

## Development of learning media based on iSpring Suite with vector material for Grade X students

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### Abstract

Learning media is one of the tools to streamline the learning process in the classroom, besides being able to increase students' interest in learning. Recognizing the abstract and complex concept of vectors, this study identifies significant challenges that students face, particularly in understanding the addition, subtraction, and multiplication of vectors due to the lack of effective learning resources. The research aims to evaluate the validity, practicality, and effectiveness of the media developed. As an answer, this study uses preliminary stage research methods and formative evaluation by Tessmer. The validity test based on four experts, including two material experts and two media experts, was declared valid because it received a percentage of 93,74% and 96,87% with the category of very feasible. Meanwhile, the practicality test based on the questionnaire of media student responses was declared practical because it obtained a percentage of 88,15% to 97,57% in the very good category. The effectiveness test based on the results of the student test is said to be effective because it obtained a completion percentage of 70,37% in the good category.

**Keywords:** learning media, ispring suite, vector

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### Abstrak

Media pembelajaran merupakan salah satu alat untuk melancarkan proses pembelajaran di kelas, selain itu mampu meningkatkan minat belajar siswa. Menyadari konsep vektor yang abstrak dan kompleks, penelitian ini mengidentifikasi tantangan signifikan yang dihadapi siswa, khususnya dalam memahami penjumlahan, pengurangan, dan perkalian vektor karena kurangnya sumber belajar yang efektif. Penelitian bertujuan untuk mengevaluasi validitas, praktikalitas, dan efektivitas media yang dikembangkan. Sebagai jawabannya, penelitian ini menggunakan metode penelitian preliminary stage (studi pendahuluan) dan formatif evaluation (studi formatif) oleh Tessmer. Uji validitas berdasarkan empat orang ahli diantaranya dua ahli materi dan dua ahli media, dinyatakan valid karena mendapatkan persentase mencapai 93,74% dan 96,87% dengan kategori sangat layak. Sementara itu, uji kepraktisan berdasarkan angket respon siswa media tersebut dinyatakan praktis karena memperoleh persentase 88,15% sampai 97,57% dengan kategori sangat baik. Uji keefektifan berdasarkan hasil tes siswa dikatakan efektif karena memperoleh persentase ketuntasan 70,37% dengan kategori baik

**Kata kunci:** media pembelajaran, ispring suite, vektor

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## INTRODUCTION

Vectors are an important concept in mathematics taught at the high school level. A vector is a quantity that has both magnitude (value) and direction. Students' understanding of vectors is crucial for several reasons. First, vectors can help students describe changes in position and direction of movement in everyday life. Second, vectors provide a framework for modeling and solving problems in various disciplines, such as physics, engineering, and computer science. Third, vectors can help students develop problem-solving skills and enhance analytical thinking. The concept of vectors is abstract, visual, and problem-solving utilizes mathematical methods. Therefore, students are taught to analyze problems, identify relevant variables, and apply vector concepts to find solutions.

Based on observations conducted at the target school regarding the obstacles experienced by students in vector material, a large number of students did not understand the material, particularly the operations of addition, subtraction, and multiplication of vectors. This was caused by several factors, such as the abstract nature of vector concepts and students not utilizing learning media.

Therefore, it is crucial to develop engaging and effective learning strategies to facilitate students' understanding of vector space. One way to do this is by using learning media. The use of learning media can serve as a medium for delivering learning materials, enabling students to easily grasp the material being taught. Furthermore, the use of learning media can also attract students' interest and increase their motivation to learn. The appropriate use of interactive learning media can demonstrate effective results in fostering students' conceptual understanding. (Handayani & Rahayu, 2020). Furthermore, the use of learning media can assist students with different learning preferences, such as visual, auditory, or kinesthetic learning styles. For example, by providing video, audio, text, and interactive activities within a learning medium, students can choose the method that best suits their individual learning style. The use of learning media in education has been shown to provide significant benefits, improving student understanding and teaching efficiency.

Currently, many learning media have been developed using various software. Unfortunately, most media use Adobe Flash, which has a difficult programming language to understand, so not many people are able to use it. There is software that is very easy to develop and use as a learning medium: Ispring Suite. Ispring Suite is a practical and easy-to-use computer program for designing learning because Ispring Suite's features are integrated directly with PowerPoint. (Samudro et al., 2022). Ispring Suite as a tool to help develop learning media, also provides interactive learning features, such as videos, animations, simulations, and quizzes. In addition, Ispring Suite also provides features to test student understanding through trials and evaluations. This Ispring Suite-based media can also be used on Android. The learning process carried out at the target school, teachers use media in the form of LCDs to explain the material and also use teaching materials in the form of modules. Likewise, the exams carried out at the school are already Android-based, both Mid-Semester Exams and Final Exams. However, students are still not facilitated with appropriate learning tools or media for learning mathematics, especially in vector material. Vector material is abstract material so it requires media to make it easier for students to understand the material.

Based on the issues, the researcher wants to develop interactive and engaging learning media to help students understand the material being taught and also to foster their interest in learning. One of the recommended tools for creating interactive learning media is using Ispring Suite. This Ispring Suite-based learning media can be used on Android, making it easier for students to access it anywhere and anytime. The development of this Ispring Suite-based learning media is expected to help students understand the learning material, increase learning motivation, and also improve student learning outcomes.

## METHOD

The type of research used is Research and Development (R&D). Research and Development is research used to produce a particular product and test the feasibility, practicality, and effectiveness of the product (Sugiyono, 2016). This research procedure has two stages, namely: Preliminary Study and Formative Study according to (Tessmer, 1993). The preliminary stage consists of an analysis of needs, time, place, materials, and problems in the research. Meanwhile, according to Tessmer, the formative study consists of: self-evaluation, design (Prototyping), expert and one-to-one tests (Expert Review and One-to-One), small group evaluation, and field tests.

### 1. Validity analysis

The validity analysis of learning media based on Ispring suite was carried out by calculating the validation results of material experts and media experts. To calculate the percentage of how valid the media produced is, using the equation

$$\text{Percentages} = \frac{\text{total score from data collection}}{\text{maximum score}} \times 100 \%$$

From the results of the analysis, conclusions will be obtained about the validity of Ispring Suite-based learning media with vector material on the competency of stating vectors in various representations for class X students of SMA Negeri 1 Kefamenanu, using a Likert scale with criteria that can be seen in the following Table 1.

**Table 1. Criteria for Interpretation by Media and Material Experts**

Evaluation	Interpretation Criteria
0% - 25%	Not feasible
26% - 50%	Less than worthy
51% - 75%	Worthy
76% - 100%	Very Worthy

Sumber: adaptasi Ridwan (2012)

From the results of the validation questionnaire analysis by experts, it can be concluded that the Ispring Suite-based learning media that has been developed is said to be valid for use if it gets a percentage  $\geq 51\%$  with the Eligible category.

2. Practicality analysis

To determine the practicality of using Ispring Suite-based learning media, students can assess the learning media. The practicality percentage is calculated using the following equation:

$$\text{Percentages} = \frac{\text{total score from data collection}}{\text{maximum score}} \times 100 \%$$

Based on the results of the calculation of the percentage of practicality of media use, this can be seen in the assessment criteria table 2/

**Table 1. Student Response Score Conversion**

Presentation	Criteria
80% - 100%	Very good
60% - 79%	Good
40% - 59%	Pretty good
20% - 39%	Not good
< 20%	Not Good (Failed)

Source: adaptation of Arikunto (2023)

From the results of the analysis of the student response questionnaire, it can be concluded that the Ispring Suite-based learning media that has been developed is said to be practical to use if it gets a minimum percentage of 60% in the good category.

3. Effectiveness Test

To assess the effectiveness of the developed learning media, the average student score was assessed and the number of students whose scores exceeded the minimum completeness criteria (KKM) established by the school was calculated. The researcher adjusted the criteria value to suit the school, which is  $\geq 75$ . The equation for calculating the percentage of student learning completeness is as follows:

$$\text{Percentages} = \frac{\text{total score from data collection}}{\text{number of students}} \times 100\%$$

After obtaining the completion score, it is then compared with the student success criteria to determine the effectiveness of the ISpring Suite-based learning media. The student success criteria can be seen in the following Table 3.

**Table 3. Criteria for the effectiveness of learning media**

<b>Presentation</b>	<b>Criteria</b>
81% - 100%	Very good
61% - 80%	Good
41% - 60%	Pretty good
21% - 40%	Not good
0% - 20%	Very bad

Sumber: adaptasi Mamoh (2016)

From the results of the analysis of student completion, it can be concluded that the Ispring Suite-based learning media that has been developed is said to be effective for use if it gets a minimum percentage of 61% in the good category.

## RESULTS AND DISCUSSION

### Results

This study uses the Research and Development (R&D) type of research, which is to test the feasibility, practicality, and effectiveness of a product, which was carried out at SMA Negeri 1 Kefamenanu in September. This research procedure has two stages, namely: Preliminary Study and Formative Study. The preliminary stage consists of an analysis of needs, time, place, materials, and problems in the research. While the formative study according to Tessmer, consists of: Self-Evaluation, Design (Prototyping), Expert Test and One-to-One Test, Small Group Evaluation, and Field Test.

#### 1) *Preliminary*

##### a. Needs analysis

In this section, the researcher observed the teaching and learning process in the classroom and conducted direct interviews with several students and the mathematics teacher. The observations revealed that students tended to feel bored and lacked interest in learning due to the lack of appropriate media support for the material. Furthermore, teachers reported that students had studied vectors but were having difficulty understanding them, particularly vector operations. This was due to several factors, including the abstract nature of vectors and the lack of appropriate learning media to foster student learning.

##### b. Time, Place and Material

This research is divided into two stages, namely the first preliminary stage carried out from September to December 2023 and the design stage until the field test stage on September 3-9, 2024, at SMA Negeri 1 Kefamenanu with Vector material.

##### c. Problems

There are a large number of students who do not understand the vector material, especially vector operations, because the vector material is abstract and there is also a lack of use of learning media, and the learning process is not yet Android-based.

#### 2) *Self Evaluation*

At this stage, researchers conduct student analysis, curriculum and needs analysis, by conducting direct observations at schools.

##### a. Student Analysis

Based on observations, students at the school are generally accustomed to technology, especially Android devices, both for studying and seeking information. However, students are not yet using their mobile phones for studying, primarily for gaming. Furthermore, a challenge encountered during the learning process is the limited availability of learning media for classroom use. Interviews with teachers and several students revealed that most students often feel bored and fed up during the learning process, as the teacher dominates the classroom.

##### b. Curriculum Analysis

Based on the results of the analysis of what students need during the learning process, where previously the teacher used the PBL learning method by using learning media in the form of ordinary teaching modules in the form of pdf files, which were distributed to students to be printed or used as a tool for independent learning, and also the learning process in the classroom was not yet android-based even though the evaluation was android-based, so it did not support the evaluation system in the classroom, especially in mathematics learning. However, students were not very interested in learning, because the media was in the form of ordinary files without animation or new things that could attract students' interest in learning. So, researchers offer this ispring suite-based learning media, to help students be more active in learning and develop their potential in learning, because in this ispring suite media, evaluation questions that are already android-based have been provided, in order to train students in understanding the material and be more accustomed to applying the use of android as a learning medium. And also, this media gives students breadth in learning and students are also not easily bored because this media can be accessed on android offline or online.

3) *Prototyping*

Based on the results of the analysis carried out by the researcher, the researcher provides a solution to solve the problems faced during the learning process, by designing learning media based on iSpring Suite which can be used via computer or Android.

Table 4. Initial product design

Cover		
Menu		
Basic competencies		
Material		
Problems example		
Evaluation		

4) *Expert Review & One-to-One*

At this stage, the initial product (first prototype) was tested for feasibility based on expert validation results, including two media experts and two material experts. Validation by the media experts and one-on-one testing were conducted on September 3 and 4.

a. *Expert Review*

The resulting product is tested for suitability based on expert validation, including two material experts (A1 and A2) and two media experts (C1 and C2), then the following data is obtained:

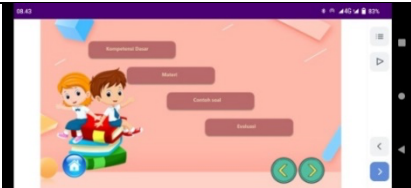
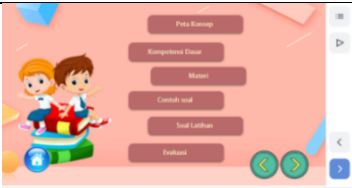
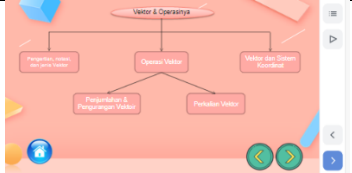
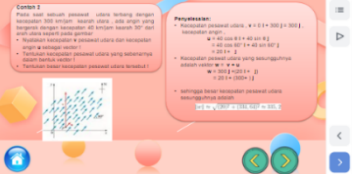
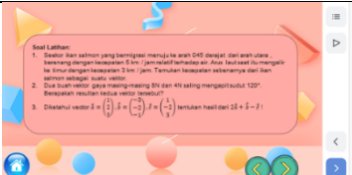
1. Subject matter expert

**Table 5. Validation by material experts**

Aspect	Average	
	A1	A2
Material	3,625	3,625
Linguistics	3,667	4
Presentation	4	4
<b>Total</b>	<b>11,292</b>	<b>11,625</b>
<b>Presentation</b>	<b>92.85%</b>	<b>94.64%</b>

Based on the results of the analysis by two material experts in Ttable 5 and by looking at several suggestions given, it can be concluded that the material presented in the learning media is said to be valid for use in research, because it gets a percentage in the "Very Suitable" category. The differences between media or products before and after revision can be seen in the following Table 6.

**Table 6. Differences before and after revision by material experts**

Before	After
 <p>Menu page before adding the concept map menu and practice questions</p>	 <p>The menu page after adding the concept map menu and practice questions</p>
<p>There is no concept map yet</p>	 <p>There is already a concept map</p>
<p>There are no examples of material related to everyday life.</p>	 <p>There are examples of questions related to everyday life</p>
<p>There are no practice questions yet</p>	 <p>There are already practice questions</p>

1. Media expert

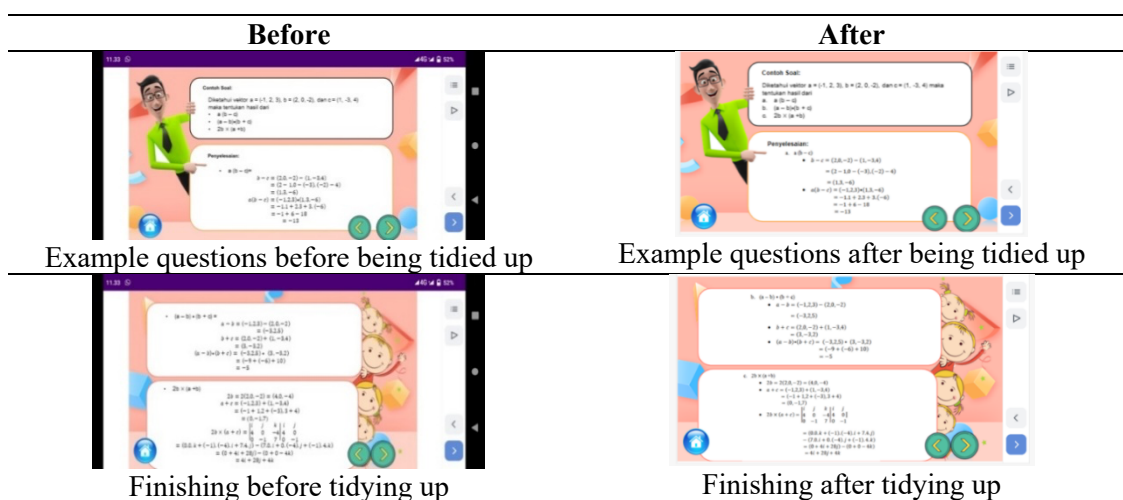
**Table 7. Media expert validation**

Aspect	Average	
	C1	C2
Audio-Visual	3,857	4
Linguistics	3,333	4
Software engineering	3.8	4
<b>Total</b>	10.99	12
<b>Presentation</b>	93.75%	100%

Based on the results of the analysis of two media experts in Table 7 and by looking at several suggestions given, it can be concluded that the iSpring Suite-based learning media is valid for use in research, because it gets a percentage in the "Very Appropriate" category.

The differences before and after being revised by media experts can be seen in Table 8.

**Table 8. Differences before and after revision by media experts**



2. One-to-One

In this section, the researcher met directly with three students selected by the teacher from grade 12, taking turns at the same time. The goal was to pilot the developed product by assessing student responses and its practicality. The student response data can be seen in the following Table 9.

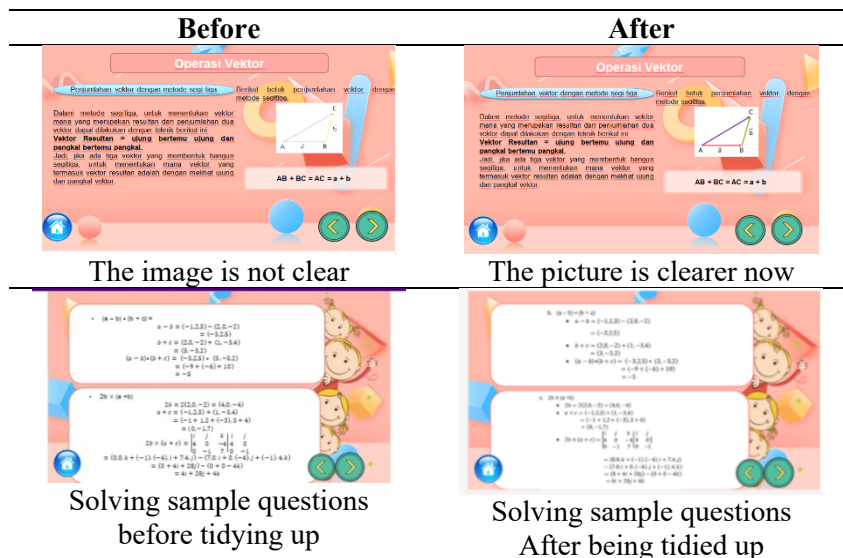
**Table 9. Student response questionnaire data stage One-to-One**

Aspect	Average		
	S1	S2	S3
Media display	4	3.75	4
Material	4	3.4	3
Language	4	3	3.33
Use	3.67	3.33	3.33
Learning	3.75	3	3.25
<b>Total</b>	19.42	16.48	16.91
<b>Presentation</b>	97.36%	82.89%	84.21%

Based on the analysis of the student response questionnaire consisting of three students, it can be concluded that the iSpring Suite-based learning media is practical for use in the learning process, because it gets a percentage in the "Very Good" category.

The differences before and after the revision can be seen in Table 10.

**Table 10. Differences before and after the revised One-to-one stage**



5) *Small Group*

At this stage, researchers conducted a trial of the product that had been validated by experts, also known as the second prototyping. On September 6, 2024, researchers conducted a small field trial with six students from grade XII, selected based on their cognitive level, based on their learning outcomes. This trial aimed to assess the practicality of the product developed based on opinions in the questionnaire and suggestions or comments. Data from the small field trial can be seen in Table 11.

**Table 11. Data on student responses at the Small Group stage**

Aspect	Average					
	S1	S2	S3	S4	S5	S6
Media display	3.75	4	4	4	4	3.75
Material	3.8	4	4	4	3.8	4
Language	4	4	4	4	4	4
Use	4	4	4	4	3.67	4
Learning	3.5	3.75	3.5	4	3.75	4
<b>Total</b>	<b>19.05</b>	<b>19.75</b>	<b>19.5</b>	<b>20</b>	<b>19.21</b>	<b>19.75</b>
<b>Presentation</b>	<b>94.73%</b>	<b>98.68%</b>	<b>97.36%</b>	<b>100%</b>	<b>96.05%</b>	<b>98.65%</b>

Based on the results of the analysis of the student response questionnaire in Table 11, it can be concluded that the iSpring Suite-based learning media is practical for use in the learning process because it gets a percentage in the "Very Good" category.

6) *Field Test*

At this stage, after making revisions to the Small Group stage, the researcher conducted a large field test on the selected test subjects, namely in the advanced mathematics class 2 with a total of 27 students, precisely on September 9, 2024. At this stage, the learning process was carried out during one meeting, where at the beginning of the learning the researcher explained what would be done during the learning by introducing the media that would be used during the learning process, namely in the form of Ispring Suite-based learning media that can be accessed using Android and can be used online or offline. The researcher explained how to use the learning media, then explained the material using the learning media. After carrying out learning by implementing Ispring Suite-based learning media, at the end of the learning, a test question was given to see the success of students in using the Ispring Suite-based learning media, which was done directly using the media that had been provided on their respective Androids, and also provided a student response questionnaire.

Table 12. Student grade data

Student	Score			Total Score	Mark
	1	2	3		
S1	10	10	30	50	100
S2	10	10	30	50	100
S3	10	10	30	50	100
S4	10	10	15	35	70
S5	10	10	30	50	100
S6	10	10	0	20	40
S7	10	10	30	50	100
S8	10	10	15	35	70
S9	10	0	30	40	80
S10	10	10	30	50	100
S11	10	10	30	50	100
S12	10	10	30	50	100
S13	10	10	30	50	100
S14	10	10	0	20	40

Student	Score			Total Score	Mark
	1	2	3		
S15	10	0	30	40	80
S16	10	10	15	35	70
S17	10	10	30	50	100
S18	10	0	30	40	80
S19	10	10	30	50	100
S20	10	10	30	50	100
S21	10	10	30	50	100
S22	10	10	15	35	70
S23	10	10	30	50	100
S24	10	10	15	35	70
S25	10	0	30	40	80
S26	10	10	15	35	70
S27	10	10	30	50	100

From the results of the student's score in Table 12, the percentage score of student success can be calculated from the total score obtained using the equation:

$$\begin{aligned} \text{Percentage} &= \frac{\text{number of students who completed the course}}{\text{number of students}} \times 100\% \\ &= \frac{19}{27} \times 100\% \\ &= 70,37\% \end{aligned}$$

Based on the percentage of completion obtained, it can be said that the iSpring Suite-based learning media is effective to use because it obtained a percentage of 70.37% with the "Good" category.

## Discussion

### 1. Validity of Ispring Suite-based learning media

The validity value obtained is based on the achievement of assessment indicators, namely the suitability of the presentation of material in the media developed according to competency, the suitability of learning materials with learning objectives, the suitability of the order of presentation of learning materials, the suitability of images and animations with the material, the suitability of practice questions with learning objectives, and the clarity of the material presented in the learning media. The validity value itself is the extent to which the elements of the assessment instrument are relevant and represent the construct of the measuring instrument targeted to achieve certain objectives (Ihsan, 2015). Based on the assessment carried out by media experts and material experts, the validity value obtained was in the "Very Appropriate" category.

The results of the validity analysis of the iSpring Suite-based learning media are in line with research conducted by Demon et al. (2021) The results of the study indicate that the MathClass application learning media using iSpring Suite 6 is very suitable for use in the learning process because it obtained an average score in the valid category. What distinguishes this study from previous studies is that the previous study used two validators, one material expert and one media expert. Meanwhile, this study used four validators, two material experts and two media experts.

Apart from that, there is also other research conducted by Yustika et al. (2023) The results show that the learning media using iSpring Suite 8 is valid for use in research. This previous study also conducted expert validation twice. Furthermore, there are differences in the question types found in the

quiz or evaluation menu. The previous study used several types, such as multiple-choice and descriptive. This study, however, used iSpring Suite 11, and only descriptive questions.

## 2. Practicality of Ispring Suite-based learning media

The second aspect of learning media feasibility is reviewed from the level of practicality. Based on the results of the student response questionnaire analysis, the Ispring Suite 11-based learning media was found to be practical to use because it obtained an average score and percentage in the "Very Good" category. The questionnaire was completed after students had finished using the Ispring Suite 11-based learning media.

In addition, development research conducted by Samudro et al. (2022) This research, titled "Developing Android-based learning media using iSpring Suite 10 for the topic of algebraic function derivatives," resulted in a practicality score of "very practical." While previous research provided instructions for using the learning media, this study does not.

As for other research conducted by Rochma et al. (2019) This study demonstrates that the developed learning media is very practical to use, and also includes instructional videos. Meanwhile, although this study did not include instructional videos to support the material presented, the evaluation menu can be used online, and student responses are automatically sent to the teacher's email.

## 3. Effectiveness of Ispring Suite-based learning media

A learning medium can be considered effective if students' learning outcomes achieve the required standard. In this study, the effectiveness of the iSpring Suite-based learning medium was analyzed based on student learning outcomes. A learning medium is considered effective if students who have participated in the learning process are able to achieve the minimum required standard. The analysis results show that the completion percentage is categorized as "Good." Therefore, this iSpring Suite 11-based learning medium is considered effective.

There are several studies, one of which was conducted by Hannisah et al. (2022) The results showed that the resulting learning media was effective. The study also used five formative tests and one summative evaluation to assess the effectiveness of the learning media. However, this study only used two tests: a pre-test and a post-test.

In addition, the results of this study are supported by research conducted by Nuraini et al. (2019), where the development of PowerPoint learning media using iSpring Suite 8 is effective if students' completion level reaches the specified Minimum Competency (KKM) score. This previous study also included audio and used several question types, such as matching, descriptive, and multiple-choice questions, but only offline. In this study, the evaluation menu is online.

## CONCLUSION

The design of this learning media was developed based on an analysis of student needs and curriculum analysis. Previously, the learning media used was regular print media with Android-based evaluations, but the learning process in the classroom was not yet Android-based. Therefore, this ispring suite learning media can train students in the learning process using Android and also assist students in completing evaluation questions directly on Android. The validity of this learning media is seen based on validation results by experts, including material experts and media experts. From the initial prototyping produced, there were several shortcomings in the material such as some unclear images and also the lack of examples of material related to everyday life, in addition, the problem solutions were not neat so that students did not understand. From these shortcomings, improvements were made, resulting in a valid ispring suite-based learning media. The practicality of this learning media was seen based on student comments on the student response questionnaire. After using the media, there were several things that needed to be fixed, namely there were some unclear images and also less neat solutions. From these several things, improvements were made to produce a practical ispring suite-based learning media for use. The effectiveness of the learning media was seen from the gain normality value based on the pre-test and post-test results. The pre-test results showed an average score of 52.88, while the post-test results showed an average score of 83.70. This indicates that student learning outcomes exceeded the completion percentage of  $\geq 75$ . Therefore, this ispring Suite-based learning media is said to be effective.

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