

The Effectiveness of Authentic Learning Materials to Enhance *Kayuh Baimbai* Characters

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Article Info	Abstract
Article history: Received: April 11, 2025 Accepted: June 2, 2025 Published: July 2, 2025 Keywords: Authentic learning Characters <i>Kayuh Baimbai</i> Learning materials This article is licensed under a Creative Commons attribution-share alike 4.0 international license © 2025 Jurnal ilmiah Pendidikan Fisika	The limited availability of science learning materials containing authentic learning and students' low academic performance served as the background for this research. This research generally aims to describe the effectiveness of science learning that contains authentic learning on vibration, waves, and sound. This research is classified as research and development using the ASSURE model, with 23 eighth-grade students from one of the public junior high schools in Banjarmasin as the test subjects. Data were obtained from character observation sheets, which were then analyzed by averaging the values of each indicator and comparing them with the effectiveness criteria. The results showed that the effectiveness was classified as effective, with a value of 68.34 for the <i>Kayuh Baimbai</i> characters. The research concludes that the developed science learning material with authentic content on vibration, waves, and sound was adequate to be used in educational activities to enhance students' <i>Kayuh Baimbai</i> characters. This research implies that the implementation of authentic learning materials can serve as an effective strategy for character education in science learning, provided that instructional time efficiency is carefully considered.
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INTRODUCTION

By their very nature, humans are not free from a set of rules or laws that are constant and applicable in life, which is referred to as the natural sciences. Students, as learners, are expected to study natural sciences based on character to understand and solve problems in their surroundings (Singh et al., 2023; Suyidno et al., 2021). In line with this, character is very much needed in students' daily lives, making it one of the main focuses of science education to prepare high-quality and outstanding students in the 21st century (Fitriah et al., 2021; Maisyaroh et al., 2023; Wati & Misbah, 2021).

Character foundations can provide motivation and improve academic performance, one of which is the character of cooperation. Learning experiences that encourage students to work together in teams make the learning process more engaging and active, positively influencing students' academic performance (Resy et al., 2021; Si et al., 2022; Zainuddin et al., 2020). In their research, Lim (2023) found that learning involving cooperation among students would result in higher learning outcomes than learning that focuses on competition or individualism. The findings support a positive relationship between learning outcomes and collaboration.

Support in the students' learning process is also obtained from good educational facilities, one of which is the learning material presented by the teacher, which must be engaging for the students. Engaging learning material will help students understand the

lessons and determine the level of mastery they need to achieve ([Ridho et al., 2020](#); [van Dulmen et al., 2023](#)). [Basyir et al. \(2022\)](#) also explain that learning materials should facilitate meaningful learning, which occurs when students can connect new information with the knowledge they already possess.

A study at one of the public junior high schools in Banjarmasin also shows that students are less active in group discussions, as evidenced by the lack of cooperation, knowledge sharing, helping classmates in difficulty, and respecting others' opinions ([Aulia et al., 2021](#)). The results of an interview with one of the science teachers at a public junior high school in Banjarmasin also revealed that the science learning materials used by the students were limited in number, as they were sourced from the school library. The school library has difficulty providing one learning material for each student, so they have to share or borrow learning materials from one another. This finding highlights that there are still challenges in fostering the cooperative character of students, particularly in presenting meaningful learning materials to them.

One innovation that can be implemented to improve the quality of science learning is the development of learning materials that incorporate authentic learning experiences. [Rieger & Rolfe \(2021\)](#) state that authentic learning differs from conventional learning in that it focuses on real-world problems relevant to daily life. These explorations are ideally undertaken alongside experts or professionals, within authentic or professional settings, and utilize tools and resources commonly employed by practitioners or encountered in everyday life ([Nachtigall et al., 2022](#)).

In the local context, the authentic learning approach can be applied by integrating local wisdom, such as *panting* music, a traditional art form from South Kalimantan, into science education ([Fatma et al., 2024](#)). The *panting*, when plucked or vibrated, produces sound waves, which can be directly related to the concepts of vibration, waves, and sound in science. This cultural integration helps students understand these concepts more easily and meaningfully within the framework of their cultural context ([Febrian, 2023](#); [Silmina et al., 2020](#)). Integrating local cultural concepts into science learning has the potential not only to enhance the learning process but also to strengthen students' noble characters ([Mashoko, 2022](#); [Novitasari & Walid, 2024](#)).

In their research, [Rieger and Rolfe \(2021\)](#) also emphasize that authentic learning requires active student involvement through scaffolding. Moreover, students are engaged in community-based activities. Authentic learning materials are closely related to the surrounding environment and to other disciplines, thus enabling learning from various sources. Students are trained to solve problems through higher-order thinking tasks, cooperative discussions, inquiry-based activities, and the creation of products that can be presented.

The cooperative discussion process, which is central to authentic learning, can foster the development of student character, particularly the value of cooperation ([Lowell & Tagare, 2023](#); [Nachtigall et al., 2022](#)). In the local cultural context of the Banjar community, the value of cooperation is embedded in the cultural concept of *Kayuh Baimbai*. Literally meaning "paddling together," *Kayuh Baimbai* refers to collective action toward a shared goal ([Hasani et al., 2019](#); [Humaidi & Adrian, 2017](#); [Wati et al., 2020](#)). This character trait can be adopted in science learning to instill attitudes such as respecting group members, participating actively in completing tasks, showing care for peers, and maintaining unity in accomplishing group work ([Hasani et al., 2019](#); [Pratiwi et al., 2022](#); [Rochmawati et al., 2020](#); [Setiawan et al., 2019](#)).

Research on authentic learning, local wisdom, and *Kayuh Baimbai* has been extensively conducted, as seen in studies such as [Lowell & Tagare \(2023\)](#), who stated that authentic learning can facilitate a novel and engaging learning experience that may not be achievable

through conventional classroom methods. [Wati et al. \(2020\)](#) also stated that learning material based on local wisdom can cultivate the *Kayuh Baimbai* characters. [Hasani et al. \(2019\)](#) conducted classroom action research by implementing a physics module infused with local wisdom, improving the students' *Kayuh Baimbai* characters. [Damarsha et al. \(2024\)](#) also linked the traditional musical instrument, gamelan (saron), as a learning resource for material on vibrations, waves, and sound. However, so far, there has been no development of learning material related to the local wisdom of South Kalimantan as a form of authentic learning on the topics of vibrations, waves, and sound to enhance the *Kayuh Baimbai* characters. However, South Kalimantan has various local wisdoms that can be used as sources for science learning, including the Baayun Maulid activity and panting music.

The researchers believe that the development of learning materials based on authentic learning can enhance students' *Kayuh Baimbai* characters. This belief is supported by the theories of Piaget, Bruner, and Ausubel, each of which emphasizes the importance of active student engagement, learning through problem-solving, and the connection of new knowledge to prior experiences. These three theories serve as a strong foundation for meaningful and contextual learning approaches ([Basyir et al., 2022](#); [Zhang, 2022](#)).

The theoretical foundation and relevant empirical findings serve as the basis for innovation aimed at enhancing students' *Kayuh Baimbai* characters. Therefore, this writing aims to describe the effectiveness of science learning material infused with authentic learning on vibration, waves, and sound. This research aims to produce learning material on vibrations, waves, and sound infused with authentic learning that effectively enhances students' *Kayuh Baimbai* characters. Specifically, this research aims to describe the effectiveness of learning materials on vibrations, waves, and sound, infused with authentic learning, developed to enhance the *skills of the Kayuh Baimbai* characters.

METHODS

This research and development study uses the ASSURE development model, which consists of analyzing learner characteristics; stating performance objectives; selecting methods, media, and materials; utilizing materials; requiring learner participation; and evaluating ([Al-Haydary & Majeed, 2021](#)).

The learning material discusses the concepts of vibration, waves, and sound using an authentic learning approach, such as the *Baayun Maulid* and panting music. It is implemented using the STAD-type cooperative learning model. The detailed steps for developing learning material using the ASSURE model are presented in Table 1.

Table 1. The development steps using the ASSURE model

Development Steps	Activities
Analyze Learner Characteristics	Analyzing the problems and characteristics of students, including general aspects, competencies, and learning styles.
State Performance Objectives	Setting specific learning objectives based on the competencies to be achieved
Select Methods, Media, and Materials	Choosing appropriate methods, media, and learning materials, whether by using, developing, or creating new materials
Utilize Materials	Using methods, media, and learning materials in field trials after expert review and simulation
Requires Learner Participation	Involving the active participation of students to enhance the effectiveness of learning through various interactive activities, such as question-and-answer sessions or the distribution of response questionnaires
Evaluation	Conducting evaluations to assess the effectiveness of learning and improve less optimal aspects.

[Hidayah et al. \(2020\)](#) define effectiveness as a measure of success in achieving the established goals. A learning material can be considered adequate if it enables students to acquire knowledge and skills through the presentation of information and learning activities both inside and outside the classroom. Learning material must be designed to help students achieve the specific learning objectives that have been determined ([Irvy, 2020](#)). In summary, if the developed instrument can provide results per the predetermined objectives, then the instrument can be classified as effective ([Wati et al., 2021](#)). [Humayrah et al. \(2022\)](#) assess the effectiveness of the developed product by reviewing the students' *Kayuh Baimbai* characters. The development product, in the form of learning materials on vibrations, waves, and sound, featuring authentic learning content, is shown in Figure 1.

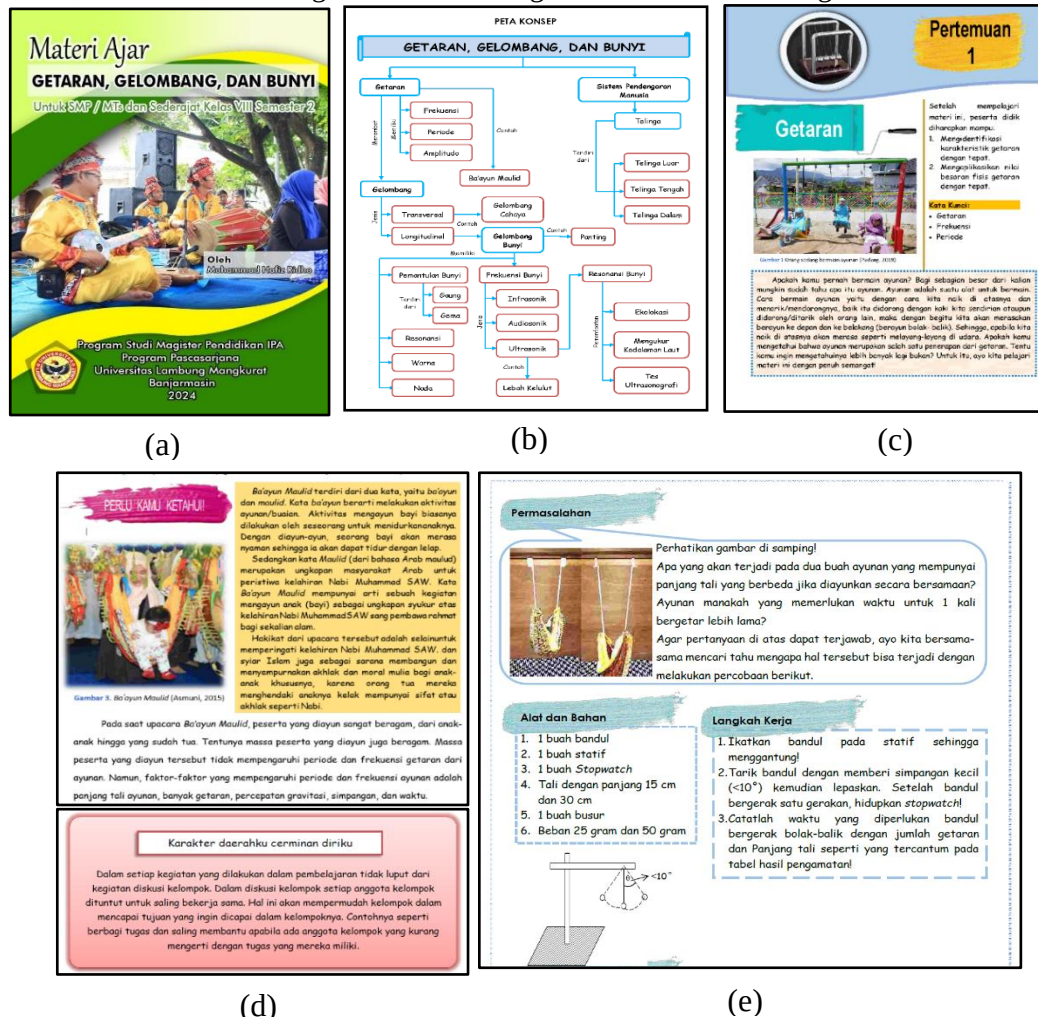


Figure 1 Learning material with sections: (a) Front cover, (b) Concept map, (c) Initial chapter display, (d) Authentic content and the characters of *Kayuh Baimbai*, (e) Discussion materials

The research was conducted in June 2024 at one of the public junior high schools in Banjarmasin. The research subjects are learning materials. The trial subjects in this study are 23 eighth-grade students for the 2023/2024 academic year. Meanwhile, the researchers acted as the teachers in this study.

Data collection was conducted using observation techniques, employing a research instrument in the form of an observation sheet to assess the effectiveness of the learning

material for the Kayuh Baimbai characters. Two academic experts and one practitioner validated the instrument. It achieved an average validity score of 3.69, indicating that the instrument is generally considered valid. The reliability coefficient was 0.94, which is categorized as excellent. The observation sheet uses a score range of 1 to 4, which is used when students engage in group discussion activities over four meetings. The indicators of the *Kayuh Baimbai* characters used are respecting group members (K1), participating in task completion (K2), caring for group members (K3), and being cohesive in task execution (K4).

Data is analyzed by calculating the average value of the *Kayuh Baimbai* characters per indicator according to equation (1), then the obtained average value is compared with the learning material effectiveness criteria in Table 2.

$$x = \frac{s}{s_{max}} \times 100 \quad (1)$$

s = *kayuh baimbai characters score*

s_{max} = *kayuh baimbai characters max score*

Table 2 Criteria for the effectiveness of learning material

No.	Formula	Interval	Category
1	$x > \bar{x}_i + 1,8 \times S_{b_i}$	$\bar{x} > 80$	Very Effective
2	$\bar{x}_i + 0,6 \times S_{b_i} < x \leq \bar{x}_i + 1,8 \times S_{b_i}$	$60 < \bar{x} \leq 80$	Effective
3	$\bar{x}_i - 0,6 \times S_{b_i} < x \leq \bar{x}_i + 0,6 \times S_{b_i}$	$40 < \bar{x} \leq 60$	Quite Effective
4	$\bar{x}_i - 1,8 \times S_{b_i} < x \leq \bar{x}_i - 0,6 \times S_{b_i}$	$20 < \bar{x} \leq 40$	Less Effective
5	$x \leq \bar{x}_i - 1,8 \times S_{b_i}$	$\bar{x} \leq 20$	Not Effective

$\bar{x}_i = \text{Ideal Mean} = \frac{1}{2} (\text{maximum ideal score} + \text{minimum ideal score})$

$S_{b_i} = \text{Ideal Standard Deviation} = \frac{1}{6} (\text{maximum ideal score} - \text{minimum ideal score})$

$x = \text{Empirical Score}$

[Widoyoko \(2017\)](#)

RESULTS AND DISCUSSION

The developed learning materials are infused with authentic learning; thus, they are equipped with a front cover consisting of an authentic image of *panting* musical art and the identity of the learning material. Before entering the first meeting section, the developed learning material includes a concept map that provides an overview of the material to be studied by the students. At the beginning of each session, authentic images and questions are presented to motivate students to engage in the learning process actively. Learning indicators are also provided so that students understand the scope of the material and are more focused on the learning process.

After presenting the learning indicators, the developed learning material includes a description of the content that contains various authentic pieces of information about vibrations, waves, and sound, reviewed through examples of phenomena and images related to the students' regional environment, specifically South Kalimantan. Based on the concept developed by the researchers and the adaptation of local wisdom from the study by [Damarsha et al. \(2024\)](#), the researchers analyzed examples of authentic learning that would be included in the learning material shown in Table 3.

Table 3. Authentic learning content in the learning materials

Phenomena	Concept
The swinging motion in the <i>baayun maulid</i> activity	Vibration is a back-and-forth motion through an equilibrium point. One vibration is defined as one complete oscillation, that is, from the starting point back to that point. For example, in the movement of the <i>Baayun maulid</i> .
The vibrating string oscillates repeatedly, producing frequency and period values.	String vibration Panting produces quantities of period (the time for one vibration) and frequency (vibrations per unit time), which are both related. $f = \frac{1}{T}$
A stone that falls into the river creates a wave of water. The vibration of the vibrating string propagates, producing a wavelength and a wave speed.	Waves are vibrations that propagate while carrying energy. For example, if a stone falls into a river, it creates water waves. The Panting string wave generates the quantities of wavelength and wave speed, whose relationship comes from $v = \frac{s}{t}$ For one wave, the relationship becomes: $v = \frac{\lambda}{T}$
<i>Panting</i> is a sound produced by a certain action.	Sound reaches the ear because it travels in the form of mechanical waves composed of compressions and rarefactions (longitudinal waves). Sound has pitch and volume, as well as tone, timbre, resonance, and reflection.
The sound produced by a vibrating string is characterized by its frequency, period, wavelength, and sound propagation speed.	When the <i>panting</i> string is plucked, the sound of the <i>panting</i> produces frequency, period, wavelength, and sound speed, which are related: $\lambda = \frac{v}{f} \text{ atau } \lambda = vT$
The mechanism in humans and animals that allows them to hear sounds is like panting music.	The sound waves of the panting music that enter the outer ear will vibrate the eardrum. The auditory nerves receive these vibrations and then send them to the brain. In the auditory system, the ear converts wave energy into nerve impulses, which the brain interprets as specific sounds.
Technology nowadays uses applications of vibrations, waves, and sound.	Some applications of vibration, waves, and sound in technology are ultrasound, ultrasonic therapy, ultrasonic cleaners, sonification, ultrasonic testing, and sonar in shipping systems. Sonar can be used to calculate the depth of the sea by knowing the time data and the speed of sound in seawater, then using the equation: $x = \frac{v \times t}{2}$

The integration of authentic content in the form of local wisdom titled "*Perlu Kamu Ketahui*," relevant to the topic being discussed, was embedded in the learning materials. This integration aimed to make the materials more engaging and to increase students' motivation to learn. Additionally, a character corner section titled "*Karakter Daerahku Cerminkan Diriku*" was included as a motivational element and a reminder for students to internalize positive values, particularly the *Kayuh Baimbai* characters, which emphasize cooperation in daily life.

The developed materials were also designed to align with the cooperative learning model, specifically the STAD (Student Teams Achievement Division) type. Collaboration in problem-solving is one of the essential skills of the 21st century. In accordance with this,

each meeting in the learning materials contained discussion tasks to be solved in groups. These collaborative activities were expected to foster and enhance students' *Kayuh Baimbai* characters.

The field trial results demonstrated the effectiveness of the learning materials in cultivating the *Kayuh Baimbai* characters. This was reflected in students' character achievement scores, as presented in Table 4.

Table 4 Results of the students' *kayuh baimbai* character achievement

Indicator of the <i>Kayuh Baimbai</i> Characters	1st Meeting		2nd Meeting		3rd Meeting		4th Meeting	
	Average	K	Average	K	Average	K	Average	K
Appreciating group members	68,48	E	71,74	E	75,00	E	73,91	E
Participate in completing the assignment	63,04	E	66,30	E	70,65	E	72,83	E
Caring for group members	60,87	E	68,48	E	67,39	E	70,65	E
Compact in carrying out tasks	63,04	E	63,04	E	68,48	E	69,57	E
Average Total	63,86	E	67,39	E	70,38	E	71,74	E
Achievement of the <i>Kayuh Baimbai</i> Characters	68.34 Effective							

Category Description (K):

VE= Very Effective; E = Effective; QE = Quite Effective; LE = Less Effective; NE = Not Effective

The development of character achievements in each meeting can be monitored by converting the results of each indicator item into a graph, as shown in Figure 2.

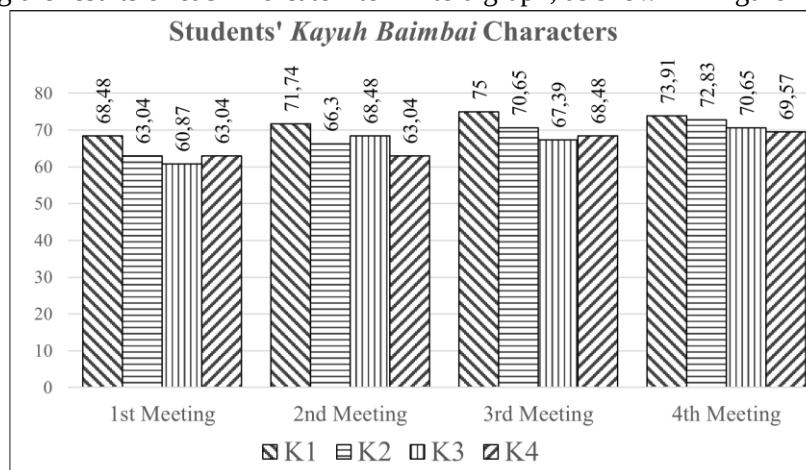


Figure 2 The development of characters' achievements

The achievement of the *Kayuh Baimbai* characters of students in the effective category indicates that the developed learning material is effectively used in learning. This aligns with the findings of [Zambrano et al. \(2019\)](#) and [Rieger & Rolfe \(2021\)](#), who suggest that learning is more effective when students collaborate in groups. The community in Banjarmasin recognizes this concept of cooperation as *Kayuh Baimbai*, which has become the motto of the City of Banjarmasin ([Hasani et al., 2019](#)).

Overall, the achievement of the *Kayuh Baimbai* characters of the students when conducting learning using the developed learning material is classified as good, with a score of 68.48. The *Kayuh Baimbai* character of the students in meeting 1 was the meeting with the lowest *Kayuh Baimbai* character score compared to other meetings, although it still received a good rating. The indicator for respecting group members (K1) is the highest

compared to the other indicators. This happens because most of the students in the group already behave well when expressing and receiving opinions. In addition, the students also use clear and straightforward voices when in their group. This indicator serves as a good initial step in instilling the values of *Kayuh Baimbai* characters, including tolerance and respecting differing opinions among group members, which can create a pleasant social atmosphere among students ([Rochmawati et al., 2020](#)).

The indicator of caring for group members (K3) received the lowest score compared to other indicators in meeting 1. Initially, some students were less accepting of their group members. Students tend to want to choose members according to their preferences, but it becomes conducive when each group starts discussing problem-solving. [Theobald et al. \(2017\)](#) explained that if students still prioritize their egos, it will result in less care for their fellow group members.

The character *Kayuh Baimbai* of the students in Meeting Two is still classified as good. However, there was a 5.53% increase from the previous meeting's score, with the best indicator also found in Indicator K1. Students are still accustomed to solving problems together with their group members, and a sense of happiness within the group is also beginning to be evident when viewed from this indicator. However, the indicator of cohesiveness in task execution (K4) still has the lowest score compared to other indicators. This is due to some students having difficulty in communicating and appreciating the performance of their group members. In line with this, [Sudarto \(2021\)](#) explained that the lack of cohesion in a group can occur because students still need to adapt to their group members to solve problems.

Students in Meeting Three are becoming more accustomed to their groups when given a problem, as evidenced by a 4.44% increase in the *Kayuh Baimbai* characters' score compared to Meeting Two. Indicator K4 became the indicator with the highest increase of 8.62%. Internal factors such as the comfort of students in discussing become the reason for the diligence and cohesion of student groups. The habituation of group learning activities can also lead to a decrease in the individualistic and selfish attitudes of students ([Sudarto, 2021](#)). However, the level of concern among students for their group members decreased by 1.59%. Some students who are accustomed to the problem-solving process can complete tasks more quickly than other group members. Students want to complete tasks as quickly as possible, which leads them to take on portions of tasks from other members who have not finished, without first explaining how to solve the problem. [Karina et al. \(2024\)](#) explain that *Kayuh Baimbai* should embody the attitude of how each group member contributes to finding a solution together, such as helping friends who do not understand the lesson material so that they can solve the problem.

The highest achievement of the *Kayuh Baimbai* characters among the students was in meeting 4, with a score of 71.74. This achievement is considered good because the students have been trained to solve problems in groups during the previous three meetings. [Sudarto \(2021\)](#) explains that the habituation of character-building in learning activities impacts the improvement of good character among students, such as participating in task completion, caring for group members, and being cohesive in carrying out tasks, which are aspects of the *Kayuh Baimbai* characters. However, there is one indicator whose value decreased by 1.44% from the previous meeting, namely, indicator K1. This is caused by the fact that within one group, some students are too close to each other, resulting in several aspects of the *Kayuh Baimbai* characters being overlooked, such as using a voice intonation that is too loud with their friends, and some not showing polite and courteous behavior when speaking with their friends. [Muhlis et al. \(2024\)](#) found a phenomenon where students, when interacting with their close friends, give off a relaxed impression, leading them to tend to

use less polite language. Environmental factors and the unwise use of social media also influence the etiquette of students with their peers.

If we examine the graph of the *Kayuh Baimbai* characters' achievements in Figure 2, it can be seen that there is an improvement in each meeting, especially in the indicator of task completion participation (K2), which is the indicator with the most significant increase in value from meeting to meeting. Students are accustomed to participating in group discussions to solve problems presented in the developed learning materials. The learning material also presents a section on "*Karakter daerahku cerminan diriku*," which serves as a knowledge and motivation source for students in cultivating the *Kayuh Baimbai* characters. The use of a cooperative learning model infused with authentic learning also plays a role in enhancing this character, as students are trained to collaborate in each session to solve science problems related to their surroundings ([Hasani et al., 2019](#); [Rieger & Rolfe, 2021](#)).

The results of the effectiveness categorized as effective are inseparable from the role of the authentic learning material used by the students. The authentic learning content includes problem-solving activities that facilitate group discussions, allowing students to engage in the learning process actively. [Humayrah et al. \(2022\)](#) state that group discussion activities have a positive impact on students' learning outcomes. [Karina et al. \(2024\)](#) also assess that learning that applies the *Kayuh Baimbai* characters allows students to discuss ideas and exchange thoughts. This process also enhances the students' ability to apply the concepts they have learned.

The achievement of the *Kayuh Baimbai* characters of students in the effective category demonstrates that the learning material on vibrations, waves, and sound, infused with authentic learning, effectively enhances the *Kayuh Baimbai* characters of students and is effectively utilized in the students' learning process.

Although this study holds considerable potential regarding the implementation of authentic learning materials, it has certain limitations. First, the lack of time efficiency when implementing authentic learning, which requires more optimal classroom management, so that the learning process runs according to the planned duration. This challenge is supported by [Watterston & Zhao \(2024\)](#), who argue that traditional school schedules may not be conducive to the flexibility required for authentic learning, suggesting that rethinking time allocation could enhance both student engagement and teacher performance. Second, the characteristics of authentic learning that were applied included learning that was relevant to daily life, scaffolding, complex problem-solving, cooperative discussions, and inquiry activities. The researchers did not conduct the creation of works, community activities, or the integration of science material with other fields due to the limited research time. This limitation aligns with findings by [Nachtigall et al. \(2024\)](#), who noted that while authentic learning approaches positively affect student motivation and engagement, their implementation often requires substantial time and resources, which can be challenging under time constraints.

In the long term, the implementation of authentic learning materials such as those developed in this study has the potential to instill lasting cooperative character values in students, particularly the *Kayuh Baimbai* characters, through repeated exposure to collaborative and contextual learning activities. The integration of local cultural elements into science content not only supports students' character development but also contributes to cultural preservation and the contextualization of science learning. This approach can foster lifelong skills such as teamwork, empathy, and social responsibility ([Nachtigall et al., 2022](#); [Novitasari & Walid, 2024](#)).

Furthermore, although the learning materials were specifically developed based on the local wisdom of South Kalimantan, the authentic learning framework and pedagogical

principles applied in this study are universally adaptable. Educators from other regions can modify the cultural components to reflect their respective local contexts while retaining the structure and core values of the materials ([Zachrich et al., 2024](#); [Zidny & Eilks, 2020](#)). Therefore, this model presents significant potential for broader implementation across different regions in Indonesia and even in other countries with similar educational and cultural goals, especially those promoting contextual learning and character education.

CONCLUSION

Based on the research conducted, it was found that the science learning material with authentic learning content on the topics of vibrations, waves, and sound received an effective category in terms of achieving the *Kayuh Baimbai* characters with a score of 68.34. Thus, it can be concluded that learning materials on vibrations, waves, and sound, featuring authentic learning content, are effective in enhancing students' *Kayuh Baimbai* characters. In the future, these materials hold potential for further development across other science topics and are recommended for implementation in teaching practices as a means to enhance the character of cooperation or *Kayuh Baimbai* through an authentic learning approach.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, MHR, MW, and S; methodology, MHR, MW; formal analysis, MHR and MW; writing preparation of the original draft, MHR, MW, and S.

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