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DEVELOPMENT OF SMART BOX MEDIA TO IMPROVE STUDENTS' TOLERANCE CHARACTER IN SCIENCE LEARNING IN GRADE IV OF SDN KARANGHARJA 03

Nanda Amanda Dewi Lestari[1], Ira Restu Kurnia[2]

[1] Universitas Pelita Bangsa
[2] Universitas Pelita Bangsa
[1] nandamanda2803@gmail.com, [2] kurniarestuira@pelitabangsa.ac.id

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Abstract

This study aims to develop a smart box learning medium to improve students tol-erance in the subject of cultural diversity in Indonesia in fourth-grade students at SDN Karangharja 03, in terms of feasibility, practicality, and effectiveness. The method used was a developmen research using the ADDIE (Analyze, Design, De-velopment, Implementation, Evaluation) model involving 30 fourth-grade students. The research instruments included validation by media, language, and material experts, as well as teacher and students response questionnaires, and a tolerance character questionnaire. The results showed that the smart box media was deemed feasible (media expert 94%, language 98%, and material 92%), very prac-tical (teacher and students questionnaire 98% responses), and effective in improv-ing students tolerance character, with a tolerance character observation percentage of 67% (quite effective) and a tolerance character questionnaire 0f 98% (very effec-tive). Therefore, the smart box media is suitablefor use as an innovation in science learning on cultural diversity in indonesia to improve students tolerance character.

Keywords: Smart Box Media, Tolerance Character, IPAS

Abstrak

Penelitian ini bertujuan mengembangkan media smart box untuk meningkatkan karakter toleransi siswa pada materi keberagaman budaya di indonesia pada ke-las IV SDN Karangaharja 03, ditinjau dari kelayakan, kepraktisan, dan keefek-tifan. Metode yang digunakan adalah penelitian pengembangan dengan model ADDIE (Analyze, Design, Development, Implementation, Evaluation) yang melibatkan 30 siswa kelas IV. Instrumen penelitian meliputi validasi ahli media, bahasa, materi, serta angket respon guru, siswa, dan angket karakter toleransi. Hasil penelitian menunjukkan bahwa media smart box dinyatkan layak (ahli media 94%, bahasa 98%, dan materi 92%), sangat praktis (angket respon guru 98% dan siswa 96%), serta efektif meningkatkan karakter toleransi siswa dengan persentase observasi karakter toleransi 67% (cukup efektif) dan angket karakter toleransi 98% (sangat efektif). Dengan demikian, media smart box layak digunakan sebagai inovasi pembelajaran IPAS materi keberagaman budaya di indonesia untuk meningkatkan karakter toleransi siswa.

Kata Kunci: : Media Smart Box, Karakter Toleransi, IPAS

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INTRODUCTION

Character education is a structured process for instilling moral values in students, encompassing relationships with God, the self, others, the environment, and the nation. These values are reflected in mindsets, attitudes, feelings, speech, and actions grounded in religious, legal, ethical, cultural, and customary norms (Kurnia et al., 2023). This aligns with Law Number 20 of 2003 concerning the National Education System. A key character trait to be cultivated from an early age is tolerancean attitude of respecting differences and maintaining harmony amidst the diversity of Indonesian society.

In elementary schools, the cultivation of tolerance can be integrated into various subjects, such as Natural and Social Sciences (IPAS). This subject combines Natural Sciences (IPA) and Social Sciences (IPS) to provide a comprehensive understanding of the interconnectedness between humans and nature, as well as social interactions. However, current IPAS instructional practices tend to be theoretical and monotonous, proving ineffective in fostering tolerance.

Consequently, a strategy to achieve successful learning outcomes is the implementation of creative and innovative instructional media. Instructional media are defined as tools or means that serve as intermediaries for conveying information, messages, or content, with the aim of creating a supportive environment for the learning process (Andi Kristanto, 2016).

One example of creative, interactive, and innovative instructional media is the "smart box" a learning kit containing content, educational games, and collaborative activities designed to enhance tolerance through enjoyable learning experiences. This medium encourages students to cooperate and respect differences.

Observations and interviews at SDN Karangharja 03 revealed that some students still struggle to grasp the concept of tolerance, evidenced by a lack of mutual respect during group work. Therefore, this study aims to develop a smart box medium for IPAS instruction and analyze its effectiveness in fostering tolerance among fourth-grade students. The research findings are expected to make a tangible contribution to strengthening character education particularly regarding tolerance and serve as a reference for teachers and education practitioners in designing more effective learning strategies for primary schools.

METHOD

This study employs the Research and Development (R&D) method using the ADDIE development model. This model comprises five stages: Analysis, Planning, Development, Implementation, and Evaluation. Each stage includes guidelines and concepts that serve as a reference for applying the ADDIE model (Fayrus & Slamet, 2022).

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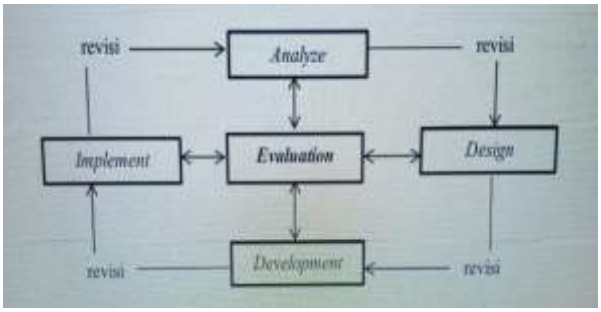


Figure 1 ADDIE Development Model (Fayrus & Slamet, 2022)

This study was conducted with fourth-grade students at SDN Karangharja 03, located in Kampung Teluk Bango (RT 10/RW 04), Karangharja Village, Pebayuran District, Bekasi Regency. Observations revealed an issue regarding the students' tolerance specifically, a lack of mutual respect among peers during group work during Natural and Social Sciences (IPAS) lessons. Consequently, there is a need for an instructional medium to enhance student tolerance, specifically the "Smart Box" learning medium.

Data collection techniques represent the most strategic step in the research process, as the primary objective is to obtain authentic data (Maryaningsih, 2023). The data collection techniques employed in this development research include observation, interviews, validation sheets, documentation, and questionnaires. Instruments were used to assess the feasibility of the learning medium and to validate the developed product via validation questionnaires administered to media, language, and subject matter experts. The validation questionnaire data were analyzed using a 1–5 Likert scale to evaluate the feasibility of the Smart Box medium. The feasibility of the Smart Box medium is calculated using the following formula:

$$P = \frac{F}{N} \times 100\%$$

Note:
P = Percentage score
F = Score obtained
N = Maximum score

The result obtained from the percentage calculation is then used to determine the feasibility level of the learning media product, based on the following qualification criteria:

Table 1. Feasibility Assessment Criteria

Percentage	Qualification	Eligibility criteria
81% < score ≤ 100%	Highly suitable	No Revision
61% < score ≤ 80%	Suitable	No Revision
41% < score ≤ 60%	Moderately suitable	Revision
21% < score ≤ 40%	Less suitable	Revision
0% < score ≤ 20%	Unsuitable	Revision

An assessment is considered valid if it meets the achievement criteria—specifically, a score between 61 and 100—across all aspects of the assessment questionnaire, including evaluations by subject matter experts and language experts.
In addition to assessing feasibility, a practicality test was conducted for the "Smart Box" media. To evaluate this practicality, teacher and student response questionnaires were used to gather their opinions on the developed Smart Box learning media. The practicality of the Smart Box media is calculated using the following formula:

$$K = \frac{R}{SM} \times 100\%$$

Note:
K = Practicality percentage value
R = Score obtained
SM = Maximum score

The practicality criteria are as follows.

Table 2. Practicality Criteria

Practicality Score	Criteria
25 K 55%	Impractical
55 K 60%	Not very practical
60 K 75%	Fairly practical
75 K 85%	Practical
85 K 100%	Very practical

The "smart box" media is considered practical if it meets a minimum practicality level of 75% or higher. This indicates that the media is suitable for use in instruction, as it has met the established standards for practicality.

Following the analysis of the smart box media's practicality, the process proceeded to the analysis of students' tolerance traits to determine the effectiveness of the developed media; the effectiveness of the smart box media can be calculated using the following formula:

$$P = \frac{T}{N} \times 100\%$$

Legend:
P = Percentage of character improvement
T = Score obtained
N = Maximum score

Table 3. Percentage Criteria for Improving Tolerance Character

Interval (%)	Category
H < 50%	Ineffective
50 < H < 60%	Less effective
60 < H < 70%	Moderately effective
70 < H < 80%	Effective
H > 80%	Highly effective

The smart box is deemed effective if it meets the effectiveness criteria with a score of at0 least 70%. If the results reach or exceed this figure, the smart box can be categorized as an effective learning medium, particularly for fostering the character trait of tolerance.

RESULTS AND DISCUSSION

Results

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The following outlines the results of the research and development of the "Smart Box" learning medium for the Natural and Social Sciences (IPAS) subject specifically the topic of Indonesia's cultural diversity in the fourth grade of elementary school.

1. Analysis

At this stage, an analysis was conducted to identify existing learning challenges and to evaluate the potential of the Smart Box medium as an innovative solution for the school's learning process. The author carried out analyses of the curriculum, student needs, and learning media. Regarding the curriculum analysis, interviews with the fourth-grade teacher revealed that the school employs the *Kurikulum Merdeka* (Independent Curriculum), utilizing the *Kurikulum Merdeka* textbook for Natural and Social Sciences (IPAS).

The analysis of student needs was conducted through interviews with the fourth-grade teacher, Ms. Rowinah, S.Pd. It was found that students still struggled to understand diversity and to apply attitudes of mutual respect in their daily lives. Furthermore, the prevailing teaching method lecturing failed to fully engage students' attention; consequently, there was a need for a more interactive and innovative medium to help students understand the material and cultivate an attitude of tolerance toward diversity. The Smart Box medium is intended to serve as an innovative solution by offering a more tangible learning experience through the use of educational aids and a process centered on interaction and collaboration. In this way, students can not only grasp the concept of tolerance theoretically but also apply it in their everyday lives.

Finally, regarding the analysis of learning media, careful observation and interviews highlighted a critical need for interactive, innovative, and enjoyable media for the fourth-grade IPAS subject—particularly for the topic of Indonesia's cultural diversity—to assist teachers in achieving classroom learning objectives. Additionally, the researcher analyzed the Learning Outcomes (*Capaian Pembelajaran* or CP) and Learning Objectives (*Tujuan Pembelajaran* or TP) for the fourth-grade IPAS subject. Consequently, the researcher developed the Smart Box learning medium for the IPAS unit on Indonesia's cultural diversity. This medium is designed to present material in a more engaging and enjoyable manner, thereby fostering student enthusiasm for learning and strengthening their character regarding tolerance. 2.Planning (Design)

At this stage, the researcher develops an initial design for the instructional media product based on the results of the needs analysis, student characteristics, and the material to be presented (Rahman et al., 2022). The design for the "Smart Box" media is outlined below:

a. Content Review

The material used in designing the Smart Box media focuses on cultural diversity in Indonesia, as covered in the Grade 4 Elementary School IPAS (Natural and Social Sciences) subject. The selection of this material is aligned with the learning outcomes and objectives of the *Kurikulum Merdeka* (Independent Curriculum).

b. Initial Design

The Smart Box is an IPAS instructional medium constructed as a box made primarily of plywood. It contains material regarding cultural diversity in Indonesia, aiming to foster tolerance in Grade 4 elementary students. The Smart Box consists of four compartments, each containing learning materials, practice questions, and games. Each compartment measures 33 cm x 47 cm and features an engaging design intended to boost student enthusiasm during the learning process. The appearance of the Smart Box media is shown below.



Figure 2. Smart Box media design.

3. Development

In the development stage, following the design of the learning media, the product undergoes a validation process involving media, language, and subject matter experts. Assessments from the three validators are analyzed to determine the average percentage score. The results of the experts' assessments are presented in the following table:

Table 1. Validator Assessment Results

No	Validator	Percentage Score
1	Media Expert	94%
2	Linguist	98%
3	Materials Expert	92%
Average		**95%**
Category		**Highly Suitable**

Based on the aggregated assessments from three validators, an average score of 95% was obtained, placing it in the "highly feasible" category. This figure represents the total score divided by the number of validators (three). With this percentage, the "smart box" media falls into the "highly feasible" category. This indicates that the smart box media meets the feasibility criteria established by experts; therefore, it is deemed highly suitable for use in the learning process.

4. Implementation

The implementation phase took place after the smart box media had undergone the validation process and was deemed suitable for trial by experts. During this stage, a practicality test was conducted involving teachers and students, who completed response questionnaires to assess the ease of using the media in the learning process (Sari et al., 2024). The results of the teacher and student response questionnaires were analyzed, yielding the following findings:

Table 2. Results of Teacher and Student Response Assessments

No	Validator	Score precentation
1	Teacher Response	98%
2	Student Response	96%
Average		**97%**
Category		**Highly Suitable**

Based on the recapitulation of teacher and student responses to the "Smart Box" media, an average score of 97% was obtained, falling under the "Very Practical" criterion. Consequently, the Smart Box is categorized as highly practical as an IPAS (Natural and Social Sciences) learning medium for enhancing students' tolerance.

5. Evaluation
The evaluation stage was conducted to determine the final outcome of the Smart Box development and to assess the medium's effectiveness. Data regarding the Smart Box's impact on student tolerance was gathered from 30 fourth-grade students at SDN Karangharja 03 using two instruments: an initial observation questionnaire administered prior to the medium's implementation, and a student tolerance questionnaire administered after using the Smart Box. Effectiveness data was derived by calculating the difference between the scores from the initial observation questionnaire and the student tolerance questionnaire.

The Smart Box is deemed effective for use in the learning process if it meets the established criteria. Observations conducted prior to the introduction of the Smart Box yielded a total score of 808 from the 30 students (a 67% rating), placing it in the "moderately effective" category; this indicated that the students' tolerance levels were initially low.

Subsequently, following the use of the Smart Box to support IPAS learning, the 30 fourth-grade students achieved a total score of 2,359, resulting in an average tolerance score of 98% categorized as "highly effective." Based on these effectiveness test results, it can be concluded that the Smart Box is an effective tool for enhancing the tolerance of fourth-grade students at SDN Karangharja 03 during IPAS lessons covering the topic of Cultural Diversity in Indonesia.

CONCLUSION

Based on the development and trial results of the "smart box" learning medium designed for the Natural and Social Sciences (IPAS) subject focusing on cultural diversity in Indonesia for fourth-grade students at SDN Karangharja 03 the following conclusions can be drawn: The smart box medium was deemed highly suitable based on expert validation results, specifically: the media validator (score of 47 or 94%), the language validator (score of 49 or 98%), and the content validator (score of 46 or 92%). An average score of 95% indicates that the medium is categorized as highly suitable for use in fourth-grade IPAS instruction.

Feedback from both teachers and students was positive, highlighting the practicality of the smart box medium; teachers rated it at 98%, while students rated it at 96%. This indicates that the medium is highly practical for supporting classroom IPAS learning.
The smart box medium proved effective in enhancing students' tolerance. This is supported by results from the tolerance questionnaire, which yielded a score of 98% placing it in the "highly practical" category following the use of the medium.

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