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Development of Interactive Learning Media using Scrath to Increase Students' Motivation to Learn

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ABSTRACT

This research was conducted to overcome the problem of low student learning motivation in Informatics subjects at SMPN 2 Hu'u which is often caused by conventional learning methods and limitations of interactive media. The purpose of this research is to develop Scratch-based interactive learning media that is able to increase student motivation and involvement in the learning process. This development follows the ADDIE model which consists of Analyze, Design, Development, Implementation, and Evaluation stages. Data collection was carried out through observation, interviews, expert validation, and practicality questionnaires involving teachers and students. The results of expert validation showed that the media was in the very feasible category with an overall score above 80 percent, while the practicality test showed a positive response from both teachers and students with an average score above 85 percent. These findings prove that Scratch-based media is not only feasible and practical but also effective in creating a fun and interactive learning atmosphere. In conclusion, the media developed in this study can be considered as an innovative solution to increase students' motivation to learn and improve the quality of Informatics education in schools.

1. Introduction

Education has a central role in human life because it not only aims to transfer knowledge but also forms skills, attitudes, and values that are in harmony with the demands of the times. Learning is one of the main pillars in the educational process which is expected to equip students with competencies in accordance with the curriculum that has been set (Ministry of Education, Research, and Technology, 2023),(Inayati, 2022). In the Indonesian context, the presence of technology-based learning is becoming increasingly urgent along with the rapid development of digital innovation. The integration of technology in education has been proven to improve the quality of learning, strengthen students' digital literacy, and support a more effective and interactive learning process. (Rohmah, 2023), explaining that the use of technology in post-pandemic learning not only accelerates learning activities but

also encourages the emergence of adaptive innovations. In line with that, (Fauziyah, 2023),(Sektiyawan et al., 2025) emphasized that technology-based learning fosters creativity and facilitates students' understanding of abstract concepts through interactive digital media.

Another important factor that determines the success of education is learning motivation. Motivation is a psychological component that affects students' attitudes, behaviors, and persistence in facing academic challenges. (Anwar & Lestari, 2022) Describe learning motivation as an internal drive that underpins student engagement in learning, demonstrated through attention, perseverance, and consistency in achieving goals. Students with high motivation tend to actively participate, pay attention to learning materials, and strive to achieve optimal achievements. In contrast, low motivation often leads to passivity, disengagement, and low academic performance. Furthermore, according to, (Hidaya, 2025) based on Self-Determination Theory, students' motivation is influenced by the fulfillment of three psychological needs: competence, autonomy, and social connectedness. When these needs are met, intrinsic motivation develops on an ongoing basis, which in turn increases student engagement in learning.

Informatics is one of the subjects that is considered challenging because it requires mastery of abstract and technical concepts. At SMPN 2 Hu'u, especially grade VII, many students showed low interest and difficulties in learning Informatics. This condition is caused by, among other things, teachers who do not have an academic background in the field of Informatics, so learning is highly dependent on textbooks and lecture-based explanations, (Puspita, 2024). notes that the theoretical and non-interactive teaching approach makes Informatics learning monotonous and less interesting, thereby reducing student motivation. In line with this, (Norma, 2024). Finding that interactive and engaging media design plays an important role in increasing student engagement and motivation during the learning process.

Learning media serves as an intermediary that makes learning materials clearer, more interesting, and easier to understand. The use of diverse media such as images, animations, videos, and digital applications can accommodate students' diverse learning styles and enhance understanding. (Putri, 2024) shows that interactive digital media significantly improves students' motivation and conceptual understanding, while (Astuti & Kustijono, 2022) emphasizing the effectiveness of animation-based learning in strengthening mastery of abstract material. In line with that, (Kurniawan, 2024) emphasizing that interactive digital media improves knowledge retention and builds a fun and collaborative learning environment.

One promising form of technology-based learning media is Scratch, a visual programming app that allows students to create interactive animations, games, and stories without the hassle of conventional programming languages (Kumawati, 2023) describes Scratch as an effective platform for developing educational game based learning media that encourages creativity and problem solving, (Hardiansyah et al., 2023) shows that Scratch based game learning media is effective in improving students' problem solving skills and motivation. (Hasryani, 2024), further argues

that game-based learning through Scratch creates an immersive learning experience, increases engagement, and fosters creativity and critical thinking.

Therefore, the development of Scratch based interactive learning media is seen as a strategic solution to overcome the low motivation of students in Informatics learning. These media are expected to provide an engaging, fun, and meaningful learning environment that not only boosts motivation but also enhances students' creativity, problem-solving skills, and digital competence. Based on these considerations, the purpose of this study is to test the feasibility and practicality of Scratch-based interactive learning media in order to improve student motivation and learning outcomes in Informatics subjects at SMPN 2 Hu'u.

2. Methodology

This research is a development research that aims to test the feasibility and practicality of learning media using scratch. In the development of this media, the ADDIE Model developed by Dick and Carry was used (Umami et al., 2021).

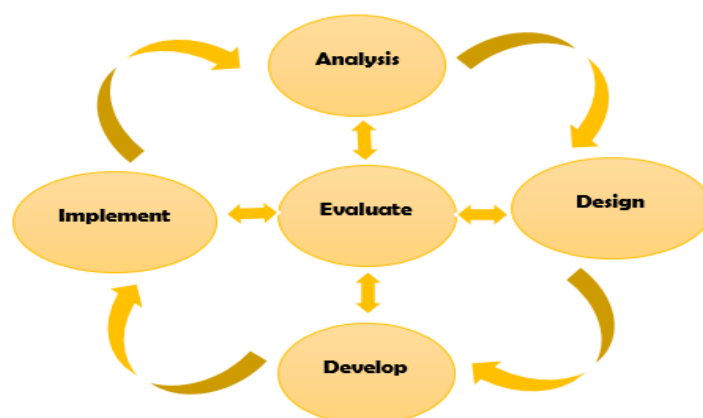


Figure 1. ADDIE Research Model

The ADDIE model consists of 5 stages, namely 1) Analyze, The analysis stage is the initial stage in the development research process. At this stage, the researcher conducts observations and interviews with the school to identify problems that occur in the learning process. Based on the results of observations at SMPN 2 Hu'u, it is known that the school has implemented the Independent Curriculum. However, several obstacles were found in the learning of Informatics subjects. Learning difficulties and low student motivation are caused by teachers who teach Informatics subjects who do not have a scientific background in the field. In addition, the learning approach used is still conventional, which only focuses on delivering material and relies on textbooks. The results of an interview with an Informatics teacher, Mrs. Rubiatunisa, revealed that students tend to feel bored and unfocused during learning. This causes a lot of learning time to be wasted on unproductive activities, such as playing and chatting, and a decrease in students' motivation to learn. 2) Design, In the design stage, the researcher begins to design interactive

learning media to be developed. The design process includes the collection of relevant learning materials, analysis of the curriculum, and design adjustments based on problems that have been identified at the analysis stage, especially related to low student learning motivation. Based on the results of the analysis, the researcher developed a scratch-based learning media framework, which was designed with interactive elements such as animation, visual presentation of materials, quizzes, and simple educational games. These elements aim to increase students' active involvement in the learning process in a fun way. 3) Development, then The development stage is the realization stage of learning media design. At this stage, the researcher began to create products in the form of Scratch-based learning media, which were designed as a tool in the learning process in the classroom. This product is then tested for feasibility by media experts and subject matter experts to ensure its quality and suitability with learning needs. 4) Implementation, The fourth stage is at the implementation stage, the learning media that has been developed is tested on grade VII students who are the subject of the research. The learning process is carried out using *a multimedia learning model*, which is expected to increase student motivation and learning effectiveness. 5) Evaluation, then the last stage, namely the researcher must conduct an ongoing evaluation, this aims to improve the media that has been developed.

Technical Data Collection

In this study, the data collection method was carried out with several techniques to support the development process of Scratch based interactive learning media and evaluate its effectiveness and practicality. The data collection techniques used include:

1. Observation was carried out at the Analyze stage in the ADDIE model, to identify problems that occurred in the informatics learning process at SMPN 2 Hu'u. The researcher directly observed students' learning activities, their involvement in learning, and the teaching approach used by teachers.
 2. Interviews are conducted with teachers of informatics subjects as authorities and understand the learning conditions in the classroom. The interview aims to dig deeper information about students' low motivation to learn and obstacles in delivering material.
 3. Validation Questionnaire
This questionnaire was used to obtain data from two experts, namely:
 - a. Material experts, who assess the suitability of the content and accuracy of the material presented in the media.
 - b. Media experts, who assess the appearance, interface design, and technical aspects of Scratch-based learning media.
 4. Practicality Questionnaire
This questionnaire was given to 20 grade VII students after using learning media. The questionnaire covers several aspects, such as Interest in Learning, Active Involvement in Learning, Relevance of Materials and Media, Self-Confidence and Satisfaction and Desire to Learn Again. The assessment uses a 5-point (1–5) Likert scale and the results are analyzed in
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the form of percentages to measure the level of practicality of the media based on the interpretation of the predetermined category.

Data Analysis Techniques

The data analysis in this study was carried out in a quantitative descriptive manner. The data collected comes from the validation of material experts and media experts, media practicality.

1). Validation Test

Validation is carried out by material experts and media experts. Data from the validation results were analyzed using percentage analysis techniques. (Arikunto, 2010), The formula used is:

$$\text{Percentage} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

2). Practicality Test

The practicality test was carried out to find out the extent to which Scratch-based interactive learning media can be used practically in the learning process by teachers and students. The instrument used is in the form of a practicality questionnaire given to teachers and students after they use the learning media. The respondents to the practicality test consisted of 1 informatics teacher and 20 students in grade VII of SMPN 2 Hu'u. The practicality questionnaire consists of several statements that include aspects of ease of use, clarity of appearance, comprehension of content, and effectiveness in supporting learning. The assessment uses the Likert scale with a score range of 1–5, namely, as shown in Table 1.

Table 1. Likert scale

Percentage	Category
81% - 100%	Strongly agree
61% - 80%	Agree
41% - 60%	Neutral
21% - 40%	Dissent
0% - 20%	Strongly Disagree

$$\bar{x} = \frac{\sum x}{n}$$

Remarks : $\bar{x}$ = Average score

$\sum x$ = Total value

N = Number of indicators assessed

3. Results and Discussion

The results of the implementation of Scratch-based learning media in the informatics learning process at SMPN 2 Hu'u show that this media is effective, feasible to use, and has a positive impact on student learning motivation. Further explanation is presented through the results of Validation, Display Documentation, and practicality

questionnaire data below. The results of the material validation of the two validators can be seen in Table 2.

Table 2. Material Validation

Aspects Assessed	Validator I	Validator II
Material Suitability	17	15
Truth and Accuracy	13	12
Completeness and Integration	12	12
Integration with Media	12	12
Total	54	51
Percentage	90%	85%
Average	13.5	12,75

Validation was carried out by two subject matter experts. Based on the results of the assessment, Validator I gave a total score of 54 with a percentage of 90% and an average of 13.5. Meanwhile, Validator II gave a score of 51 with a percentage of 85% and an average of 12.75. If referring to the eligibility criteria according to Arikunto, this result is included in the category of very feasible to use in terms of content/material. This assessment includes several important indicators. In the aspect of material suitability, the media obtained a high score because the learning content was considered relevant to the curriculum objectives and student needs. The aspects of truth and accuracy also received a good assessment, indicating that the information presented was valid, accurate, and scientifically accountable. In terms of completeness and integration, the material assessed is able to provide a complete and structured understanding so that it makes it easier for students to understand the learning flow. Meanwhile, the integration aspect with the media shows that the content has been presented in harmony with the visual appearance and media features used. The results of media validation by two validators are presented in Table 3.

Table 3. Media Validation

Aspects Assessed	Validator I	Validator II
Aspect of Display	17	16
Functionality Aspects	16	16
Consistent and integration aspects	10	8
Technical aspects of competence	10	9
Total	53	49
Percentage	82,81%	81,67%
Average	13,25	12,25

Based on the table, Validator I gave an overall score of 53 with a percentage of 82.81% and an average of 13.25. Meanwhile, Validator II gave a total score of 49 with a percentage of 81.67% and an average of 12.25. These two assessment results are in the category of very feasible to be used in learning. In more detail, the display aspect received a high score because the media was considered to have an attractive visual design and was easy for students to understand. The functionality aspect was also well assessed, which showed that the media could run according to the purpose and support learning activities effectively. In terms of consistency and integration, even though there is a slight difference in scores between validators, the media is

still quite integrated and consistent in presenting the material. Meanwhile, from the technical side, the media is considered to have met the eligibility criteria although there are still some suggestions for minor improvements to improve performance. An initial view of Scratch-based learning media is shown in Figure 2.



Figure 2. Media Preview

This image shows the first page or homepage of Scratch-based interactive learning media. This view is the entrance for students to start learning by clicking the start button, designed with an attractive interface to arouse students' curiosity from the start. This early look also emphasizes simplicity and clarity so that students can easily navigate the learning process without confusion. The main menu containing material, quizzes, and game options can be seen in Figure 3.



Figure 3. Menu

This image shows the main media menu, which contains options such as materials, quizzes, and games. The visualization is attractively designed to increase student engagement and comfort when using this learning medium. The presence of clear icons and labels helps students quickly select their desired learning activities. The display of learning materials in the media is shown in Figure 4.



Figure 4. Material Display

This image displays a page of materials that contains explanations of the subject matter, such as computer system concepts. The visual design and text are made simple yet informative to help students more easily understand the technical concepts of informatics learning. Content arrangements combine brief descriptions with visual elements such as images and animations, making abstract material easier to understand. Multiple-choice quizzes designed to measure student comprehension are shown in Figure 5.



Figure 5. Quiz View

This image shows the view of multiple-choice quiz questions related to the material being studied. This quiz is designed to be as engaging as possible to measure student understanding directly while also serving as a fun form of evaluation. Feedback is provided after each answer, so students can instantly know the correctness of their answers and strengthen their understanding. The educational game aspect of this medium is shown in Figure 6.

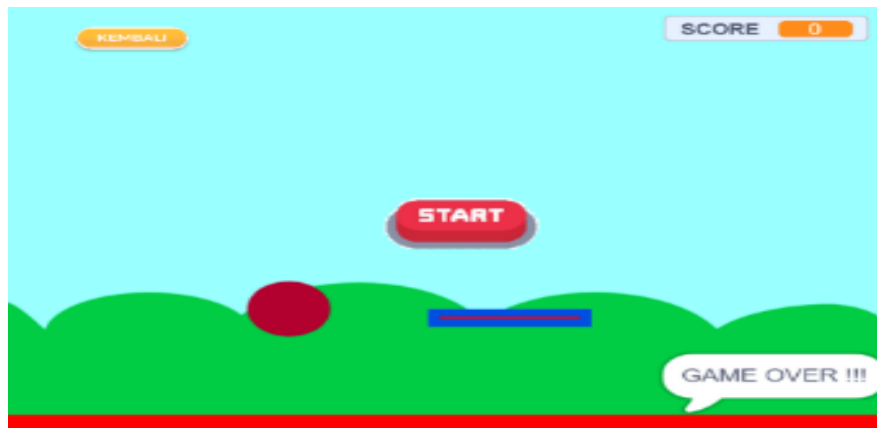


Figure 6. Game Display

This image shows the gamification feature of learning media, where students can learn while playing. The elements of the game are designed to resemble educational games to increase students' motivation to learn. Through interactive challenges, students not only remember the learning material but also practice critical thinking and problem-solving. The students' response to the use of this learning medium is shown in Figure 7.

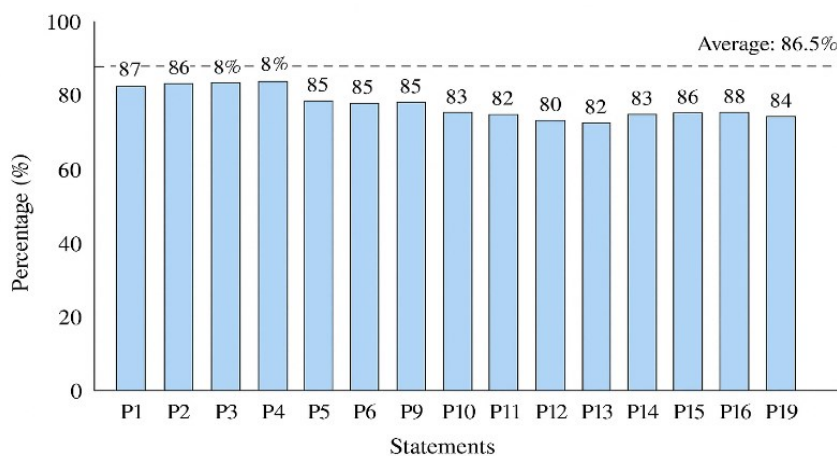


Figure 7. Student Media user Response Graph

This graph illustrates the results of students' responses to the use of learning media. Each statement (P1–P20) has a high score, with percentages between 83% and 90%. The overall average of 86.5% indicates that students respond very positively to the media, thus placing it in the "very feasible" category for use in learning. These results show that the media succeeds in attracting students' attention, building interest, and creating a positive perception of Informatics learning. The motivation of students after using the media is illustrated in Figure 8.

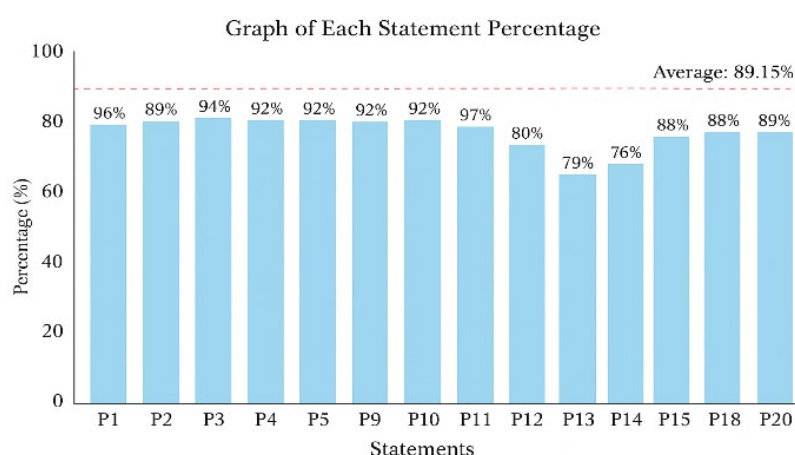


Figure 8. Student Motivation Graph

This graph shows the increase in students' motivation to learn after using the media. Each motivation indicator gets a high percentage, reaching 97%. The overall average of 89.15% shows that Scratch-based media is very effective in increasing student motivation in learning Informatics. These findings prove that interactive and game-based approaches are highly effective in fostering enthusiasm, perseverance, and fun in the learning process.

Discussions

The results of the study show that the development of Scratch based interactive learning media has a positive impact on students' learning motivation. This is in line with the findings (Belessova et al., 2024) which states that the use of Scratch is able to increase students' cognitive, emotional, and behavioral learning engagement, and has a significant impact on improving their learning outcomes at the elementary school level. The media developed through the ADDIE model has also proven to be very valid and practical to be applied in the learning process. Research (Udayani et al., 2024) showed that Scratch-based media with the ADDIE approach obtained a very high validity and practicality score, and was even able to significantly improve high-level thinking skills (HOTS) with an N-Gain value of 0.72. This is in line with the results of this study which showed a validation score above 80% and practicality of 86.5%. The gamification approach integrated in the Scratch learning media has proven to be effective in increasing students' intrinsic motivation. This is reinforced by (Proulx et al., 2018), which explains that digital media with game elements supports the fulfillment of three main aspects in Self Determination Theory, namely the need for competence, autonomy, and social connectedness, all of which are the main triggers for the emergence of learning motivation from within students.

Further (Rahman et al., 2025) states that Scratch is very effective in practicing critical and creative thinking skills because it gives students the freedom to explore animation projects and games that they design themselves. This process requires students to analyze, evaluate, and create, which is at the core of HOTS based learning. These findings corroborate the results of this study that students show high

enthusiasm and active involvement during the learning process, as reflected in an increase in learning motivation by 89.15%. Thus, Scratch's interactive media-based learning not only succeeds in creating an enjoyable learning experience, but also strengthens concept understanding, encourages active student engagement, and significantly increases learning motivation.

4. Conclusion

Based on these findings, this study concludes that the development of Scratch-based interactive learning media is feasible and practical to be used in Informatics learning at SMPN 2 Hu'u. The media developed through the ADDIE model was well received by experts, teachers, and students, which showed that the design and implementation were aligned with educational needs. This shows that the integration of interactive and game-based features in Scratch successfully creates an engaging learning environment and supports active student participation. This study also shows that media contributes positively to increasing students' learning motivation. Students show greater enthusiasm, interest, and engagement during the learning process. Interactive designs that combine materials, quizzes, and educational games provide a meaningful learning experience, reduce boredom, and increase students' desire to learn. Teachers also consider the media to be a useful and innovative tool to support their teaching practices. Therefore, this study confirms that Scratch-based interactive learning media can be an innovative solution to overcome challenges in Informatics learning, especially related to low student motivation and conventional teaching approaches. The success of this study highlights the importance of integrating digital learning media to create a more enjoyable, effective, and student-centered learning atmosphere. Further research is recommended to undertake further development and wider testing in various subjects and school contexts to maximise its potential and ensure wider application.

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