



Development of OLMP Model Teaching Modules on SPLTV Material to Improve Students' Creative Thinking Skills

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ABSTRACT: Learning in the classroom that does not utilize media optimally causes the class to be boring, inhibits independence, and limits students from seeking knowledge. Apart from that, students' creative thinking abilities in Indonesia are generally still relatively low. Therefore, come up with the idea of outdoor learning to develop students' creativity. The aim of this research is to describe the process and results of developing OLMP model teaching modules on SPLTV material to improve students' creative thinking abilities. This type of research is development using a 4D model. The data collection methods used are observation, questionnaires, tests, interviews and documentation. The subjects of this research were 4 classes of class X students at IBU Vocational School for the 2023/2024 academic year. Based on the research stages that have been carried out, it can be explained that a teaching module has been successfully developed which has gone through the stages of definition, design, development and distribution. Then it can also be said that the teaching module that has been developed is suitable for use. This is reinforced by the mean value of the three validators of 87.45%.

KEYWORDS: Creative, OLMP Model, Teaching Module, SPLTV.

INTRODUCTION

In mathematics, creative thinking is the ability to solve mathematical problems using more than one solution, where students can think fluently, flexibly, elaborate on their ideas, and produce original answers (Beaty et al., 2020). According to Roger & Johnson (2009), using textbooks as the only learning resource without the support of media makes the learning environment less engaging and boring, hindering students' skill and creativity development. The lack of learning experiences can lead to low creative thinking abilities among students (Rachmawati et al., 2020). The teaching method used by teachers is one of the reasons why students may become less creative (Marzuki et al., 2023).

Classroom learning that does not make optimal use of media and is not student-centered leads to a boring environment, does not foster curiosity, hinders independence, and limits students from seeking knowledge beyond what the teacher provides (Wandini et al., 2022). Students only receive abstract mathematical concepts without the opportunity to actively discover these concepts while solving problems, and the learning process takes place only inside the classroom (Pambudi et al., 2022). In general, students' creative thinking skills in Indonesia are still relatively low (Widiastuti et al., 2018). This statement is supported by Florida et al., (2015) in the Global Creativity Index, which ranked Indonesia 115th out of 139 countries.

Eaton (in Dillon et al., 2006) explained that outdoor learning experiences are more effective in developing students' creativity. Outdoor adventure activities can enhance students' creativity in innovating and improve their learning abilities (Zafeiroudi & Kouthouris, 2021). Creative thinking skills can be enhanced through challenging environments and innovative learning models, which are expected to change students' perceptions of learning and achieve optimal learning objectives (Adiastuty et al., 2021). Outdoor learning can increase children's creativity by giving them opportunities to imagine, gain new experiences, and turn what they observe into creative works that they can be proud of (Nurdin, 2022). Outdoor learning is also referred to as the "outdoor learning method," and applying this method can significantly increase children's creativity (Yuzila et al., 2023).

The process of fostering creative thinking implies that teachers must stimulate students' motivation and creativity during the learning process by applying various methods and strategies, such as group work, role-playing, and problem-solving (Faturahman & Afriansyah, 2020). Outdoor Learning Mathematics (OLM) is designed to take place in outdoor environments, utilizing learning resources from the surroundings and guiding students in collecting data and solving problems while discovering and applying mathematical concepts (Pambudi, 2022). The OLMP model is defined as a learning model that integrates the PjBL (Project-Based Learning) model with the OLM method, aimed at guiding students to learn collaboratively and creatively, linking

mathematical concepts and applying them to solve contextual problems related to both in-class and outdoor environments in the form of projects (Pambudi, 2023).

Several previous studies have shown that the OLMP model is effective in improving the learning activities and outcomes of prospective mathematics teachers, as indicated by the high level of participation in various activities and an N-gain score of 0.79, although this study had limitations in terms of subjects and requires further research across different disciplines and locations (Pambudi et al., 2023). A similar study found that applying the PjBL learning model had a significant effect on students' creative thinking skills, with a significance value of 0.000, which is smaller than 0.05, and an $F_{\text{calculated}}$ value of 35.551 (Fitriyah & Ramadani, Shefa, 2021). Based on the above explanations, new breakthroughs are needed to improve creative thinking skills through the OLMP model. This is aligned with the "Merdeka Curriculum" and supports the Pancasila student profile in terms of the creative dimension (Kemendikbudristek, 2021). The implementation of the Merdeka Curriculum requires teachers to be more creative in designing teaching modules, setting learning objectives, and outlining learning objectives, with the teacher playing a key role in creating teaching modules as a learning tool (Darmansyah et al., 2023).

The appropriate material for use in this study is the system of three-variable linear equations (SPLTV), which can be supported by trial results from articles explaining students' creative thinking abilities in solving mathematical problems related to SPLTV with reflective cognitive styles. It was concluded that these students met three indicators of creative thinking: fluency, flexibility, and originality. Meanwhile, students with impulsive cognitive styles only met two indicators, namely fluency and flexibility (Sari et al., 2020). Based on these conditions, the researcher is interested in conducting a study titled "Development of OLMP Model Teaching Modules on SPLTV Material to Improve Students' Creative Thinking Skills."

METHOD

The subjects of the research were students from SMK IBU in the Digital Business and Accounting majors for the 2023/2024 academic year. The study took place from June to July 2024, covering validation, revision, and classroom trials involving an experimental class and a control class. Data collection techniques included observation, questionnaires, tests, interviews, and documentation. The data analysis method involved evaluating the quality of the teaching modules (validity and reliability tests) as well as assessments by three validators, normality tests, effectiveness tests, and practicality tests.

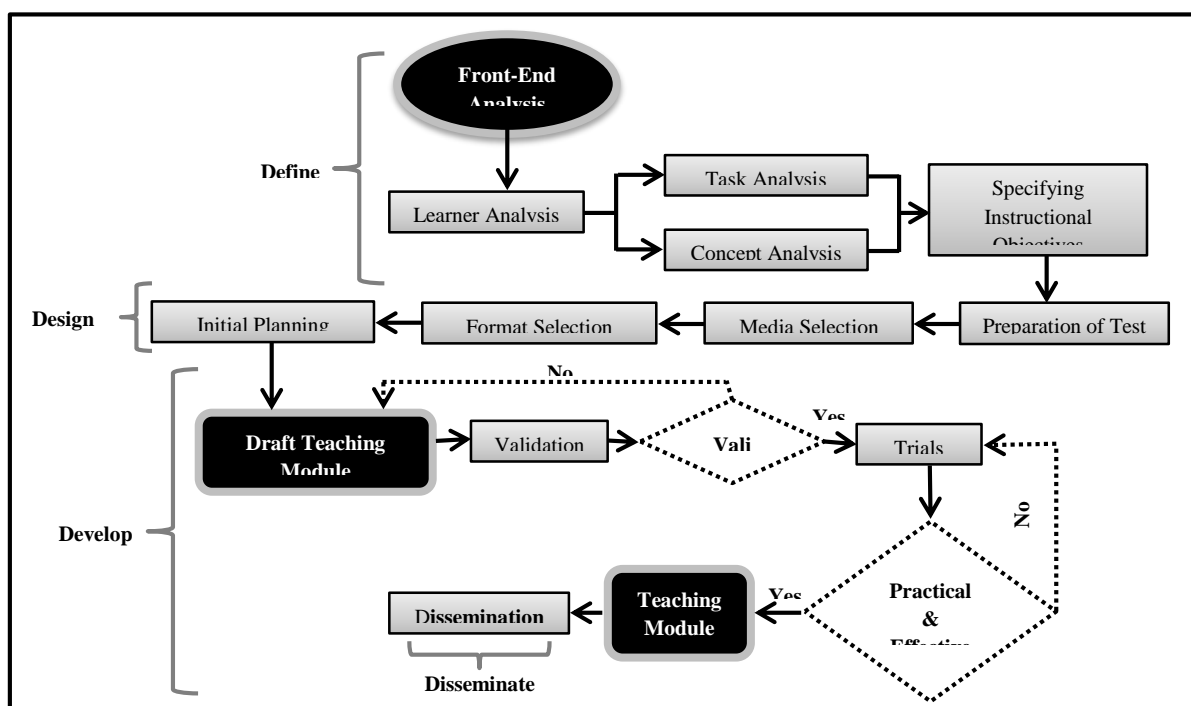


Figure 1. 4D Model Learning Device Development Scheme



The research flow can be seen in Figure 1. The researcher carried out the defining stage, the designing stage, the developing stage, and the disseminating stage (Thiagarajan et al., 1974).

RESULT

The expert assessment involved the researcher providing a draft of the teaching module to be validated by validators using research assessment tools, which included a validation sheet and a scoring rubric. The validators in this study consisted of two mathematics education lecturers and a mathematics teacher. The explanation of the validation results can be seen in Table 1 as follows:

Tabel 1. Validator assessment

	Validator 1	Validator 2	Validator 3	Mean
<i>Teaching Modules</i>	91,6%	89,5%	81,25%	87,45%
<i>LKS</i>	88,6%	88,6%	84,1%	87,1%
<i>Test</i>	88,8%	91,6%	83,3%	87,9%

Based on the assessment of the three validators, the average score for the teaching module, along with the attached student worksheets and tests, falls into the "highly suitable" category with some revisions recommended.

The researcher conducted trials on two classes of Grade X students, namely class X AK 2 and X AK 3. The students were asked to read and understand the teaching modules and complete the test questions. This was done to carry out validity and reliability tests, as well as to ensure that the questions were easily understood by the students. Additionally, a normality test was conducted to determine whether the classes used in this study were normally distributed.

Validity Test

The explanation related to the validity test results can be seen in Table 2 as follows:

Tabel 2. Validity Test

	VI	V2	V3	Total
<i>Pearson Correlation</i>	1	.790**	.718**	.884**
<i>Sig. (2-tailed)</i>		.000	.000	.000
<i>N</i>	60	60	60	60
<i>Pearson Correlation</i>	.790**	1	.902**	.963**
<i>Sig. (2-tailed)</i>	.000		.000	.000
<i>N</i>	60	60	60	60
<i>Pearson Correlation</i>	.718**	.902**	1	.945**
<i>Sig. (2-tailed)</i>	.000	.000		.000
<i>N</i>	60	60	60	60
<i>Pearson Correlation</i>	.884**	.963**	.945**	1
<i>Sig. (2-tailed)</i>	.000	.000	.000	
<i>N</i>	60	60	60	60

***. Correlation is significant at the 0.01 level (2-tailed).*

The conclusion of the validity test is drawn by comparing the sig. 2-tailed value with $\alpha = 0.05$. The hypotheses for the validity test are H_2 (the test instrument is valid) and H_3 (the test instrument is not valid). The sig. 2-tailed value for questions 1, 2, and 3 is 0.000. Since the sig. 2-tailed value is less than α , H_2 is accepted and H_3 is rejected, thus it can be concluded that the test instrument is valid.



Reliability Test

The explanation related to the reliability test results can be seen in Table 3 as follows:

Tabel 3. Reliability Test

Cronbach's Alpha	N of Items
.924	3

The conclusion of the reliability test is drawn by comparing the Cronbach's alpha value with $\alpha = 0.05$. The hypotheses for the reliability test are H_4 (the test instrument is reliable) and H_5 (the test instrument is not reliable). The Cronbach's alpha value is 0.924. Since Cronbach's alpha $> \alpha$, H_4 is accepted, and H_5 is rejected, meaning that the test instrument is reliable. The results of both the validity and reliability tests show that the test instrument is valid and reliable, therefore it can be used in the research.

Normality Test

The normality test is conducted to determine the use of parametric and non-parametric statistical formulas. The normality test uses the mathematics scores of students from four classes that will be included in this study, specifically the trial classes (X AK 2 and X AK 3), the experimental class (X BD 6), and the control class (X BD 8). The explanation related to the results of the normality test can be seen in Table 4 as follows:

Tabel 4. Normality Test

		X AK 2	X AK 3	X BD 6	X BD 8
N		30	30	34	35
Normal	Mean	62.40	56.87	63.00	59.97
Parameters	Std. Deviation	25.182	27.843	23.810	25.999
Most Extreme Differences	Absolute	.185	.209	.220	.193
	Positive	.112	.128	.089	.131
	Negative	-.185	-.209	-.220	-.193
Kolmogorov-Smirnov Z	1.015	1.146	1.282	1.142	
Asymp. Sig. (2-tailed)		.255	.145	.075	.147

- a. Test distribution is Normal.
- b. Calculated from data.

The results of the normality test are concluded by comparing the sig. 2-tailed values with $\alpha = 0.05$. The hypotheses for the normality test are H_6 (the class is normally distributed) and H_7 (the class is not normally distributed). The sig. 2-tailed values for classes X AK 2, X AK 3, X BD 6, and X BD 8 are 0.255, 0.145, 0.075, and 0.147, respectively. Since sig. 2-tailed $> \alpha$, H_6 is accepted, and H_7 is rejected, which indicates that the subjects sampled are from normally distributed classes.

Independent Sample t-Test

The researcher conducted tests in the experimental class (X BD 6) and the control class (X BD 8) to evaluate the effectiveness and practicality of the OLMP model teaching module that has been developed in this study. The type of parametric statistics used in this research is the independent sample t-test. Therefore, the effectiveness test to assess the effectiveness of the teaching module employs the independent sample t-test. The explanation regarding the results of the independent sample t-test can be seen in Table 5 as follows:

Tabel 5. Independent Sample t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Nilai	Equal variances assumed	3.017	.087	2.684	67	.009	10.890	4.057	2.792	18.988
	Equal variances not assumed			2.694	63.677	.009	10.890	4.042	2.815	18.965

The results of the independent sample t-test above allow us to draw conclusions by comparing the value of sig. 2-tailed with $\alpha = 0.05$. The hypothesis of the independent sample t-test is H_1 (effective) and H_0 (not effective). The sig. 2-tailed values for the experimental class and the control class are 0.009. Therefore, since $\text{sig} < \alpha$, we accept H_1 and reject H_0 , concluding that there is a significant difference in scores between the two classes and that the OLMP model teaching module used in the experimental class is effective.

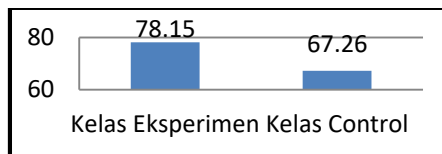


Figure 2. Mean of Both Classes

In addition, the difference in the means of the two classes can be seen in Figure 2, which shows a significant difference. The mean score for the experimental class (X BD 6) is 78.15, while the mean score for the control class (X BD 8) is 67.26. The experimental class employed the developed teaching module and utilized the OLMP learning model, whereas the control class relied on teacher-provided learning resources without a teaching module and used a conventional learning model.

DISCUSSION

Before the learning process began, a pretest was conducted, followed by a posttest after the lesson was completed. On May 31, 2024, students were asked to take the pretest, which included two open-ended questions related to the material of linear equations in two variables (SPLTV). The results of the pretest were utilized to assess the students' initial abilities. The following day, students engaged in lessons using the SPLTV teaching module with the OLMP model, participating in activities both inside and outside the classroom. The students were divided into two sessions, each consisting of three groups that took turns visiting the school cooperative or bazaar.



Figure 3. Learning in the cooperative and at the bazaar

On June 5, 2024, students completed a project at the school cooperative, where they were again divided into two sessions to facilitate the researcher's observation. Each group was given Rp20,000 to purchase stationery within a time limit of five minutes. In the first session, three groups shopped and each obtained a different equation. The second session followed with groups acquiring different equations as well. On June 7, 2024, students conducted a project at the bazaar, maintaining the same session structure for ease of observation. After gathering data from the bazaar, the groups returned to the classroom to finalize their answers.



Figure 4. Purchased Products, Discussion & Presentation

The project work emphasized the OLMP model, where students applied SPLTV concepts during shopping activities. Groups identified their purchases as variables and formed equations based on their shopping experiences. After returning to the classroom, each group focused on completing their assignments by using various solving methods, such as substitution and elimination. Once they determined the unit prices, they presented their findings, showcasing different approaches to problem-solving. On June 12, 2024, after completing the lessons with the SPLTV teaching module, students were asked to take the posttest, which also contained two open-ended questions. This assessment was designed to evaluate students' creative thinking skills by comparing pretest and posttest results. The N-Gain results indicated an overall improvement of 0.39, classified as moderate. It also illustrated the differences in responses between students categorized as highly creative and non-creative.

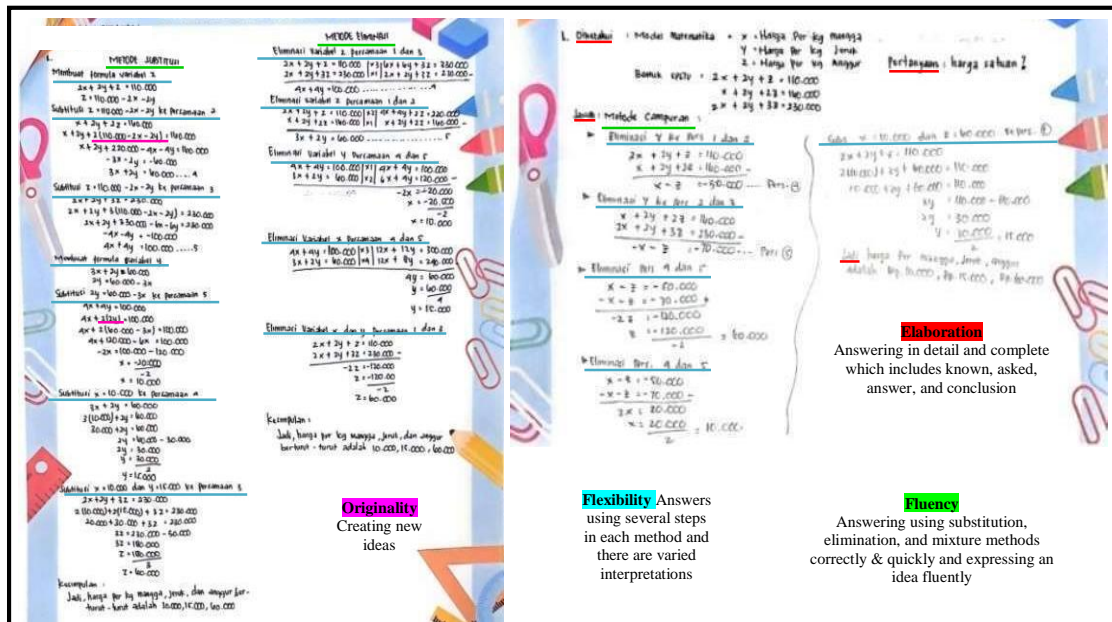


Figure 5. Students Categorized as Highly Creative

The student named IDL is categorized as highly creative because he was able to complete two essay questions using three methods: substitution, elimination, and a combination of both within 90 minutes. Figure 5, one of IDL's answers to question one meets the indicators of creative thinking abilities: 1) Fluency aspect: he answered using substitution, elimination, and a combination

of methods correctly and quickly, expressing his ideas fluently; 2) Flexibility aspect: he answered using multiple steps in each method, providing various interpretations; 3) Originality aspect: he created a new idea by determining the formula for variable y from equation 4, yielding the result $2y = 60.000 - 3x$, then substituting it into equation 5 by replacing the value $4y = 2(2y) = 2(60.000 - 3x)$; 4) Elaboration aspect: he answered in detail and completely, including what is known, what is asked, the answer, and the conclusion.

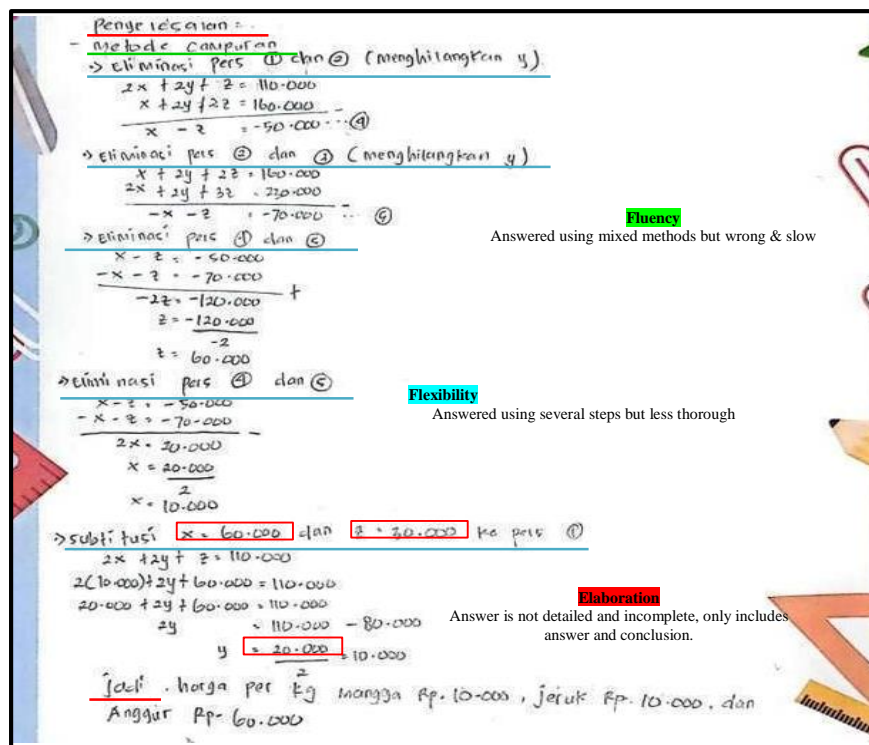


Figure 6. Students Categorized as Non-Creative

On the other hand, the student named FDN is categorized as uncreative because he was only able to complete two essay questions using one mixed method, but his solutions were incorrect and lacked precision within 90 minutes. Figure 6, one of FDN's answers to question one does not meet the indicators of creative thinking abilities: 1) Fluency aspect: he answered using a mixed method, but it was incorrect and slow, expressing his ideas ineffectively; 2) Flexibility aspect: he attempted to use several steps in his solutions but lacked attention to detail; 3) Originality aspect: he did not create new ideas; 4) Elaboration aspect: he provided answers that were not detailed or complete, covering only the answer and conclusion.

The OLMP learning model provided several advantages over conventional teaching methods, including contextualized learning experiences and opportunities for active, collaborative engagement. Students reported increased motivation and enthusiasm due to the practical applications of SPLTV in managing stocks and financial transactions at the cooperative and bazaar. Furthermore, the model fostered social skills development, enhancing communication and interaction with others in real-world settings. Observation results indicated a mean creative thinking ability of 79.46%, placing the students within the creative criteria range.

CONCLUSION

Based on the research findings and discussions above, it can be concluded that the quality of the OLMP model teaching module on the material of linear equations in two variables (SPLTV) developed to enhance students' creative thinking abilities is as follows: 1) The developed teaching module is categorized as "valid," determined by the assessment results from three validators and the validity test; 2) The developed teaching module is categorized as "practical," determined based on the analysis of student



response questionnaires and observation sheets regarding the implementation of the teaching module; 3) The developed teaching module is categorized as "effective," determined by comparing the scores and means of the experimental and control classes.

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