


Animated Mathematics Learning Media on guru.tesonlineku.com using Plotagon Story and Lectora Inspire

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ARTICLE INFO	ABSTRACT
Article history Received Feb 01, 2024 Revised April 02, 2024 Accepted June 10, 2024	<p>This research aims to develop animated story-learning media that helps students improve their understanding of mathematical concepts. This research uses the ADDIE development (R&D) method, which consists of analysis, design, development, implementation, and evaluation stages. The sample research subjects consisted of 6 experts, two material, media, and language validator experts each, one teacher, 5 and 147 class VII students who assessed the practicality and effectiveness of the product being developed. Data was collected through expert validation, interviews with teachers, teacher and student response tests, and tests on students. At the same time, the N-Gain test was used to evaluate media effectiveness. Expert validation results show that the criteria are very valid, with an average score of 89%. The teacher and student response test showed an average score of 86%, which shows that the animated story media is practically used for mathematics learning. The N-Gain test of 67% shows that students' ability to understand mathematical concepts is increasing. Therefore, using animated stories to develop skills in understanding mathematical concepts is feasible, practical, and effective.</p>
Keywords Mathematics learning Plotagon story Assessment	

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I. Introduction

The ability to think, identify, and build formulas in mathematics is essential for students to create meaningful learning. These skills are directed by the five standard mathematics learning processes formulated by the NCTM (National Council of Teachers of Mathematics): problem-solving, reasoning, communicating, making connections, and presentation. (Khalid et al., 2020; Lestari et al., 2022; Maslihah et al., 2020). The goals of these thinking skills, both formal and material, involve structuring reasoning and forming students' character (Siagian, 2019; Hasanah, 2019; Yayuk, 2020). While formal objectives focus on developing students' reasoning abilities and character formation, material objectives place more emphasis on students' abilities to solve problems and apply mathematical concepts, both in the context of mathematics itself and in other fields of science (Arisoy & Aybek, 2021; Hikayat et al., 2020; Purwitaningrum & Prahmana, 2021). Thus, developing mathematical thinking skills helps understand concepts and holistically form students' personalities. (Dahlan & Wibisono, 2020; Kwangmuang et al., 2021; Soboleva et al., 2022).

Mathematics involves problem-solving and logical thinking (Lovianova et al., 2022; Nur et al., 2020;

Oljayevna & Shavkatovna, 2021). Mathematics students are taught to think systematically, analyze situations, and develop problem-solving strategies (Barham, 2020; Siagan et al., 2019; Yayuk & As' ari, 2020). This helps students develop critical thinking skills. Mathematical concepts are often abstract, and understanding them helps students develop abstract thinking skills (Al-Mutawah et al., 2019; Genc & Erbas, 2019; Susac et al., 2014). It is also helpful in understanding concepts outside mathematics, such as scientific and philosophical concepts. Mathematics provides the foundation for many life skills. The ability to read graphs, manage budgets, calculate discounts, and understand mathematical concepts such as proportions and percentages are fundamental in everyday life (Bahar & Maker, 2020; Gal et al., 2020; Osana et al., 2006; Ozkale & Ozdemir Erdogan, 2020). Mathematics learning helps students hone their numeracy skills (Bernard & Senjayawati, 2019; Kartika et al., 2019; Ramirez et al., 2018). This benefits everyday life and careers in various fields, including science, technology, engineering, and business. Mathematics is the foundation for many scientific disciplines, especially science and technology (Attwood et al., 2019; Bakker et al., 2023; Charlesworth & Banaji, 2019). Students who understand mathematics well are

more likely to succeed in this field and have more opportunities in STEM (Science, Technology, Engineering, and Mathematics) related careers (Hafni et al., 2020; Kwon et al., 2019; Wang & Degol, 2017; Warne et al., 2019).

Teachers still have limited reference sources, and good-quality teachers cannot find interesting and effective learning methods to motivate students. Developing mathematics learning materials that align with technological developments is an urgent need. On the other hand, students often have difficulty understanding abstract mathematical concepts. Conventional approaches that only rely on textbooks and whiteboards are often insufficient to build deep understanding. Apart from that, some students still find it difficult to face Mathematics, viewing it as a complicated field. Not only that, but students' perceptions of the usefulness and relevance of mathematics in everyday life are also inadequate. Based on the problems above, researchers provide solutions for teachers and students by developing mathematics learning media in the form of animated stories assisted by Plotagon Story and Lectora Inspire based on web assessment guru.tesonlineku.com, which allows students to gain a more interesting and interactive learning experience, helping teachers convey concepts. -mathematical concepts effectively, as well as changing students' perceptions of this subject to be more positive.

Plotagon Story and Lectora Inspire are not just ordinary software; both are very effective tools for creating interactive learning media. (Liliana et al., 2020; Neta et al., 2020; Umbara et al., 2019). With their ability to create 3D animated stories, these two software have their appeal, especially in the eyes of students who currently tend to like animation-based content. (Praveen & Srinivasan, 2022; Zelenskaya, 2022). The moral impressions presented in animated stories are also quite diverse, adding to the beneficial value of their use. Educators can utilize cartoon stories, including those produced by Plotagon Story and Lectora Inspire, to create interesting learning experiences, including in the context of mathematics subjects, which are often considered boring. (Fatahillah et al., 2020; Suyatna, 2019; Umbara et al., 2019). Mathematics teachers can use animated story media as a visualization tool to convey material to increase students' understanding. (Dinayusadewi & Agustika, 2020; Khoiriyah et al., 2022; Septian et al., 2020). To attract students' attention, animated stories are presented in 3D format. Along with the typical criteria of Generation Z, especially at the junior high school level, this approach can be adapted to meet the needs of the production age at that level. Using animated stories in 3D form, especially by providing case cases, is expected to increase students' curiosity about the presented mathematical concepts. (Chao et al., 2023; Suselo et al., 2019; Umbara et al., 2019).

Several studies on mathematics learning media in the form of animation, such as research conducted by Rizaldy (2019), have researched learning media assisted by Lectora Inspire software on permutation and combination material, showing that animated learning media can involve students in the learning process, and students are more interested and motivated to learn mathematics. As stated by Jintapitak (2018), animated stories have the power to attract the attention of anyone who watches them. Research conducted by Shefia (2023) shows that using interactive media, such as Lectora Inspire and Plotagon Story, can improve student learning outcomes, and students are enthusiastic and eager to answer questions on these media. However, no research has focused on combining two different animated learning tools and adding web assessment elements, creating a more holistic and comprehensive approach to developing mathematics learning media.

II. Method

This research uses the ADDIE R&D approach, which consists of four stages: analysis, design, development, implementation, and evaluation. At the analysis stage, the author identifies the curriculum and learning objectives, analyzes students, evaluates available resources, and identifies possible obstacles and challenges. Data collection techniques at this initial stage were carried out using observation interviews and tests on students. The results at the analysis stage become the basis for creating media designs. At the design stage, the author determines the structure and sequence of material, designs learning activities, selects teaching methods and media, and creates an evaluation plan. At the Development stage, the author tested the media in small groups, including expert validation and product trials. The expert assessment consists of material, media, and language experts. Six experts were involved with two experts in each field to determine whether the media being developed was valid. The expert assessments are considered to improve the media and make it more perfect. Furthermore, product trials in small groups were carried out on one mathematics subject teacher and five students at An-Nizam School. Based on the assumptions that show that media products are practical and useful, it is likely that the use of these products will soon be expanded to a wider class. On the other hand, if the results of the assumptions show that the resulting media is less practical or does not meet needs, the product will be revised according to input provided by students and teachers. The media validity criteria are shown in Table 1.

Table 1. Criteria for Validity and Practicality of Media Development

Percentage	Category
$81\% \leq P \leq 100\%$	Very Valid
$61\% \leq P \leq 80\%$	Legitimate
$41\% \leq P \leq 60\%$	Fairly Valid

Percentage	Category
$21\% \leq P \leq 40\%$	Less Valid
$0\% \leq P \leq 20\%$	Very invalid

In the implementation stage, after the product has been assessed as valid and practical, the product is implemented in the classroom, where the author provides training or delivers learning material to students. The author supports students throughout the learning process while monitoring and managing logistical and administrative aspects.

At the evaluation stage, as many as 147 students evaluated the media created to determine how effective the media in animated stories was in learning mathematics. The media influence test was carried out through a t-test with an independent sample t-test, and to find out how much media contributed to students' mathematical concept understanding skills, it was evaluated using the N-Gain test. The N-Gain criteria formulated by Richard Hake (1999) Were used to determine the impact of virtual field visits on the use of primary source evidence, presented in Table 2.

The sampling technique used in this research was purposive sampling, where students in class VII SMP had never used interactive learning media based on Plotagon Story and Lectora Inspire. This research also used an experimental class and a control class. Learning media in the form of PowerPoint is used in the control class. Meanwhile, animated video learning media with the help of Plotagon Story and Lectora Inspire in the experimental class. The student's understanding of mathematical concepts was tested twice as a pretest and posttest. The pretest was conducted to determine students' initial abilities before treatment. After the experimental class was treated, the posttest was conducted using animated video media. The test design for students' mathematical concept understanding skills is shown in Table 3.

Table 2. Criteria for N-Gain Score

Intervals	Criteria
$g \geq 0.7$	High
$0.3 \leq g < 0.7$	Middle
$g < 0.3$	Low

Table 3. Pretest and Posttest Design

Group	Pretest	Process	Posttest
Controls	Mathematical concept understanding skills	Teachers use PowerPoint in the learning process	Mathematical concept understanding skills
Experiment	Mathematical concept understanding skills	The teacher uses animated video media in the process of learning	Mathematical concept understanding skills

The ability test for understanding mathematical concepts consists of three essay questions which include various indicators, namely: 1) Restating the concepts that have been studied; 2) Classify objects based on whether they fulfill the requirements that form the concept; and 3) Provide examples or counterexamples (not examples) of the concept being studied.

To determine whether the items used to assess students' understanding of mathematical concepts are valid and reliable, a validity and reliability test of the instrument is carried out, as shown in Table 4.

Table 4. Item Validity Results

No	Indicator of Mathematical Concept Understanding Skills	Sig value. (2-tailed)
1.	Restate concepts that have been learned	0.606
2.	Classifying objects based on whether they fulfill the requirements that form the concept	0.645
3.	Provide examples or counterexamples (not examples) of the concept being studied	0.636

Table 4 shows that the three questions have a significance value greater than 0.05, which shows that these three questions can be used as instruments to assess the ability to understand mathematical concepts.

Table 5. Reliability Test Results of Question Items

Cronbach's Alpha	N of Items
.753	147

Based on table 5 shows that the results of the reliability test on the questions show a Cronbach Alpha value of $0.753 > 0.05$. The results of this research can conclude that these questions can be used to assess students' mathematical concept understanding skills.

This research uses qualitative and quantitative data analysis methods. Qualitative analysis evaluates learning media in depth by paying attention to certain aspects. This research examines media design, content, results from open questionnaires given to experts, and results from media effectiveness tests. Qualitative analysis provides deeper insight into how the media was received and responded to by the experts and students involved in this research. Meanwhile, quantitative analysis used the Independent Sample T-Test using SPSS version 25.0 software. This approach aims to statistically evaluate the effect of AR media on developing mathematical concept understanding skills. In other words, this research objectively measures whether using VR media significantly impacts improving students' practical mathematics skills. This combined approach between qualitative and quantitative analysis provides a

comprehensive framework for describing AR media's influence on mathematics learning.

III. Results and Discussion

A. Analysis Stage

1) Interview with Teacher

Mathematics teachers were asked about the mathematics learning process in the classroom. The following are the results of interviews with several teachers.

"In teaching mathematics, I often use two types of media, namely PowerPoint (PPT) presentations and manual writing on the blackboard. PPT media provides flexibility in presenting material with an attractive visual appearance. I may include images, graphs, or diagrams to explain math concepts visually and interactively. Additionally, PPT allows me to design a structured series of slides, helping students understand the steps or concepts step by step. Manual writing on the blackboard remains my choice because it provides flexibility in adapting to class needs. I can respond directly to student questions or provide additional examples."

Based on the interview results above, it can be concluded that teachers use two different types of media, namely PowerPoint presentations (PPT) and manual writing on the blackboard, in the mathematics learning process. PPT media provides flexibility in presenting material visually and interactively, allowing teachers to include images, graphs, and diagrams to explain concepts in a structured and gradual manner. On the other hand, manual writing on the blackboard was chosen because it provides high flexibility to adapt to class needs, allowing the teacher to respond directly to student questions and provide additional examples as needed.

Next, the author asked questions about students' mathematical concept understanding skills. The following is a summary of some interviews given by teachers.

"Currently, my class's mathematical concept understanding skills are still low. This can be seen from students' difficulties in answering even basic questions, such as difficulty applying mathematical concepts taught in simple problems. I also see that some students have difficulty relating one mathematical concept to another. This becomes an obstacle when facing problems that require thorough understanding. One of the main obstacles I identified was the lack of student involvement in discussions and problem-solving. Students sometimes lack the confidence to speak or express their opinions. Apart from that, I also noted that some students tend to be less enthusiastic in dealing with mathematics material, which affects their understanding of concepts."

The interview results show that students' mathematical concept understanding class skills are currently low. This is illustrated by students' difficulties in answering basic

questions and applying mathematical concepts in the context of simple problems. It was also found that some students had difficulty relating mathematical concepts to one another, becoming an obstacle when faced with problems that required comprehensive understanding. The main obstacle identified was the lack of student involvement in discussions and problem-solving, supported by students' lack of confidence to speak or express opinions. In addition, there were notes that some students were less enthusiastic about dealing with mathematics material, which impacted their understanding of concepts.

The author also asked about solutions to the problem of students' lack of ability to understand mathematical concepts. Following are the answers given by the teacher.

"So far, I have tried to improve students' understanding of mathematical concepts by making PowerPoint presentations (PPT) in several meetings. Unfortunately, however, I see that there is still a lack of enthusiasm among students for this method. Therefore, my implemented solutions may still be less effective."

The interview results show that efforts to improve students' understanding of mathematical concepts using PowerPoint presentations (PPT) have not had a satisfactory impact. Teachers are aware of the lack of enthusiasm from students towards this method and feel that the solutions implemented may still be less effective.

2) Curriculum Analysis

In developing animated video learning media to improve skills in understanding mathematical concepts, researchers analyzed the Junior High School Mathematics curriculum in education in Indonesia.

Based on Table 6, one of the main focuses in learning mathematics is developing students' skills in solving mathematical or everyday problems. This problem-solving process involves applying effective strategies and emphasizes students' ability to adapt various strategies to reach the right solution. Furthermore, the importance of problem-solving is seen not only from the result but also from the construction and reconstruction of students' mathematical understanding that occurs during problem-solving. Thus, this mathematics curriculum emphasizes achieving mathematical answers and developing a deeper conceptual understanding through problem-solving experiences. This analysis shows that this mathematics curriculum specifically prioritizes the development of students' problem-solving skills, creating a foundation for learning that emphasizes the result and a learning journey that involves understanding mathematical concepts through problem-solving activities.

Table 6. Process Elements in Mathematics subjects

Element	Description
Mathematical Problem Solving	Mathematical problem solving involves solving mathematical or everyday problems by applying and adapting various effective strategies. This process also includes constructing and reconstructing mathematical understanding through problem-solving.

3) Analysis of Students' Mathematical Concept Understanding Skills

The essay test was used to assess students' mathematical concept understanding skills. It consisted of three basic questions that emphasized the components of understanding mathematical concepts for 147 students. In the first question, students are asked to repeat the concept that has been taught. Second, students are asked to classify objects based on whether they fulfill the requirements that form the concept. Finally, students are asked to provide examples or counterexamples (not examples) of the studied concepts. The results of the initial analysis of students' ability to understand mathematical concepts are presented in Table 7.

Table 7 shows that only seven students (5%) could answer question number one correctly. Question number 2 was only able to be answered by five students (3%) correctly. The last question was only able to be answered by three students (2%) correctly. Based on these findings, it can be concluded that students' ability to understand mathematical concepts is still low; only around 3% can answer questions correctly, while 97% answer questions incorrectly. Thus, teachers' efforts to develop students' understanding of historical concepts effectively and efficiently must be increased.

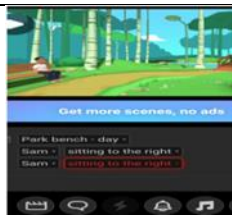




B. Design Stage


The author prepares a media design consisting of selecting the material to be developed and compiling a media draft to produce valid, reliable, and practical learning media. The material developed uses Plotagon Story and Inspire Lectures based on the local cultural approach of the Mandailing Tribe. Learning Media is prepared and developed for SMP/Mts and equivalent levels. Several displays of learning media that have been developed are shown in Table 8.

Table 7. Results of Students' Mathematical Concept Understanding Ability Test

Category	Question 1		Question 2		Question 3		Average
	F	%	F	%	F	%	
Correct	7	5%	5	3%	3	2%	3%
Wrong	14	95	14	97	14	98	97%
	0	%	2	%	5	%	

Table 8. Media section Animated videos

No.	Media Section	Information
1.		Plotagon Story View gives users an easy-to-use and creative tool for creating animated stories. In addition to the display, there is also a topic achievement room and a teacher's classroom. Ensures a friendly and intuitive user interface so that people of all skill levels, including those with no animation experience, can easily create animated stories.
2.		Cover View of Comparison Material
3.		There is a group name menu along with the names of group members. A (Comparison) learning topic will also be discussed. This display also contains basic competencies, indicators, objectives, and problems 1 to 3 of Perbandingan.
4.		Display of instructions for using LKPD in Case 1 relating to Gordang Sembilan, which is the local culture of the Mandailing tribe
5.		Display of instructions for using LKPD in Case 2 relating to Bagas Godang, which is the local culture of the Mandailing Tribe

No.	Media Section	Information
6.		Display of instructions for using LKPD in Case 3 relating to Markobar, which is the local culture of the Mandailing Tribe

C. Development Stage

1) Expert Validity Test

In validating animated video media, the writing involved six teams of experts consisting of 2 media experts, two material experts, and two language experts. The expert team provides assessments and input on the media being developed. The expert team was selected based on their expertise in mathematics, language material, and learning media expertise. The expert team consists of professors or professors from their respective fields. The expert team validation results are presented in Table 9.

Based on the information in the table, it can be concluded that all aspects of the assessment received very high scores and were categorized as valid. The average score reached 89%, indicating a very good validity category. Therefore, based on these results, it can be concluded that the animated video media that has been developed is considered valid for use as a mathematics learning tool that can improve students' mathematical concept understanding skills.

2) Practicality Test

The practicality test was carried out to determine whether the media developed was practical to use in the distance history learning process. The practical test involved one junior high school mathematics teacher and five students. The practicality test results are shown in Table 10.

Table 9. Product Validity Test Results

Aspect	Score	Information
Material	89%	Very Valid
Media	90%	Very Valid
Language	88%	Very Valid
Average	89%	Very Valid

Table 10. Practicality test results

No	Aspect	Score	Interpretation
1	Content	88%	very good
2	Practicality	80%	very good
3	Language	91%	very good
4	Design	85%	very good
	Mean	86%	very good

Based on Table 10, it is known that the average practicality test value is 89% in the very good category. The four aspects, content, practicality, language, and design received scores in the very good category. This means that the animated video learning media developed is practical for mathematics learning to improve students' understanding of mathematical concepts.

D. Implementation Stage

The implementation stage begins after the animated video learning media product is assessed as valid and practical. The product is applied in the classroom at this stage, where the author provides training or delivers learning material to students. The author acts as a student supporter throughout the learning process while monitoring and managing logistical and administrative aspects.

E. Evaluation Stage

To determine whether the animated video media being developed is effective and improves understanding of mathematical concepts, the effectiveness was tested using the t-test. The t-test data was obtained from a media trial in a large group involving 147 An-Nizam Middle School students. Two tests were carried out to test the effectiveness of the media, consisting of a pretest and a posttest on the same respondents. The results of the influence test via the t-test are presented in Table 11.

Table 11. The results of the t-test of the Experimental Class and Control Class

t-Test Results of the Independent Sample Test	Significance
	0,000

Based on Table 11, it is known that the significance value of the t-test is 0.000 or less than 0.05, so it can be concluded that the use of animated video learning media significantly influences students' mathematical concept understanding skills. Next, an N-Gain test was conducted to determine the percentage increase in students' mathematical concept understanding skills for each indicator. The N-Gain test results are presented in Table 12.

Table 12. N-Gain Test Results

No	Indicators	N-gain Score	Categories
1	Restate concepts that have been learned	0.69	Medium
2	Classifying objects based on whether they fulfill the requirements that form the concept	0.70	High
3	Provide examples or counterexamples (not examples) of the concept being studied	0.64	Medium
	Mean	0.67	Medium

Based on Table 12, it is known that overall, the animated video learning media used in local history learning can improve students' understanding of mathematical concepts by 0.67 or 67% in the high category. Based on the results above, it is concluded that local history learning media based on animated videos effectively improves mathematical concepts and understanding skills for An-Nizam Middle School students.

Based on research findings, it was concluded that the learning media developed were valid, reliable, practical, and effective for use in history learning, especially mathematics learning, to improve high-level thinking skills such as understanding mathematical concepts.

The research results highlight that the animated video learning media, which has been developed, has very positive characteristics, namely that it is valid, reliable, and practical for use in mathematics learning. The research also revealed that using this media increased skills in understanding mathematical concepts by 67%. The implication is that the animated video media developed has proven effective in enriching students' understanding of mathematical concepts. These findings open opportunities for alternative solutions for mathematics teachers in teaching material to students. Teachers can build a more interesting, interactive, and motivating learning atmosphere by implementing valid, reliable, and practical animated video learning media. This aligns with previous research, such as that conducted by Rizaldy (2019), which shows that animated learning media can activate students' learning process, creating interest and motivation in learning mathematics. Furthermore, the results of this research support Jintapitak's (2018) theory, which states that animated stories have the appeal of attracting the audience's attention. Therefore, animated video media can effectively attract students' interest in the mathematics learning process. Apart from that, Shefia's (2023) findings also support the results of this research by showing that the use of interactive media such as Lectora Inspire and Plotagon Story can improve student learning outcomes and inspire student enthusiasm and enthusiasm in responding to the challenges presented in these media.

Animated stories or cartoon films are clear examples of creative works that utilize computer application facilities in the multimedia field. This is done by combining images, text, audio, animation, and video to modify a series of still images into images that appear to move and sound, forming an interesting story structure. (Pahrulroji et al., 2020; Uroskie, 2012).

Animation-based learning media, such as Plotagon Story, have significant benefits. First, animation can increase student engagement because it tends to be more interesting and attracts attention than static learning methods. (Ayu et al., 2023; Faber et al., 2023; Passalo et al., 2022). This helps students become more focused and involved in the learning material. Second, the visualization

presented in animation can help explain abstract or difficult concepts in a way that is easier to understand (Agustini et al., 2020; Aysolmaz & Reijers, 2021; Hanif, 2020; Shafira & Handayani, 2022). Third, understanding concepts can be improved through dynamic and moving visual images, making it easier for students to understand and remember information. (Brunyé et al., 2019; Hernandez-de-Menendez et al., 2020; Kılıçkaya, 2020; Elmunsyah et al.). Finally, the interactive Ness of animated media allows students to actively participate in learning, such as answering questions, exploring content, or even solving problems. (Daryanes et al., 2023; Hanif, 2020; Shaleha et al., 2023; So et al., 2019).

Plotagon Story, as an animation creation software, can be downloaded for free via the link <https://plotagon.com/>. Although there are several types of Plotagon, this research will use story Plotagons (Saputra et al., 2022). Even though Plotagon Education is designed as a learning medium, its use has time limitations, so researchers chose Plotagon stories with almost the same function. Released in Stockholm, Sweden, in 2012, Plotagon allows users to create 3D animations without requiring special training. The animator only needs to select the background and enter the story text to create the animation. The advantages of Plotagon involve the ease of downloading, no costs, and the need for special skills, as animators can create animations simply by creating a script and selecting readily available characters and settings. In addition, the characters in Plotagon can be customized according to needs.

According to Mahliatussikah (2021) Lectora Inspire is an authoring tool developed by Trivantis Corporation designed to create e-learning content. It enables users to develop online courses swiftly and requires minimum system specifications like other software authoring tools. Lectora Inspire stands out due to its rapid development and numerous advantages over other e-learning authoring tools. These benefits include its capability to create websites, interactive e-learning content, and product presentations or company profiles. Its features particularly support novice users in creating multimedia learning, incorporating audio and video elements. For educators, Lectora Inspire simplifies the process of creating learning media with its comprehensive templates and helpful Media Library. Additionally, it offers the flexibility to convert PowerPoint presentations into e-learning content. The content created with Lectora Inspire can be published in various formats, including HTML5, single file executable (exe.), CDROM, or e-learning standards such as SCORM and AICC. The interface of Lectora Inspire consists of four main sections: the menu, Toolbar, Title Explorer, and Working Area. The diverse features and user-friendly design make Lectora Inspire an excellent choice for developing e-learning content for various purposes and needs.

Thus, the conclusion from the results of this research is that animated video learning media has great potential to contribute positively to mathematics learning. The effectiveness of this media in increasing students' understanding of mathematical concepts is visible in terms of the final research results and the extent to which the media can encourage student involvement, create interest in learning, and build high motivation. As an alternative solution, the use of animated video learning media can provide a new color to the mathematics teaching approach, helping teachers achieve learning goals more effectively.

IV. Conclusions

Based on the research findings, it can be concluded that the animated video media developed is valid, practical, reliable, and suitable for use in mathematics subjects to improve students' understanding of mathematical concepts. In the assessment of Material Experts and Media Experts regarding the validity of the instruments given, it is known that learning media based on Plotagon Story and Lectora Inspire are valid. Validation produced an average score of 89%, 81% - 100%, and is classified as "very valid" criteria. From the results of the questionnaire on the practicality of learning media by mathematics teachers and students, a practicality percentage of 86% was obtained, which is in the range of 81%-100%. This shows that Interactive Learning Media, in the form of animation videos with the help of Plotagon Story and Lectora Inspire, is based on an assessment by a guru.tesonlineku.com, is classified as "very practical." Based on the results of the N-Gain test, it was found that students' skills in understanding mathematical concepts increased by around 67%. The weaknesses and limitations of this research lie in the complexity and dynamics that continue to change in the learning environment or context. These models may not be able to address these dynamics effectively.

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