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Integration of Local Wisdom in Physics Learning Videos: A Study on Media Development for Momentum Material through the "Adu Domba Garut" Contest

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Abstract: This study aims to develop and evaluate the feasibility of a physics learning video integrating local wisdom, specifically the *Adu Domba Garut* tradition, as a contextual medium for teaching the concept of momentum. The research employed a 4D development model (Define, Design, Develop, Disseminate) with a mixed-methods approach. The participants consisted of four validators (two physics education lecturers and two physics teachers) and eleventh-grade high school students in Garut Regency. Research instruments included expert validation sheets and student response questionnaires. The validation results indicated that the learning video achieved an average feasibility score of 67%, categorized as "Feasible", with minor revisions addressing learning objectives, audio quality, and additional supporting animations. After revisions, the product was tested on a limited group of students, and the questionnaire results revealed a positive response, with an overall rating categorized as "Good." Students reported that the video enhanced their understanding of momentum concepts, increased their learning motivation, and expanded their knowledge of local wisdom. Therefore, this learning video is considered feasible and effective for use as a contextual and engaging physics learning medium while simultaneously supporting the preservation of local cultural heritage.

Keywords: adu domba Garut, learning video, local wisdom, momentum, media development

Introduction

Local wisdom has not been widely integrated into physics learning. Despite its rich potential to enhance the learning experience, local wisdom is still rarely utilized as a means to connect abstract concepts with students' everyday experiences (Ernawati et al., 2024; Harefa, 2024; Warliani et al., 2023, 2024). In many educational contexts, particularly in physics instruction, teachers tend to rely heavily on textbooks and traditional methods such as lectures, which are less effective in linking scientific theories to real-life situations. The absence of local cultural elements in the learning process makes it difficult for students to interpret the concepts being taught, thus hindering their ability to perceive the relevance of physics to their surrounding environment (Baptista & Molina-Andrade, 2023; Hikmawati et al., 2021).

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The absence of local wisdom integration in physics learning can result in a less engaging and meaningful educational experience for students. By incorporating local knowledge, such as regional traditions, into physics lessons, educators can provide students with a more contextual and relevant understanding of scientific principles (Baptista & Molina-Andrade, 2023; Kasi et al., 2024; Oladejo et al., 2023). This approach not only deepens students' comprehension but also fosters a greater appreciation for both their cultural heritage and the subject matter. Therefore, it is essential to explore innovative methods that combine local wisdom with academic content, particularly in physics education, to achieve more impactful and relevant learning outcomes.

Local wisdom has not been widely integrated into physics education, despite its great potential to make learning more contextual and meaningful. Most physics instruction still relies on textbooks and lecture-based methods, which tend to overlook the connection between physics theories and students' everyday lives (BORLIBOUNE et al., 2025; Bozzi et al., 2021; Dancy et al., 2024; Sulastri et al., 2024). In this context, physics learning often feels distant from students' real-world experiences, making it difficult for them to see the relevance of the knowledge they acquire. Therefore, there is a need for approaches that can link physics content to local cultural values that are more closely related to students' lives.

One effective way to address this challenge is by utilizing instructional videos. Through videos, abstract physics concepts can be visualized in a concrete manner, helping students understand how physics theories are applied in everyday life (Henukh et al., 2024; Kokkonen & Schalk, 2021; Qolbi et al., 2024; Semenikhina et al., 2021). By integrating local wisdom, such as traditions or cultural phenomena familiar to students, videos can demonstrate the application of physics concepts in a more relevant and relatable context. This approach not only makes learning more engaging but also enhances students' understanding of physics content, making the learning process more dynamic and memorable.

Local wisdom relevant to physics can serve as a bridge to connect scientific concepts with students' everyday experiences. One example of applying local wisdom in physics education is by linking traditional phenomena to physics content taught in the classroom (Elisa et al., 2022; Susanto et al., 2023; Warliani et al., 2023, 2024). In this context, the *Adu Domba Garut* contest, a well-known local tradition in the region, serves as an interesting example to be used as instructional material. This contest, which involves two sheep colliding, can be explained using physics concepts, particularly momentum, which is an essential topic in dynamics.

By linking *Adu Domba Garut* with the concept of momentum, students not only learn physics theory in an abstract sense but also observe the application of the concept in real-life situations familiar to them. In *Adu Domba Garut*, momentum is generated by the speed and mass of each sheep moving toward a collision (Warliani et al., 2023). This phenomenon provides students with an opportunity to directly observe how the concept of momentum operates in everyday life while simultaneously introducing them to a local tradition rich in cultural values. This approach makes learning not only more engaging but also more relevant and easier to understand.

To address this issue, innovation in learning media is needed, one that does not solely rely on textbooks or lectures but also introduces more engaging and interactive methods (Arifin & Sukati, 2020; Irvani, 2022; Paling et al., 2024). One proposed solution is the use of local wisdom-based instructional videos that can present physics concepts in a more contextual and comprehensible way. By utilizing local traditions such as *Adu Domba Garut* in connection with the concept of momentum, these videos not only provide a visualization of the material but also introduce cultural values relevant to students' lives. Through this approach, students are expected to become more interested and motivated to learn, as they can directly see how the scientific knowledge taught in the classroom relates to phenomena in their surroundings.

The primary objective of this study is to assess the feasibility and student responses to a physics learning video based on local wisdom, specifically on the topic of momentum. This research aims to determine the extent to which the video can be accepted and utilized by students as an effective learning medium. In this regard, the feasibility of the video will be evaluated based on aspects such as content, material visualization, production quality, and alignment with the current curriculum. Meanwhile, student responses will be measured through questionnaires assessing their perceptions of

the learning video, ranging from the clarity of the material to their level of engagement during the learning process.

The results of this study are expected to contribute to the development of more innovative and relevant learning media. By employing a local wisdom-based approach, physics learning is expected to become not only more engaging and meaningful for students but also improve their understanding of physics concepts that are often difficult to grasp through conventional methods. Furthermore, this study also aims to provide an alternative solution for educators seeking ways to enhance student learning outcomes in an enjoyable and contextual manner while simultaneously introducing students to the richness of local culture in their surroundings.

Method

The research method employed in this study is a mixed-methods approach, which combines qualitative and quantitative techniques to obtain a more comprehensive understanding of the development of a local wisdom-based physics learning video. This approach allows the researchers to explore deeper aspects and provide a more complete depiction of the phenomenon under investigation, incorporating both narrative qualitative data and numerical quantitative data (Amarulloh & Irvani, 2025; Creswell & Clark, 2017). In this method, the researchers began by collecting qualitative data through interviews and then proceeded with quantitative data collection, such as validation results and student response questionnaires.

The research design employed in this study is a sequential exploratory design, which prioritizes the collection and analysis of qualitative data first, followed by the collection of quantitative data. The initial stage focused on needs analysis and concept validation through interviews with physics teachers, as well as gathering data related to materials relevant to local wisdom. After the initial exploratory phase, the researchers proceeded with quantitative data collection involving the testing of the developed product. In this study, the product development model used was the 4D model, consisting of four stages: Define, Design, Develop, and Disseminate (Thiagarajan, 1974; Ulfa et al., 2024).

In the Disseminate stage, adjustments were made by transforming it into a limited implementation, as the researchers only tested the learning video product on a small group of students rather than on a larger scale. This process was conducted to observe the responses and effectiveness of the product in a real learning context. Data collection in this study was carried out using various instruments, including interviews to obtain qualitative information regarding the needs and feedback on the developed product, as well as validation questionnaires to assess the feasibility of the media. In addition, student response questionnaires were also used to measure students' perceptions and attitudes toward the developed learning video, in order to obtain more in-depth quantitative data related to the acceptance and effectiveness of the product.

Result and Discussion

The research results include a discussion of each stage of product development, namely Define, Design, Develop, and Disseminate.

Define Stage

The Define stage began with a preliminary study through interviews with physics teachers from several high schools in Garut Regency. Based on the interviews, it was found that most teachers still relied on lectures and discussions as the main approaches in teaching physics, including on the topic of momentum. Instructional videos were rarely utilized, even though when they were used, teachers reported an increase in students' enthusiasm and understanding of the material. Furthermore, most teachers had never integrated local wisdom, particularly the *Adu Domba Garut* contest, into physics instruction. This condition indicates that physics learning in schools remains focused on textbooks and has yet to provide contextual learning experiences, making it difficult for students to connect physics concepts with the phenomena around them (Georgiou et al., 2021; Oladejo et al., 2023; Shrestha et al., 2023).

Furthermore, in the curriculum review stage, the researchers found that the topic of momentum is part of the dynamics unit taught in Phase F (Grade XI) of the Merdeka Curriculum. This topic presents a great opportunity for integration with local wisdom because the concept of momentum is highly relevant to collision phenomena, such as those occurring in the *Adu Domba Garut* contest. Thus, the development of a local wisdom-based instructional video on the topic of momentum is considered to align with curriculum requirements while simultaneously enhancing the relevance of the material to students' daily lives.

These findings reinforce the urgency of developing innovative learning media that not only visualize abstract physics concepts but also incorporate local cultural contexts that are familiar to students' lives. By integrating the *Adu Domba Garut* tradition into the learning process, students are expected to more easily understand the concept of momentum while fostering an appreciation for local wisdom. This approach is consistent with previous studies, which emphasize that integrating local wisdom into education can enhance students' interest, understanding, and engagement in the learning process (Novitasari et al., 2017; Rohman & Warliani, 2025; Silla et al., 2023; Wardani, 2021).

Design Stage

The Design stage was carried out based on the needs analysis obtained in the previous stage. The purpose of this stage was to design a local wisdom-based instructional video on the topic of momentum that meets students' needs and aligns with curriculum requirements. The design process began with the creation of a storyboard outlining the content flow, starting with the introduction of the *Adu Domba Garut* tradition as a context for local wisdom, an introduction to the basic concept of momentum, a simple calculation analysis of momentum in sheep collision phenomena, and a reflective explanation linking cultural values with physics concepts. The product storyboard is presented in Table 1.

Table 1. Educational Video Storyboard

No.	Visual Design	Description
1		Visual: A view of the rural landscape in Garut, featuring a farmer with sheep grazing in a wide meadow. Narration: "In Garut, there is a unique tradition known as Adu Domba Garut. This tradition is not merely entertainment but also an integral part of the region's culture and local wisdom."
2		Scene 2: Introduction to the Concept of Momentum Visual: A teacher is in the classroom, explaining the concept of momentum using an illustration of Garut sheep. Narration: "Momentum is the product of mass and velocity. When a sheep runs at high speed and has a large body mass, it will possess greater momentum."
3		Scene 3: Preparing for Adu Domba Visual: Garut sheep are being prepared by farmers. The farmers are feeding and training their sheep. Narration: "Farmers prepare their sheep for the contest. Heavier and faster sheep usually have a better chance of winning because they possess greater momentum."
4		Scene 4: When the Adu Domba Begins Visual: Two sheep run quickly from opposite directions, preparing to collide. Narration: "As these sheep run, their momentum increases. Higher momentum makes the collision between the sheep much stronger."

No.	Visual Design	Description
5		Scene 5: Collision and the Effect of Momentum Visual: The two sheep collide forcefully. One sheep is seen being pushed backward, indicating the transfer of momentum. Narration: "This collision results in a transfer of momentum. The sheep with greater momentum will push back the sheep with smaller momentum."
6		Scene 6: Explanation of the Collision Outcome Visual: The teacher returns to the classroom, explaining the previous collision using a momentum graph. Narration: "In physics, we can calculate momentum to predict the outcome of an Adu Domba contest. The greater the mass and velocity, the greater the momentum."
7		Scene 7: Reflection on Cultural and Scientific Meaning Visual: Footage of sheep playing in the field. Narration: "From this tradition, we learn about the concept of momentum while also preserving local culture."
8		Closing Scene: Local Wisdom and Science Visual: Students smiling, feeling more confident in understanding physics lessons through a tradition they are familiar with. Narration: "Local wisdom can be an enjoyable way to learn science. Momentum is not merely a theory but something that can be observed in everyday life."
9		Final Message The Adu Domba Garut tradition is not merely a form of entertainment but also a manifestation of local wisdom that can be used as a tool for learning science, particularly physics and the concept of momentum.

The media design process utilized a combination of software such as *Canva* for visual design and *CapCut* for video editing. The video was designed to be visually appealing by integrating text, illustrations, narration, and footage from the *Adu Domba Garut* contest. Each scene was carefully arranged to visualize the abstract concept of momentum in a more concrete manner, such as through animations illustrating changes in momentum before and after collisions. In addition, learning objectives were included at the beginning of the video to provide an introduction, ensuring that students understood the competencies expected to be achieved after watching.

Develop Stage

The Develop stage focused on refining the design results to produce a local wisdom-based physics learning video ready for implementation. Based on the previously created storyboard, the video was developed by combining visual elements such as footage of the *Adu Domba Garut* contest, graphic illustrations, explanatory text, and simple animations explaining the concept of momentum. The narration was designed to be communicative and easy to understand, while audio was added to enhance the clarity of the information presented. The video production utilized *CapCut* software (Figure 1) for editing while maintaining a structured material presentation: introducing the cultural phenomenon, delivering the physics concept, providing simple momentum calculations, and offering reflective explanations that connect scientific knowledge with local wisdom values.

Figure 1. Video Editing Process Using CapCut

After the initial product was completed, a feasibility validation process was carried out by four validators, consisting of two physics education lecturers and two physics teachers. The validation process included an assessment of various aspects, such as video content, visual appearance, alignment of the material with the curriculum, and the technical quality of the video. The validation results are presented in Figure 2.

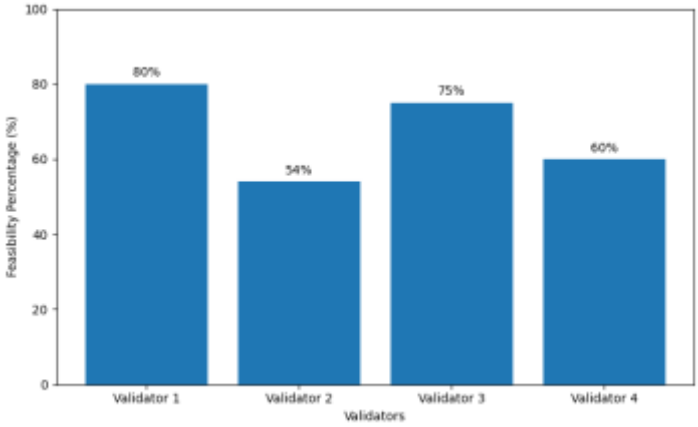

Figure 2. Product Validation Results by Experts

The assessment results indicated that the product obtained an average feasibility score of 67%, which falls into the "Feasible" category, with minor revisions required. The validators' comments included suggestions such as adding learning objectives at the beginning of the video, clarifying information regarding the mass and speed of the sheep, providing a more in-depth explanation of momentum and impulse concepts in the collision section, adding a simple momentum calculation example, and improving the audio quality to make it more comfortable to listen to.

The revision process was carried out in accordance with the validators' suggestions. The video was updated by clearly presenting the learning objectives, adding guidance for students, displaying the mass and speed values of each sheep, and incorporating slow-motion animations in the collision scenes to enhance the visualization of the momentum concept. A simple calculation example was also added to help students directly see the application of the momentum formula in the *Adu Domba Garut* contest phenomenon. These improvements align with the principles of effective instructional media development, which emphasize well-defined objectives, readability, and the presentation of applicable content (Sales & Protacio, 2025; Siregar et al., 2025; ur Rehman et al., 2016). With these revisions, the video is expected to provide a more comprehensive and engaging learning experience for students.

Disseminate Stage

The Disseminate stage in this study was conducted through a limited trial involving eleventh-grade students at one of the senior high schools in Garut Regency. The trial aimed to gather student feedback

on the developed local wisdom-based physics learning video. Data were collected using student response questionnaires, which covered aspects such as ease of understanding, visual appeal, learning motivation, and the usefulness of the video content in helping them comprehend the concept of momentum. The results of the student responses are presented in Table 2.

Table 2. Student Response Questionnaire Results

No.	Assessment Aspect	Percentage (%)	Category
1	Ease of understanding the material	78	Good
2	Visual appeal of the video	80	Good
3	Increased learning motivation	75	Good
4	Support for independent learning	77	Good
5	Increased knowledge about local wisdom	79	Good

Based on the questionnaire results, students generally gave positive responses to the developed instructional media. The average response percentage fell within the "Good" category, indicating that the video successfully increased students' interest in learning physics. Most students stated that the visualization of the Adu Domba Garut phenomenon helped them better understand the previously abstract concept of momentum. In addition, they felt that the presentation of the video, complemented by animations, simple calculations, and communicative narration, made it easier for them to study the material independently outside the classroom.

These results reinforce previous findings which state that local wisdom-based learning media can enhance students' motivation and understanding (Fadhilah & Sumarni, 2025; Nurvitasari et al., n.d.; Susanti & Nurhayati, 2025; Widiantari et al., 2025). The integration of local culture into the learning process makes physics content feel closer to students' daily lives, thereby making the learning experience more meaningful. Thus, the developed product is not only substantively feasible but also effective in enhancing students' learning experiences.

Conclusion

This study produced an instructional video for physics learning based on local wisdom by incorporating the *Adu Domba Garut* tradition as the context for teaching the concept of momentum. Based on validation results from four validators, the media obtained an average feasibility score of 67%, categorized as "Feasible," with several minor revisions that have been addressed. These revisions included adding explicit learning objectives, visualizing mass and velocity values, incorporating slow-motion animations in the collision scenes, and including simple momentum calculation examples. With these improvements, the product meets the criteria for being a contextual, engaging, and curriculum-aligned learning medium.

The limited trial conducted with eleventh-grade students showed a positive response. The average student ratings were categorized as "Good," particularly in aspects such as ease of understanding the material, visual appeal, and increased learning motivation. The integration of local wisdom into the learning process proved to help students grasp abstract physics concepts more concretely while also introducing them to local culture. Thus, the developed instructional video is not only feasible for use but also effective in enhancing students' understanding, motivation, and engagement in physics learning.

Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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