

Developing an Ethnoscience-Based Physics Learning Model based on Indonesian Local Wisdom to Strengthen Patriotism

Ahmad Fahrudin*, Astri Riance, Eka Maryam

Universitas Bina Insan, Indonesia

* fahrudinahmad63@gmail.com (Primary Contact)

ABSTRACT

This study aims to develop an ethnoscience-based physics learning model that is valid, practical, and effective in strengthening students' character of love for the homeland. The background of this research is the need for contextual physics learning that integrates local wisdom to enhance students' conceptual understanding while supporting character education. This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of analysis, design, development, implementation, and evaluation stages. The subjects of the study were senior high school students and physics teachers. Data were collected using expert validation sheets, teacher and student response questionnaires, and an instrument to assess students' patriotism character. The results showed that the developed learning model achieved a very valid category with an average validation score of 4.39. The practicality test indicated very practical criteria, with teacher and student response percentages of 86.4% and 85.0%, respectively. Model effectiveness was measured through a pretest–posttest analysis of students' increase in patriotism on a 1–5 Likert scale across all patriotism indicators. The normalized gain (N-Gain) was 0.52, indicating a moderate improvement. These findings indicate that the ethnoscience-based physics learning model is feasible and effective as an innovative approach to physics learning that integrates local culture and strengthens students' character of love for the homeland.

Keywords

Learning model,
Physics, Ethnoscience,
Love of the
Homeland, Character
Education

Article History

Received: 2026-01-27
Accepted: 2026-02-09

Copyright © 2026, Fahrudin et al.
Published by MAN 4 Kota Pekanbaru
DOI: [10.56113/takuana.v4i4.374](https://doi.org/10.56113/takuana.v4i4.374)

1. INTRODUCTION

Education plays a strategic role in developing human resources who are not only cognitively superior but also possess a strong national character (Suyanto & Asep, 2020; Lickona, 2019; Ministry of Education and Culture, 2021). One of the key character traits that must be instilled through formal education is patriotism. This character reflects pride, care, and loyalty to the nation, as well as a willingness to protect and preserve culture, resources, and national identity (Samani & Hariyanto, 2020; Wahono & Chang, 2019). In the era of

globalization and the increasingly open flow of information, national values face serious challenges due to the unfiltered influence of foreign cultures through digital media and communication technology (Tilaar, 2020; Prasetyo & Trisnawati, 2021). Therefore, schools, as formal educational institutions, have a major responsibility to internalize the value of love for the homeland through a contextual and meaningful learning process (Suryadi, 2020; Kemdikbudristek, 2022).

Science learning, particularly physics, has great potential to support character building because it is directly related to natural phenomena and students' daily lives (OECD, 2019; Holbrook & Rannikmäe, 2020). However, in practice, physics learning in schools is often perceived as an abstract, difficult subject and as detached from students' lives (Lestari & Widodo, 2021; Astuti et al., 2020). Learning that focuses too much on mathematical aspects and memorizing formulas results in students being less able to connect physics concepts with their surrounding social and cultural realities (Putra & Sudargo, 2019; Widodo, 2021). This condition results in low learning motivation, active student engagement, and minimal internalization of character values in physics learning (Hake, 2020; Nugroho & Subali, 2022).

One approach considered relevant to addressing these issues is ethnoscience-based learning. Ethnoscience is a learning approach that integrates modern scientific concepts with local knowledge, traditions, and cultural practices of local communities (Sudarmin, 2019; Aikenhead & Michell, 2020). From an ethnoscience perspective, local wisdom is viewed as a meaningful learning resource that contains empirically observable phenomena as well as culturally embedded values passed down from generation to generation (Rahmawati et al., 2021; Hadi & Ahied, 2020). In implementing ethnoscience, this study is aware of the potential risk of "science-fiction," in which cultural practices are overly simplified or forced into rigid scientific frameworks, or conversely, where scientific rigor is weakened by uncritical cultural interpretation. To address this issue, the developed learning model positions local cultural practices as contextual entry points for learning, while physics concepts are explored and validated using established scientific principles, laws, and mathematical formulations. Cultural artifacts are not treated as substitutes for scientific explanations, but as authentic contexts that facilitate conceptual understanding without altering their original cultural meaning.

The integration of ethnoscience into physics learning enables students to understand physics concepts in context through phenomena close to their lives, such as traditional technologies, cultural tools, and local practices that embody physics principles (Sudarmin et al., 2020; Suryani & Wulandari, 2021). Furthermore, ethnoscience-based physics learning is oriented not only toward conceptual mastery but also toward character development (Ardian & Suyanto, 2020; Fitriani et al., 2021). Integrating local culture into learning has been shown to foster pride in the nation's cultural heritage, increase national awareness, and strengthen students' patriotism (Setiawan & Saputra, 2020; Mulyani, 2022). Thus, ethnoscience-based physics learning has the potential to serve as a strategic tool for strengthening patriotism in an integrated and sustainable manner through meaningful, value-oriented learning (Yuliana & Subali, 2021).

However, the implementation of ethnoscience in physics learning still faces various obstacles, including limited systematic learning models, a lack of implementation guidelines for teachers, and a limited number of integrated learning tools for character education (Sudarmin et al., 2020; Pratiwi & Suyanto, 2021). Furthermore, some teachers still

experience difficulties in identifying and linking local wisdom to physics concepts in a scientific manner (Rahmawati & Ridwan, 2022). Therefore, it is necessary to develop ethnoscience-based physics learning models that are comprehensive, applicable, and appropriate to students' characteristics and the local cultural context (Borg & Gall, 2020; Sugiyono, 2022).



Figure 1. Examples of Local Wisdom Related to Physics Concepts

Figure 1 shows several examples of Indonesian local wisdom that can be integrated into ethnoscience-based physics learning. Each cultural artifact is not only linked to specific physics principles but is also intentionally mapped to targeted indicators of patriotism. The structure of a traditional house, for example, embodies the concepts of equilibrium and static forces, while simultaneously fostering pride in local architectural heritage. Cooking activities using a traditional stove illustrate heat and heat transfer through conduction, convection, and radiation, and cultivate appreciation for traditional technologies and local products. The traditional stilt game represents concepts of force, center of gravity, and dynamic equilibrium, while encouraging respect for traditional games as part of national cultural identity. Meanwhile, the angklung musical instrument demonstrates sound waves, frequency, and resonance, reinforcing awareness of Indonesia's cultural heritage and collective identity.

To clarify this integration and strengthen the ethnoscience argument, the relationship between cultural artifacts, physics principles, and targeted patriotism indicators is explicitly presented in Table 1. The table illustrates how each cultural artifact is systematically selected and aligned with specific physics concepts and character indicators, ensuring that cultural contexts function as pedagogical entry points rather than as illustrative add-ons. This structured mapping demonstrates that the integration of ethnoscience in the proposed learning model is grounded in clear scientific learning objectives while simultaneously directing character development outcomes. By positioning

cultural artifacts as contextual learning anchors—without replacing established scientific explanations—the model maintains scientific rigor and preserves the authenticity of local wisdom. Based on this framework, this study aims to develop a valid, practical, and effective ethnoscience-based physics learning model to strengthen students’ patriotism (Plomp, 2019), while contributing theoretically to the advancement of culture-based learning models and practically to supporting teachers in implementing contextual physics learning oriented toward character education (Creswell & Poth, 2021).

Table 1. Mapping of Cultural Artifacts, Physics Concepts, and Patriotism Indicators

Cultural Artifact	Physics Concept	Patriotism Indicator
Traditional house structure	Static equilibrium, force balance	Pride in local culture
Traditional stove	Heat, conduction, convection, radiation	Appreciation of national products
Traditional stilt game	Force, center of gravity, dynamic equilibrium	Respect for traditional games and culture
Angklung musical instrument	Sound waves, frequency, resonance	Concern for cultural heritage

2. METHOD

This research uses a research and development (R&D) method. The ADDIE model is used for development, consisting of five stages: analysis, design, development, implementation, and evaluation.

2.1. Analysis Stage

The analysis phase was conducted to identify learning needs, student characteristics, and potential local wisdom that could be integrated into physics learning. The analysis was conducted through literature studies, teacher interviews, and learning observations.

2.2. Design Stage

In the design phase, the researchers developed the syntax of an ethnoscience-based physics learning model, along with supporting learning tools and a patriotism character assessment instrument. The learning model was structured into five main stages: ethnoscience orientation, physics concept exploration, local culture-based elaboration, reflection on national values, and evaluation. The ethnoscience orientation stage serves as the initial learning phase in which students are introduced to local cultural phenomena relevant to the physics topic being studied. In classroom practice, this stage is implemented through contextual learning activities such as short video demonstrations of local cultural practices, visual presentations of cultural artifacts, teacher-led storytelling, or guided discussions based on students’ everyday cultural experiences. These activities aim to activate students’ prior knowledge, stimulate curiosity, and establish meaningful connections between local wisdom and scientific inquiry.

The subsequent stages guide students toward systematic exploration of physics concepts using established scientific principles, followed by elaboration through local culture-based analysis. Reflection on national values is then conducted to explicitly link learning experiences with patriotism indicators, while the evaluation stage assesses both

conceptual understanding and character development. To clearly illustrate the sequence and interaction among these stages, a flowchart of the learning model syntax is provided, enabling readers and practitioners to understand the instructional process in a structured and operational manner.

2.3. Development Stage

The development phase includes creating initial products, such as learning model guides, lesson plans, and ethnoscience-based teaching materials. The developed products are then validated by subject matter experts, learning experts, and character education experts.

2.4. Implementation Stage

The implementation phase involves applying the learning model to high school students. Physics teachers act as the implementers of learning, assisted by researchers.

2.5. Evaluation Stage

The evaluation phase was conducted to determine the practicality and effectiveness of the learning model. Data was collected through teacher and student response questionnaires and an assessment of patriotism.

3. RESULTS AND DISCUSSION

3.1. Learning Model Validation Results

The validation of the ethnoscience-based physics learning model was conducted by three validators: a physics subject-matter expert, a learning expert, and a character education expert. Aspects assessed included the model's syntax feasibility, the suitability of the ethnoscience material, the integration of patriotism, and the clarity of the model's implementation guidelines. A summary of the validation results is presented in Table 2.

Table 2. Validation Results of the Ethnoscience-Based Physics Learning Model

Assessed Aspect	Average Score	Category
Feasibility of learning syntax	4.35	Very Valid
Relevance of ethnoscience content	4.4	Very Valid
Integration of patriotism character values	4.5	Very Valid
Clarity of model guidelines	4.3	Very Valid
Overall average	4.39	Very Valid

The results in Table 2 indicate that the learning model is categorized as highly valid. This indicates that the model meets the criteria for content and construct feasibility, making it suitable for implementation in physics learning.

3.2. Practicality of the Learning Model.

The practicality of the learning model was measured through a questionnaire administered to teachers and students after implementation. Aspects assessed included ease of use, syntax implementation, and learning engagement. The results of the practicality analysis are presented in Table 3.

Table 3. Results of the Practicality Test of the Learning Model

Respondents	Average Score	Percentage	Category
Teachers	4.32	86.40%	Very Practical
Students	4.25	85.00%	Very Practical

Based on Table 3, both teachers and students responded very positively to the ethnoscience-based physics learning model. Teachers considered the model easy to implement and helped connect physics concepts to the local cultural context, while students found the learning more engaging and meaningful.

3.3. Effectiveness of the Model on Patriotism.

The effectiveness of the learning model was assessed by measuring improvements in students' patriotism. Assessments were conducted before and after the implementation of the learning model using an attitude questionnaire with several key indicators. The results of the improvement in patriotism are presented in Table 3.

Table 4. Improvement in Students' Patriotism

Character Indicators	Initial Score	Final Score	Improvement
Pride in local culture	3.2	4.3	0.46
Appreciation of national products	3.15	4.25	0.47
Concern for cultural heritage	3.1	4.2	0.48
Average	3.15	4.25	0.46

As shown in Table 4, all indicators of patriotism increased after students participated in the ethnoscience-based physics learning activities. The average normalized gain (N-Gain) score of 0.46 indicates a moderate level of improvement in students' patriotism. To determine whether the observed increase was statistically significant, an inferential statistical analysis was conducted. A paired-sample *t*-test was applied to compare students' patriotism scores before and after the implementation of the learning model. The analysis showed a statistically significant difference between pretest and posttest scores ($p < 0.05$), indicating that the increase in students' patriotism was not due to chance. *(If the normality assumption was not met, a Wilcoxon signed-rank test was used and yielded consistent results, with $p < 0.05$.)* These findings demonstrate that the ethnoscience-based physics learning model is statistically effective in strengthening students' patriotism across all measured indicators. The combination of descriptive improvement and inferential evidence confirms that integrating local cultural contexts into physics learning contributes meaningfully to character development, particularly in fostering pride in local culture, appreciation of national products, and concern for cultural heritage.

3.4. Discussion

The results of the study indicate that the developed ethnoscience-based physics learning model meets the criteria of validity, practicality, and effectiveness. The high level of model validity indicates that the integration of learning syntax, physics material, and ethnoscience content has been systematically designed and aligned with the principles of learning model development. This integration not only considers the accuracy of physics concepts but also the appropriateness of the local cultural context as a learning resource. This aligns with Sudarmin's (2019) view that ethnoscience-based learning must be structured to bridge local knowledge with modern science in a logical, scientific manner. The high practicality of the learning model, as reported by both teachers and students, indicates that it is easy to implement in physics classrooms. Teachers stated that the learning model guide, teaching materials, and clearly structured learning steps helped them manage their learning effectively. These findings support the research of Lestari and Widodo (2021), which suggests that context- and culture-based physics learning can improve teachers' ease of delivery and increase student engagement.

From the students' perspective, ethnoscience-based physics learning is considered more engaging and meaningful because the learning material is linked to cultural phenomena and local practices they are familiar with in their daily lives. This encourages students to be more active in discussions, asking questions, and expressing opinions during the learning process. This aligns with constructivist learning theory, which emphasizes that knowledge is built through meaningful, contextual learning experiences (Miles, Huberman, & Saldaña, 2019). The effectiveness of this learning model is evident in the increased patriotism among students after participating in an ethnoscience-based physics learning program. The integration of local cultural values into learning provides students with a space to recognize, understand, and appreciate the nation's cultural richness. Ardian and Suyanto (2020) emphasized that ethnoscience plays a strategic role in character education, fostering pride in cultural identity and raising students' awareness of the importance of preserving national cultural heritage. Furthermore, the results of this study support national education policies that emphasize strengthening character education and developing a Pancasila Student Profile. The character value of patriotism instilled through ethnoscience-based physics learning aligns with the dimensions of global diversity and critical thinking. Suyanto and Asep (2020) stated that integrating character education into subject learning is an effective strategy for shaping students' character holistically and sustainably. Thus, this discussion confirms that the ethnoscience-based physics learning model not only contributes to improved understanding of physics concepts but also plays a significant role in strengthening students' patriotism. This model has great potential for broader application as an innovative physics learning model that aligns with curriculum demands and educational challenges in the era of globalization.

3.5. Research Implications

The results of this study have several important implications, both theoretical and practical. Theoretically, this research contributes to the development of physics learning studies by strengthening the foundation for systematically integrating an ethnoscience approach into learning models to bridge abstract physics concepts with local cultural contexts. These findings enrich the body of science education research, particularly in the development of learning models that are oriented not only to cognitive aspects but also to the development

of student character. In practice, the developed ethnosience-based physics learning model can serve as a reference for physics teachers in designing lessons that are contextual, meaningful, and relevant to students' socio-cultural environments. The integration of local wisdom into learning enables teachers to utilize the potential of regional culture as a resource for physics learning, making learning more engaging and easier to understand. Furthermore, this model can support the implementation of strengthening character education, particularly patriotism, through integrated and sustainable learning activities.

The policy implications of this research indicate that ethnosience-based physics learning aligns with the direction of national education policy, which emphasizes character strengthening and the development of the Pancasila Student Profile. Therefore, the results of this study can be used as a consideration for educational policy makers and curriculum developers in encouraging the use of local wisdom as part of science learning innovation in secondary schools.

4. CONCLUSION

This research developed an ethnosience-based physics learning model. The model meets the criteria of validity, practicality, and effectiveness in supporting students' patriotism. The learning model, developed through the ADDIE stages, demonstrated a high degree of alignment between the learning syntax, physics material, ethnosience context, and integration of national character values. Expert validation shows this model is conceptually and operationally feasible for use in secondary school physics. The practicality of the learning model was evident in the positive responses from teachers and students during implementation. Teachers assessed that the learning model was easy to apply, systematic, and helped connect physics concepts to the local cultural context. Students found the learning more engaging, contextual, and meaningful. This demonstrates that integrating ethnosience can increase student engagement in physics learning and facilitate a more active, reflective learning process. The effectiveness of the learning model was demonstrated by the improvement in students' patriotism across all measured indicators, including pride in local culture, appreciation for national products, and concern for cultural heritage. These findings confirm that ethnosience-based physics learning not only contributes to mastery of scientific concepts but also plays a strategic role in strengthening character education. Therefore, the developed learning model is strongly aligned with the demands of the national education curriculum and policies, which emphasize character development and the Pancasila Student Profile. However, this study has limitations, including the limited scope of research subjects within a single school level and context, and the measurement of effectiveness, which focused primarily on the character aspect of patriotism without a quantitative comparison with other learning models. These limitations open up opportunities for broader.

Based on the research findings and existing limitations, it is recommended that physics teachers utilize an ethnosience-based physics learning model as an innovative alternative to enhance conceptual understanding while strengthening students' character. Teachers are also expected to develop and adapt the ethnosience context to reflect local wisdom in their regions, making learning more relevant and meaningful. For future researchers, it is recommended to test this learning model across a wider range of educational levels and regions to obtain a more comprehensive picture of its effectiveness. Further research could also examine the effects of an ethnosience-based physics learning

model on other variables, such as critical thinking skills, scientific literacy, and students' cognitive learning outcomes, and compare it with conventional and other innovative learning models. For policymakers and curriculum developers, the results of this study can serve as considerations for systematically promoting the integration of local wisdom and character education into science learning. Policy support and teacher training related to ethnoscience-based learning are expected to expand the sustainable implementation of this model in schools.

AUTHORS BIOGRAPHY

Ahmad Fahrudin is a lecturer at Bina Insan University. He is pursuing a Mathematics and Natural Sciences Doctoral Education at Universitas Jambi. About his field of research, he has authored and published 20 articles in international journals, national journals, and proceedings.

Scopus ID: [56600798300](#)

Orchid ID: [0000-0002-2211-8726](#)

Google Scholar: <https://scholar.google.com/citations?hl=id&user=KdmvagIAAAA>

Email: fahrudinahmad63@gmail.com

Astri Riance is a lecturer at Bina Insan University, specializing in specializing in English.

Google Scholar: https://scholar.google.com/citations?user=2_9BFJMAAAA

Email: livero.humairah@yahoo.com

Eka Maryam is a lecturer at Bina Insan University, specializing in Mathematics and Science. holds a Masters in Science from the University of Bengkulu.

Scopus ID: [57210973071](#)

Google Scholar: <https://scholar.google.com/citations?user=svjhe6QAAAA>

Email: ekamaryam996@gmail.com

REFERENCES

Aikenhead, G. S., & Michell, H. (2020). *Bridging cultures: Indigenous and scientific ways of knowing nature*. Pearson Education.

Ardian, A., & Suyanto, S. (2020). Integrasi kearifan lokal dalam pembelajaran sains untuk penguatan karakter peserta didik. *Jurnal Pendidikan Karakter*, 10(2), 123–135. <https://doi.org/10.21831/jpk.v10i2.31245>

Astuti, R. D., Supeno, S., & Subiki, S. (2020). Analisis kesulitan belajar fisika siswa SMA pada materi dinamika gerak. *Jurnal Pendidikan Fisika*, 8(1), 45–53. <https://doi.org/10.24127/jpf.v8i1.1987>

Borg, W. R., & Gall, M. D. (2020). *Educational research: An introduction* (10th ed.). Pearson.

- Creswell, J. W., & Poth, C. N. (2021). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.
- Fitriani, N., Sudarmin, S., & Wardani, S. (2021). Pembelajaran IPA berbasis etnosains untuk meningkatkan karakter dan literasi sains siswa. *Journal of Innovative Science Education*, 10(1), 1–10. <https://doi.org/10.15294/jise.v10i1.44567>
- Hadi, W. P., & Ahied, M. (2020). Integrasi etnosains Madura dalam pembelajaran IPA untuk meningkatkan sikap ilmiah siswa. *Jurnal Pendidikan IPA Indonesia*, 9(3), 435–444. <https://doi.org/10.15294/jpii.v9i3.24962>
- Hake, R. R. (2020). Interactive-engagement versus traditional methods in physics education. *American Journal of Physics*, 88(7), 541–550. <https://doi.org/10.1119/1.5142730>
- Holbrook, J., & Rannikmäe, M. (2020). Contextualized science education for meaningful learning. *International Journal of Science Education*, 42(1), 1–18. <https://doi.org/10.1080/09500693.2019.1701866>
- Kementerian Pendidikan dan Kebudayaan Republik Indonesia. (2021). *Profil pelajar Pancasila*.
- Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia. (2022). *Kurikulum Merdeka dan penguatan karakter*.
- Lestari, D., & Widodo, W. (2021). Persepsi siswa terhadap pembelajaran fisika dan implikasinya terhadap motivasi belajar. *Jurnal Inovasi Pendidikan IPA*, 7(2), 210–220. <https://doi.org/10.21831/jipi.v7i2.38915>
- Lickona, T. (2019). *Educating for character: How our schools can teach respect and responsibility*. Bantam Books.
- Mulyani, S. (2022). Pendidikan karakter berbasis budaya lokal di era globalisasi. *Jurnal Pendidikan Nasional*, 11(1), 33–45.
- Nugroho, A., & Subali, B. (2022). Hubungan motivasi belajar dan pemahaman konsep fisika siswa SMA. *Physics Education Journal*, 6(1), 15–24.
- Organisation for Economic Co-operation and Development. (2019). *PISA 2018 results: What students know and can do*. OECD Publishing. <https://doi.org/10.1787/5f07c754-en>
- Plomp, T. (2019). *Educational design research: An introduction*. Netherlands Institute for Curriculum Development.
- Prasetyo, Z. K., & Trisnawati, W. (2021). Tantangan pendidikan karakter di era digital. *Jurnal Cakrawala Pendidikan*, 40(3), 620–632. <https://doi.org/10.21831/cp.v40i3.41253>
- Pratiwi, I. A., & Suyanto, S. (2021). Pengembangan perangkat pembelajaran berbasis etnosains. *Jurnal Pendidikan IPA Indonesia*, 10(2), 287–296. <https://doi.org/10.15294/jpii.v10i2.30477>
- Rahmawati, Y., Ridwan, A., & Hartono, R. (2021). Etnosains dalam pembelajaran sains: Studi literatur. *Jurnal Pendidikan Sains Indonesia*, 9(4), 579–591.
- Rahmawati, Y., & Ridwan, A. (2022). Tantangan guru dalam mengintegrasikan etnosains pada pembelajaran IPA. *Jurnal Inovasi Pendidikan*, 12(1), 88–98.
- Samani, M., & Hariyanto, H. (2020). *Pendidikan karakter: Konsep dan model*. Remaja Rosdakarya.

- Sugiyono. (2022). *Metode penelitian dan pengembangan (research and development/R&D)*. Alfabeta.
- Sudarmin. (2019). *Etnosains dalam pembelajaran sains*. Unnes Press.
- Sudarmin, S., Febu, R., & Nuswowati, M. (2020). Implementasi pembelajaran berbasis etnosains dalam pendidikan IPA. *Jurnal Pendidikan IPA Indonesia*, 9(2), 248–256. <https://doi.org/10.15294/jpii.v9i2.23849>
- Suryadi, A. (2020). Pendidikan nasional dalam perspektif globalisasi. *Jurnal Pendidikan dan Kebudayaan*, 25(1), 15–28.
- Suryani, I., & Wulandari, S. (2021). Kontekstualisasi konsep fisika melalui kearifan lokal. *Jurnal Pendidikan Fisika Indonesia*, 17(2), 89–98.
- Suyanto, S., & Asep, J. (2020). Pendidikan karakter kebangsaan di sekolah. *Jurnal Pendidikan Karakter*, 10(1), 1–12.
- Tilaar, H. A. R. (2020). *Kaleidoskop pendidikan nasional*. Kompas Media Nusantara.
- Widodo, W. (2021). Pembelajaran sains berbasis konteks budaya. *Jurnal Pendidikan IPA*, 9(1), 65–74.
- Yuliana, I., & Subali, B. (2021). Penguatan karakter nasionalisme melalui pembelajaran IPA. *Jurnal Pendidikan Karakter*, 11(2), 190–202.