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Coastal environment-based rotating wheel media to increase motivation and critical thinking of elementary school students

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Abstract: *Low learning motivation and critical thinking skills in science learning, particularly on the topic of the five senses, as well as the limited use of contextual media based on the coastal environment, remain important educational challenges. This study aimed to develop a Coastal Environment-Based Spinning Wheel as a learning medium to enhance the learning motivation and critical thinking skills of third-grade elementary school students. The study employed a Research and Development (R&D) approach using the ADDIE model and a quasi-experimental design involving experimental and control groups. The participants consisted of 60 students. Data were collected through questionnaires and tests. The findings indicated that the developed media met the criteria of validity and practicality, while the effectiveness test showed a very high level of effectiveness. Furthermore, the t-test results demonstrated a significant difference between groups, indicating that the media effectively improved students' learning motivation and critical thinking skills.*

Keywords *: rotating wheel media; coastal environment; learning motivation; critical thinking; science learning.*

Introduction

Elementary school education is the first step in a student's education. Education is an essential part of developing lifelong learning skills (Sudrajat, H. et al., 2021). Lifelong learning is a continuous learning process from childhood to adulthood (Dewi, 2025). Students must be equipped with basic skills to foster a desire or drive, namely motivation and the ability to connect related ideas to what is happening, or critical thinking skills , as both are crucial for their future success (Alfidyah, 2025). Learning motivation is necessary for students to have an internal drive to learn and strive to understand the material in depth, not simply to complete assignments (Oktayani et al., 2025). Meaningful learning will help students develop a positive attitude towards lifelong learning.

Students' critical thinking skills also play a crucial role in channeling this enthusiasm into a meaningful learning process (Risandy et al., 2024). With the ever-growing availability of information, students need the ability to observe, compare, evaluate, and draw conclusions based on valid information (Dewi & Purwanti, 2024). Therefore, in- depth thinking skills are essential to face the challenges faced by 21st-century students today (Nisak & Suprapto, 2022). Students must possess the skills of critical *thinking* , creativity , communication , and collaboration , or *the* 4Cs (Ferianto et al., 2024).

Based on initial observations, students in grade III of SD Negeri 023 Penajam demonstrated low learning motivation for the five senses subject of science (Irene et al., 2022). This was demonstrated by students' unfocused behavior during the lesson. When the teacher explained the science material, six students talked with their deskmates, four played with writing instruments, and three daydreamed or diverted their attention to other activities

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unrelated to the lesson. Furthermore, students' critical thinking skills were not yet optimally developed. This was evident when students had difficulty answering questions that required explanations, connecting information obtained with everyday experiences, and drawing conclusions from the material they had learned. Most students tended to provide short answers without proper reasons and still relied on the teacher's explanations to solve the problems given.

During the question-and-answer session, only a small percentage of students actively responded to the teacher's questions. Sixteen out of 30 students remained silent and waited to be called on, even when the questions were simple and related to everyday experiences. Students did not answer the teacher's questions when given the opportunity, indicating a lack of interest in the science material.

Interviews with classroom teachers revealed that students tend to lack an intrinsic drive to learn science. Learning is still viewed as an obligation to complete assignments rather than a process of understanding the world around them. This situation suggests that students lack interest in learning science, and that more significant learning interventions are needed.

Student engagement in class and their critical thinking skills in science lessons are affected by low levels of learning motivation (Sari et al., 2025). This is evident in a situation where twenty out of thirty students struggled to provide logical and coherent answers when faced with questions requiring cause-and-effect explanations or simple reasoning. In most cases, the answers given were short, guesswork, or simply repeating the teacher's statements without providing clear reasons (Triwulandari, 2022).

Students' question-posing skills are also lacking. This demonstrates that they lack the ability to think critically about the science phenomena they are studying (Sae, 2023). Furthermore, when presented with contextual problems, students tend to wait for direction or answers from the teacher, without attempting to express their own opinions or alternative solutions.

In relation to other student abilities, students are not yet accustomed to analyzing problems, providing reasons, and evaluating answers. Science learning often focuses on delivering material, memorizing, and completing assignments, so students' opportunities to develop critical thinking skills are still limited (Azura, Suryanti, & Hariyono, 2023). This condition indicates that third-grade students' critical thinking skills in science learning are still low and require reinforcement through learning approaches that emphasize in-depth thinking processes (Risandy, 2024).

Learning using conventional approaches is one of the factors contributing to low learning motivation and critical thinking skills in students (Sitorus, 2021). Learning tends to be oriented towards delivering material and achieving learning outcomes, and learning media are limited (Suprapro, 2020). Consequently, the learning process, which requires active student involvement, has not become the primary focus (Peranging-angin, 2020). Furthermore, conventional learning approaches also found that teachers primarily act as sources of information, while students merely receive the lessons delivered by the teacher (Devita et al., 2022). This condition can hinder the development of students' critical thinking skills. According to Ennis' theory, critical thinking is rational and reflective thinking that

focuses on determining what to believe or do. Critical thinking skills include the ability to provide simple explanations, present reasons, analyze information, and draw conclusions.

To address these issues, innovative solutions are needed to create more interactive and engaging learning media (Sidabutar, 2023). Learning media are various tools or resources used to convey information from teachers to students, aiming to stimulate students' thinking, emotions, attention, and interest in learning during learning activities (Alviana et al., 2025). One tool used as a learning medium in the classroom is a spinning wheel based on the surrounding environment. This medium is designed to create a more engaging and interactive learning experience. The spinning wheel assists students in activity-based learning (Nashrudin et al., 2025). Meanwhile, the surrounding environment encourages students to learn contextually (Rusman, 2021).

Several studies have proven the effectiveness of the spin wheel media in learning activities. Research conducted by Hidayah, Rokhim, Listiana, and Perdana (2025) found that the use of *the Spin The Wheel Wordwall media* in Pancasila learning can create a fun learning atmosphere, encourage collaboration, and strengthen understanding of social norms contextually. This digital spin wheel is designed with various segments containing case-based questions, real situations, or statements related to activities on the beach (Sari Y, 2023). Each student who spins the wheel will be faced with the challenge of explaining the meaning, assessing the relevance, or offering solutions to emerging problems so that this activity directly stimulates students to think critically, especially in connecting the material to everyday life experiences.

According to Qorina, Fakhriyah, and Masfuah (2025), developing a spinning wheel media model for the Teams Games Tournament model can improve student learning outcomes. This is because students prefer game-based learning, challenges, and group activities because they boost their self-confidence. Furthermore, the addition of rewards at the end of the lesson motivates them to be active in the learning process.

QR-code- based spinning wheel can increase student learning interest, engagement, and enthusiasm in mathematics learning. This media utilizes the Canva application to create an attractive visual display of the spinning wheel. Furthermore, during the product development process, several supporting applications such as *Google Drive, Kahoot!,* and *Quizziz were used* to store materials and games, create interactive questions, and integrate content into *QR codes.*

Meanwhile, Alviana and Setiyaningsih (2025) stated that the rotating wheel (kitchen) media is effective in mathematics learning, particularly multiplication. The Kitchen (Spinning Wheel) media is a circular tool that can be rotated and used in learning activities. This media serves to convey lesson material and information in an engaging manner, thereby increasing engagement and enthusiasm in learning and facilitating understanding of the material presented by the teacher.

Several studies have shown that using rotating wheels in learning can improve students' motivation and critical thinking skills. This study differs from previous studies in that it focused on the science subject "Five Senses and Coastal Environments" for third-grade elementary school students. However, no previous research has examined coastal environments.

The advantage of developing a coastal-based rotating wheel media is that it provides contextual and meaningful learning for students. The coastal environment is where students live, so using examples such as fishing activities, ocean waves, coastal breezes, and seafood helps students understand the material more concretely. Therefore, integrating the coastal context into learning media can strengthen conceptual understanding and reduce abstract learning.

Furthermore, the coastal environment-based spinning wheel media can increase student active engagement in the science learning process. Student engagement in learning is driven by intrinsic motivation (Wahab, 2020). The Coastal Environment-Based Spin Wheel media incorporates game elements, creating a fun and interactive learning environment, so students are not merely passive recipients of information (Nasution, 2024). Spinning the wheel, group discussions, and presentations of analysis encourage students to be more assertive and collaborative. This has the potential to increase learning motivation because students feel directly involved in the learning process.

Another advantage lies in its ability to stimulate students' critical thinking skills. Questions related to coastal environmental phenomena encourage students to explain reasons, analyze cause-and-effect relationships, and draw simple conclusions (Fitanti et al., 2025). This process helps students develop deeper thinking skills beyond simply memorizing information. Thus, the coastal environment-based spinning wheel media serves not only as a visual aid but also as a means to build critical thinking skills and a more comprehensive understanding in elementary school students. Therefore, this study aims to develop a coastal environment-based spinning wheel media to develop learning motivation and critical thinking skills in third-grade elementary school students. This research is expected to make a real contribution to the world of education, particularly in contextual learning .

Method

This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides a systematic, flexible, and user-centered framework for developing learning media. The study aimed to develop a Coastal Environment-Based Spinning Wheel learning media for the topic of the Five Senses in Grade III elementary school. The development process included needs analysis, media design, product development, expert validation by media, material, and language experts, implementation, and product evaluation and revision. The research was conducted at SDN 023 Penajam and SDN 020 Penajam, North Penajam Paser Regency, involving a total of 60 third-grade students.

To examine the effectiveness of the developed media, a quasi-experimental design with a Control Group Pretest–Posttest was employed. The experimental group consisted of 30 students from SDN 023 Penajam who learned using the Coastal Environment-Based Spinning Wheel media, while the control group consisted of 30 students from SDN 020 Penajam who received instruction using conventional image media. Data were collected through expert validation sheets to assess media validity, teacher and student response questionnaires to measure practicality, learning motivation questionnaires, and pretests and posttests to evaluate students' critical thinking skills. The collected data were analyzed using validity and practicality analyses, while effectiveness was determined through N-Gain analysis followed by prerequisite tests, including normality and homogeneity tests, and an independent samples t-test to identify significant differences between the experimental and control groups.

Results and Discussion

Media development using the ADDIE development model has five stages, consisting of analysis , design , development , implementation , and evaluation . At the analysis stage, curriculum analysis is carried out. Curriculum analysis is carried out to ensure the suitability of learning media with the Independent Curriculum implemented in elementary schools. The learning outcomes (CP) studied are students analyzing the relationship between the form and function of human body parts (five senses). The learning objectives set include students being able to explain the function of the five senses simply based on the coastal environment, students being able to provide reasons about the function of the five senses based on the coastal environment, and students being able to draw conclusions about the function of the five senses in activities carried out by coastal communities. This analysis aims to ensure that the material developed in the Coastal Environment-Based Rotating Wheel media is in accordance with the expected learning outcomes.

Initial observations showed low learning interest, characterized by students' lack of focus during learning. Some students were still talking, playing with writing instruments, daydreaming, or diverting their attention to activities unrelated to the lesson. Students tended to remain silent and wait to be pointed out when asked simple questions. Based on student characteristics, students would focus on understanding the material if it was related to their experiences. Environmental analysis showed that the school was located in a coastal area. However, learning activities were not yet connected to the environment. Therefore, media innovation must be continuously updated according to student needs (Qorina, 2025). Learning media that can integrate the coastal environmental context with science and science material, especially the five senses material, is urgently needed.

The Coastal Environment-Based Spinning Wheel media design is designed in the form of a rotating wheel that can be rotated by students. This wheel is divided into several sections, each containing images of the five senses associated with coastal environmental objects. The visual design is made attractive by using bright colors and illustrations that are appropriate for the world of children. In addition, this media is equipped with various objects found in coastal environments, such as shells, sand, coral, twigs, crab nets, and others that are used in

classroom learning activities. These objects are used to help students observe and identify the functions of the five senses directly before using the spinning wheel to determine the answer.

Furthermore, the researchers also designed question cards to be used in learning activities. The question cards were arranged based on indicators of critical thinking skills, such as providing simple explanations, constructing reasons, and drawing conclusions. The questions were written in simple language to be easily understood by third-grade students. The Rotating Wheel media also comes with a guidebook. This guidebook explains how to use the rotating wheel media. With this guidebook, teachers can more easily understand how to implement the media in learning, so that the learning process can be more focused and in line with the established objectives.

Next, the media was developed, including the creation of a Coastal Environment-Based Rotating Wheel. The creation began with the preparation of necessary materials and tools, such as cardboard, cardboard, cover paper, images of the five senses, images of the coastal environment, glue, scissors, skewers, straws, a glue gun, and a cutter. The selection of materials took into account practicality, availability, and safety. The process began with the creation of the basic structure of the media, a rotating wheel circle equipped with a central axis so that it could be rotated easily. Then, the wheel circle was affixed with images of the five senses and a straw was placed in the center to insert the skewers that would be inserted into the cardboard to allow it to rotate. A direction indicator needle was also added to this section to determine the rotation results.

Next, design the body of the rotating wheel media in the shape of a house by cutting the cardboard into two square parts and six rectangular parts that are used to become the walls and supports of the rotating wheel house. In making the rotating wheel house, four triangular shapes are also made which are used to cover the roof and the bottom of the house body support so that it can stand upright. After the cardboard is cut into pieces, it is covered with cardboard to make the media look more attractive. On the front of the house is attached a picture of the coast, and on the top is attached the title of the Rotating Wheel Media Based on the Coastal Environment.

Furthermore, the media is designed using various objects found in coastal environments, such as shells, sand, coral, twigs, seawater, and other marine objects to support learning activities. These objects were chosen because they are found in the students' local environment, thus increasing their connection to the material being studied. The use of real objects provides students with the opportunity to observe, touch, and identify the characteristics of objects directly using their five senses. This activity helps students understand the concepts of the five senses through more concrete and meaningful learning experiences.

The media is also equipped with question cards integrated with the coastal environmental context. Each card contains images and questions related to the five senses, such as the question card for the sense of sight is a picture of a boat on the coast, the sense of hearing is a picture of waves on the beach, the sense of smell is a picture of a fisherman holding a fish, the sense of taste is a picture of salted fish, and the sense of touch is a picture

of a female student playing with beach sand. Each question card is equipped with three questions related to the existing image. Each question is designed to encourage students to observe, provide simple explanations, build reasoning, and draw conclusions. The integration between the spinning wheel and the question cards makes students have a fun learning experience. In addition, this media is designed with a user manual for using the media. The manual includes learning outcomes, the purpose of using the media, preparation before use, steps for use, and game rules. With the manual, the use of the media becomes more focused and systematic.

Once the media is developed, the next stage is validation by experts. Validation is conducted to assess the suitability of the media, materials, and language used in the learning media. In addition to providing assessments, the validators also provide input for improvements to perfect the media. This input is used as the basis for revising the media before it is implemented in learning activities. The revised media, based on the validation results from media experts, material experts, and language experts, is then field-tested to determine its suitability for use.

The implementation phase was carried out in the third grade of the research school using the validated and revised Coastal Environment-Based Rotating Wheel media. The experimental class used the Coastal Environment-Based Rotating Wheel media, while the control class used conventional learning media in the form of images. The field test involved 30 students in the experimental class and 30 students in the control class with the same material, namely the five senses. Each learning session lasted 2 x 35 minutes according to the time allocation for the Science subject. Documentation of the learning process was carried out to analyze student responses and engagement while using the media (Suprapto et al., 2020).

Figure 1. Implementation of Learning in Class

The lesson begins with a pretest to measure students' initial abilities in the five senses material. Then the teacher teaches the five senses material by showing the five senses material based on the coastal environment using an LCD. Then the teacher introduces the media that will be used in the lesson, namely using the Coastal Environment-Based Rotating Wheel media. Previously, the teacher divided the students in the class into five groups that were useful for representing each sense. Then the teacher explained the rules for using the media, where representatives from each group came forward to turn the rotating wheel clockwise, and saw which sense was indicated on the needle. After that, each group would

get a question card according to the sense they got. Then they returned to their respective groups to discuss the questions on the question card with their group and wrote the answers on paper provided by the teacher. Then each group presented their answers to the front of the class. And after that, the lesson ended with a posttest that was used to measure the increase in student understanding after using the media.

Table 2. Implementation of Environmentally Based Rotating Wheel Media in Field Trials

Aspect	Experimental Class	Control Class
School	SDN 023 Penajam	SDN 020 Penajam
Number of Students	30 Students	30 Students
Media	Coastal Environment-Based Spinning Wheel	Images of the Five Senses
Duration	2 x 35 minutes	2 x 35 minutes

The effectiveness evaluation was conducted by comparing the pretest and posttest results between the experimental and control classes using the N-Gain Score analysis. The results showed a significant increase in the experimental class with an average N-Gain of 0.66, which is in the medium category. The control class showed a lower increase of 0.22, which is in the low category. The statistical test used a parametric test, namely the Independent Sample T-Test. The test showed a significant difference between the pretest and posttest results in both classes. These results prove that the Coastal Environment-Based Spinning Wheel media is more effective in increasing learning motivation and critical thinking skills compared to conventional media.

The practicality evaluation showed a positive response from teachers and students to the use of the Coastal Environment-Based Spinning Wheel media in learning. One principal and one teacher involved gave practicality scores of 3.6 and 3.7, respectively, on a scale of 4.0, indicating a very practical category. Students gave a practicality score with an average of 3.53, also included in the very practical category. Aspects that received high ratings included ease of use, media appeal, and benefits in understanding the material. The results of the practicality evaluation showed that the Coastal Environment-Based Spinning Wheel media can be easily integrated into learning.

Based on feedback from the implementation process, several improvements were made to optimize the performance of the learning media. These improvements included improving the wheel axle to make it stronger and more stable. These improvements aimed to enhance and ensure the media could be used optimally in learning.

Media Validation Results

Media validation was carried out by three experts, namely media experts, material experts, and language experts, and the percentage results obtained were as below.

Table 3. Expert Validation Results

No	Validator	Field	Percentage	Category
1	Validator 1	Media	73.68%	Valid
2	Validator 2	Material	88.46%	Very Valid
3	Validator 3	Language	86.53%	Very Valid
	Average		**82.33%**	**Valid**

From the three validators above, it can be seen that the results of the media, material, and language validation tests for the Coastal Environment-Based Rotary Wheel media averaged 82.33%, categorized as valid. This result indicates that the developed learning media has met quality standards in terms of media, material, and language.

Media Practicality Test Results

Evaluation of practicality using a questionnaire with a Likert scale of 1-4 which was distributed to teachers and students after using the media.

Table 4. Teacher Questionnaire Results Scores

No	Teacher's Name	Score
1	HRS	3.60
2	NJ	3.70
	Average	**3.65**

The results of the questionnaire given to teachers showed a very positive response to the practicality of the Coastal Environment-Based Rotating Wheel media. The assessment of the media's practicality included several aspects, namely the ease aspect with a score of 3.75, the practicality aspect 3.66, the suitability aspect 3.50, and the benefit aspect getting a score of 3.66. All of these aspects were in the very practical category. Based on the results of the assessment, an average score of 3.65 was obtained on a scale of 4 which is included in the very practical category. These results indicate that the developed media is easy to use in learning, easy to carry and operate, according to learning needs, and provides benefits in helping teachers deliver material to students.

Table 5. Student Questionnaire Results Scores

Number of Students	Highest Score	Lowest Score	Average
30	4.00	3.30	3.53

Based on the results of the practicality questionnaire given to 30 students, an average score of 3.53 was obtained, which is included in the very practical category. The assessment of the practicality of the media includes several aspects, namely the ease aspect with an average score of 3.40, the practicality aspect of 3.54, the suitability aspect of 3.61, and the usefulness aspect of 3.54. All of these aspects are in the very practical category. From the results of the assessment, the highest score obtained by students was 4.00, while the lowest score was 3.30. Most students gave assessments in the score range of 3.40 to 3.60. These results indicate that the Coastal Environment-Based Rotating Wheel Media received a very

positive response from students. The developed media was considered easy to use, appropriate to the learning material, helped students understand the subject matter, and made the learning process easier and more interesting.

Media Effectiveness Test Results

The effectiveness of the Coastal Environment-Based Rotating Wheel media in science learning on the Pancaindra material is reviewed from two main aspects, namely learning motivation and critical thinking skills.

Effectiveness of Media on Student Learning Motivation

Learning motivation is a crucial factor influencing student engagement and activeness in the learning process. Learning motivation was measured using a Likert-type questionnaire with a 1-4 scale administered to students in the control and experimental classes after the learning process.

Based on the results of the student learning motivation questionnaire in the control class, there were 23 students who obtained scores in the medium category. Students who scored in the medium category had scores between 1.08 and 2.13. And there were 7 students who received scores in the low category with scores of 1.60 to 1.73. Also obtained an average score of 1.83 in the low category. Based on the data obtained, it shows that student learning motivation is still not optimally developed.

Based on the results of the student learning motivation questionnaire in the experimental class, all students achieved scores in the very high category, ranging from 3.53 to 3.93. The average score was 3.64, which is considered very high. This indicates that student learning motivation was at a very good level during the learning process using the coastal environment-based rotating wheel media.

Based on the practicality questionnaire assessment table, the control class received an average score of 1.83 in the moderate category, and the experimental class received an average score of 3.64 in the very high category. Both average scores indicate that the average motivation score in the experimental class was higher than the control class. This indicates that the use of the Coastal Environment-Based Rotating Wheel media increases the learning motivation of third-grade elementary school students.

The Effectiveness of Media on Students' Critical Thinking Skills

Effectiveness was measured using a quasi-experimental design by comparing pretest and posttest results between the experimental and control classes. Data analysis used the N-Gain Score to determine the level of improvement in learning outcomes in the two groups, indicating students have a high learning motivation, which leads to active learning and fosters critical thinking in learning. Statistical tests were conducted to determine the significance of differences between the experimental and control classes. The results of the effectiveness test serve as the main indicator to determine whether the developed learning media successfully achieves the stated objectives.

Based on the test scores in the control class, students received the lowest score of 50 and the highest score of 73. The average pretest score was 60.10. In the posttest results, students received the lowest score of 60 and the highest score of 80. In the posttest, the average score was 69.20. The increase was relatively small, indicating that conventional

learning using static images and lecture methods has not been able to improve students' critical thinking skills. Students tend to be less active and bored and have difficulty connecting abstract concepts with real phenomena.

In the experimental class, the pretest results showed that students obtained the lowest score of 50 and the highest score of 76 with an average score of 60.30 which was relatively equivalent to the control class, which indicated comparable initial abilities between the two groups. The posttest results showed a significant increase with the lowest score of 76 and the highest score of 96 with an average score of 86.03 which was much higher than the pretest results. Based on the pretest and posttest data, the experimental and control classes showed a small difference in pretest scores, and a significant difference in posttest scores. These results indicate the effectiveness of the Coastal Environment-Based Rotating Wheel media in optimizing learning for students.

The results of the N-Gain Score test show that the average N-Gain Score for the experimental class is 65.83 or 65.8%, which is included in the fairly effective category. Meanwhile, the average N-Gain Score for the control class is 22.36 or 22.3%, which is included in the ineffective category. Therefore, it can be concluded that the use of Coastal Environment-Based Rotating Wheel learning media for the science subject of the five senses material for grade III elementary school is quite effective. Meanwhile, the use of image media in conventional methods in the science subject of the five senses material for grade III elementary school is not effective.

The results of the normality test showed a *Shapiro-Wilk significance value* of 0.277 in the experimental class and 0.137 in the control class, which is greater than 0.05. Based on the decision-making criteria, a significance value greater than 0.05 indicates that the data for both groups is normally distributed. The data in both groups are normally distributed, thus meeting the requirements for parametric statistical tests.

The homogeneity test results showed a Lavene Statistic value with a significance of 0.501, which is greater than 0.05. Based on the decision-making criteria, a significance value greater than 0.05 indicates that the data for both groups are homogeneous. Based on the homogeneous data results, there is a similar distribution, and the appropriate type of further analysis to use is a parametric statistical test.

Based on the results of the normality and homogeneity test, the significance value is greater than 0.05, then it is continued with the hypothesis test, namely the Independent t-Test because the data is normally distributed and because there is no relationship or connection between the two samples to be analyzed and aims to compare two samples that are not paired with each other.

Table 6. Independent T-Test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
N-Gain Critical Thinking	Equal variances assumed	,459	,501	16,156	58	,000	,43367	,02684	,37994	,48740
	Equal variances not assumed			16,156	57,183	,000	,43367	,02684	,37992	,48741

The results of the Independent T-Test (2 tailed) showed a significance value of 0.000 which is less than 0.05. Based on the basis of data collection in the Independent T-Test, the significance value of 0.000 < 0.05, then Ho is rejected and Ha is accepted. Where Ha states that there is an influence of the use of coastal environment-based rotating wheel media on students' critical thinking skills.

The expert validation results showed a valid category with an average score of 82.33% for the Coastal Environment-Based Rotary Wheel media. This confirms that the material content, question cards, and media navigation are in accordance with learning outcomes and 21st-century learning needs. Media expert validation emphasized that the questions on the question cards must follow critical thinking indicators appropriate for third-grade elementary school students. Material expert validation emphasized the suitability of the material content with learning outcomes and the material was created by paying attention to the student's developmental stage. Meanwhile, language expert validation emphasized that the language used in the teaching media was appropriate for the characteristics of third-grade elementary school students. This is in line with the theory of learning media which emphasizes that learning media has an important role in creating a more interesting, interactive, and meaningful learning atmosphere. This is also in accordance with previous research that the Rotary Wheel media can help students understand the material presented during learning by using language that is understood by students so that it can develop students' critical thinking skills (Hidayah, 2025).

The practicality of the Coastal Environment-Based Rotary Wheel media received a very positive response from the principal, teachers, and students with an average score of 3.65. The principal and teachers assessed that the use of the media does not require special training and can be directly integrated with science learning. Students also felt more motivated because they considered the media easy to use, namely from the easy-to-understand manual,

students understood how to use and could easily use it. According to Hidayati (2024), a product is said to be practical if it is easy to use. Teacher responses showed that the media is very practical to use in learning based on the students' residential environment, namely the coastal environment, so that learning is more contextual and in accordance with learning objectives.

The effectiveness of the use of Coastal Environment-Based Rotating Wheel media shows two effectiveness, namely the effectiveness of the media on student learning motivation and the effectiveness of the media on students' critical thinking skills. The effectiveness of the media on student learning motivation is shown using a motivational questionnaire using a Likert scale given to students in the control class and the experimental class after learning with both classes given treatment. From the distribution of the questionnaire, the results obtained in the control class showed an average value of 1.85 in the moderate category. In the experimental class, the average value showed 3.64 in the very high category.

The effectiveness of the media on students' critical thinking is shown by looking at the N-Gain value of the control class and the experimental class. The N-Gain value was obtained by giving pretest and posttest questions to both classes. In the experimental class the N-Gain value was 0.66 in the moderate category, while in the control class the N-Gain value was 0.22 in the moderate category. Based on the comparison of the N-Gain Score values of the experimental class and the control class, it can be concluded that by using the Coastal Environment-Based Rotating Wheel media, students have higher critical thinking skills compared to using ordinary image media.

The increase in student learning motivation occurred because the Coastal-Based Spinning Wheel Media provided an interesting and interactive learning experience compared to conventional learning. The use of the spinning wheel, question cards, and coastal objects made students actively involved in learning activities, namely by actively observing, trying, and working on problems during learning activities. This active involvement encouraged students' curiosity and enthusiasm during the learning process. In addition, the material linked to the coastal environment that is close to students' daily lives made learning more meaningful and easier to understand. This finding is in line with the opinion of John W. Santrock who stated that learning motivation can increase when students are actively involved in the learning process and gain interesting learning experiences. This finding is also in accordance with research by Hidayah (2025), which showed that the Spinning Wheel media can make students more active in discussions and provide solutions to existing events.

Students' critical thinking skills improved because the use of the Coastal Spinning Wheel media not only required students to memorize information but also encouraged them to answer questions, provide reasons, and draw conclusions based on the objects observed. Question cards arranged based on critical thinking indicators provided students with opportunities to develop their ability to analyze and evaluate information. Furthermore, the use of coastal objects as supporting media helped students connect learned concepts with real-life experiences, thus deepening their thinking process. These findings align with Robert

H. Ennis's opinion that critical thinking involves the ability to provide explanations, use logical reasoning, and draw conclusions based on available evidence.

Conclusion

Based on the results of the study, it shows that the Coastal Environment-Based Spinning Wheel media meets three main criteria, namely validity, practicality, and effectiveness. High validation indicates the media is suitable for use, high practicality proves the media is easy to use, and significant effectiveness proves the media is able to increase students' motivation and critical thinking skills. These findings indicate that the use of media associated with the coastal environment can support more meaningful and contextual learning. However, this study is still limited to the five-sensory material, a limited number of subjects, and the use of media materials in the form of cardboard which has limited durability. Therefore, further research is recommended to develop media with stronger materials, apply it to more diverse materials, and test it on a wider range of subjects and learning environments.

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