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Development of web-based learning media with a realistic mathematics education approach to increase student self-determination

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Abstract

This study aims to: (1) develop and validate web-based learning media utilizing Google Sites with a realistic mathematics education (RME) approach on linear inequality material in one variable that is valid and effective; (2) enhance students' self-determination in mathematics. The subjects consisted of 27 seventh-grade students from a junior high school in Lhokseumawe City, Aceh. This research employed the research and development (R&D) method using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The instruments used include expert validation sheets, student response questionnaires on the practicality of the media, and student self-determination questionnaires. The results indicate that the web-based learning media with the RME approach on linear inequality in one variable is suitable for use and improves students' self-determination in mathematics. This study highlights the potential benefits of web-based learning with the RME approach in mathematics education.

Keywords:
Google sites, Realistic mathematics education, Self-determination

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1. INTRODUCTION

Self-determination is a critical aspect of mathematics learning, referring to an individual's ability to organize and motivate themselves to achieve a desired goal (Ryan & Deci, 2020). High self-determination in mathematics learning can positively influence how students approach challenges, solve problems, and utilize learning opportunities. Students with strong self-determination tend to maintain a positive attitude toward mathematics, persist in solving complex tasks, and develop effective learning strategies. This disposition enables them to tackle mathematical problems confidently and creatively, fostering

motivation and enthusiasm in their learning experience. When faced with difficult problems requiring deductive reasoning, these students are more likely to persist in finding solutions and building their mathematical reasoning skills (Wilujeng, 2018; Yotha & Rojchaphot, 2022). Self-determined students also report higher satisfaction and engagement with mathematics, utilizing problem-solving strategies and collaborating with peers, which contributes to a supportive learning environment and overall academic success (Ampadu & Anokye-Poku, 2022).

In particular, Linear Inequality in One Variable is a fundamental concept in algebra that presents significant challenges for students. These challenges are often linked not only to the inherent complexity of the subject but also to low levels of self-determination (Dimitriadou et al., 2023; Knopik & Oszwa, 2023; Yotha & Rojchaphot, 2022). Observational data suggests that students lacking autonomy and motivation in mathematics often struggle to engage meaningfully with mathematical concepts. This disengagement is frequently attributed to teacher-centered methods that limit opportunities for independent learning and contextual relevance, leading students to perceive mathematics as disconnected from real-life applications (Hofer et al., 2022; Nasruddin et al., 2022; Putrawangsa & Hasanah, 2018; Putri & Junaedi, 2022). As a result, fostering self-determination in mathematics learning, especially for complex topics like linear inequalities, becomes essential not only for academic performance but also for instilling lifelong mathematical interest and skills (Putri et al., 2023; Simanungkalit et al., 2021; Takiuddin, 2022).

Despite these insights, research has yet to address instructional methods that directly enhance self-determination through technology, particularly within the Realistic Mathematics Education (RME) framework. RME, which encourages students to connect mathematical concepts with real-world contexts, has shown promise in improving engagement and fostering deeper conceptual understanding (Bayrak & Aslanci, 2022; Prahmana et al., 2020). However, few studies explore RME's impact on self-determination specifically, particularly in the context of web-based platforms like Google Sites, which offer a range of interactive features for creating a student-centered learning environment. The challenge lies in the limited resources for educators to develop RME-based digital learning materials that effectively promote both understanding and autonomy in mathematics (Patullayeva, 2022; Siregar et al., 2022).

Given these challenges, this research addresses a significant gap by developing a web-based learning medium via Google Sites grounded in the RME approach to specifically target self-determination in mathematics, focusing on the topic of linear inequalities. Existing studies highlight the benefits of RME and technology-based learning tools individually; however, there is minimal integration of these methods aimed at bolstering self-determination in mathematics. Therefore, this study contributes a novel perspective by combining RME and Google Sites to create an interactive and supportive learning platform, addressing both conceptual understanding and student autonomy (Harahap, 2021; Purna et al., 2021). Through this approach, it is anticipated that students will not only gain mathematical competencies but also develop a strong, self-motivated approach to learning mathematics.

2. METHOD

Development with the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation) in this study aims to produce Google Sites-based Learning Media with the RME approach to improve students' mathematical abilities, especially in linear inequalities of one variable. The development process follows the stages of the ADDIE development model, as depicted in Figure 1 (Hidayat et al., 2023).

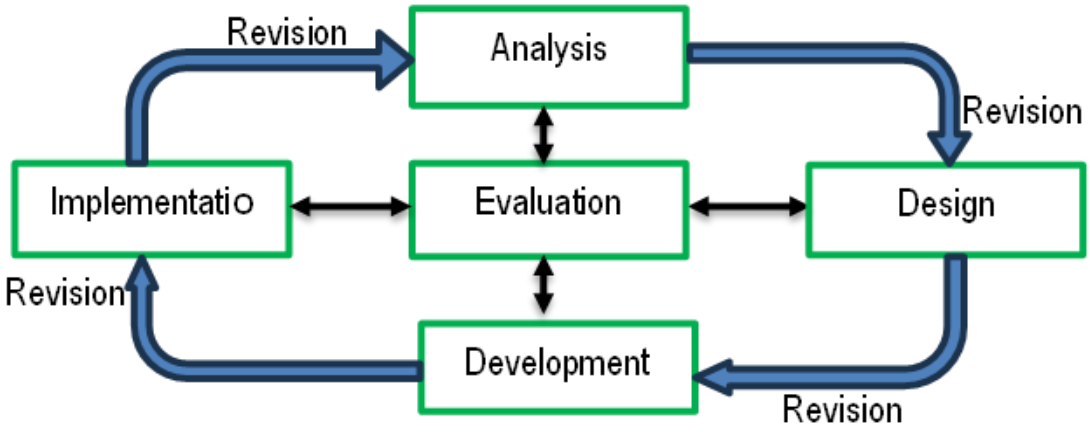

Figure 1. ADDIE development model

2.1. Analysis Stage

The explanation for the ADDIE stages in this study begins with the analysis stage, interviews and needs identification were conducted supported by questionnaires on students' self-determination of mathematics learning and their perceptions of their mathematics abilities. In addition, interviews with teachers allowed for a deeper exploration of the obstacles in the learning process so far, providing valuable insights for developing effective teaching strategies.

2.2. Design Stage

In the Design stage, interactive, interesting, and relevant learning media were developed, ensuring that learning objectives were achieved. This was done by integrating media supported by other Google features such as Google Forms, YouTube, Interactive Quiz Worksheets, and material simulations through PhET. These additional Google features enhance the learning experience by providing various methods of delivering and interacting with information.

2.3. Development Stage

At this stage, the learning media is validated to assess its feasibility and provide feedback on the media design. This validation was carried out by two expert lecturers in the field of content and media as well as a small group of students who provided user validation. Expert lecturers thoroughly analyze the content of the learning media to ensure that it is aligned with the curriculum and effectively conveys the concept of linear inequality. Simultaneously, they evaluate the design of the media, including layout, visuals, and

interactive elements, to ensure that the content enhances the learning experience. Students in small groups provide valuable feedback on their user experience, highlighting areas of confusion or suggestions for improvement to make the learning media more intuitive and user-friendly. Overall, this comprehensive validation process ensures that Google Sites-based learning media with a high-quality RME approach meets the needs of teachers and students.

2.4. Implementation Stage

At the implementation stage, 27 Grade VII Junior High School students in Lhokseumawe City, Aceh consisted of 10 female students and 17 male students. Accessing one-variable linear content through Google Sites has never been done before in the learning process. In addition to achieving the objectives of this research, this study also aims to assess students' self-determination. Therefore, the self-determination questionnaire is given at the beginning and before the learning process with indicators including self-awareness (Know yourself), perception of choice, intrinsic motivation (competence), and extrinsic motivation (relationship/connectedness). The questionnaire consisted of 20 statements including negative and positive statements.

2.5. Evaluation Stage

In the last stage of ADDIE, the media was tested with 27-grade VIIA students at a junior high school in Lhokseumawe City, Aceh. Furthermore, a self-determination questionnaire was conducted for these 27 students to collect information about the level of self-determination after using the media. All data in this study are presented in the stages of its development. To ensure valid results, validation is carried out by two expert validators in both the subject matter and. Furthermore, the results are categorized based on the eligibility criteria (Rohaeti et al., 2023), which can be shown in the following Table 1.

Table 1. Formatting rules

Percentage	Criteria	Explanation
80% - 100%	Very Feasible	No Revision Required
60% - 79,9%	Feasible	No Revision Required
40% - 59,9%	Fair	Revision Required
0% - 39,9%	Not Feasible	Major Revision Required

3. RESULTS AND DISCUSSION

3.1. Results

In the analysis stage, we found an urgent need for innovative interactive learning media in mathematics classrooms. Based on interviews with teachers, the media currently used is limited to traditional teaching aids such as whiteboards, printed books, and Regular Student Worksheets, which lack interactive learning and often make the learning atmosphere monotonous. Previous studies have shown that a limited learning environment can inhibit students' self-determination in learning, which is very important in mathematics learning

(Meliala, 2022; Zimmerman & Schunk, 2011). This condition was seen in our initial survey, which indicated the low self-determination of students toward mathematics in grade VII of junior high school in Lhokseumawe, Aceh. This limitation contributes to low mathematics learning outcomes among students and a low level of self-determination in mathematics, as indicated by the results of the student self-determination before instruction questionnaire presented in Table 2.

Table 2. Results of the student self-determination questionnaire

No	Indicator	Percentage
1	Self-Awareness	68%
2	Perceived Choice	59%
3	Intrinsic Motivation	65%
4	Extrinsic Motivation	68%

The data in Table 2 was obtained from a survey of 27 seventh-grade students in junior high schools in Lhokseumawe City, Aceh. The survey consisted of 20 statements, categorized into four indicators, with details of the number of statements: 4, 5, 6, and 5 respectively for the four indicators. The questionnaire results showed some interesting insights into students' motivation and autonomy in the context of mathematics education, which contributed to an understanding of how students perceive and interact with these subjects. The Self-Awareness indicator highlights that only 68% of students already have self-awareness in learning mathematics. This level of self-awareness indicates that the majority of students are unable to recognize their strengths and weaknesses related to the math material being studied. Good self-awareness is an important component in increasing internal motivation and learning sustainability (Zimmerman, 2000). When students realize what they need to improve, they are better prepared to face the challenges that exist in the math learning process. In this context, strong self-awareness allows students to become more independent and reflective in their learning process.

The second indicator in the form of Perceived Choice shows a value of 59%, which is lower than other indicators. This indicates that students still feel less free to choose learning methods or strategies that suit their needs. The perceived low choice score may be due to a learning approach that tends to be instructional and less flexible. Autonomy in learning is one of the main factors that drive students' intrinsic motivation (Ryan & Deci, 2000). By increasing the space for students to choose and direct their learning, the likelihood of student engagement and interest in math will increase.

A score of 65% on the Intrinsic Motivation indicator indicates that students who already have intrinsic motivation for mathematics are not relatively high, where students do not feel compelled to learn not only for external reasons but also because of their interest and satisfaction in understanding the mathematical material. Intrinsic motivation has a very positive impact on deep understanding and perseverance in learning (Dweck, 2006). When students are happy with the material they are learning, they tend to have stronger attachments and are better able to overcome difficulties and understand mathematics, which is an important capital in long-term learning. The last indicator in the form of extrinsic motivation, also received a score of 68%, showing that there are still many students who are not

sufficiently motivated by external factors, such as appreciation, recognition, or encouragement from teachers and parents. External motivation can act as an additional support that strengthens intrinsic motivation, especially in the context of formal learning. Research shows that extrinsic motivation balanced with intrinsic motivation can increase students' academic achievement without reducing their interest in learning (Hamzah, 2019).

The result of observations also shows that the available teaching materials tend to be no longer relevant to the latest developments, making it difficult for students to relate the concepts they learn to real applications. Learning centered on traditional textbooks and Student Worksheets that are limited to repetitive materials makes it difficult for students to understand abstract concepts, especially in single-variable linear inequality materials. In response, stakeholders, including teachers, principals, and education offices, can initiate the use of more up-to-date and relevant resources to improve the quality of math education. The procurement of web-based learning media or interactive applications can help students develop a deeper understanding of concepts, especially on challenging materials. However, keep in mind that students' academic achievement is not only affected by the availability of resources (Lone, 2021). Other factors such as students' personal motivation, study habits, family support, and parental involvement in the learning process also play an important role in their academic development (Mata et al., 2018). For example, students with high internal motivation tend to be better able to survive and succeed in challenging learning tasks, even with limited resource support. Therefore, changes in the provision of resources must be accompanied by an approach that focuses on increasing students' intrinsic motivation, such as building a collaborative learning atmosphere, appreciating student efforts, and introducing materials that are relevant to daily life.

Based on the results of the analysis, at the design stage, product design was carried out to develop Google Sites-based learning media with the Realistic Mathematics Education (RME) approach, mainly focusing on the linear inequality of one variable. Based on the results of the analysis, six main menus are needed, namely home, purpose, material, video, simulation, and evaluation with each menu being interrelated and spread with their respective contents. The results of the media shape design can be illustrated in Figure 2.

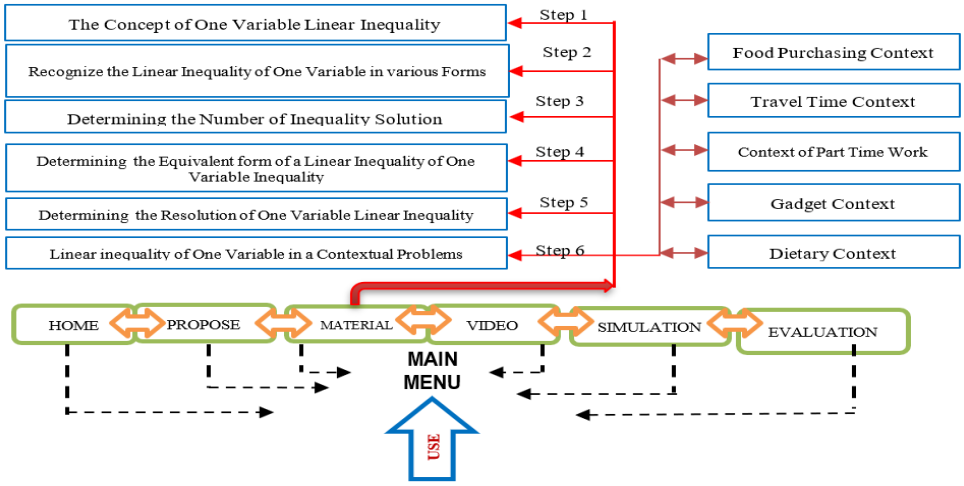

Figure 2. Design of the media flow structure

Furthermore, the media structure in Figure 2 is designed to be displayed on the Google Site Main Menu as shown in Figure 3.

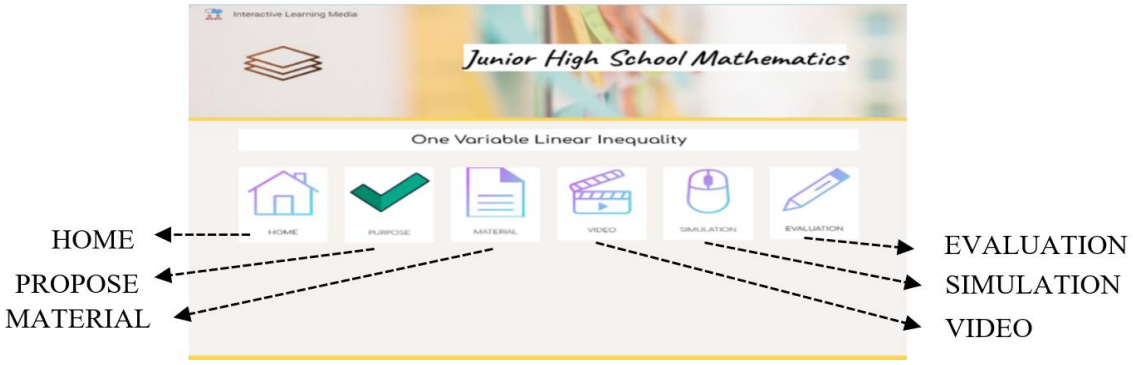

Figure 3. Layout design on google sites

The "Proposal" menu contains a map of concepts and learning objectives, while the "Material" menu includes sub-materials that must be studied. The "Videos" menu contains a collection of videos that serve as learning resources for students to understand the material. The "Simulation" menu contains animated game content supported by PhET. The "Evaluation" menu consists of self-paced exercises linked to Google Forms and Quizizz links. The display of each menu is contained in the following Figure 4.

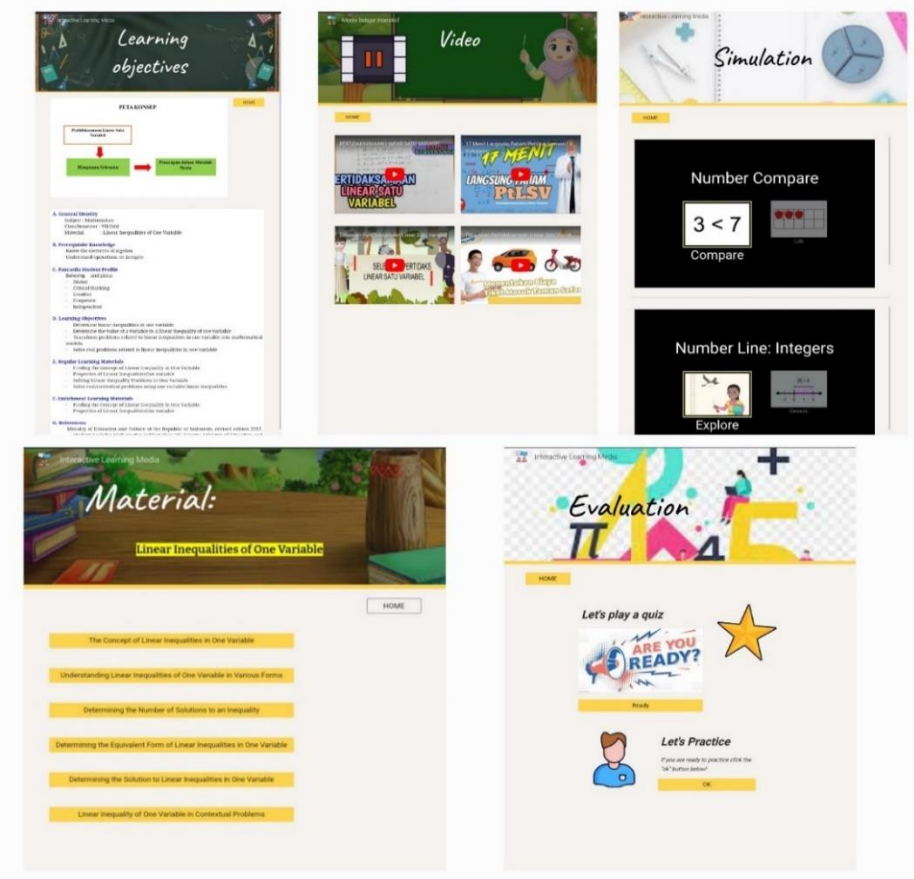

Figure 4. The display of each menu

The content contained in each menu can be accessed at any time by students and even students can repeat it at any time if there is still material that has not been understood. The content contained in each menu can be accessed at any time by students and even students can repeat it at any time if there is still material that has not been understood. At this stage of development, because the media is created using the Google Sites platform, it combines and incorporates features such as Google Drive, YouTube, and PhET links in each menu that has been designed, where these features are already provided by Google. These features allow the integration of different types of media content such as documents, videos, and interactive simulations in each main menu as shown in the "Simulations" menu that integrates PhET (see Figure 5).

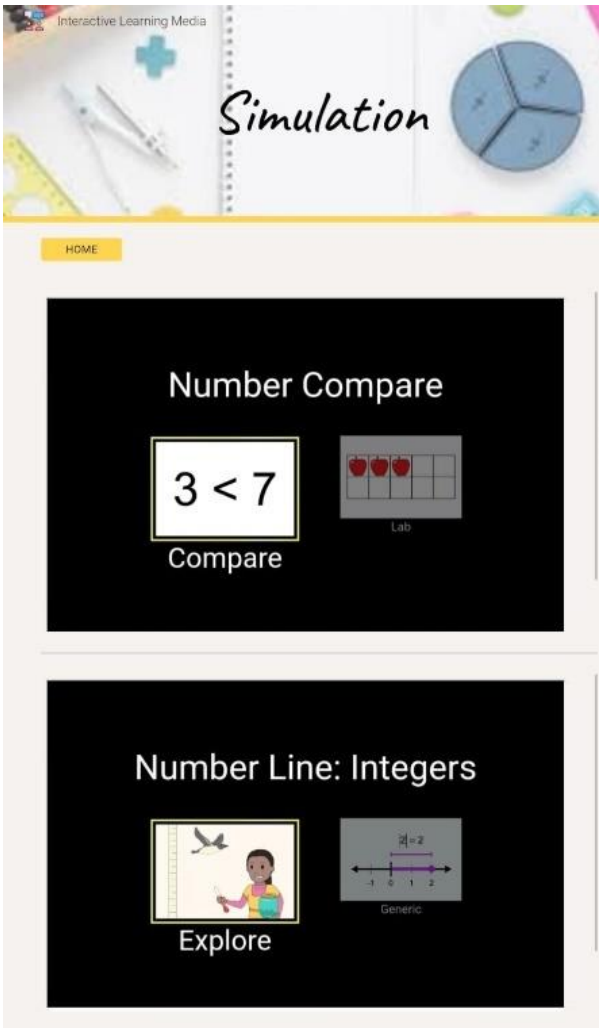

Figure 5. Simulation menu

In this Simulation menu, students only need to click on one of the simulations, then students can do a simple and interesting game. The simulation game is intended to repeat the initial materials that students must remember again, which are related to the material of linear inequalities of one variable, such as the Number Compare activity shown in Figure 5. Likewise, in other menus of Google Sites media, such as in the Material menu under the sub-section Getting to Know the Linear Inequality of One Variable in Various Forms, each topic

is presented interactively with YouTube videos and exercises designed to keep students engaged throughout the learning process. The integration of multimedia and interactive elements within each section ensures that students encounter the material in a variety of formats, which aids in reinforcing their understanding and retention. Furthermore, the exercises are crafted to challenge students progressively, encouraging them to build confidence as they practice and apply new skills. Teachers can monitor student progress in completing exercises and assignments through integrated response links for each question, allowing for real-time evaluation of student understanding and participation, as shown in Figure 6.

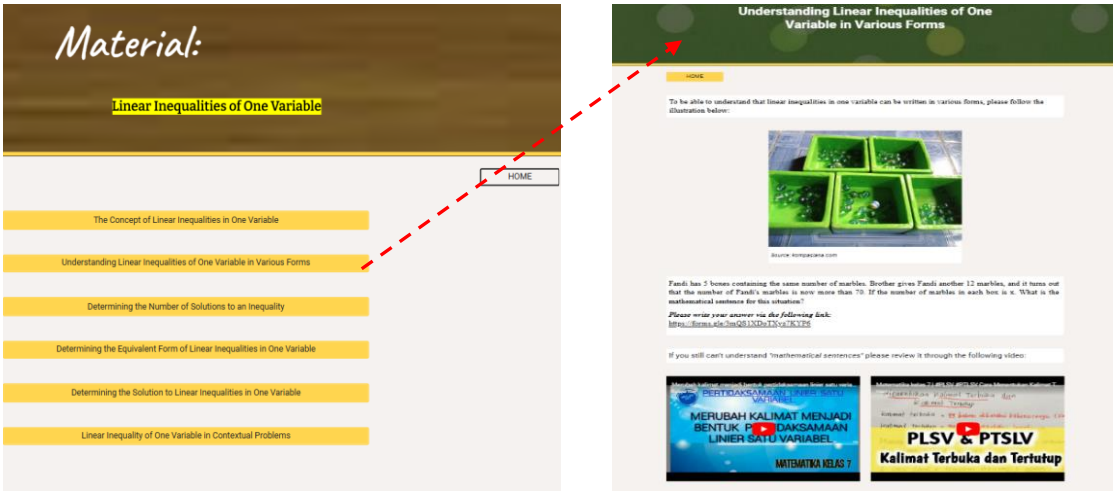

Figure 6. Material menu

Figure 6 shows a detailed display of the sub-material sub-material "Getting to Know the Linear Inequality of One Variable in Various Forms", which contains a Google Form link to monitor student work results and a YouTube video that students can use to learn and repeat the material whenever students want. Likewise in the presentation of sub-material in the other material menu. based on the results of the resulting Design and Development, then validation testing is carried out. The results of media validation carried out by media expert validators are summarized in the following Table 3. The results of the media validation are presented in Table 3.

Table 3. Results of the media validation

Aspect	Percentage
Media quality	89.09%
Language usage	85.00%
Media layout	88.00%
Average	**87.36%**

From Table 3, it can be seen that the percentage of media quality is higher than other aspects. However, the lowest aspect, namely the language use aspect, did not show a much lower percentage, standing at 85% of the average percentage of the three aspects in the media validation assessment, which was 87.36%. Therefore, with the average percentage obtained

from all three aspects, the criteria show that it is very feasible (see Table 1). Based on the results obtained, it can be concluded that in terms of media aspects, the media is suitable for use without the need for significant improvements. Furthermore, based on the validation of material experts, the average percentage value is obtained in Table 4. The average percentage value obtained from the validation of material experts is 92.15%. This shows that the material used in the media is very valid and reliable. In addition, the materialist's validation shows that there is no need for any major changes or improvements in the material.

Therefore, overall, both the media and the materials used in the assessment are considered very suitable for use. The high average percentage value of 92.15% obtained from material expert validation indicates that the material used in the media has been well-researched and accurately represents the intended concept. This level of validity gives confidence to users and ensures that the assessment accurately measures the desired results. A positive result from material expert validation also validates the effort made to develop the material, confirming that they are effectively assessing the targeted skill or knowledge. Overall, the validation results support the conclusion that the media and material are very suitable for use. Furthermore, based on the material expert validation, the average percentage value is obtained in Table 4.

Table 4. Results of material expert validation

Aspect	Percentage
Material suitability	94.37%
Language proficiency	80.00%
Presentation	86.67%
Media effect on strategy	84.00%
Overall appearance	80.00%
Average	**85.01%**

Based on Table 4, the results of material validation indicate the highest percentage in terms of material feasibility, reaching 94.37%. In the presentation aspect, the percentage is 86.67%. However, in terms of authenticity and the overall appearance of the media, the percentage is 80%. This percentage is not significantly different from the average percentage obtained from the five aspects measured in the validation by content experts, which is 85.01%. These results also indicate a "very feasible" criterion. Based on the validation results from content and media experts, the generated media can be further tested. Further testing of the generated media should focus on specific areas of improvement to enhance authenticity and overall appearance. The feedback from content and media experts suggests that the media is highly reliable and meets the "very feasible" criterion, indicating that it is suitable for further evaluation and refinement.

This validation process ensures that the generated media aligns with high standards and can be considered a viable option for future use. Furthermore, user testing can also be conducted to gather feedback on the usability and user experience of the generated media. By involving the target audience in the testing process, any potential flaws or areas of improvement can be identified and addressed. Additionally, conducting comparative studies

with existing media can provide valuable insights into the effectiveness and competitiveness of the generated media. Overall, this comprehensive testing approach will help ensure that the generated media not only meets high standards of authenticity and appearance but also delivers a seamless and engaging user experience.

In the implementation stage, the small group trial involved eight students from the seventh-grade students Junior High School in Lhokseumawe City. The small group trial was conducted to observe the students' responses to learning media based on Google Sites with the Realistic Mathematics Education (RME) approach on the topic of linear inequalities in one variable. The results of the student response questionnaire are obtained and presented in Table 5.

Table 5. Student responses to the suitability of the media

No	Student	Sum	Average Score	Percentage
1.	S1	50	3.33	82.00%
2.	S2	51	3.40	87.00%
3.	S3	53	3.53	92.00%
4.	S4	54	3.60	87.00%
5.	S5	51	3.40	82.00%
6.	S6	51	3.40	85.00%
7.	S7	52	3.47	85.00%
8.	S8	55	3.67	92.00%
Average				**94.40%**

According to Table 5, it is known that a small group trial was given to 8 junior high school students in Lhokseumawe City to assess the feasibility of Google Sites-based learning media with an RME approach on the topic of linear inequality in one variable. All show percentages above 80%. Two students scored 82%, two students scored 85%, two students scored 87%, and finally, two students scored 92%. From a detailed percentage breakdown of how students feel about the product's feasibility, we can see that the average percentage of students who favor Google Sites-based learning media with an RME approach to linear inequality in one variable is 94.4%. This means there is no need for revision. This high average percentage indicates that the majority of students consider Google Sites-based learning media with an RME approach to linear inequality in one variable effective and beneficial. With an average above 90%, it is clear that the majority of students respond positively to this method.

The results showed that the material presented was well received and understood by students, further supporting the idea that no revision was required. In addition, feedback from students regarding the interactive nature of Google Sites-based learning media is very positive. Many students mentioned how interesting and interactive the material was, which contributed to the understanding and retention of their concepts. This positive response further reinforces the effectiveness of this approach and reinforces the conclusion that no revision is needed. A high average percentage and positive feedback suggest that the

combination of Google Sites and the RME approach to linear inequality in a single variable is a successful instructional method.

The next step involved a trial with a larger group of 27 students from class VII of junior high school in Lhokseumawe City, Aceh. The obtained average percentage was 87%, indicating that the media is highly suitable for use in the learning process. To assess the improvement in students' self-determination at the beginning of the learning process before using learning media based on Google Sites with the Realistic Mathematics Education (RME) approach on the topic of linear inequalities in one variable, 27 students in class VII Junior High School in Lhokseumawe City were given a self-determination questionnaire that had been validated. The results of the students' self-determination questionnaire are presented in Table 6.

Table 6. Results of the student self-determination questionnaire

No	Indicator	After Learning	
		Average	Percentage
1	Self-awareness	96.50	89.00%
2	Perceived choice	95.40	88.00%
3	Intrinsic motivation	109.80	85.00%
4	Extrinsic motivation	95.33	88.00%

Table 6 shows that overall there was a percentage increase for all indicators compared to the results of the pre-learning student determination questionnaire (see Table 1). In the first indicator, which is about oneself, there was an increase of 21%; on the second indicator of the feeling of making a choice, there was an increase of 29%; Meanwhile, in the third and fourth indicators, in the form of intrinsic and extrinsic motivation, a difference in the percentage of grades was obtained with the questionnaire determining students before learning with the same percentage, which is 20% each. Overall, the results of the pre-learning student determination questionnaire showed significant improvements in various indicators. A 21% increase in the first indicator indicates that students have gained a better understanding of themselves and their abilities. A 29% increase in the second indicator indicates that students now feel more empowered and confident in making choices. Interestingly, the third and fourth indicators showed the same percentage increase of 20%, indicating that both intrinsic and extrinsic motivation have been positively influenced through the learning process.

These findings highlight the effectiveness of learning programs in increasing student determination and motivation. Furthermore, the fifth indicator, which measures overall satisfaction with the learning program, experienced a significant increase of 35%. This shows that students not only feel more empowered and motivated but also genuinely enjoy the learning experience. Such a high level of satisfaction is essential for long-term engagement and continuous improvement. Taken together, these findings demonstrate the profound impact of learning programs on students' self-perception, motivation, and overall learning journey, paving the way for future success.

From the calculation of student self-determination questionnaires after using Google Sites-based learning media with the RME approach on linear inequality material one variable shows results in the form of data of minimum values of 65, maximum 109, mean 73.48, and Standard deviation of 8.026. From these grades, the final results of the student self-determination questionnaire can be shown in the number of students at each level of student self-determination shown in Table 7.

Table 7. Self determination category

No	Category	Score Range	Frequency	Percentage
1	High	X > 81	4	14.00%
2	Moderate	65 ≤ X < 81	22	81.00%
3	Low	X < 65	1	3.70%

Based on Table 7, provides a specific picture of the level of student self-determination towards mathematics after learning using Google Sites-based learning media with an RME approach to one variable linear inequality material. It can be seen that the high determination category has a student self-determination questionnaire score of more than 81% and this is as many as 4 students with the percentage being 14%. In the low category, with a questionnaire score of 65%, one student had a percentage of 3.7%, and 22 students were already in the category of medium student self-determination. When students used Google Sites-based learning materials with an RME approach on a single variable of linear inequality material, only 3.7% of them were still in the low category for self-determination in mathematics. This is because the data paints a clear picture.

When students interact with Google Sites-based learning materials using the RME approach on one variable linear inequality material, students' level of self-determination in mathematics will increase significantly. The data clearly shows that only 3.7% of students remain in the low category after utilizing these resources. It highlights the effectiveness of combining technology and student-centered approaches in promoting self-determined learning in mathematics. By leveraging Google Sites-based learning materials with an RME approach, students can take ownership of their learning and actively engage with the material. The significant improvement in their level of self-determination in mathematics is evident from the data. This suggests that combining technology and a student-centered approach can foster a sense of autonomy and independence, ultimately promoting a more effective and enjoyable learning experience in mathematics.

3.2. Discussion

The findings from the application of Google Sites-based learning media with the Realistic Mathematics Education (RME) approach show a promising impact on student learning outcomes in mathematics. This approach not only supports autonomy in learning but also fosters critical thinking skills, as seen in students' increased enthusiasm and independence when working on linear inequality exercises. This is in line with the idea that web-based platforms, especially when paired with the RME framework, facilitate a student-centered learning environment that encourages active engagement and analytical reasoning (Fauzan et al., 2024; Hidayat & Aripin, 2023; Palinussa et al., 2025).

Students work on the questions presented with full accuracy and then upload the answers to the Google Form link provided. This systematic approach not only tracks their understanding but also supports self-assessment, as students can review their answers and make improvements. By submitting their work digitally, students receive timely feedback, helping them address mistakes or misunderstandings in their problem-solving process. This feedback loop strengthens learning and fosters confidence, encouraging students to approach future tasks with greater independence and precision (Wijayanto et al., 2022; Wongvorachan et al., 2022). Students can understand problems well and show a willingness to try even though they don't have to do and learn the material in a classroom that is directly controlled by the teacher. This can be seen from the results of student answers uploaded in each context of the problem presented. The following is the display of the answer from one of the students (see Figure 7).

Figure 7. Issue and student answer

In Figure 7, students do the questions presented with full accuracy and then upload the results of the answers into the Google Form link that has been provided. Students can understand problems well and show a willingness to try even though they do not have to work on and study the material in class, which is directly controlled by the teacher. This level of independence and accountability prepares students for real-world situations where they need to take initiative and complete tasks on their own (Sari et al., 2021). In addition, by uploading the results of their answers, students can receive timely feedback from their teachers, allowing them to identify areas of weakness and make improvements. Overall, this approach promotes a sense of responsibility and fosters a growth mindset among students.

The contextual nature of RME income in this digital format gives students the autonomy to manage tasks autonomously, encouraging skills such as accountability and self-management. These findings are consistent with studies that highlight the effectiveness of web-based learning in fostering real-world competencies, such as problem-solving and self-paced learning (Sutarni et al., 2024; Yuanita et al., 2018). Additionally, students' initiative in completing assignments accurately and submitting their work through Google Forms reflects a higher level of intrinsic motivation and engagement. Providing timely feedback grades in reinforcing student learning can support the practice of reflection (Panjaitan et al., 2023). The development of critical thinking and analytical skills through RME-based digital learning further underscores the relevance of contextual problems in mathematics (Jupri, 2018; Van den Heuvel-Panhuizen & Drijvers, 2014). Through the digital RME approach, students engage as active participants in their learning journey, demonstrating improved problem-solving skills and resilience in the face of challenges.

4. CONCLUSION

The research has shown that the use of RME (Realistic Mathematics Education) learning media through digital transformation (Google Sites) on the topic of Linear Inequalities in One Variable can enhance students' self-determination in mathematics. By providing real-world context to students within the presented learning material, students are more likely to perceive the relevance and importance of mathematics in life. Additionally, the use of digital technology can offer students more opportunities for self-directed learning and collaboration with their peers. Overall, the combination of RME and digital transformation can contribute to improving students' self-determination in mathematics. Due to the limitations of this study, further research in this matter is highly recommended.

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Declarations

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