

## TEACHER MEDIATION AND THE PEDAGOGICAL USE OF AUDIOVISUAL MEDIA IN ELEMENTARY SCIENCE LEARNING

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### Abstract

This study examines how elementary teachers mediate audiovisual media in science learning and how such mediation shapes pupils' access to abstract and sequential scientific concepts. Using a qualitative descriptive multiple-case design, the study involved six Grade 4 and Grade 5 teachers from three public elementary schools in Surabaya, Indonesia. Data were collected through semi-structured teacher interviews, classroom observations, follow-up interviews, lesson documents, worksheets, media files, and assessment tasks. Thematic analysis generated four main findings. First, teachers commonly viewed audiovisual media as a means of visual explanation, although media use was not always organised as guided inquiry. Second, pupils' learning difficulties were related not only to the availability of media, but also to their ability to connect visual processes, scientific language, and causal explanation. Third, teacher mediation shaped whether audiovisual media supported active conceptual engagement or remained passive viewing. Fourth, implementation constraints included pedagogical issues such as media selection, questioning strategies, worksheet design, preparation time, and assessment practice, alongside technical limitations. The study highlights the importance of teacher guidance, representational tasks, and assessment support in making audiovisual media pedagogically meaningful in elementary science classrooms.

**Keywords:** audiovisual media; teacher mediation; elementary science learning; guided inquiry; science representation; primary education

## INTRODUCTION

Elementary science learning involves concepts and processes that are not always directly visible to pupils. Topics such as the water cycle, changes of matter, ecosystems, the respiratory system, force, and energy require pupils to understand sequences, relationships, and causal explanations. In classroom practice, these ideas are often introduced through verbal explanation, textbook images, and written exercises. Such approaches may help pupils recognise terms, but they do not always support them in visualising how a process unfolds or why one event leads to another. This issue is important in the context of Indonesian primary education, where Kurikulum Merdeka encourages teachers to design learning that is responsive to pupils' needs, meaningful in context, and supportive of active understanding (Badan Standar, Kurikulum, dan Asesmen Pendidikan, 2024). In science learning, responsiveness requires more than the delivery of content. It requires the teacher to help pupils observe, describe, question, represent, and explain scientific phenomena in ways that are accessible to their stage of development.

Audiovisual media offer one possible support for this purpose because they combine images, movement, sound, narration, and visual sequencing. When used appropriately, videos and animations can help pupils observe processes that are too slow, too fast, too small, too large, or too abstract to be demonstrated directly in the classroom. This view is supported by multimedia learning theory, which explains that learners can build stronger understanding when verbal and visual information are meaningfully selected, organised, and integrated (Fiorella & Mayer, 2016; Mayer et al., 2020). Cognitive Load Theory also suggests that visual support may help learners manage complex information when the representation is clear, relevant, and aligned with the learning goal (Sweller et al., 2019). In elementary learning contexts, studies have reported that multimedia-supported instruction can strengthen motivation, engagement, and learning performance when it is embedded in coherent instructional activities (Antari et al., 2024; Lauc et al.,

2020; Niman et al., 2024). These findings provide a useful foundation for understanding why teachers are increasingly interested in audiovisual resources for science and IPAS learning.

However, the pedagogical value of audiovisual media depends strongly on how teachers mediate their use. A video may show a process clearly, but pupils still need support to identify important stages, relate visual information to scientific terms, and explain the relationship among events. Research on video use in science education shows that videos function as mediating artefacts when they are connected to observation, questioning, discussion, and interpretation (Breslyn & Green, 2022; Higgins et al., 2018). Studies on visual and multimodal representation also indicate that pupils need opportunities to draw, label, compare, and explain what they observe, rather than merely watch or copy information (Jeppsson et al., 2022; Yoon et al., 2021). In guided science learning, teacher scaffolding remains important because pupils may notice attractive visual features while missing the underlying scientific relationship (Sasse et al., 2025). Thus, the central issue is not only whether audiovisual media are available, but how teachers transform those media into learning activities that invite pupils to think.

This issue is especially relevant in Indonesian elementary classrooms, where the use of audiovisual media is shaped by both pedagogical and material conditions. Teachers may have access to projectors, internet resources, or online videos, but they still need time to select suitable materials, adapt language, prepare guiding questions, design worksheets, and assess pupils' explanations. Needs-analysis research in Indonesian elementary education shows that multimedia development must consider pupils' characteristics, teacher readiness, and classroom constraints (Alyusfitri et al., 2024). Other studies have shown the potential of audiovisual and digital media in science learning, including video-based and interactive media for IPAS topics (Hasanah et al., 2023; Sholihah & Rohmani, 2024; Umami et al., 2025). At the same time, recent work on educational video selection reminds us that

teachers require pedagogical criteria when choosing videos, because attractive or popular videos are not always conceptually suitable for classroom learning (Bitzenbauer et al., 2024; Kim & Sermeus, 2025). These studies point to a practical concern: audiovisual media integration requires pedagogical judgement, not only technical access.

The present study examines audiovisual media integration through the lens of teacher mediation in elementary science learning. It focuses on how teachers understand audiovisual media, how they organise video or animation use during classroom instruction, how pupils are guided to connect visual processes with scientific language, and what constraints influence meaningful implementation. The study is guided by three research questions: (1) How do elementary teachers understand and use audiovisual media in science learning? (2) How does teacher mediation shape pupils' access to abstract or sequential scientific concepts? and (3) What pedagogical, material, and assessment constraints influence the integration of audiovisual media in elementary science classrooms? By foregrounding teachers' classroom decisions, pupils' representational needs, and the practical conditions of media use, this study contributes to a grounded understanding of audiovisual media integration in Indonesian primary science education.

## **LITERATURE REVIEW**

Audiovisual media in elementary science learning are best understood as representational resources that help pupils access phenomena that are difficult to observe directly. Videos, animations, narrated diagrams, and visual sequences can make scientific processes more visible by showing movement, change, sequence, and relationship. This is important because many science concepts in primary classrooms, such as the water cycle, changes of matter, food chains, and body systems, require pupils to connect what they see with scientific terms and causal explanation. Higgins et al. (2018) describe video as a mediating artefact in science learning because it can support pupils'

observation and discussion of events that are not easily available through direct classroom experience. Breslyn and Green (2022) also show that online science videos are increasingly used by teachers and students as learning resources across different learning contexts. Shao et al. (2024) further suggest that video watching may complement science learning activities when it helps clarify concepts and principles. These studies indicate that audiovisual media are pedagogically useful when they support observation, interpretation, and explanation, not merely information delivery.

Teacher mediation is central to the pedagogical value of audiovisual media. A video may present a scientific process clearly, but pupils still need guidance to notice relevant details, connect visual stages, use scientific vocabulary, and explain relationships among events. Research on instructional video design shows that video-based learning depends on clarity, pacing, signalling, coherence, and opportunities for active processing (Mayer, 2021). The issue is also related to teacher judgement. Bitzenbauer et al. (2024) found that pre-service teachers may rely on surface features, such as thumbnails, views, likes, and familiarity, when selecting YouTube videos for science teaching. This suggests that teachers need stronger pedagogical criteria for choosing videos and embedding them in classroom tasks. Visual representation studies also show that pupils' reasoning develops when teachers use drawings, diagrams, and worksheets as tools for meaning-making rather than as simple completion tasks. Yoon et al. (2021) show that visual representation construction can support collective reasoning in elementary science classrooms, while Jeppsson et al. (2022) demonstrate that worksheets can become multimodal resources for pupils' science meaning-making. Teacher questioning and scaffolding are therefore needed to move pupils from watching to explaining.

In the Indonesian elementary context, recent studies show growing interest in digital and audiovisual media for science learning, but the classroom process of teacher mediation still needs closer attention. Hasanah

et al. (2023) found that elementary teachers need science learning multimedia that can help pupils understand abstract material and support critical thinking. Alyusfitri et al. (2024) similarly argue that multimedia development should consider pupils' characteristics and classroom conditions, rather than focus only on technological features. Studies on audiovisual and digital media in elementary science also suggest that visual media may support attention, motivation, and access to concepts when they are connected to learning activities (Antari et al., 2024; Niman et al., 2024; Sholihah & Rohmani, 2024; Umami et al., 2025). Yet the existing discussion often emphasises media development or learning outcomes, while less attention is given to how teachers select videos, pause them, ask questions, design worksheets, and assess pupils' explanations. This study responds to that gap by examining audiovisual media as a pedagogical practice shaped by teacher mediation, representational tasks, and classroom constraints in elementary science learning.

## **METHOD**

This study used a qualitative descriptive multiple-case design to examine teacher mediation in the pedagogical use of audiovisual media in elementary science learning. The design was selected because the study focused on teachers' classroom practices, instructional decisions, and the conditions that shaped media use across several classroom contexts. Qualitative description is appropriate for studies that seek a clear and practice-oriented account of participants' experiences and observed events (Bradshaw et al., 2017). The multiple-case orientation enabled the study to compare patterns across classrooms while maintaining attention to the particular conditions of each teacher and school context (Yin, 2018). The study was conducted in three public elementary schools in Surabaya, Indonesia. Six Grade 4 and Grade 5 teachers were purposively selected because they taught science topics that involved abstract, visual, or sequential concepts, such as the

water cycle, changes of matter, ecosystems, and human body systems. The participating teachers also represented varied classroom conditions, including differences in projector access, internet availability, teacher-prepared media, and the use of downloaded or online audiovisual resources.

Data were collected through semi-structured teacher interviews, classroom observations, follow-up interviews, and document analysis. Each teacher participated in one main interview lasting approximately 40–60 minutes. The interviews explored teachers' understanding of audiovisual media, criteria for selecting videos or animations, strategies for guiding pupils during viewing, perceived pupil responses, and constraints in media integration. One science lesson from each teacher was observed, with each observation lasting approximately 45-70 minutes. The observations focused on how audiovisual media were introduced, whether teachers paused or discussed the media, how pupils responded to visual representations, and how the lesson moved from viewing to explanation, drawing, sequencing, discussion, or written tasks. After each observation, a follow-up interview lasting approximately 15-25 minutes was conducted to clarify the teacher's instructional decisions during the observed lesson. Documents included lesson modules, worksheets, media links or files, assessment tasks, and observation field notes. Interviews were conducted in Indonesian, and selected excerpts were translated into English while preserving the meaning of participants' responses.

Data were analysed thematically. The researchers first read the interview transcripts, observation notes, and documents repeatedly to become familiar with the data. Meaningful segments related to teacher understanding, media use, pupil response, representational tasks, questioning strategies, and implementation constraints were then coded. Initial codes included media as visual explanation, passive viewing, pause-and-question strategy, pupil difficulty in sequencing, drawing as representation, limited preparation time, media selection difficulty, and assessment gap. These codes

were compared within and across cases, then grouped into broader themes concerning teacher mediation, pupils' access to scientific concepts, and the pedagogical conditions of audiovisual media use. Thematic analysis was used because it supports systematic interpretation of patterned meanings across qualitative data (Braun & Clarke, 2021; Kiger & Varpio, 2020). Trustworthiness was strengthened through triangulation across interviews, observations, and documents; member checking with participating teachers; reflexive analytic notes; and an audit trail of coding decisions and theme development (Nowell et al., 2017; Tracy, 2010). Ethical procedures included school permission, teacher consent, anonymisation of participants and schools, and classroom observation that focused on instructional practice rather than individual pupil evaluation.

## FINDINGS AND DISCUSSION

The analysis generated four themes that explain how teachers mediated audiovisual media in elementary science learning. Across the six teachers and three schools, audiovisual media were valued because they made science processes more visible and easier to introduce to pupils. Yet the findings also show that the educational value of media depended on how teachers framed, paused, questioned, and followed up the viewing activity. Pupils often responded positively to video and animation, but they still needed guidance to connect what they saw with scientific terms, sequence, and causal explanation. The findings are summarised in Table 1 and discussed through the four themes that follow.

**Table 1.** Overview of Themes

<b>Theme</b>	<b>Core meaning</b>
Audiovisual media as visual explanation	Teachers valued videos and animations because they made science processes easier to show, but media use was not always organised as guided inquiry.
Visual process, language, and explanation	Pupils could often recognise images or terms, but needed support to explain sequence and causal relationships.

Teacher mediation	Pausing, questioning, prediction, drawing, and sequencing shaped whether video became a learning tool or passive viewing.
Pedagogical and material constraints	Implementation was shaped by preparation time, media selection, worksheet design, assessment practice, and technical access.

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### **Audiovisual media was understood as visual explanation, not yet as guided inquiry**

Most teachers understood audiovisual media as a way to make science content clearer and easier to explain. They saw video and animation as helpful for topics that involved movement, change, or sequence, such as the water cycle, changes of matter, ecosystems, and body systems. Teachers repeatedly said that some science processes were difficult to explain only through speech or textbook pictures. Video gave them a way to bring those processes into the classroom, even when the real phenomenon could not be observed directly.

One teacher explained:

If I only talk, the children just nod. I cannot really know whether they see the process in their head. With video, at least they can see water going up, clouds forming, then rain. It is easier for me to explain. (*Teacher interview, T2*)

This comment shows that teachers were not using audiovisual media simply for novelty. They used it because it solved a practical instructional problem. Elementary pupils often need visual support to follow scientific processes that are too slow, too large, too small, or too abstract to observe directly. This aligns with Higgins et al. (2018), who describe video as a mediating artefact in science learning because it allows learners to observe events that may not be available in direct classroom experience. Breslyn and Green (2022) also show that online science videos have become common learning resources for both teachers and pupils. In the present study, the teachers' use of media reflected this broader role of video as a practical representational resource.

Classroom observations, however, showed that media use often stopped at visual explanation. In several lessons, videos were played from

beginning to end, then followed by teacher explanation or worksheet completion. Pupils watched the screen and some repeated key words from the video, but they were not always invited to predict, pause, question, compare, or explain what they saw. In the T1 water-cycle lesson, the teacher played an animation showing evaporation, condensation, precipitation, and runoff. Pupils watched quietly. After the video, the teacher asked them to mention the stages. Several pupils could say “evaporation” or “rain”, but only a few could explain how one stage led to another. The lesson then moved to a worksheet activity.

This episode suggests that the video made the topic more visible, but did not yet organise pupils’ reasoning. It functioned as a clearer explanation, not as a shared object for guided inquiry. This distinction matters because audiovisual media do not only show information; they also need to be worked with. Multimedia learning theory argues that learners need to select, organise, and integrate verbal and visual information (Fiorella & Mayer, 2016; Mayer et al., 2020). When pupils only watch, they may remember striking images without understanding the relationships that the images represent.

Document analysis supported this interpretation. Lesson modules commonly included activities such as “watching a learning video” or “observing audiovisual media”. Yet several worksheets asked pupils only to write definitions, name stages, or copy terms from the board. Fewer tasks asked pupils to explain why a stage happened, draw the sequence, compare stages, or describe relationships among events. This shows that audiovisual media had entered the lesson plan, but not always the structure of pupils’ thinking tasks.

The finding does not suggest that teachers misunderstood the value of media. Rather, it shows that the first layer of media use was explanatory. Teachers used video to make difficult content easier to show. The next pedagogical step is more demanding: using video to support guided inquiry. This involves asking pupils what they notice, stopping at key moments,

inviting predictions, and asking them to reconstruct the process in words, drawings, or diagrams. Ayres and Ackermans (2025) emphasise that educational videos require careful attention to pacing and processing. The present study adds that classroom mediation matters as much as video design. A clear video may still result in shallow learning if pupils are not guided to interpret it.

### **Students' difficulty was not only lack of media, but difficulty connecting visual process, language, and explanation**

The second theme shows that pupils' difficulty in science learning was not simply a matter of limited audiovisual media. Even when videos or visual materials were used, some pupils still struggled to connect visual processes with scientific language and explanation. They could remember visible objects, sounds, or movements, but had difficulty explaining sequence, cause, and relationship.

A teacher described this problem directly:

They remember the picture faster than the explanation. They can say, 'the water goes up' or 'there is rain'. But when I ask, 'Why does it become cloud?' they get quiet. So I still have to break it down.  
(*Teacher interview, T4*)

This comment captures a common classroom pattern. Pupils often recognised parts of the video, but their explanations remained incomplete. In a water-cycle lesson, pupils could mention the sun, clouds, water, and rain after watching an animation. However, when the teacher asked what happened after evaporation, several pupils gave short answers. Some skipped condensation and moved directly from "water goes up" to "rain falls". Their answers were not entirely wrong, but they showed that the process had not yet been understood as a connected cycle.

Observation evidence showed that pupils' responses were strongest when questions focused on naming. They became less confident when questions required explanation. For example, when asked "What do you see?", pupils could answer quickly. When asked "Why does the water change?" or

“What happens before rain falls?”, the responses became slower and less complete. This suggests that pupils needed more than visual exposure. They needed support in building the language of explanation.

This finding is consistent with Cognitive Load Theory, which explains that learners may struggle when they must process several kinds of information at once, such as movement, narration, new terms, and sequence (Sweller et al., 2019). For young pupils, an animation that appears simple to adults may still contain too much information. Some pupils may focus on the moving picture but miss the scientific relationship behind it. This is why teacher guidance is needed to direct attention to the relevant part of the process.

Document analysis strengthened this finding. Pupils' worksheets and drawings showed that many pupils could reproduce visible elements from the videos. In the water-cycle task, most drawings included clouds, rain, the sun, and water. However, several drawings did not include arrows, and some placed the stages as separate objects rather than as a cycle. Some pupils labelled only one or two stages. In the changes-of-matter lesson, several pupils drew the objects correctly but did not explain the change from solid to liquid. These products suggest that pupils noticed the images, but still needed help organising them into scientific explanation.

This pattern is important for interpreting the role of audiovisual media. The learning challenge was not only about whether pupils could see the phenomenon. It was also about whether they could connect seeing with saying, sequencing, and explaining. Jeppsson et al. (2022) argue that worksheets and multimodal representations can support science meaning-making when they are used as thinking tools. Yoon et al. (2021) similarly show that visual representations can support collective reasoning when pupils are guided to construct and discuss meaning. In the present study, drawings and worksheets became useful when they required pupils to reconstruct the process, not merely copy terms.

The local implication is clear. Teachers need to design tasks that help pupils move gradually from visual recognition to conceptual explanation. For example, after viewing a video, pupils can be asked to draw the sequence, label each stage, add arrows, explain why each stage happens, or compare their drawings with a partner. These tasks help pupils translate visual information into science language. Without such support, pupils may appear engaged but still have fragile understanding.

### **Teacher mediation determined whether audiovisual media became learning support or passive viewing**

The third theme shows that teacher mediation shaped the quality of audiovisual media use. In classrooms where teachers prepared questions, paused videos, asked pupils to predict, and followed viewing with drawing or sequencing tasks, pupils became more active in making sense of the media. In those lessons, video was not treated as a finished explanation. It became a shared object for classroom thinking.

One teacher described her strategy:

I do not just play it until finished. If I do that, some children only watch like watching cartoons. I stop it in the important part. I ask, 'What do you think will happen?' Sometimes their answers are messy, but that is okay. From there I know what they understand. *(Teacher interview, T5)*

Observation of the T5 lesson showed this strategy in practice. During a lesson on changes of matter, the teacher paused the video several times. At each pause, pupils were asked to describe what they saw or predict the next change. The classroom became more active and slightly noisier, but the talk remained connected to the science task. After the video, pupils completed a drawing activity and labelled the changes. This episode differed from lessons where the video was played without interruption. Pupils were not only watching; they were predicting, checking, naming, and explaining.

This kind of mediation changed the function of audiovisual media. A video shown continuously may keep pupils attentive for a short time, but a

paused and questioned video invites pupils to think with the media. The teacher's actions made pupils' understanding visible. Wrong or incomplete answers became useful because they showed where pupils needed further explanation. This aligns with Sasse et al. (2025), who emphasise teacher guidance in inquiry-oriented science learning. Pupils need support to focus on relevant evidence and connect observation with explanation.

Follow-up interviews showed that teachers who mediated media use more actively made deliberate decisions about video length, pause points, and follow-up tasks. They did not always use a complete video. Some selected only a short section because it matched the concept being taught. Others muted parts of the video and explained in their own words when the language was too difficult for pupils.

A teacher explained:

The video must be controlled. If it is too long, they enjoy it but lose the point. I choose the short part. Then I ask them to draw it. If they cannot draw the order, I know they only watched, not understood.  
*(Follow-up interview, T3)*

Document analysis showed the same contrast. In lessons with stronger mediation, worksheets asked pupils to arrange pictures, draw arrows, label stages, or explain what happened before and after viewing. These tasks required pupils to reconstruct the process. They also gave the teacher evidence of understanding. In less mediated lessons, worksheets mostly asked pupils to write definitions or name objects. These tasks were easier to complete, but they gave limited information about pupils' reasoning.

This finding supports Shao et al. (2024), who suggest that video can complement science learning activities when it clarifies concepts and is connected to meaningful tasks. It also resonates with Bitzenbauer et al. (2024), who show that teachers need stronger criteria when selecting science videos. The present study extends this issue from selection to use. A relevant video still needs to be mediated through classroom talk, drawing, sequencing, and explanation. Kim and Semeus (2025) also reminds us that science videos differ

in how they represent scientific ideas. Teachers therefore need to judge not only whether a video is attractive, but whether it helps pupils notice and explain the intended concept.

The main point of this theme is that teacher mediation turned viewing into learning activity. Pausing, questioning, predicting, drawing, sequencing, and explaining are not additional decorations. They are the pedagogical work that makes audiovisual media meaningful. These actions help pupils move from passive viewing to scientific meaning-making.

### **Implementation constraints were pedagogical, not merely technical**

The fourth theme concerns the constraints that shaped the use of audiovisual media. Teachers mentioned familiar technical barriers, including limited projector access, unstable internet, unclear audio, shared devices, and lack of ready-to-use media. These barriers affected classroom practice. In one school, the projector had to be shared across several classrooms. In another, the video sound was unclear, so the teacher repeated much of the narration. In another lesson, the teacher used a laptop screen because the LCD projector was unavailable.

However, the more persistent constraints were pedagogical. Teachers needed time to find suitable videos, adjust them to pupils' language level, prepare guiding questions, design worksheets, and assess pupils' explanations. The availability of devices did not remove this work.

One teacher stated:

The problem is not only the LCD. Sometimes the LCD is there. But finding the right video takes time. Some videos are nice, but too fast. Some use words children do not know. If I just take any video, I will spend more time explaining the video than teaching the topic.  
*(Teacher interview, T1)*

Observation evidence showed that the quality of media use varied according to this preparation. In lessons where videos were short, relevant, and connected to teacher questions, pupils were more focused and the discussion moved more clearly from image to explanation. In lessons where

the video was long or weakly connected to the worksheet, pupils watched but the follow-up activity became less focused. This shows that video selection and lesson design were part of the same pedagogical process.

Document analysis revealed another constraint: assessment. Many assessment tasks focused on factual recall. Pupils were commonly asked to name stages, match terms, or choose correct answers. Few tasks required them to explain why a process happened, draw the sequence, compare stages, or describe relationships among events. This created a gap between the purpose of audiovisual media and the evidence collected from pupils' work. Teachers used media to make processes visible, but assessment tasks did not always show whether pupils had connected those processes with scientific explanation.

This issue matters because teacher mediation requires assessment support. If assessment only asks pupils to name terms, pupils may appear to understand the lesson even when their explanation remains incomplete. Simple rubrics for drawings, sequence accuracy, use of scientific vocabulary, and explanation quality would help teachers see whether pupils had moved beyond visual recognition. Hasanah et al. (2023) found that teachers need multimedia resources that match abstract science material and classroom needs. Alyusfitri et al. (2024) similarly argue that multimedia development should consider pupils' characteristics and classroom conditions. The present findings add that assessment and worksheet design should be part of that support.

Teachers also described classroom management as part of the challenge. Pupils often became excited when videos were shown, but attention could decrease if the video was too long or if pupils were not given a task. One teacher said:

If I say, 'Watch this,' they watch for a while. Then some start talking.  
But if I say, 'After this, you must draw the order,' they look more  
carefully. They know they have work to do.  
(*Teacher interview, T6*)

This statement shows the link between media, task, and attention. Pupils' engagement was shaped not only by the attractiveness of the video, but by what the teacher asked them to do with it. This helps explain why audiovisual media can support learning in some classrooms but remain passive viewing in others. Studies by Lauc et al. (2020), Antari et al. (2024), Niman et al. (2024), Sholihah and Rohmani (2024), and Umami et al. (2025) show the potential of audiovisual and digital media in elementary science learning. The findings of the present study show the classroom conditions that help realise that potential: suitable media, purposeful teacher mediation, representational tasks, and assessment that captures explanation.

Across the four themes, the study shows that audiovisual media integration in elementary science learning is mainly shaped by teacher mediation. Teachers valued media because it made science processes visible, but visibility needed to be connected to inquiry, language, representation, and assessment. Pupils needed help to move from watching to explaining. Teachers who paused videos, asked direct questions, used drawing and sequencing tasks, and checked pupils' explanations created richer opportunities for science learning. The pedagogical use of audiovisual media therefore depends on ordinary but important classroom decisions: what video to choose, when to pause, what to ask, what task to give, and how to assess pupils' understanding.

## **CONCLUSION**

This study shows that the pedagogical value of audiovisual media in elementary science learning depends strongly on teacher mediation. Across the observed classrooms, teachers valued videos and animations because they made abstract and sequential science processes more visible to pupils. However, the findings indicate that visibility alone did not ensure understanding. Pupils still needed support to connect visual information with scientific vocabulary, process sequence, and causal explanation. Audiovisual media became more meaningful when teachers paused videos, asked guiding

questions, invited pupils to predict, encouraged drawing or sequencing tasks, and used pupils' responses to clarify misconceptions. The study also found that implementation constraints were not limited to technical issues such as projectors, internet access, or available media. Teachers also faced pedagogical demands, including selecting suitable videos, preparing questions, designing worksheets, managing classroom attention, and assessing pupils' explanations. These findings suggest that schools should support audiovisual media integration through curated media resources, practical lesson examples, representational tasks, and simple assessment rubrics. The study contributes to elementary science education by showing that audiovisual media are most useful when they are treated not as stand-alone teaching aids, but as resources embedded in guided classroom interaction and scientific meaning-making.

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