.000 yang akan digunakan untuk membayar tiket masuk ke tempat wisata tersebut. Bagaimana cara untuk dapat membagi menjadi 2 kelompok agar uang yang dimiliki Herman cukup untuk membayar tiket masuk 20 orang dengan mendapat kembalian semaksimal mungkin? Dengan syarat dalam satu kelompok harus terdapat orang dewasa untuk mendampingi anak-anak dan untuk jumlah orang dewasa tidak boleh kurang dari jumlah anak-anak

Langkah penyelesaian

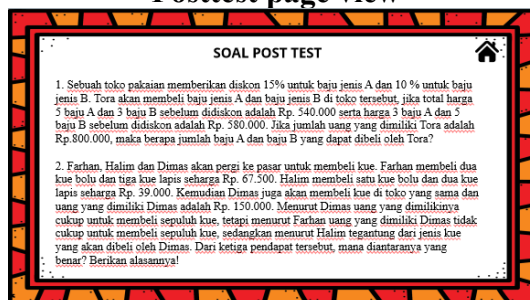
CPS learning step view

- Klarifikasi masalah
- Pengungkapan pendapat
- Evaluasi dan pemilihan
- Implementasi

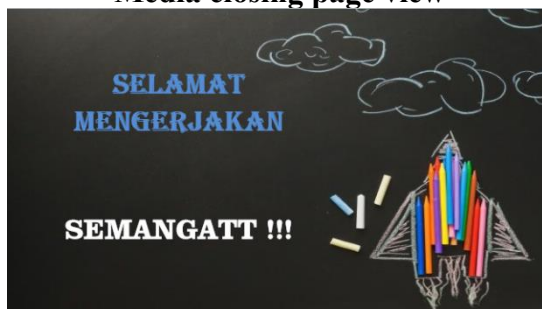
e. Posttest and Closing View

At the end there is a posttest page that will be done by students after finishing using learning media, besides that on the closing slide there are motivational sentences so that students are enthusiastic in learning.

Posttest page view



Media closing page view



4. Implementation

The implementation stage is the trial or application stage of a product, where in this research the product being tested is in the form of learning media that has been developed. The application of learning media was carried out on 23 students of Diponegoro Kandangan Junior High School class VIII. This stage of media implementation is carried out with the aim of assessing the practicality and effectiveness of learning media that have been used by students.

- For the practicality of media, it can be seen from the student response questionnaire after students have used learning media, while the effectiveness of the media can be seen from the results of student pretests and posttests before and after using Articulate Storyline learning media based on Creative Problem Solving (CPS). The following is a table of the results of the practicality test of learning media by students.

Table 5 Media Practicality Questionnaire Results

No	Statement	Persentase
1	Attractive learning media design	89.5%
2	Sentence display is easy to read and understand	85.2%
3	The sound used on the media is clearly audible	90.4%
4	The language presented on the material is easy to understand	82.6%
5	The material presented on the media is easy to understand	83.4%
6	Presentation of materials and test questions related to daily life	80.8%
7	The media used is effective and practical in learning	91.3%
8	The media used can motivate students in learning	80.8%
Average score		85.5%

The result of the media practicality test obtained an average percentage value of 85.5%, where based on the media practicality criteria in table 2, the media used was included in the very practical criteria. Then for the media effectiveness test, it can be done by giving pretest and posttest questions to students, where pretest questions are given before students use learning media and posttest questions are given to students after using learning media. The purpose of giving pretest and posttest questions is to find out the influence of Articulate Storyline media on students' creative thinking ability.

- b. The effectiveness of the media can be measured by looking at the scores obtained by students from the pretest and posttest results, later the value will be used for the Paired Sample t-Test.

The Paired Sample t-Test has the following conditions:

- 1) The data owned by the subject is interval or ratio data
- 2) Both groups of normally distributed paired data

Therefore, before conducting the Paired Sample t-Test, it is necessary to first do a normality test. The following are the results of the normality test that has been carried out.

Table 6 Normality Test

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRE TEST	.135	23	.200*	.965	23	.562
POST TEST	.165	23	.107*	.938	23	.163

Basis for decision making

- 1) If the value of Sig. (Significant) >0.05, then the data is normally distributed
- 2) If the value of Sig. (Significant) <0.05, then it is not normally distributed

Based on the normality test data obtained in the table above, it shows the value of Sig. (Significant) >0.05, so the data includes normal distribution. Then after completing the data normality test, the Paired Sample t-Test can be done. It can be seen in the table below for the results of the Paired Sample t-Test.

Table 7 Paired Sample t-Test

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	PRE TEST - POST TEST	-24.32130	9.27833	1.93466	-28.33355	-20.30906	-12.571	22	.000

Dasa Basis for decision making

- 1) If the value of Sig. (2-tailed) < 0.05 , then there is a significant difference before and after applying Creative Problem Solving (CPS)-based Articulate Storyline media
- 2) If the value of Sig. (2-tailed) > 0.05 , then there is no significant difference before and after applying Creative Problem Solving (CPS)-based Articulate Storyline media

Based on the results of the Paired Sample t-Test test above, it is known that the value of Sig. (2-tailed) is $0.000 < 0.05$, it can be concluded that there is a significant difference in the pretest and posttest results before and after applying Creative Problem Solving (CPS)-based Articulate Storyline media. From the results obtained, Articulate Storyline media based on Creative Problem Solving (CPS) in developing creative thinking skills has been tested for effectiveness.

Furthermore, the results of the pretest and posttest are used to determine the improvement of students' creative thinking ability. The improvement of students' creative thinking skills based on pretest and posttest scores can be seen in the table below.

Table 8 N-gain Test Results

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Ngain	23	.55	1.00	.7468	.13348
Valid N (listwise)	23				

Table 9 Average Gains in Creative Thinking Ability

$\bar{X}_{pretest}$	$\bar{X}_{posttest}$	$N - gain$	Category
66.70	91.03	0.7468	High

It can be seen in the table above that the average value of N-gain obtained is 0.7468, which means that based on the N-gain value criteria contained in table 3, it shows that the N-gain value > 0.7 is included in the high criterion. From the results of pretest and posttest answers that have been obtained by students, it shows an increase in students' creative thinking ability in SPLDV material after using Creative Problem Solving (CPS)-based Articulate Storyline media. The following is one of the pretest questions done by students:

Anggi was told by her mother to buy fruit juice, she would buy guava juice and avocado juice. If the price of 4 glasses of guava juice and 2 glasses of avocado juice is Rp. 28,000, the price of 2 guava juice and 5 avocado juice is Rp. 38,000. While the money brought by Anggi is Rp. 70,000, then how many glasses of guava juice and avocado juice can Anggi buy by spending all the money?

> Diketahui:

$$\begin{aligned} 4 \text{ jambu} + 2 \text{ alpukat} &= 4x + 2y = 28.000 \\ 2 \text{ jambu} + 5 \text{ alpukat} &= 2x + 5y = 38.000 \end{aligned}$$

> Ditanya:

Jumlah jus jambu dan alpukat yang dibeli Anggi dengan menghabiskan semua uangnya?

> Jawab:

$$\begin{array}{r} 2x + 5y = 38.000 \quad | \times 2 \\ 4x + 2y = 28.000 \quad | \times 1 \\ \hline 4x + 10y = 76.000 \\ 4x + 2y = 28.000 \quad - \\ \hline 8y = 48.000 \\ y = 6.000 \end{array}$$

$$\begin{aligned} 4x + 2y &= 28.000 \\ 4x + 2(6.000) &= 28.000 \\ x &= 4.000 \end{aligned}$$

Jadi jus jambu dan alpukat yang di beli adalah

Figure 1 Student Pretest Answers

The results of the answers that have been done by students on the pretest questions show that students do not meet the fluency aspect, that is, students are not fluent in finding ideas or ideas to solve problems in the questions. In addition, students are also unable to find alternative answers in the later stage. Then the posttest questions are given to students after the researcher has finished learning using Creative Problem Solving (CPS)-based Articulate Storyline media. The following is one of the posttest questions done by students:

Farhan, Halim and Dimas will go to the market to buy cakes. Farhan bought two sponge cakes and three layer cakes for Rp. 67,500. Halim bought one sponge cake and two layer cakes for Rp. 39,000. Then Dimas will also buy cakes at the same store and the money that Dimas

has is Rp. 150,000. According to Dimas, the money he has is enough to buy ten cakes, but according to Farhan, the money that Dimas has is not enough to buy ten cakes, while according to Halim, it depends on the type of cake that Dimas will buy. Of the three opinions, which one of them is correct? Give the reason!

Misalkan
 x : kue bolu
 y : kue lapis

Diket
 $2x + 3y = 67.500$
 $x + 2y = 39.000$

Ditanya
 apakah uang Dimas sebesar Rp 150.000 cukup untuk membeli 10 kue?

jawab:
 $x + 2y = 39.000$
 $x = 39.000 - 2y$
 jadi
 $2x + 3y = 67.500$
 $2(39.000 - 2y) + 3y = 67.500$
 $78.000 - 4y + 3y = 67.500$
 $78.000 - y = 67.500$
 $y = 78.000 - 67.500$
 $y = 10.500$
 $x = 39.000 - 2y$
 $x = 39.000 - 2(10.500) = 18.000$

Di dapat harga kue bolu adalah Rp. 18.000 dan kue lapis adalah Rp. 10.500, maka

- jawaban 1
 Untuk beli 10 kue bolu harganya adalah $10 \times 18.000 = 180.000$
 Uang Dimas adalah Rp. 150.000
 jadi pendapat Farhan yang Dimas tidak cukup

- jawaban 2
 Untuk beli 10 kue lapis harganya $10 \times 10.500 = 105.000$
 uang Dimas adalah Rp. 150.000
 maka pendapat Dimas benar cukup 10 kue

Figure 7 Student Posttest Answers

The picture above is the result of posttest answers from students after using Creative Problem Solving (CPS)-based Articulate Storyline media. The results of the answers above show that students are fluent and able to solve questions using several alternative answers, this is in accordance with the aspects of creative thinking ability, namely fluency and flexibility. From the posttest results, it shows that there is an increase in students' creative thinking skills after using Creative Problem Solving (CPS)-based Articulate Storyline media. From the results of the differences in pretest and posttest that have been obtained, it can support the assessment of Creative Problem Solving-based Articulate Storyline media validly, effectively and practically.

5. Evaluation

In the final stage, the evaluation stage is carried out to observe the results of the implementation of Creative Problem Solving (CPS)-based Articulate

Storyline media that has been applied to students. This is done with the aim of knowing the shortcomings that exist in the media after completing the implementation stage. The results of the evaluation stage show that based on table 2 of the media practicality test results, it can be seen that there is an indicator of media practicality that obtains the lowest percentage value of 80.8%, while for the highest percentage, a value of 91.3% is obtained.

The discussion section of this study contains the results of an assessment of the development of Creative Problem Solving (CPS)-based Articulate Storyline media to develop students' creative thinking skills in SPLDV material. The Media Articulate Storyline that has been created and developed by researchers has been tested based on three aspects, including the validity aspect of the media, the practicality aspect of the media and the aspect of media effectiveness.

In the first aspect, namely the media validity aspect, it is obtained from media validation carried out by media experts and also material validation carried out by material experts. It can be seen in table 1 of the media validity criteria that the media can be said to be valid if the percentage of the media validity score is more than 60%. Meanwhile, in this study, the media validation that had been carried out obtained a percentage score of 94%, where the score was included in the very valid criteria but with few comments and suggestions from media experts. Then the results of material validation in this study obtained a percentage score of 100%, where the score was included in the very valid criteria without revision from the material expert. From the acquisition of media validation and material validation values, it can be concluded that Articulate Storyline media based on Creative Problem Solving (CPS) get very valid results based on media validity criteria. This is in line with research conducted by Risma Agustina, Yudha Irhasyurna, & Sauqina (2022) which shows that the results of articulate storyline media validation are declared valid by media experts. In addition, other studies conducted by Safira, Sarifah, & Sekarintyas (2021) and research from Rohmah & Bukhori (2020) obtained results from media validation with very valid criteria.

In the second aspect, namely the practicality aspect of the media, it is obtained from the results of the student response questionnaire. In this study, the results of the student response questionnaire obtained an average score percentage of 85.5%, if viewed in table 2 of the media practicality criteria for obtaining a score of more than 80%, it can be concluded that it is included in the very practical criteria. Similar results were shown by research from Nadzif, Irhasyurna, & Sauqina (2022) which showed the results of the percentage of student response questionnaire scores of 83%. In addition, the results of the practicality test conducted by Pratama (2019) resulted in an average percentage of 81.53% which was included in the very practical criteria. As for other research conducted by Suhailah, Muttaqin, Suhada, Jamaluddin, & Paujiah (2021) which obtained practicality questionnaire results with a score of 83.1% which was included in the practical criteria.

In the third aspect, namely the aspect of media effectiveness, the results of students' pretest and posttest scores were obtained. In this study, the media effectiveness test used the Paired Sample t-Test. For the Paired Sample t-Test, a Sig value was obtained. (2-tailed) of $0.000 < 0.05$, which means that there is a significant

difference in students' pretest and posttest results before and after using Articulate Storyline media. As for the N-gain test in this study, the average N-gain value of 0.7468 was obtained, which means that based on the N-gain value criteria found in table 3, it shows that the N-gain value > 0.7 is included in the criteria tall. It can be concluded from the two media effectiveness tests that Creative Problem Solving (CPS)-based Articulate Storyline media is effective for developing students' creative thinking skills. Research conducted by Ridwan, Zuhdi, Kosim, & Sahidu (2021) and Nurfajriani, Hajar, & Halimah (2020) showed similar results to this study, as well as research from F. A. Sari, Pratiwi, & Fatmaryanti (2022), which is related to the development of Articulate Storyline media to improve students' creative thinking skills.

CONCLUSION

The conclusion obtained from the results of the research that has been previously presented is that the development of Creative Problem Solving (CPS)-based Articulate Storyline media used to develop students' creative thinking skills can be declared valid, practical and effective. The development of Creative Problem Solving (CPS)-based Articulate Storyline media was carried out with the ADDIE (Analysis, Design, Develop, Implement and Evaluate) development model where the results of media validity were obtained from media experts with very valid information, and based on the results of the N-gain test, it showed that the N-gain score was included in the high criteria, which means there was an increase in the creative thinking ability of the students. Then the results of media practicality are obtained from the student response questionnaire given after students use Creative Problem Solving (CPS)-based Articulate Storyline media which obtains an average score with very practical information. In addition, the results of media effectiveness are obtained from the results of pretests and posttest results of students by conducting media effectiveness tests using the Paired Sample t-Test test. The results of the Paired Sample t-Test test obtained information that there were significant differences in the pretest results and posttest results, where the differences were seen from before and after students used Articulate Storyline media. From the results obtained, Articulate Storyline media based on Creative Problem Solving (CPS) in developing creative thinking skills has been tested for effectiveness.

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