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Development of Flashcard Learning Media for Fourth Grade Science and Social Studies Subject

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Abstract
Learning that relies solely on textbooks often results in low student engagement and limited conceptual understanding. To address this challenge, flashcards can serve as an alternative learning medium, particularly for Science and Social Studies (IPAS). This study aims to develop flashcard-based learning media to improve students' understanding of climate and seasonal concepts. The research employed a Research and Development (R&D) approach using the ADDIE development model, covering the stages of Analyze, Design, and Develop. Validation instruments were used to evaluate the appropriateness of the flashcards, with assessments conducted by two media experts and one subject matter expert. The validation results indicated a feasibility score of 98% from media experts and 98.75% from the subject matter expert, both of which fall into the "highly appropriate" category. Suggestions for refinement included increasing font size, selecting a more engaging font style, and adding game instructions to facilitate student use. The findings demonstrate that flashcard-based media has strong potential to foster interactive and engaging learning
Keywords: *Development, Flashcard, Learning Media*

Abstrak
Pembelajaran yang hanya bergantung pada buku teks sering kali menyebabkan rendahnya keterlibatan siswa dan terbatasnya pemahaman konseptual. Untuk mengatasi tantangan ini, kartu flash dapat digunakan sebagai media pembelajaran alternatif, khususnya pada mata pelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS). Penelitian ini bertujuan untuk mengembangkan media pembelajaran berbasis kartu flash guna meningkatkan pemahaman siswa terhadap konsep iklim dan musim. Penelitian ini menggunakan pendekatan Research and Development (R&D) dengan model pengembangan ADDIE, yang mencakup tahap Analisis, Desain, dan Pengembangan. Instrumen validasi digunakan untuk menilai kelayakan kartu flash, dengan penilaian dilakukan oleh dua ahli media dan satu ahli materi. Hasil validasi menunjukkan tingkat kelayakan sebesar 98% dari ahli media dan 98,75% dari ahli materi, yang keduanya termasuk dalam kategori "sangat layak." Saran perbaikan meliputi pembesaran ukuran huruf, pemilihan jenis huruf yang lebih menarik, serta penambahan petunjuk permainan untuk memudahkan penggunaan oleh siswa. Temuan ini menunjukkan bahwa media kartu flash memiliki potensi besar dalam menciptakan pengalaman belajar yang interaktif dan menarik
Kata Kunci: Pengembangan, *Flashcard,* Media Pembelajaran

INTRODUCTION

Science and Social Studies education at the elementary school level plays a vital role in shaping students' early understanding of natural and social phenomena in their surrounding environment. Climate and seasonal differences are among the most contextually relevant topics in early science education. Introducing this material from an early age is crucial so that students can understand the relationship between natural conditions and daily human life, as well as develop an awareness of the importance of environmental conservation amidst global climate change. Understanding seasonal differences also contributes to the development of scientific literacy and students' analytical thinking skills.

However, in practice, teaching climate and seasons in elementary schools still faces several challenges. One major obstacle is the abstract nature of the material, which can be difficult for students to grasp without the support of visual media. In addition, many teachers still rely heavily on textbooks and student worksheets as the sole learning resources, without incorporating interactive and engaging instructional media. This situation may lead to low conceptual understanding and reduced student engagement in learning.

A study conducted by Nurjanah et al., (2024) showed that most students had not yet mastered the subject matter related to the concepts of weather, climate, and seasons. This difficulty stemmed from conventional teaching methods that emphasize lectures and memorization without the inclusion of concrete media to support student understanding. Therefore, innovation is needed in the form of instructional media that can simplify abstract concepts and make them more accessible.

One potential medium to address these challenges is the use of flashcards. Flashcards are simple instructional tools in the form of cards that typically display images, keywords, or brief explanations, and have been proven to help reinforce students' memory through visual repetition. Flashcards are learning aids in the form of cards containing pictures, numbers, or information used as learning material (Cahyaningtyas et al., 2023). They consist of small cards containing images, text, or symbols and brief explanations (Safitri et al., 2018). In essence, flashcards are educational cards that contain images, symbols, or specific words designed to support learning through repetition and association. This medium has been proven effective in enhancing memory retention and conceptual understanding due to its visual nature, simplicity, and versatility in various instructional strategies.

In a previous study by Krisdiana & Jamaludin (2023), the learning outcomes of fourth-grade students on the topic of traditional house diversity in Indonesia improved through the use of flashcards. Similarly, research by Dewi et al., (2024) conducted at SDN 1 Dawuhan found that using flashcards based on local wisdom increased students' interest in learning, which directly influenced their IPAS learning outcomes. This is consistent with research by Wahyuni (2020), which showed a significant difference in learning outcomes on the theme "My Activities" between students taught with and without the help of flashcards.

Another study by Febriyanto & Yanto (2019) concluded that the use of flashcards in Social Studies learning for fourth-grade students at SDN I Pesanggrahan yielded satisfactory results based on classroom observations. Additionally, research by Yanti et al., (2022) concluded that flashcards based on contextual learning are effective and can be successfully

implemented in fourth-grade Social Studies lessons. This medium is highly suitable for elementary school students as it captures their attention, is easy to use, and promotes active and enjoyable learning. Furthermore, flashcards can enhance student participation and facilitate comprehension through a visual learning approach (Galuh Purbosari & Wijaya Saputra, 2024).

Based on the aforementioned background, the purpose of this study is to develop a flashcard learning medium that is both appropriate and effective for use in Science and Social Studies subject learning on the topic of climate and seasons for fourth-grade elementary school students, under the title *"Development of Flashcard Learning Media for Fourth Grade Science and Social Studies Subject."* This study also aims to assess the feasibility of the media based on expert validation and to evaluate the potential of using flashcards to enhance students' conceptual understanding

METHODS

The design of this study is Research and Development (R&D), which aims to develop flashcard media to improve the learning outcomes of fourth-grade students in the Science and Social Studies subject. According to Sugiyono, (2016), the ADDIE development model provides a systematic framework for instructional development, consisting of five stages: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation. However, due to limitations in time, cost, and resources, this study only covers three stages: analysis, design, and development. Waruwu, (2024) illustrates the ADDIE development design in Figure 1.

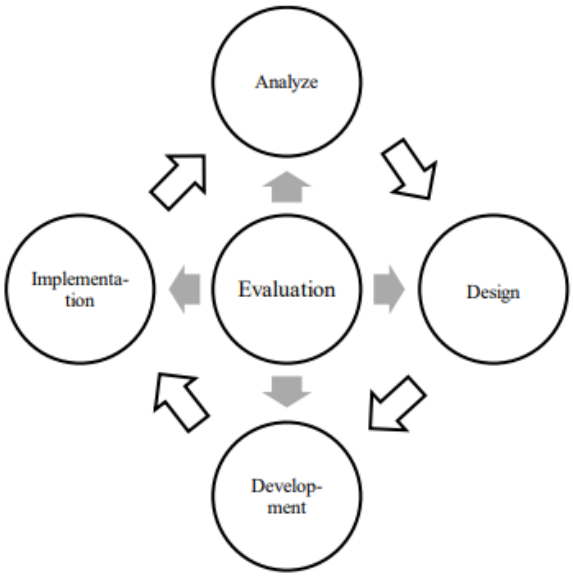


Figure 1. Description of the ADDIE Development Design

The instrument used in this study is a questionnaire, specifically validation sheets from media and content experts. These validation sheets are filled out by experts to obtain

information regarding the feasibility of the flashcard media and the appropriateness of the content. The data obtained from the validity results were then analyzed using quantitative analysis techniques to determine the feasibility of the developed media.The validity level of the flashcard media is calculated using the following formula:

$$\text{Validity} = \frac{\text{Total Score}}{\text{Maximum Expected Score}} \text{ x } 100\%$$

After obtaining the percentage result from the formula above, it is then categorized based on predetermined criteria (Arikunto, 2013):

Table 1. Expert Validator Assessment Criteria

Score Range	Category
75% < Score ≤ 100%	Very Feasible
50% < Score ≤ 75%	Feasible
25% < Score ≤ 50%	Less Feasible
0% ≤ Score ≤ 25%	Not Feasible

RESULT AND DISCUSSION

This study resulted in the development of flashcard learning media through a Research and Development (R&D) method. The development process followed the ADDIE approach, which consists of three stages:

Analysis Stage

Based on classroom observations conducted in a fourth-grade elementary school, it was found that the Science and Social Studies learning process is still dominated by conventional methods, particularly the use of textbooks and student worksheets (LKS) as the sole learning resources. Teachers tend to rely on lecture-based instruction and worksheet activities without integrating interactive learning media. As a result, learning becomes one-directional with minimal interaction-both between teachers and students and among students themselves.

This condition directly impacts the low level of active student engagement. Students appear passive in receiving information, show little enthusiasm during lessons, and often struggle to grasp abstract concepts such as the differences between weather, seasons, and climate. These concepts, however, are crucial for building scientific literacy and students' understanding of their surrounding environment.

Moreover, informal interviews with several teachers revealed a need for instructional media that is not only visually appealing but also easy to use, cost-effective, and aligned with the developmental characteristics of elementary students. Teachers indicated that simple yet effective visual aids are essential for explaining topics that cannot be observed directly by students.

To address these challenges, an alternative learning medium is needed, one that can accommodate students' visual needs and foster engagement. Therefore, flashcards were selected as a solution due to their several advantages: they are practical, support visual-based learning, and encourage active and enjoyable learning activities. The flashcards developed in this study specifically target the topic of climate and seasons, which is often confusing for students when delivered only through verbal explanation or text.

By developing flashcard-based learning media, the learning process is expected to become more contextual, communicative, and capable of promoting active student participation. Additionally, this media provides opportunities for teachers to diversify their instructional strategies, improve students' conceptual understanding, and create a more enjoyable and meaningful learning experience.

Design Stage

These flashcards are designed to be visually appealing, educational, and appropriate for the developmental characteristics of elementary school students. Each card consists of two complementary sides: the front side displays illustrative images and keywords aimed at stimulating students' visual memory, while the back side contains a concise and easy-to-understand explanation directly related to the keyword. The visuals on the front are colorful, proportionally arranged, and pleasant to look at, helping capture and maintain students' attention during the learning process.

As an added innovation, each pair of cards is marked with a matching colored ribbon to indicate the connection between the image and its explanation. This feature facilitates quicker and more accurate matching, while also supporting students' visual association skills, an essential aspect of cognitive development at the elementary level.

The use of these flashcards not only encourages passive concept recognition but also promotes active physical and mental engagement. Students are invited to actively search for matching card pairs, observe visual details, and discuss with peers to find the correct match between keywords and explanations. These activities foster critical thinking, collaboration, and long-term memory retention. Through this approach, learning becomes more meaningful as students take an active role in constructing knowledge through direct experience and social interaction.

Figure 2. Flashcard Design

Development Stage

In the development stage, the flashcard media underwent two key processes: content validation and media presentation validation. These validation steps were essential to ensure

that the developed media not only aligned substantively with the curriculum and students' cognitive levels, but was also feasible and practical in terms of its visual design and classroom implementation. Content validation was conducted by a fourth-grade classroom teacher who had a direct understanding of students' needs and characteristics, while media validation was carried out by a lecturer and an experienced elementary school teacher.

The instruments used in this process were validation checklists, which covered various evaluation aspects including content accuracy, language appropriateness, visual presentation, and classroom usability. The collected data were analyzed quantitatively and supported by qualitative comments and suggestions from the validators.

Table 2. Content Expert Validation Results

Aspect	Validator	Percentage Analysis	Criteria
Instructional delivery	1	100%	Very Feasible
Content presentation	1	100%	Very Feasible
Presentation feasibility	1	100%	Very Feasible
Language feasibility	1	95%	Very Feasible

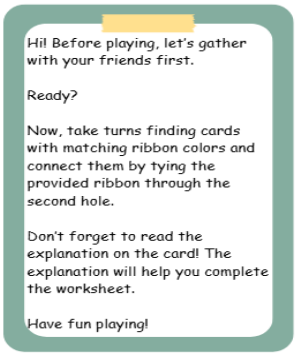
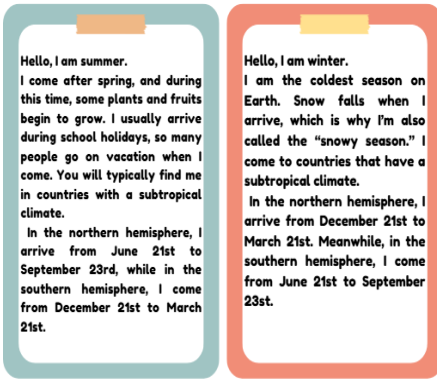
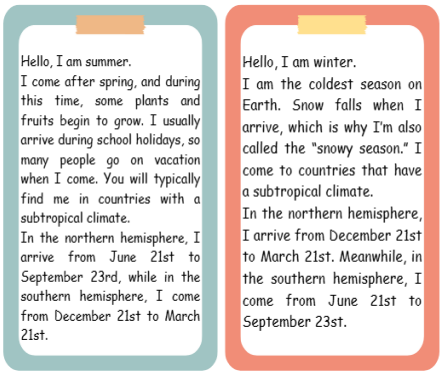
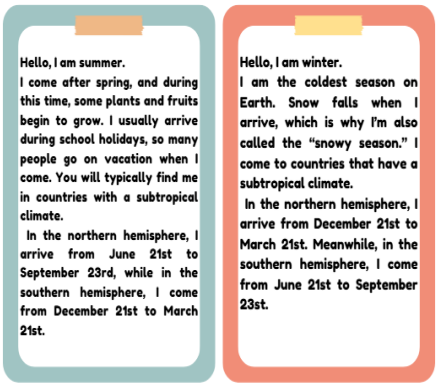
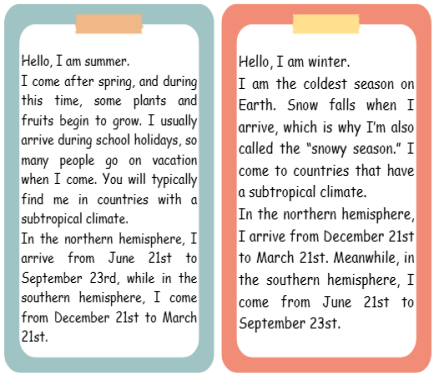
Table 3. Media Expert Validation Results

Aspect	Validator	Percentage Analysis	Average	Criteria
Physcal presentation	1	100%	97,5%	Very Feasible
	2	95%		
Flashcard usability	1	96,4%	98,2%	Very Feasible
	2	100%		
Language	1	100%	100%	Very Feasible
	2	100%		

Several improvement suggestions were provided by the media validators, with a focus on enhancing the accessibility and visual appeal of the flashcards for elementary students. One key recommendation was to add conversational text or play instructions on the flashcards to serve as a guide, making the learning process more interactive and engaging. This suggestion emphasized that the media should function not only as a reading tool, but also as an educational game that encourages student participation. In addition, the validators recommended increasing the font size to make the text easier to read for young learners, and selecting a more child-friendly and visually appealing font style, preferably one that is informal and has clearly shaped letters. These inputs highlight the importance of functional visual design, ensuring that the media is not only informative but also comfortable and enjoyable for students to use in classroom activities.

The development results of the flashcard media in this study indicate that flashcards are highly appropriate for use in Science and Social Studies learning, particularly for the topic of climate and seasons in fourth-grade elementary school. Validation by media experts yielded an average percentage of 98%, while validation by subject matter experts reached 100% in almost all aspects, with one aspect scoring 95%. Table 4 demonstrate that in terms of visual design, content feasibility, and language use, the flashcard media meets high standards of appropriateness for classroom use.

Table 4. Revision Based on Suggestion

Suggestion	Before	After
Play instruction		
Increasing the font size		
Font style		

These findings in Table 4 are consistent with previous studies. Krisdiana & Jamaludin (2023) stated that the use of flashcard media can improve students' learning outcomes in the topic of the diversity of traditional houses in Indonesia. Dewi et al., (2024) also proved that flashcards based on local wisdom can significantly increase students' interest in learning IPAS. Likewise, Wahyuni (2020) and Febriyanto & Yanto (2019) found that using flashcards in thematic and social studies learning in elementary school can enhance both student participation and learning outcomes. Thus, the findings of this study reinforce empirical evidence that flashcard media not only improves memory retention through a visual approach but also fosters student engagement and active participation in the learning process

CONCLUSION

Based on the needs analysis, media design, and validation by media and content experts, it can be concluded that the developed flashcard learning media is highly feasible for use in IPAS lessons on climate and seasons for fourth-grade students. Media expert validation showed a feasibility level of 98%, while content expert validation reached an average of 98.75%, both falling under the "very feasible" category. The media was designed to be visually appealing and educational, with images and keywords on the front side and concise explanations on the back, effectively facilitating student understanding of abstract concepts. Innovations such as using colored ribbons to match card pairs further aided the matching process, promoting active participation in learning. The results of this study are consistent with previous research, which proved that flashcard media can enhance student interest, understanding, and learning outcomes. Therefore, flashcard media can serve as an effective solution for creating interactive, enjoyable, and meaningful IPAS learning experiences.

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Declarations

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