

Analysis of the Use of Science Learning Media in Upper-Grade Elementary School Classes in Cileunyi District, Bandung Regency

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Abstract. The use of instructional media is an important aspect of supporting science learning in elementary schools, particularly because media can help teachers present learning materials more concretely and accommodate students' characteristics. This study aims to analyze the use of science instructional media in upper-grade elementary schools in Cileunyi District, Bandung Regency. This study employed a quantitative approach with a descriptive design. The participants consisted of 35 teachers of Grades IV, V, and VI from 24 elementary schools, selected using total sampling. Data were collected through a four-point questionnaire consisting of the response categories very often, often, rarely, and never. The final instrument consisted of 17 valid items covering the relevance of media to learning objectives and materials, relevance to students' characteristics, media effectiveness and efficiency, and the use of media for learning evaluation. Data were analyzed descriptively using achievement percentages and usage categories. The results showed that the use of media in terms of relevance to students' characteristics reached 77.71%, categorized as often; relevance to learning objectives and materials reached 77.57%, categorized as often; and media effectiveness and efficiency reached 74.11%, also categorized as often. Meanwhile, the use of media for learning evaluation achieved 49.52%, categorized as rarely. These findings indicate that teachers frequently use instructional media during core science learning activities; however, its use for evaluation, remedial activities, and enrichment remains limited. The findings highlight the need to strengthen the use of instructional media across various stages of science learning.

Keywords: *Science Instructional Media; Media Use; Elementary Schools; Upper Grades.*

INTRODUCTION

Science learning in elementary schools plays an important role in developing students' ability to understand natural phenomena scientifically and fostering science literacy from an early stage of education. Science learning is not only directed toward the acquisition of factual knowledge but also toward developing students' abilities to observe, ask questions, use evidence, and apply scientific concepts in everyday life. The development of these abilities is important because science literacy is closely related to students' ability to understand scientific concepts, think critically, and make evidence-based decisions [1], [2]. At the elementary school level, science learning that provides opportunities for students to engage in inquiry activities and meaningful learning experiences can also support the development of conceptual understanding and students' interest in science [3].

Science learning in primary schools is characterized by an approach that positions students as active learners who interact with natural objects and phenomena through observation, investigation, experimentation, and direct experience. These characteristics imply that science instruction cannot rely solely on verbal explanations; instead, it should provide students with opportunities to gain concrete learning experiences and construct understanding based on the evidence they encounter. Studies on the nature of science learning in primary schools emphasize the close relationship between science and real-world phenomena, which can be understood through observation and inquiry. Inquiry-based learning also provides opportunities for students to engage in the processes of discovering and constructing scientific understanding [3], [4]. In practice, however, not all scientific objects, processes, or phenomena can be presented directly in the classroom. Therefore, instructional media are needed to help represent concepts, clarify objects that are difficult to observe, and provide more concrete learning experiences. Research on the need for digital media in primary school science learning indicates that teachers perceive such media as necessary to support the delivery of science content, although its implementation still faces various challenges [5].

The use of science learning media by teachers plays a crucial role in translating scientific concepts and phenomena into more concrete learning experiences for students. In practice, teachers can utilize various

types of media, including print, visual, audiovisual, and digital media, depending on the learning objectives and subject matter. Research by [6] indicates that elementary school teachers employ a range of media in science instruction, including PowerPoint presentations, videos, and e-books, with PowerPoint being one of the most frequently used media. However, the use of media in science learning still faces several challenges. A study involving 100 elementary school

teachers in Langsa City revealed that, although all respondents recognized digital media as necessary for science instruction, some teachers still encountered obstacles related to limited experience, confidence, and knowledge in using digital media [5]. These findings indicate that the availability of or need for media does not automatically reflect optimal media-use practices among teachers. Therefore, it is important to examine how media are actually used in the learning process, including their alignment with learning objectives and content, student characteristics, effectiveness and efficiency, and use in assessment activities.

Although various studies have examined the use of instructional media in elementary schools, some studies have focused on specific types of media, the use of digital media, or teachers' needs for instructional media. Consequently, a comprehensive understanding of how media are used in science learning still needs to be further explored. A mapping study of instructional media in West Java conducted by [7] indicates that data on the need for and use of instructional media across different educational levels remain important to be mapped more comprehensively, although the study covered a broad area and diverse educational levels. Other studies have also shown that digital media have been used in IPAS learning in elementary schools; however, these studies remain limited to specific school contexts or particular forms of media [8], [9]. These conditions indicate the need for a study that specifically maps the use of science instructional media by upper-grade elementary school teachers by considering the alignment of media with learning objectives and materials, student characteristics, effectiveness, efficiency, and their use in learning evaluation. In the context of Cileunyi District, Bandung Regency, specific empirical evidence regarding patterns of media use based on these aspects is not yet available. Therefore, this study is directed at providing a factual description of the use of science instructional media among Grade IV, V, and VI teachers.

Based on these research problems and gaps, this study aims to analyze the use of science instructional media in upper-grade elementary schools in Cileunyi District, Bandung Regency, in terms of their relevance to learning objectives and materials, student characteristics, the effectiveness and efficiency of media use, and their utilization in learning evaluation.

METHODS

Research Design

This study employed a quantitative approach with a descriptive design aimed at obtaining an empirical description of the use of science instructional media in upper-grade elementary schools. The descriptive design was used to identify and describe the level of media use based on teachers' responses without providing any treatment or examining causal relationships between variables [10]. The study focused on a single variable, namely the use of science instructional media, which was analyzed based on several aspects, including the relevance of media to learning objectives and materials, student characteristics, the effectiveness and efficiency of media use, and its utilization in learning evaluation. Data were collected through a questionnaire administered to 35 Grade IV, V, and VI teachers from 24 elementary schools in Cileunyi District, Bandung Regency. The collected data were analyzed quantitatively using descriptive statistics to obtain scores and percentages representing the level of media use for each indicator.

Research Location, Time, and Participants

The study was conducted in 24 elementary schools in Cileunyi District, Bandung Regency, West Java. The study site was selected based on the consideration that the area comprises elementary schools with diverse characteristics, allowing the study to provide an overview of science instructional media-use practices in upper-grade classes. Data collection was conducted from May to July 2026.

The study participants consisted of 35 teachers teaching Grades IV, V, and VI across the 24 elementary schools in Cileunyi District. The selection of upper-grade teachers was based on the consideration that science learning in Grades IV–VI covers increasingly complex content and requires various forms of representation and learning experiences to help students understand scientific concepts and phenomena. All teachers who met the criteria as Grade IV, V, or VI teachers at the schools included in the study were involved as respondents. Therefore, total sampling was employed, meaning that all respondents who met the criteria within the scope of the study were included in the data collection.

Research Instrument

The instrument used in this study was a questionnaire on the use of science instructional media administered to Grade IV, V, and VI elementary school teachers. The questionnaire was designed to obtain information on the frequency of science instructional media use in the learning process. The variable of science instructional media use was operationalized into several indicators: (1) teachers' mastery of the media, (2) relevance to learning objectives and materials, (3) relevance to student characteristics, (4) media effectiveness and efficiency, and (5) media use in learning evaluation. These five indicators were developed into 20 statement items used for data collection.

Each statement item used a four-point rating scale based on the frequency of media use: Always, Often, Rarely, and Never. The highest score was assigned to the "Always" response, while the lowest score was assigned to the "Never" response. The use of a frequency scale was aligned with the purpose of the instrument, which was to measure teachers' actual media-use practices rather than merely their perceptions of media suitability.

Table 1. Blueprint of the Science Instructional Media Use Instrument

No.	Indicator	Item Numbers	Number of Items
1.	Teachers' mastery of the media used	1, 2, 3	3
1	Relevance to learning objectives and materials	4, 5, 6, 7, 8	5
2	Relevance to student characteristics	9, 10, 11, 12, 13	5
3	Media effectiveness and efficiency	14, 15, 16, 17	4
4	Media use in learning evaluation	18, 19, 20	3
	Total	1–20	20

Source: Adapted from Miranti [11]

Accordingly, each statement item had four response options with predetermined answer choices based on the frequency of media use. The results are presented in Table 2.

Table 2. Rating Scale for Science Instructional Media Use

Score	Response Option	Meaning
4	Always	Media are used whenever there is a relevant learning opportunity
3	Often	Media are used in most relevant learning opportunities
2	Rarely	Media are used in a limited number of relevant learning opportunities
1	Never	Media are not used

Source: Adapted and adjusted from the research objectives, 2026.

The four-point rating scale was used to obtain clearer variation in teachers' responses regarding the frequency of science instructional media use. A score of 4 indicates the highest frequency of use, whereas a score of 1 indicates that media are never used. The scores for each statement were then summed based on the respective indicators to obtain an overall description of the level of science instructional media use.

Validity and Reliability Testing of the Research Instrument

Validity and reliability testing were conducted to ensure that the instrument used was capable of measuring the use of science instructional media accurately and consistently. The initial instrument consisted of 20 statement items, namely items 1 to 20. Validity was tested using Pearson correlation with a corrected item-total correlation approach, in which the score of each item was correlated with the total instrument score after the corresponding item was excluded from the total score. The test was conducted using data from 35 respondents at a 5% significance level. With 35 respondents, the *r*-table value used was 0.334. An item was considered valid if its calculated *r* value was greater than the *r*-table value.

Table 3. Results of the Validity Test of the Science Instructional Media Use Instrument

Item No.	<i>r</i> calculated	<i>r</i> table	Description
1	0,286	0,334	Invalid
2	0,314	0,334	Invalid
3	0,321	0,334	Invalid
4	0,592	0,334	Valid
5	0,351	0,334	Valid
6	0,657	0,334	Valid
7	0,650	0,334	Valid
8	0,646	0,334	Valid
9	0,544	0,334	Valid
10	0,626	0,334	Valid

Item No.	r calculated	r table	Description
11	0,625	0,334	Valid
12	0,666	0,334	Valid
13	0,566	0,334	Valid
14	0,685	0,334	Valid
15	0,585	0,334	Valid
16	0,692	0,334	Valid
17	0,562	0,334	Valid
18	0,395	0,334	Valid
19	0,368	0,334	Valid
20	0,368	0,334	Valid
Jumlah			17 valid; 3 invalid

Source: Instrument validity test results, 2026.

The validity test results showed that 17 of the 20 statement items had calculated r values greater than the r-table value of 0.334 for 35 respondents and were therefore considered valid. Meanwhile, three items, namely items 1, 2, and 3, had calculated r values lower than 0.334 and were therefore considered invalid. Items 1, 2, and 3 were subsequently excluded from the analysis. Thus, the final instrument used to measure the use of science instructional media consisted of 17 valid statement items.

After the validity test was conducted, reliability testing was performed on the 17 statement items that were declared valid. Reliability was analyzed using Cronbach's Alpha to determine the internal consistency among the items measuring the construct of science instructional media use. The calculation showed a Cronbach's Alpha value of 0.901 for the initial 20 items. After items 1, 2, and 3 were excluded, the Cronbach's Alpha value for the remaining 17 valid items was also 0.901. This value indicates that the instrument had very good internal consistency and was therefore suitable for use in the research data collection.

Table 4. Results of the Instrument Reliability Test

Instrument	Number of Items	Cronbach's Alpha	Description
Initial instrument	20	0,901	Reliable
Instrument after invalid items were excluded	17	0,901	Reliable

Source: Instrument test results, 2026

Data Collection Technique

Data were collected from May to July 2026 using a questionnaire that had been declared valid and reliable. The questionnaire was developed in Google Forms and distributed online to all Grade IV, V, and VI teachers at 24 public and private elementary schools in Cileunyi District, Bandung Regency. The questionnaire was distributed in coordination with school principals and teacher working groups (KKG) to ensure that all respondents had access to the research instrument.

Before completing the questionnaire, respondents were provided with an explanation of the research objectives, the procedures for completing the instrument, and assurances regarding the confidentiality of their identities and the data provided. All respondents participated voluntarily and completed the questionnaire based on the actual conditions of science instructional media at their respective schools, particularly among upper-grade teachers in public and private elementary schools. The collected data were then checked for completeness (data screening) before being processed and analyzed.

Data Analysis Technique

The data obtained from the questionnaire responses were analyzed using descriptive statistics with the assistance of IBM SPSS Statistics version 25 and Microsoft Excel. Descriptive statistical analysis was conducted to describe the level of science instructional media use in upper-grade elementary schools. The data analysis procedures were carried out as follows:

1) Assigning scores to each respondent's answer based on the criteria specified in the research instrument.

2) Calculating the total score for each respondent for each research variable.

3) Calculating the achievement percentage for each respondent using the following formula:

$$\text{Achievement Percentage} = (\text{Obtained Score} / \text{Maximum Score}) \times 100\%$$

Where:

Obtained Score: the total score of the respondent's answers for each variable

Maximum Score: number of items $\times$ highest score (4)

4) Calculating the mean percentage of all respondents for each research variable.

5) Interpreting the percentage results based on the predetermined achievement categories, as presented in Table 5

Table 5. Categories of Science Instructional Media Use

Achievement Percentage	Category
81–100%	Very High
61–80%	High
41–60%	Moderate
21–40%	Low
0–20%	Very Low

Source: Adapted from Riduwan [12] and adjusted to the needs of the research analysis.

6) Presenting the analysis results in the form of frequency distribution tables, percentages, mean values, and descriptive explanations to illustrate the level of science instructional media use among upper-grade elementary school teachers.

RESULTS AND DISCUSSION

Results

Characteristics of the Research Participants

The study involved 35 upper-grade elementary school teachers from 24 elementary schools in Cileunyi District, Bandung Regency, consisting of 18 public schools and 6 private schools. All respondents were teachers teaching upper-grade classes (Grades IV, V, and VI) and were selected using total sampling, in which all teachers who met the research criteria were included as respondents. The characteristics of the respondents based on school status, grade taught, and teaching experience are presented in Table 6.

Table 6. Characteristics of the Research Participants

Characteristic	Category	Frequency (f)	Percentage (%)
School Status	Negeri	15	42,86
	Swasta	20	57,14
	Total	35	100%
Grade Taught	IV	16	45,71
	V	10	28,57
	VI	9	25,71
	Total	35	100%
Teaching Experience	< 5 years	29	82,86
	5–10 years	6	17,14
	> 10 years*	0	0,00
	Total	35	100%

Note: Percentages were calculated based on the total number of respondents (n = 35)

Based on Table 6, the respondents consisted of 15 teachers (42.86%) from public schools and 20 teachers (57.14%) from private schools. Regarding the grade taught, the largest proportion consisted of Grade IV teachers, with 16 teachers (45.71%), followed by 10 Grade V teachers (28.57%) and 9 Grade VI teachers (25.71%). In terms of teaching experience, most respondents had less than five years of teaching experience, totaling 29 teachers (82.86%), while 6 teachers (17.14%) had 5–10 years of experience. No respondents had more than 10 years of teaching experience.

The composition of the respondents indicates that the study covered upper-grade teachers across Grades IV–VI, with the largest proportions consisting of Grade IV teachers and teachers with less than five years of teaching experience. These characteristics provide a description of the respondent context as the data source for the analysis of science instructional media use in this study.

Use of Instructional Media in Terms of Relevance to Learning Objectives and Materials

The use of instructional media in terms of its relevance to learning objectives and materials was analyzed based on five statement items measuring teachers' tendency to use media in accordance with the learning objectives and science content being delivered. The results of the responses from 35 teachers are presented in Figure 1.

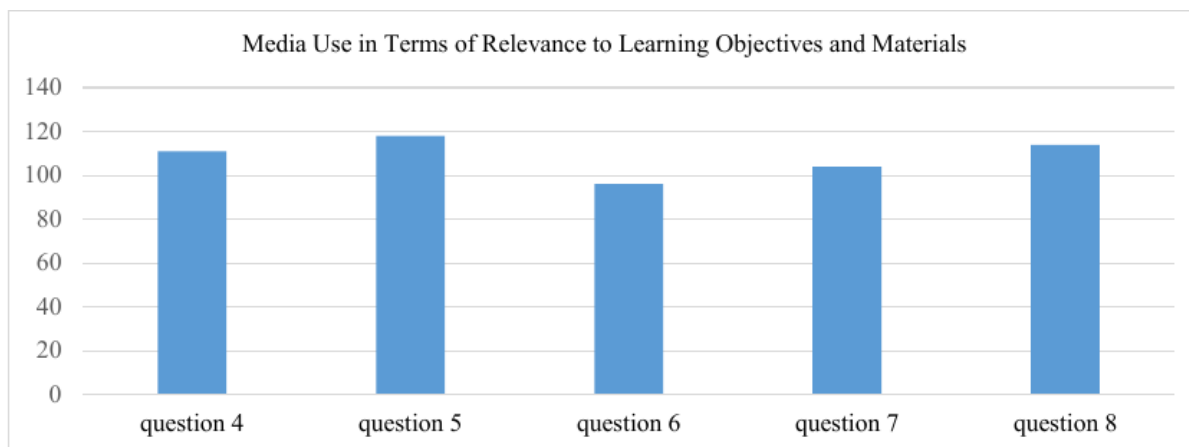


Figure 1. Level of Instructional Media Use in Terms of Relevance to Learning Objectives and Materials

The analysis results showed that all five statement items concerning the relevance of media to learning objectives and materials were categorized as often used. The percentage for each item indicates that teachers tend to use media while considering the learning objectives and materials. Overall, the aspect of relevance to learning objectives and materials obtained a score of 543 out of a maximum score of 700, or 77.57%, and was therefore categorized as often used. This finding indicates that the use of media by upper-grade teachers has been directed toward alignment with learning needs, particularly in supporting the delivery of science content. Although the scores varied across individual items, all five items remained within the often-used category.

Use of Instructional Media in Terms of Relevance to Student Characteristics

The use of instructional media in terms of relevance to student characteristics was analyzed based on five statement items measuring teachers' tendency to use media while considering student characteristics. The results of the responses from 35 teachers are presented in Figure 2.

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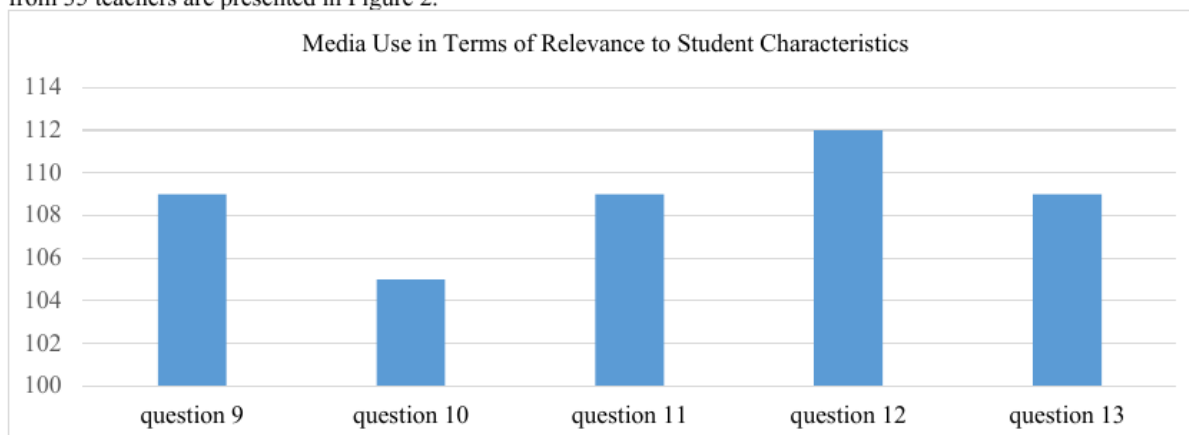


Figure 2. Level of Instructional Media Use in Terms of Relevance to Student Characteristics

Based on Figure 2, the use of instructional media in terms of relevance to student characteristics, measured through five statement items, was entirely categorized as often used. Overall, this aspect obtained an actual score of 544 out of a maximum score of 700, with an achievement percentage of 77.71%, placing it in the often-used category. The aggregate mean score per item of 108.8 indicates a relatively consistent tendency across the five items. These results indicate that upper-grade teachers relatively often use science instructional media while considering student characteristics. Based on the responses, media use in this aspect showed a relatively even tendency across the five statement items.

Use of Instructional Media in Terms of Effectiveness and Efficiency

The use of instructional media in terms of effectiveness and efficiency was analyzed based on four statement items measuring teachers' tendency to use instructional media to support the learning process effectively and efficiently. The results of the responses from 35 teachers are presented in Figure 3.

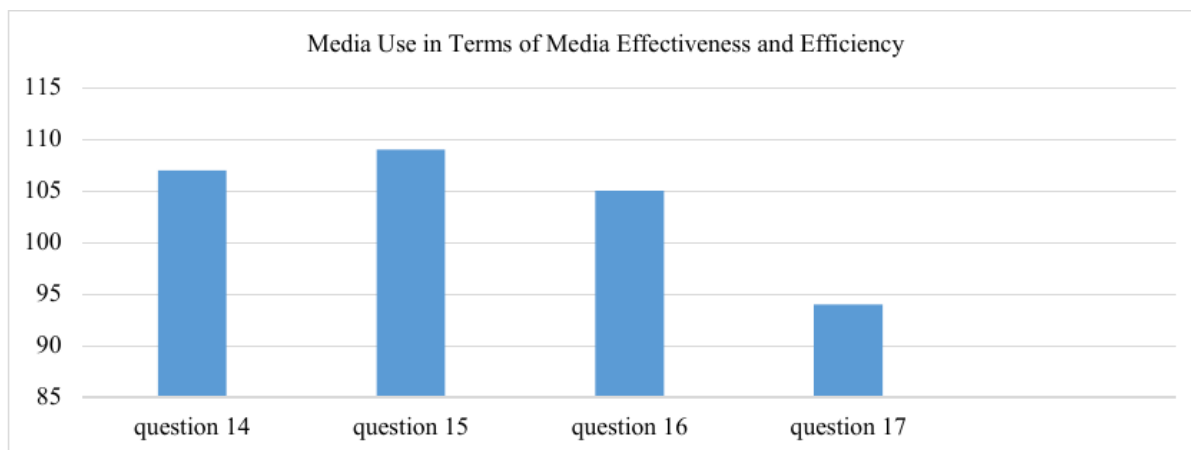


Figure 3. Level of Instructional Media Use in Terms of Media Effectiveness and Efficiency

Based on Figure 3, the use of instructional media in terms of effectiveness and efficiency, measured through four statement items, was entirely categorized as often used. Overall, this aspect obtained an actual score of 415 out of a maximum score of 560, with an achievement percentage of 74.11%, placing it in the often-used category. The aggregate mean score per item of 103.75 indicates a relatively consistent tendency across the four statement items. These results indicate that upper-grade teachers relatively often use science instructional media while considering its effectiveness and efficiency in supporting the learning process.

Use of Instructional Media for Learning Evaluation

The use of instructional media for learning evaluation was analyzed based on three statement items covering the use of media for evaluation, remedial activities, and enrichment. The analysis was based on responses from 35 upper-grade elementary school teachers. The results of the analysis are presented in Figure 4.

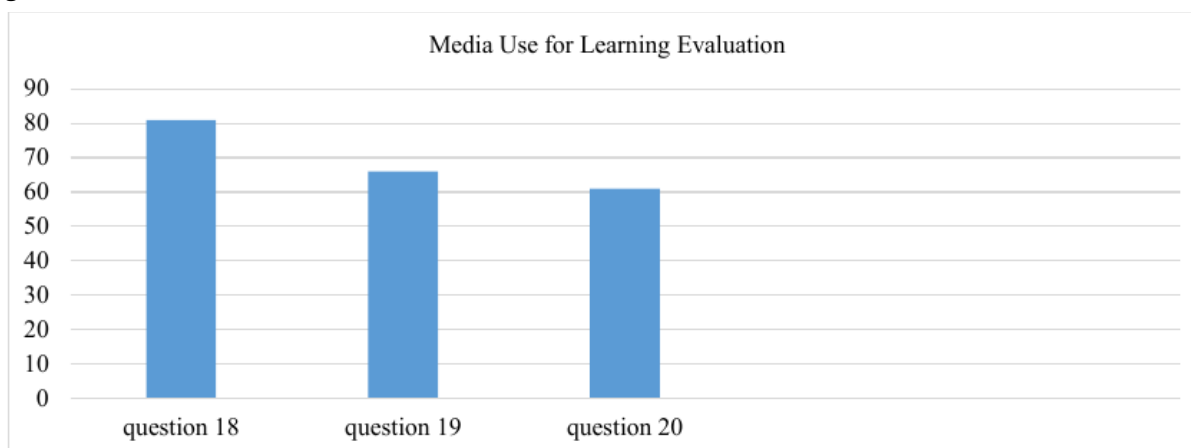


Figure 4. Level of Instructional Media Use for Learning Evaluation

Based on Figure 4, the use of instructional media for learning evaluation achieved a lower result than the other aspects of media use. The three statement items obtained an actual score of 208 out of a maximum score of 420, with an achievement percentage of 49.52%. Based on the categories used in the study, this result was classified as rarely used. The aggregate mean score for the three items was 69.33. The results for each item indicate variation in the use of instructional media for learning evaluation. Media use for learning evaluation achieved a higher result than its use for remedial activities and enrichment.

Discussion

Analysis of Science Instructional Media Use

The achievement of 77.57% for relevance to learning objectives and materials indicates that teachers relatively often use media while considering the direction and substance of science learning. Media that are aligned with learning objectives and materials can help teachers present concepts in a more concrete and contextualized manner, allowing media to function as more than merely supplementary tools in the learning process. This finding is consistent with Winangsih dan Harahap [13], who showed that the use of media is an important component in supporting science learning in elementary schools. The use of media that is appropriate to the learning content can help teachers present learning more concretely and support students' learning experiences. Nengsih serta Haryanti [14], also showed that the use of media, including digital-based media, provides an alternative for presenting science learning in ways that are more engaging and

aligned with learning needs. Setyarini dkk. [15] likewise demonstrated the importance of media in supporting the science learning process, while Alifah & Sumadi [16] showed that the use of media can support students' interest in and understanding of learning materials. The consistency of these findings indicates that the relevance of media to learning objectives and materials is an important aspect in determining the meaningfulness of science instructional media use.

The relevance of media to student characteristics achieved the highest percentage, at 77.71%. This finding indicates that teachers relatively often consider student characteristics when using science instructional media. Such consideration is important because elementary school students need learning experiences that enable them to observe, visualize, and connect concepts with more concrete experiences. Jannah et al. [17] showed that digital media can support the development of students' thinking abilities in elementary science learning, while Shela & Mustika [18]. showed that the use of media can provide alternative learning experiences that are aligned with students' needs. Saputri & Pratikno [19] also emphasized the importance of aligning learning facilities with educational needs in elementary schools. The findings of this study reinforce the view that media use should consider not only the substance of the learning material but also the characteristics of students as users of the media.

Media effectiveness and efficiency achieved 74.11% and were categorized as often used. This finding indicates that teachers relatively often use media that are considered beneficial for supporting the learning process while remaining efficient to implement. Ariandini et al. [20], showed that the diversity of media used in science learning, including visual, interactive, and digital media, can provide alternative ways of presenting learning that support effectiveness and student interest. Pratiwi & Nugraheni [21], also found that interactive multimedia is characterized by interactivity, practicality, and flexibility and can support learning activities, motivation, conceptual understanding, and student learning outcomes. These findings support the results of the present study, indicating that teachers relatively often use media while considering their benefits in the learning process. However, the achievement of 74.11% also indicates that the use of effective and efficient media has not yet reached the very often level.

The most notable finding concerns the use of media for learning evaluation. This aspect achieved 49.52% and was categorized as rarely used, substantially lower than the other three aspects. This result indicates a tendency for teachers to focus media use on core learning activities, while its use for evaluation, remedial activities, and enrichment has not yet been implemented consistently. In fact, instructional media can be used not only to deliver learning materials but also to provide more varied evaluation experiences and support follow-up learning activities. Putri & Ahmadi [22], showed that instructional media can provide flexibility in supporting learning activities, while Aisyah et al. [23], demonstrated the importance of media use in supporting science learning in elementary schools.

Implications of the Findings

The findings of this study have practical implications for teachers, schools, and the development of science instructional media. The relatively high achievement in the aspects of relevance to student characteristics, learning objectives and materials, and effectiveness and efficiency indicates that teachers tend to use media as part of core learning activities. This condition can serve as a basis for expanding the use of media to other stages of the learning process. Teachers should not only select media based on their relevance to learning materials and student characteristics but also consider how media can be used continuously for evaluation, remedial activities, and enrichment [24].

These findings also have implications for the development of science instructional media. Media developed for upper-grade elementary schools should not only focus on the presentation of learning materials but also provide activities that enable teachers to use them for evaluation, remedial activities, and enrichment [25]. Thus, future media development can be directed toward media with more comprehensive functions to support the entire learning cycle, rather than merely serving as tools for delivering learning materials.

Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. Data on media use were obtained through a questionnaire based on teachers' responses and therefore do not fully reflect the actual practices of media use occurring directly in the classroom. In addition, the study involved only 35 teachers from 24 elementary schools in Cileunyi District, Bandung Regency; therefore, generalization of the findings to broader areas and different school characteristics should be made with caution. The study also focused on the frequency of media use across several aspects and did not examine in depth the types of media used, the quality of their implementation, or the factors contributing to the low use of media in evaluation, remedial activities, and enrichment.

CONCLUSION

Based on the findings of the study, the use of science instructional media in upper-grade elementary schools in Cileunyi District, Bandung Regency, was generally categorized as often used to support the learning process. Media use in terms of relevance to student characteristics achieved the highest percentage, at 77.71%, followed by relevance to learning objectives and materials at 77.57%, and media effectiveness and efficiency at 74.11%. These findings indicate that teachers have relatively considered the alignment of media with learning objectives, materials, and student characteristics, as well as the benefits of media in implementing science learning.

Nevertheless, the use of media for learning evaluation achieved the lowest percentage, at 49.52%, and was categorized as rarely used. This condition indicates that teachers' use of media remains more oriented toward core learning activities than toward evaluation, remedial activities, and enrichment. Therefore, the development and strengthening of science instructional media use should be directed toward more comprehensive use across various stages of learning, so that media function not only as support for delivering learning materials but also as a resource for enriching evaluation and follow-up learning activities.

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