
Development of Contextual-Based Worksheets to Improve Student Learning Outcomes in Three-Variable Linear Equation System

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Abstract

The purpose of this study is to develop a valid, practical, and effective contextual-based LKPD for grade X students at Tasik Raja Private High School in the 2025/2026 school year. This study used *the Research and Development (R&D)* method with the ADDIE model, involving 30 students from class X-2. Data was collected through validation sheets of teacher and student response questionnaires, as well as tests (*pre-test* and *post-test*). The data collected was analyzed to assess the validity, practicality, and effectiveness of the LKPD. The results showed that the LKPD was very valid, with an average score of 90.34%. In addition, this LKPD is very practical, as evidenced by the response questionnaire of teachers (95%) and students (90.83%). The increase in effectiveness can also be seen from the results of *the post-test*, where this LKPD succeeded in improving student learning outcomes with a score of 0.7627. Thus, it can be concluded that this LKPD is valid, practical, and effective in improving the learning outcomes of high school class X students.

Keywords: LKPD; Contextual; Improving Student Learning Outcomes.

1. Introduction

Education is the key to building a strong country, education has an important role in meeting basic human needs and shaping their character (Azzahra et al., 2020). Education aims to equip individuals with the knowledge and abilities necessary to achieve success and become human beings with integrity (Maulidan & Tarunasena, 2024). Since education cannot be separated from learning activities, improving the quality of education can be achieved by considering the quality of the learning process (Syaiviana et al., 2024). Mathematics as one of the fields of study that determines student graduation and is the main concern for education observers (Mardika & Hasanah, 2020). In the context of science, mathematics is abstract knowledge that has a logical, critical, systematic, and consistent mindset (Setyawan, 2020). With the times, mathematics also continues to innovate by integrating new theories and technologies that expand its relevance in various contexts (Hakim et al., 2020). Many students consider math to be a difficult and boring

subject (Lumbantoruan, 2022). Due to its boring and difficult to understand nature, students experience difficulties in a learning process that is taught, especially teaching that is not connected to their daily lives (Sugiarti et al., 2024). Therefore (Andhany & Maysarah, 2023), for pupils to grasp mathematical concepts easily, learning that connects them to real-world scenarios is necessary.

The material on three-variable linear equation systems is very important to understand it discusses various types of problems and problems in other fields of learning (Hasanah, 2022). As is the case in research Pyarsha et al. (2021) stated that the benefits and objectives of SPLTV are very important because they can support the audience, especially students, in solving contextual and other problems. However, there are still students who say that the material of SPLTV is very difficult to learn. In line with research Ramadhani & Firmansyah, (2021) which states that there are several difficulties experienced by students in learning SPLTV, including: difficulties in understanding concepts and definitions, applying a responsive attitude and focus in solving contextual problems, drafting concepts, and difficulties in drawing conclusions. In addition to the difficulties in learning the Three-Variable Linear Equation System, several times students also make mistakes in solving problems in SPLTV. Pramudya et al. (2020) revealed that the mistakes experienced by students in working on SPLTV problems include: lack of knowledge of concepts, inconsistency in working on problems, and lack of ability to generalize problems. As a result, errors that students frequently make when answering questions can have an impact on their learning results during the process.

From the results of the initial observation carried out at the Tasik Raja Private High School, it was obtained that the students' daily test scores were still classified as not optimal (low). In the observation, it was found that some student scores were not complete in the process of completing the answers. This is shown in the table that follows:

Table 1.

Percentage of Daily Test Scores of Class X Students of Tasik Raja Private High School

Information	
Number of students completed (Percentage)	Number of students who did not complete (percentage)
12 students (40%)	18 students (60%)

From the data or table above, it is clear that some students cannot achieve the KKM score to be declared complete. Then an interview was conducted with the mathematics teacher there, where he revealed that the learning activities used by teachers were still with conventional teaching techniques and slightly inserted in discussion methods, as well as the Student Worksheets (LKPD) used were fixated on the material text and questions that did not discuss the activities of students' problems with daily life, which can make it difficult for students to understand the material. In line with research Rahman et al. (2020) which states that teachers do not associate learning materials with real life, so that students' experiences have not been conceptualized in real life and these

problems student learning results at the time of PAS there were only seven students (29%) out of 32 students whose scores were above KKM.

As is the case in research Sugiyanto et al. (2018) stated that student learning outcomes are low with evidence that at the time of daily tests the average score of students is 60 or lower than the KKM, the learning media provided by teachers also still use printed media such as package books and LKPD made by publishers. The LKPD made by the publisher is material that is only in the form of summaries and practice questions that do not emphasize the context or daily life (Selian et al., 2023). According to Andzin et al. (2024) The use of Student Worksheets (LKPD) can increase the effectiveness and efficiency of the learning process because it is systematically compiled based on the core competencies that must be achieved by students. LKPD is a teaching material in the form of text (*Print*) (Sabrina et al., 2021). LKPD is a sheet that contains activities that can foster curiosity in students and this LKPD serves as a guide in completing an assignment based on the steps of the work in learning activities (Delima et al., 2025). In order to help students have good learning outcomes, LKPD is prepared on a contextual basis. In addition, learning in the independent curriculum must also be contextual. Contextual proximity can make students become directed to carry out the critical thinking process (Mubarrid & Sutarto, 2024).

There are many benefits to the contextual-based learning process. Through contextual-based learning, it can make students' experiences more meaningful and build knowledge that they will apply in their daily lives. Students will be more active in the learning process, with the hope that they will be able to construct their own knowledge by using a critical mindset to solve each problem. The LKPD developed by the researcher is contextual-based LKPD so that the LKPD can invite students to apply the material learned at school in their daily lives to improve their learning outcomes. However, there is still a rare research on contextual-based LKPD development for this SPLTV material. Some of the studies that raise the topic of SPLTV are Fitria et al. (2018) development of CTL-based LKS of SPLTV material; Sepriani et al. (2024) development of Google-based LKPD From Class X High School on SPLTV Materials; Usman et al. (2025) development of E-LKPD based on a scientific approach to SPLTV materials; Santi et al. (2021) development of POE-based E-LKPD in SPLTV material for class X SMK; (Maulani & Khusaini, 2025) development of LKPD Based on Contextual Learning in Science Subjects to Improve Higher-Order Thinking Skills of Fourth Grade Students of SDN Inpres Buncu. From some of the studies above, it is proven that there is still a rare research on the development of contextual-based LKPD for SPLTV material. Based on this background presentation, this study aims to develop contextual-based student worksheets to improve student learning outcomes in three-variable linear equation systems. Contextual-based LKPD that is valid, practical, and effective and relevant to the Three Variable Linear Equation System material is expected to provide a learning experience and a positive impact on students, as well as can improve their learning outcomes.

2. Methods

The research location is at Tasik Raja Private High School, Bukit Tujuh Village, Torgamba, South Labuhan Batu. This research activity was carried out in semester 1 of the 2025/2026 Academic Year. The sample used is class X-2 with a total of 30 students as a class to validate and

develop the product. This research uses a development research method or *Research and Development* with ADDIE's development model, consisting of the Analysis stage, Design, Development, Implementation, and Evaluation. *Research and Development* is a research method that has the function of validating and developing products and testing the effectiveness of products. (Scott, 2013). In this study, the researcher only conducted an evaluation (*Evaluation*). The evaluation stage was carried out in class X-2 of Tasik Raja Private High School with a mathematics teacher. Data collection and analysis in the study are divided according to the objectives of this study and include 3 aspects, namely:

1. Validation

Validation in this study was carried out by four experts in their respective fields material experts, language experts, media experts, and practitioners. The assessment scale at the validation stage used a four-point Likert scale, namely:

Table 2.
Four-point Likert Scale

Valuation	Scale
Excellent	4
good	3
Enough	2
Less	1

The results of validation by experts will be interpreted with the following calculation formula:

$$percentage = \frac{\sum \text{score per item}}{\text{maximum score}} \times 100$$

2. Questionnaire Method

The practicality in this study will be reviewed from the questionnaire responses of educators and students who have been filled out when they have gone through stages starting from *pretest*, carrying out learning with reference to the LKPD that has been developed, to carrying out *the posttest*.

Table 3.
Likert Scale Criteria (Ratna et al, 2019)

Percentage (%)	Scale
76-100	Very Practical
51-75	Practical

25-50	Quite Practical
0-24	Impractical

The assessment scale in the practicality stage is to use a four-point Likert scale, namely:

Table 4.

Four-point Likert Scale

Valuation	Scale
Excellent	4
good	3
Enough	2
Less	1

The results of validation by experts will be interpreted using the following calculation formula. If the data is declared valid, it will be categorized as good or very good. If the data is declared invalid, it will be categorized as poor or adequate.

$$percentage = \frac{\sum \text{score per item}}{\text{maximum score}} \times 100$$

3. Test Method

The effectiveness of this study was reviewed from the students' scores obtained through *the pretest* and *the posttest*. Pretest and posttest evaluations are conducted using the assessment rubric with a score scale ranging from 1-100. The effectiveness calculation will also involve *an N-Gain* test to review how learning outcomes improve between before and after learning. *N-Gain* is formulated with:

$$N - Gain = \frac{\text{score posttest} - \text{score pretest}}{\text{maximum score} - \text{score pretest}}$$

Table 5.

Normalized Gain Criteria (Supriadi, 2021)

N-Gain Value	Criterion
$0,70 \leq g \leq 1,00$	High
$0,30 \leq g < 0,70$	Medium
$0,00 \leq g < 0,30$	Low

The LKPD developed is said to be effective in *the N-Gain test* if at least the level of effectiveness reaches the "high" category or the "medium" category.

3. Result and Discussion

Stages of Analysis

This stage aims to collect data on the math learning process and identify solutions for the LKPD, designed to improve learners' knowledge and understanding. Some of the activities carried out in this analysis stage are: needs analysis, curriculum analysis, and student analysis.

Needs Analysis

This needs analysis aims to evaluate the effectiveness of the current teaching materials for SPLTV materials. Based on interviews conducted by researchers with mathematics teachers, the application of the independent curriculum is still limited because it only uses packaged books. This also causes students to lack independence in learning, and their learning results are classified as not optimal because they struggle to understand the material and perceive mathematics as a monotonous subject. Therefore, researchers propose developing context-based LKPD to improve the quality of the learning process and expand students' knowledge.

Curriculum Analysis

Teachers were questioned on how the mathematics curriculum was being implemented in the schools prior to a review of the curriculum. All classes had their own curriculum, according to the interview results. The Core Competencies and Basic Competencies listed in this independent curriculum must be fulfilled by students. The basic competencies and achievement indicators for SPLTV material were as follows:

Table 6.

Curriculum Analysis (Anggraini, 2020)

Basic Competencies	Achievement Indicators
3.3. Constructing a System of Three-Variable Linear Equations from Contextual Problems.	3.3.1 Conceptualize and define the general form of the System of Three-Variable Linear Equations.
4.3. Solve contextual problems related to the System of Three-Variable Linear Equations.	4.3.1 Solve the problem of the Three-Variable Linear Equation System with the substitution method.
	4.3.2 Solve the problem of the Three-Variable Linear Equation System with the elimination method.
	4.3.3 Solve the problem of the Three-Variable Linear Equation System with the combined method.

Student Analysis

In this activity, school mathematics teachers were interviewed about students' prior knowledge, lesson material, learning difficulties, and written tests to measure student learning outcomes, which would be used in the worksheets. The interview results showed that student

learning outcomes were still not optimal. In addition, teachers stated that students had difficulty understanding the questions. As a result, they were unable to note down what they knew and what was being asked in the questions. Students remained focused on the teacher's explanations and were unable to perform calculations, identify concepts and arguments, or draw conclusions.

Design Stage

The design stage is the planning stage for the product to be made. The planning stage is directed at planning learning outcomes and engaging students with the variety provided to further improve their learning outcomes later. At the time of the media *selection*, the researcher provides learning materials, tools, and resources that are supportive and appropriate. The media selection procedure is modified based on the learning material and the characteristics of the students. The subject matter in LKPD is a contextual-based SPLTV material to improve student learning outcomes. This LKPD activity begins by drafting a concept and determining the general form of SPLTV, then solving a problem of SPLTV by using substitution, elimination, and mixing methods that are still associated with contextual problems (Novita, 2022).

Format Selection

In the process of preparing the LKPD, the format of the learning presentation is chosen with consideration of the LKPD media to be used. The format in the development of this LKPD is arranged into several components, namely, the LKPD consists of an introduction that contains the cover and learning objectives, but the researcher does not include KD and KI but the researcher does not include. Learning activities, such as questions or exercises, are part of the content. The LKPD was used only for six meetings with sub-topics to conceptualize and determine the general form of SPLTV, and then solve a problem of SPLTV by using substitution, elimination, and mixing methods that are still associated with contextual problems (Novita, 2022).

Advance Planning

After obtaining data on the curriculum, the material of SPLTV and the format for the preparation of the LKPD were obtained. Then the next step is to integrate it into the initial design of the LKPD. The first step that must be done in this development research is to open the Canva application and create an account, then the creation of LKPD will be carried out as follows.

Figure 1.

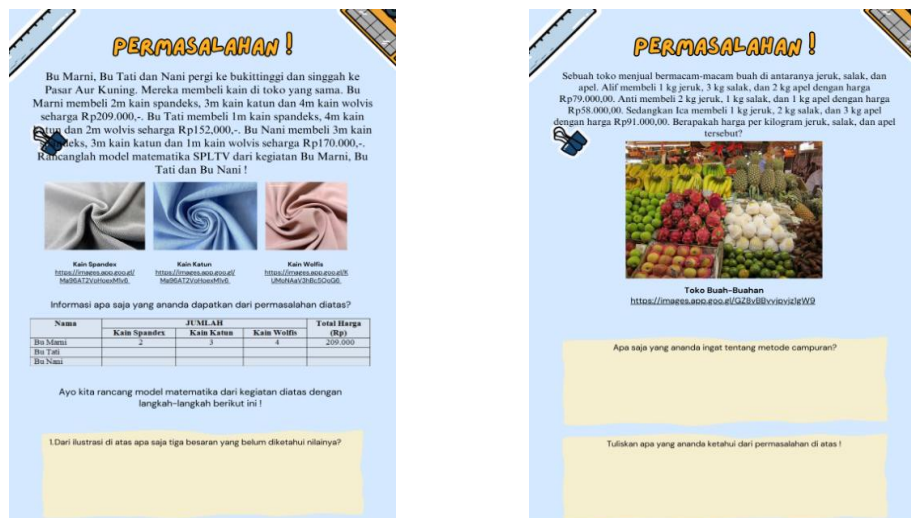
LKPD Cover



The front cover of this LKDP contains several elements, including the title of the LKDP, group identity, and learning objectives. In addition, the design of this LKPD cover is made with an elegant combination of colors.

Figure 2.

Activities in Contextual-based LKPD



In Figure 2, the content consists of problems about the problem and the steps to solve the problem.

At this point, in addition to designing the LKPD, the design of the pretest and posttest was also prepared, as well as the tools needed to develop the worksheets. These tools included validation sheets for subject matter experts, media experts, language experts, and practitioners, as well as questionnaires designed to track teacher and student responses. The material expert was carried out by 1 lecturer of FITK mathematics UINSU, the media expert was carried out by 1 lecturer of FITK mathematics UINSU, the linguist was carried out by 1 lecturer of FITK tadrис Indonesian language UINSU, and the expert practitioner was carried out by 1 mathematics teacher of Tasik Raja Private High School. At this stage, the researcher also determines validators; 4 validators can be seen in the following table:

Table 7.
List of Validators

Validator Name	Field
V ₁	Material Expert, Lecturer of the Mathematics Education Study Program
V ₂	Media Expert, Lecturer of the Mathematics Education Study Program
V ₃	Linguist, Lecturer of the Indonesian Language Study Program
V ₄	Practitioner Expert, Teacher of Tasik Raja Private High School

Development Stage

At this stage, the researcher validates the contextual-based Student Worksheet (LKPD) to improve student learning outcomes on the SPLTV material, which has been created by the researcher. Validation tests are carried out to assess whether the LKPD needs revision or not to improve the LKPD. Suggestions from validators are used as input to revise the LKPD. After the revision is completed and declared feasible, the next stage is the product trial.

Validation is carried out by material experts, media experts, linguists, and practitioners. The material expert was carried out by 1 lecturer of FITK mathematics UINSU. The media expert was carried out by 1 lecturer of FITK mathematics UINSU. The linguist was carried out by 1 lecturer of the FITK Indonesian language at UINSU. And the practitioner expert was carried out by 1 mathematics teacher at Tasik Raja Private High School. These experts each provided assessments, comments, and suggestions. The following are the results of the calculation of LKPD validation by 4 validators, so the average LKPD validation is obtained as follows:

Table 8.
Results of the Combined Validation Analysis of LKPD

Number	Validator	Average	Validation Level
1	Material Expert	85%	Highly Valid
2	Media members	86,36%	Highly Valid
3	Linguist	97,5%	Highly Valid
4	Expert practitioner	92,5%	Highly Valid
Average LKPD Validation (%)		90,34%	Highly Valid

Source: Researcher's Processed Data

Based on the results of the student worksheet (LKPD) validation analysis shown in Table 8, namely the validation level derived from four validators (V_1 - V_4), the student worksheet (LKPD) is categorized as highly valid with an average validity score of 90.34%.

Design Revision

Following the validation phase, the researcher made changes to the LKPD based on the validator's recommendations. The following is a revision of the LKPD from material experts, media experts, linguists, and practitioners. However, only 1 expert gave the revision, namely a media expert.

Table 9.
LKPD Comments/Suggestions by media expert validators

Validator	Suggestion	
	Before Revision	After Revision

Media Experts

PERMASALAHAN !

Bu Marni, Bu Tati dan Nani pergi ke bukittinggi dan singah ke Pasar Aur Kuning. Mereka membeli kain di toko yang sama. Bu Marni membeli 2m kain spandeks, 3m kain katun dan 4m kain wolvis seharga Rp209.000,-. Bu Tati membeli 1m kain spandeks, 4m kain katun dan 2m wolvis seharga Rp152.000,-. Bu Nani membeli 3m kain spandeks, 3m kain katun dan 1m kain wolvis seharga Rp170.000,-. Rancanglah model matematika SPLTV dari kegiatan Bu Marni, Bu Tati dan Bu Nani !



Informasi apa saja yang ananda dapatkan dari permasalahan diatas?

Nama	JUMLAH			Total Harga (Rp)
	Kain Spandeks	Kain Katun	Kain Wolvis	
Bu Marni	2	3	4	209.000
Bu Tati				
Bu Nani				

Ayo kita rancang model matematika dari kegiatan diatas dengan langkah-langkah berikut ini !

1. Dari ilustrasi di atas apa saja tiga besaran yang belum diketahui nilainya?

PERMASALAHAN !

Bu Marni, Bu Tati dan Nani pergi ke bukittinggi dan singah ke Pasar Aur Kuning. Mereka membeli kain di toko yang sama. Bu Marni membeli 2m kain spandeks, 3m kain katun dan 4m kain wolvis seharga Rp209.000,-. Bu Tati membeli 1m kain spandeks, 4m kain katun dan 2m wolvis seharga Rp152.000,-. Bu Nani membeli 3m kain spandeks, 3m kain katun dan 1m kain wolvis seharga Rp170.000,-. Rancanglah model matematika SPLTV dari kegiatan Bu Marni, Bu Tati dan Bu Nani !



Informasi apa saja yang ananda dapatkan dari permasalahan diatas?

Nama	JUMLAH			Total Harga (Rp)
	Kain Spandek	Kain Katun	Kain Wolvis	
Bu Marni	2	3	4	209.000
Bu Tati				
Bu Nani				

Ayo kita rancang model matematika dari kegiatan diatas dengan langkah-langkah berikut ini !

1. Dari ilustrasi di atas apa saja tiga besaran yang belum diketahui nilainya?

PERMASALAHAN !

Pandu, Rina dan Nina mampir ke sebuah toko alat tulis setelah pulang sekolah. Mereka membeli beberapa barang untuk keperluan belajar dirumah. Pandu membeli 2 buku latihan, 1 pensil mekanik, dan 1 penghapus busa dengan total harga Rp9.000,-. Rina membeli 1 buku latihan, 2 pensil mekanik, dan 1 penghapus busa dengan total harga Rp8.000,-. Nina membeli 1 buku latihan, 3 pensil mekanik, dan 2 penghapus busa dengan total harga Rp12.000,-. Bu mereka mencari tahu berapa harga masing-masing untuk sebuah buku latihan, pensil mekanik, dan penghapus busa di toko tersebut?



Bagaimana cara menyelesaikan masalah di atas?
Masih ingatkah kamu metode substitusi pada pelajaran SPLDV saat dibangku SMP?


Apa saja yang ananda ingat tentang metode substitusi?

Perhatikan! Sudahkah kalian mendapatkan hasil model matematika seperti yang dibawah ini? Kalau belum coba cek kembali!

$$\begin{aligned}
 2x + y + z &= 9.000 && \text{pers (1)} \\
 x + 2y + z &= 8.000 && \text{pers (2)} \\
 x + 2y + 3z &= 12.000 && \text{pers (3)}
 \end{aligned}$$

PERMASALAHAN !

Pandu, Rina dan Nina mampir ke sebuah toko perlengkapan sekolah setelah pulang sekolah. Mereka membeli beberapa barang untuk keperluan belajar dirumah. Pandu membeli 2 buku latihan, 1 pensil mekanik, dan 1 penghapus busa dengan total harga Rp9.000,-. Rina membeli 1 buku latihan, 2 pensil mekanik, dan 1 penghapus busa dengan total harga Rp8.000,-. Nina membeli 1 buku latihan, 3 pensil mekanik, dan 2 penghapus busa dengan total harga Rp12.000,-. Bu mereka mencari tahu berapa harga masing-masing untuk sebuah buku latihan, pensil mekanik, dan penghapus busa di toko tersebut?



Bagaimana cara menyelesaikan masalah di atas?
Masih ingatkah kamu metode substitusi pada pelajaran SPLDV saat dibangku SMP?

Apa saja yang ananda ingat tentang metode substitusi?

Perhatikan! Sudahkah kalian mendapatkan hasil model matematika seperti yang dibawah ini? Kalau belum coba cek kembali!

$$\begin{aligned}
 2x + y + z &= 9.000 && \text{pers (1)} \\
 x + 2y + z &= 8.000 && \text{pers (2)} \\
 x + 2y + 3z &= 12.000 && \text{pers (3)}
 \end{aligned}$$

Comments/Suggestions:

- Since the learning model is a contextual model, the images can also be adjusted contextually.
- The writing of the types of check cloth is re-checked so that it is in accordance with the EYD, and the numbers on the questions must also be in accordance with the context.

Implementation Stage

After the contextual-based LKPD is validated by experts, the LKPD developed will be used in the learning process to see the extent of its impact on student learning outcomes. Students and teachers complete a response questionnaire that has been previously validated by the validator following the implementation of teaching and learning activities using LKPD. Following the trial,

which involved 30 students in class X-2, all of the learning activities that the students engaged in were focused on LKPD. The specifics of the class X-2 implementation tasks are as follows.

1. First Meeting Activities

They will meet for the first time on Wednesday, July 23, 2025. Students were given pretest questions during the first meeting. Prior to learning utilizing the Student Worksheet, the content is determined by the pretest questions. The *pretest questions* consists of five questions/questions.

2. Second Meeting Activities

Thursday, July 24, 2025, was the date of the second meeting. After introducing the student worksheet, the students are divided into groups and given instructions on how to use it. They then study the first and second materials, which include drafting concepts, figuring out general forms, and using the substitution techniques in the student worksheet to solve problems. Figure 3 shows the activities that took place during the second meeting.

Figure 3.

Second Meeting Activities



3. Third Meeting Activities

The third meeting will be held on Monday, July 28, 2025. Continuing learning the third and fourth methods, namely solving problems using elimination methods and mixed methods, is contained in the Student Worksheet. The following activities of the third meeting can be seen in Figure 4.

Figure 4.

Third Meeting Activities



4. Fourth Meeting Activities

The fourth meeting was scheduled for Wednesday, July 28, 2025. To determine student learning outcomes after using the student worksheets, the researcher gave students a final test at this stage. The final test consisted of five questions. Figure 5 shows the events that took place at the fourth meeting.

Figure 5.

Fourth Meeting Activities



5. Fifth Meeting Activity

The fifth meeting was scheduled for Saturday, August 2, 2025. At this final meeting, the researchers distributed response questionnaires to educators and student Worksheets. The questionnaire consisted of 10 statements that had been validated by experts.

Based on the results of the questionnaire that has been filled out by educators and students, the Student Worksheet (LKPD) was declared "very practical" with a percentage of 92.5% and 90.83%. The following are the details of the assessment items from the practicality questionnaire by mathematics teachers presented in Table 10.

Table 10.

Results of Educator Response Questionnaire

Number of Teachers	Scores Obtained	Maximum Score	Percentage (%)	Criterion
1 teacher	37	40	92,5%	Very practical

From the table above, here's how to calculate the educator response questionnaire:

$$\begin{aligned}
 \text{Presentase} &= \frac{\sum \text{score per item}}{\text{maximum score}} \times 100\% \\
 &= \frac{37}{40} \times 100\% \\
 &= 0,925 \times 100\% \\
 &= 92,5\%
 \end{aligned}$$

Table 11.

Results of the Student Response Questionnaire

Number of Students	Scores Obtained	Maximum Score	Percentage (%)	Criterion
30 students	1.090	40	90,83%	Very practical

From the table above, here is how to calculate the student response questionnaire:

$$\begin{aligned}
 \text{Presentase} &= \frac{\sum \text{score per item}}{\text{maximum score}} \times 100\% \\
 &= \frac{1.090}{1.200} \times 100\% \\
 &= 0,9083 \times 100\% \\
 &= 90,83\%
 \end{aligned}$$

Evaluation Stage

The evaluation stage aims to assess the extent of the achievement of contextual-based LKPD in improving learning outcomes in SPLTV materials. At this evaluation stage, an effectiveness test was carried out, which was measured through student learning outcomes using *pretest* and *posttest* assessments. The data from *the pretest* and *posttest* results can be seen in Table 12 below.

Table 12.

Student Learning Outcome score recapitulation

Learning outcome tests	Test score			Standard Gain	Percentage Gain	Category
	Min	Max	Average			
<i>Pretest</i>	30	75	44,5	0,7627	76,27%	Effective
<i>Posttest</i>	75	95	86,8			

From the table above, the following is how to calculate the recapitulation of Student Learning Outcome scores:

$$N - \text{Gain} = \frac{\text{score posttest} - \text{score pretest}}{\text{maximum score} - \text{score pretest}}$$

$$\begin{aligned} &= \frac{86,8-44,5}{100-44,5} \\ &= \frac{42,3}{55,5} \\ &= 0,7627 \end{aligned}$$

Based on the recapitulation of student learning outcome scores above, it can be stated that the learning outcome score after using LKPD on SPLTV material obtained an average *pretest* score of 44.5 and a *posttest* score of 86.8, so that an *overall N-Gain* score of 0.7627 was obtained with a high and effective category.

Discussion

Using the ADDIE model, a development research study was carried out. Analysis, Design, Development, Implementation, and Evaluation are the phases that make up the ADDIE development model. Within this study, validation was conducted by practitioners and subject matter, media, and language specialists. To assess the efficacy of the LKPD product, tests of student learning outcomes were also conducted.

Based on table 12, student learning outcomes improved after the implementation of the developed LKPD. The effectiveness of LKPD in improving learning outcomes was proven through test result from experts. These context-based worksheets were designed by researchers to help students better understand the material on three-variable linear equation systems. LKPD was developed in the category of valid, practical, and effective. LKPD products meet valid criteria as shown by the percentage of assessments by experts that reach 100%. LKPD products that meet the practicality criteria based on assessments by teachers and students are included in the very practical category. LKPD products meet the effectiveness based on student learning outcomes in attitude, knowledge, and skill competencies (Santi & Santosa, 2016).

The assessment results from subject matter experts obtained an average of 85% with a very high level of validity. The assessment by media experts showed an average of 86.36%, which was also in the very high category. Meanwhile, the results from language experts reached an average of 97.5% with a very high level of validity, and the assessment from practitioners obtained an average of 92.5% with the same category. The results of this investigation are consistent with those of earlier research (Rani & Asdarina, 2024) The study's findings demonstrate that subject matter experts, media experts, and language experts conducted the validation procedure. While the assessment by media experts achieved an average of 90% with the same validity category, the assessment by subject matter experts received an average of 91% with a very high level of validity. All things considered, the experts' findings indicate that the created product has a very high degree of validity. Furthermore, the researcher tested the LKPD product.

In the individual test, it can be seen in Table 10 that educators' responses to contextual-based LKPD to improve student learning outcomes are 92.5%, so it is included in the category of very practical to use. In a large group trial consisting of 30 students, it can be seen in Table 11 that the students' response to LKPD was 90.83%, so it was included in the very practical category. This assessment is supported by research conducted by (Novitasari et al., 2021) Showed that the results

of validation and field tests showed that the LKPD developed was valid and practical. The average score obtained by students was 86.84% and the average student response was 87.72%. After the next trial, the researcher measured the students' learning outcomes by giving tests to the students.

Based on the results of the analysis, the increase in student learning outcomes after the use of LKPD was higher than before the use of this contextual-based LKPD. Learning outcome data was obtained from the *Pretest* and *posttest*, which was then calculated using *N-gain*, which aims to determine the improvement of student learning outcomes. Based on the recapitulation of student learning outcome scores in Table 12 above, it can be stated that the score of student learning outcomes after using contextual-based LKPD in SPLTV material obtained an average score of 44.5 and a score of *posttest* of 86.8, so in a score of *N-Gain* overall of 0.76 with a positive category. The test results of the improvement of student learning were obtained from a student response questionnaire of 90.83%. This shows that the LKPD developed is very effective and can improve student learning outcomes. The results of this study are supported by research conducted (Triyanti, 2024). It shows that the results obtained from the improvement of student learning outcomes in the high category, based on the gain test, show that the score achieved is 0.92 in the high category.

4. Conclusion

Based on the results of the research that has been presented, several conclusions are obtained, which are answers to the questions in the research. The conclusions are as follows:

1. The creation of contextual-based LKPD to enhance student learning outcomes in SPLTV materials satisfies legitimate criteria, according to the development and discussion results. For valid criteria, LKPD is validated by material experts, media experts, linguists, and practitioners. The average rating of language experts was 97.5% with a highly valid category, the average rating of subject matter experts was 85% with a highly valid category, the average rating of media experts was 86.36% with a highly valid category, and the final rating category was 92.5% with a highly valid category for practitioner experts. This indicates that the high validity category has been met by context-based LKPD to improve student learning outcomes in SPLTV material.
2. The practicality sheet (teacher and student questionnaire) provides information on the practical criteria. The LKPD produced is very practical, as evidenced by the results of the questionnaire that 95% of educators answered in the "very practical" category and the average results of the student response questionnaire, which are 90.83% in the same category.
3. The effectiveness sheet (pre-test and post-test) shows the effectiveness criteria. After using context-based LKPD in SPLTV material, the average score of student learning outcomes on the pre-test was 44.5 and on the post-test was 86.8, resulting in an overall N-Gain score of 0.76 with a positive/high category.

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