



# Design and Development of an Art Appreciation Learning Kit for Children Aged 7-11: Enhancing Aesthetic Engagement Through the “See, Think, Wonder” Thinking Routine



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**Abstract:** In the context of rapidly advancing digital technology, where touchscreen interactions dominate, the tactile sensory development of children is increasingly compromised. This shift towards digital media can hinder the ability of children to effectively engage with and observe their surroundings. One promising solution to this issue is the integration of art appreciation into educational practices. However, in regions such as Indonesia, there is a noticeable scarcity of comprehensive learning kits aimed at teaching art appreciation. This study addresses this gap by designing and developing an art appreciation learning kit intended for children aged 7 to 11, aiming to teach art appreciation through artful thinking (AT). The kit employs the “see, think, wonder” (STW) thinking routine, a structured three-step process that encourages children to observe art, analyze their observations, and engage with the art through inquiry. The analysis, design, development, implementation, and evaluation (ADDIE) framework was employed as the instructional design model. Additionally, a qualitative research through design (RtD) methodology was adopted to guide the design process and ensure the creation of an innovative educational tool. The developed learning kit integrates physical components, multimedia resources, and hands-on arts and crafts activities that complement the STW routine, thereby fostering deeper engagement and critical thinking skills among young learners. The study emphasizes the value of employing the ADDIE model to assess the learning needs and challenges faced by children, particularly during the STW activity. Collaboration with educators during the design and development phases was identified as crucial for refining the learning kit. Key recommendations include the integration of graphic visualizations, clear demonstrations, and interactive activities to enhance children’s engagement and enthusiasm for art appreciation. The findings offer empirical evidence supporting the effective use of the ADDIE model in educational kit design, providing a valuable reference for future product designers in the educational technology field.

**Keywords:** Analysis, design, development, implementation, and evaluation (ADDIE) model; See think wonder (STW); Learning kit; Art appreciation

## 1. Introduction

In an era of technological advancement where vast amounts of information are readily available online and accessible through touchscreen devices, there is a growing need to nurture sensory experiences beyond digital screens (Wardani & Ayriza, 2020). For children accustomed to engaging primarily with gadgets, developing the ability to observe physical objects, interact with their environment, and be mindful of their surroundings is crucial (Hirsh-Pasek et al., 2015). These skills foster a deeper connection to the tangible world, enriching their sensory and cognitive development (Cankaya et al., 2023).

One effective way to enhance observational skills is to appreciate art through learning. However, art can often be challenging for young children to understand, as many symbols and themes in the art are so far removed from their daily experiences. Therefore, the study aims to design and develop a learning kit that helps children to learn about art appreciation in a way that is accessible and meaningful to them. The learning kit was specifically tailored for children aged 7 to 11. Children in the concrete operational stage of Piaget’s theory of cognitive development

begin to develop logical thinking and can group, compare, and categorize information. At this stage, children enjoy asking questions about their environment, are motivated by curiosity, and can handle cause-and-effect reasoning while starting to form evidence-based conclusions (McLeod, 2024).

Art appreciation is essential for enhancing creativity, promoting critical thinking, and deepening cultural understanding (Gumulya, 2023). Art appreciation is defined as “the process of comprehending and deriving enjoyment from artistic works. It entails cultivating an understanding of the fundamental elements of art, including color, line, shape, and texture, and discerning how these elements are utilized to convey meaning in artwork” (Silvers, 1942).

One method to teach art appreciation is through AT, developed in 2016 by the Harvard School of Education (Tishman & Palmer, 2006). AT is an approach that combines art with cognitive processes by teaching students to observe, interpret and analyze artworks (Sullivan, 2001). Şenel & Döş (2024) found that the AT approach enhanced the cognitive abilities of 23 Turkish 6<sup>th</sup>-grade students, improving their capacity to express their thoughts and engage in meaningful discussions about art. The students demonstrated improved critical thinking skills and developed a greater appreciation for art.

## 2. Literature Review

Developing AT involves six key thinking dispositions. These dispositions include routines focused on observing and describing, questioning and investigating, reasoning, comparing and connecting, exploring complexity, and perspective-taking.

### 2.1 AT Routine: STW

This study discusses the design and development of a learning kit that teaches students to learn art appreciation by using one of AT strategies, which is the STW. Traditional art education approaches often emphasize identifying the elements and principles of art or memorizing historical context about the artworks (Ping & Ladin, 2019). However, STW promotes active learning by encouraging students to form personal connections with the artworks by conducting observations that relate to them, thinking about the meaning, and exploring questions (Lowe et al., 2013). Therefore, STW was chosen as the art appreciation teaching method for this study. While primarily used to analyze artworks, this routine has been adapted by educators across various disciplines, including literature, historical events, and natural phenomena, as it fosters critical thinking and inquiry-based learning (Schafer, 2019).

In the “see” stage, students carefully observe the artwork and document their impressions, describing it using nouns, adjectives, and verbs. During the “think” stage, they analyze their observations, establish connections, and delve into the underlying meanings. Finally, in the “wonder” stage, students formulate questions about aspects of the artwork that they find unclear and identify topics they wish to explore further.

The STW thinking strategy can be modified to suit different age groups by crafting prompts that stimulate learners’ thinking processes at varying levels of complexity (Tishman & Palmer, 2006). An illustrative example of this methodology is its application to enhance the art appreciation skills of 3<sup>rd</sup>-grade students. This example, adapted from a Massive Open Online Course (MOOC) offered by the National Gallery of Art, demonstrates the use of the STW thinking strategy to analyze Claude Monet’s *the Japanese Footbridge* (1899). By following this structured approach, learners engage deeply with the artwork, fostering observational skills, critical thinking, and curiosity (National Gallery of Art, 2020).

The process unfolds in several stages:

a) In the “see” stage, students begin by slowly observing the artwork, focusing on elements like colors, lines, shapes, and composition. They describe the piece with descriptive sentences that have nouns, verbs and adjectives, sketch their observations, and share their insights with other students.

b) In the “think” stage, students start to think based on their observations from the “see” stage, generating additional descriptive words to deepen their observation. This stage encourages people to consider many perspectives and create inferences and interpretations about the meaning, message, or purpose of the artwork.

c) In the “wonder” stage, the activity concludes with a session of wonder, where the teacher offers background information about the artwork, sparking curiosity and prompting further exploration. Students discuss their thoughts, fostering collaborative learning and deeper reflection.

d) In the final step, students reflect on their learning experiences and all the notes that they have taken during the “think” stage. Overall, the STW activity enhances students’ observation skills, critical thinking, and appreciation for art, enriching their understanding of artworks while expanding their cultural awareness about Japanese culture.

### 2.2 Learning Kit Development Framework

The ADDIE instructional design model was used in this study to design and develop the art appreciation learning

kit. It guides the development process of educational materials, ensures the plan is comprehensive, and includes assessment at every stage of the instructional design process. Originally developed by Florida State University for the U.S. Military in the 1970s, the model consists of five distinct phases: analysis, design, development, implementation, and evaluation (Molenda, 2015).

The key findings have been summarized as follows (DeBell, 2015; Gumulya, 2022; Hodder, 2023; Kemouss et al., 2023; Sam et al., 2022; Wibawa, 2017).

- In the analysis phase, the following important information needs to be captured and defined: a) information about the learners, their age, prior knowledge, learning styles, and cultural context; b) the resources, challenges and constraints, the available materials, technology, time and budget; c) the context, the environment where the learning takes place (e.g., classroom, online, and hybrid); d) the other information that needs to be collected are the learning goals, the learning outcomes that the learners should achieve by the end of the program.

- In the design phase, after gathering a lot of information in the analysis phase, the information becomes the basis for defining the blueprint of the course. First, learning objectives need to be defined. They have to be specific, measurable, achievable, relevant, and time-bound (SMART). Once the objectives are established, the next step is to organize the instructional material in a logical and meaningful sequence. Each piece of material should be delivered using methods tailored to the learners' needs, as identified during the analysis phase. Finally, the assessment criteria for measuring the learning outcomes must also be clearly defined. The design phase is critical because a well-structured plan ensures that the material aligns with the learning objectives and that the instructional strategies effectively engage and educate students.

- In the development phase, instructional materials of the course are created, including lesson plans, multimedia content, and learning tools. Once these materials are developed, they are tested with a small group of users, and the feedback is collected to make necessary improvements.

- In the implementation phase, suitable platforms or settings for delivering the course are chosen, and educators are trained to effectively teach the material. During this phase, students' engagement is closely monitored to identify potential barriers to learning. Educators must remain flexible and prepared to make real-time adjustments based on student feedback. This phase is critical for evaluating how well educational materials function in real-world scenarios, ensuring that the intended objectives are achieved and that learners remain fully engaged throughout the process.

- In the evaluation phase, feedback on the course is gathered alongside an assessment of students' learning outcomes in the areas of knowledge, skills, and attitudes. Instructional strategies are revisited and realigned if they fail to deliver the desired outcomes. This stage is crucial as it measures the success of the course and the instructional design, identifying strengths and weaknesses to inform future improvements.

The ADDIE model has been widely used in different educational contexts, ranging from developing courses to learning modules. For example, de la Torre (2018) used the model to develop a learning module for a communication course designed for the 12<sup>th</sup>-grade students in the Philippines. The results showed that the learning module developed using ADDIE was highly effective and positive feedback was received from both students and teachers. This is because the ADDIE model underscores the importance of understanding learner characteristics, teacher/faculty needs, learning conditions, existing instructional strategies, and course content before developing the module. Prakash (2023) emphasized that while the ADDIE model is highly structured, it can also be flexible and may need to be iterated in some steps to create effective learning experiences.

## 2.3 Research Questions

This study outlines the design and development process of an innovative learning kit aimed at promoting art appreciation in education through the STW methodology. Tailored for children aged 7 to 10, the kit follows the ADDIE model to ensure effective instructional design. The study seeks to answer the following research questions:

- Analysis: What are the challenges and learning goals of children aged 7-10 with regard to appreciating art?
- Design: How is the complete blueprint of the innovative learning kit structured? This includes instructional methods, assessment strategies, and multimedia integration.
- Development: How are the multimedia components, textual materials, interactive exercises, and assessments crafted using the STW methodology?
- Implementation: How do students access and engage with the learning kit?
- Evaluation: What feedback is obtained from the learners about their experience with the kit's content and features?

This study introduces an innovative learning kit focused on art appreciation, specifically designed for children aged 7 to 11. The kits incorporate STW activities, aimed at nurturing creative thinking by providing tangible tools to support this cognitive process. This study contends that fostering AT skills can benefit children in the concrete operational stage of Piaget's theory of cognitive development, as this stage is marked by enhanced logical thinking and the ability to grasp abstract concepts (Bashrin, 2015). The primary objective of this study is to offer valuable guidance for designers without an educational background, helping them create effective and innovative learning

kits for art appreciation.

### 3. Research Method

The RtD methodology was employed in this study to develop an art appreciation learning kit designed for children aged 7-10, with a focus on enhancing their art appreciation skills using the STW methodology. RtD is an iterative approach that integrates the design process with research, enabling the exploration of practical solutions to complex educational challenges while generating new knowledge (Zimmerman & Forlizzi, 2014). The methodology focuses on designing, prototyping, testing, and refining the learning kit, guided by the ADDIE instructional design model.

The process begins with the analysis phase, which identifies the needs, challenges, student context, and desired learning goals outlined by teachers. In the design phase, specific learning objectives, instructional materials, and clear assessment criteria are established. During the development phase, the kit is created, progressing from initial sketches to a functional prototype. The implementation phase involves testing the kit with children aged 7-11 in both individual and group settings. Finally, in the evaluation phase, feedback from the children is collected to identify areas for improvement. It is believed that using the RtD approach, guided by the ADDIE model, ensures that the kit is effective, engaging, and aligned with educational objectives, fostering observation, critical thinking, and an appreciation for art.

### 4. Result

The results are presented according to the steps of the ADDIE model.

#### 4.1 Analysis Results

The analysis stage can be divided into two main activities. First, to gain information about the learning goals, interviews were conducted with art teachers from a private school in Tangerang, with each teacher having over five years of art teaching experience for students in grades 1-6 (Figure 1, Figure 2 and Figure 3). Second, to gain information about learners' needs, prior knowledge, learning styles, and cultural context, observations with the children were conducted.

##### 4.1.1 Interviews

Interviews with the art teachers provide several key insights about the learning goals as follows:

a) Enhancing observational skills

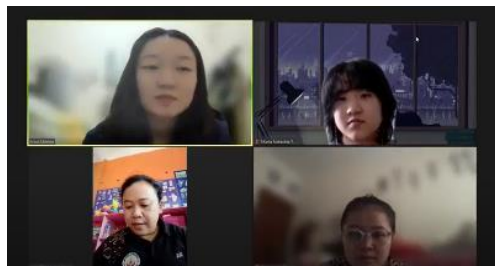
The teachers asserted that when children learned about art appreciation, they learned to observe shapes, forms, colors, textures, and compositions of artwork. This can hone their observational skills, enabling them to notice small details and become more curious about their environment, thereby nurturing their ability to interpret, analyze, and create meaning from images, symbols, and visual representations.

b) Promoting critical thinking

Art is full of symbolism and cultural elements that are sometimes far from what people encounter in their daily lives, which encourages viewers to consider the message that the artist is trying to convey. The process of thinking and connecting all the elements they see in the artwork is essential. Besides seeing and thinking, learning about art also encourages viewers to form well-reasoned opinions about the artwork. All these activities promote critical thinking.

c) Cultivating cultural awareness

Art comes in various forms and styles, originating from different eras and regions. Learning to appreciate artworks from diverse movements and cultures exposes children to different traditions, encouraging them to value diversity and appreciate a wide range of artistic expressions.



**Figure 1.** Snapshot 1 for the art teacher interview



**Figure 2.** Snapshot 2 for the art teacher interview

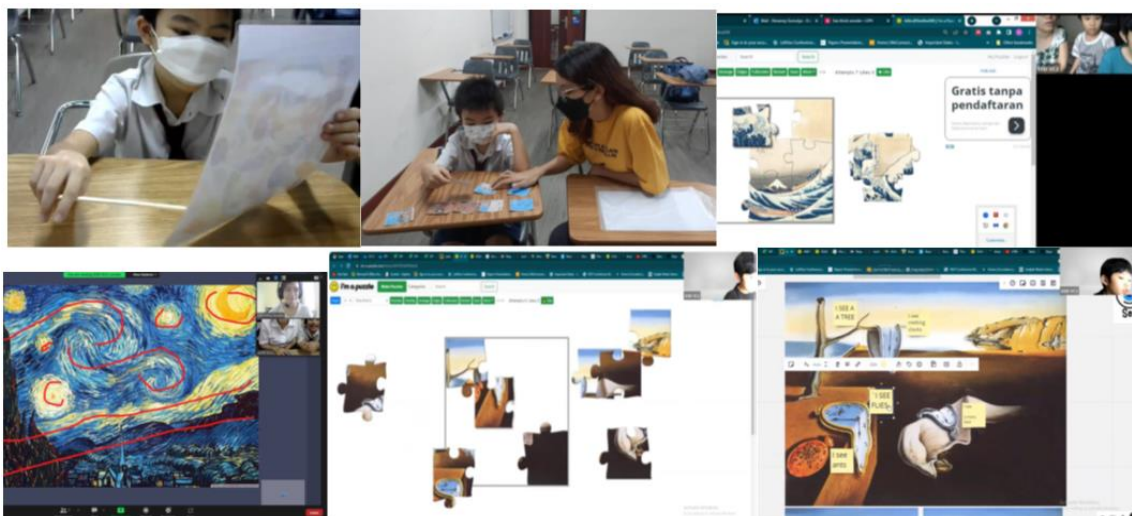


**Figure 3.** Snapshot 3 for the art teacher interview

In addition to gaining insights into the goals of art appreciation from art teachers, the best teaching strategies for teaching art appreciation to 7-11-year-olds were also inquired about. The teachers emphasized the importance of playful learning, incorporating fun, curiosity, and engagement into the educational process to encourage active participation and exploration of artistic concepts. They used games to teach, highlight the significance of storytelling, and provided visual aids, demonstrations, and hands-on activities to actively engage students' senses and make art lessons both informative and enjoyable.

#### 4.1.2 Observations

Five STW activities were carried out involving two children aged 8 and 10 years old, aiming to explore their engagement while practicing the STW thinking routine (Figure 4). All the observation materials were adopted from MOOCs created by the National Gallery of Art teaching about AT (National Gallery of Art, 2019).



**Figure 4.** STW practices

Insights into the learners' challenges in art appreciation using the STW thinking routine, drawn from five STW practices involving three children aged 8 to 10 years old, illuminate several key points.

a) Significance of incorporating games in the "see" phase

It was found that introducing games to the research subjects substantially enhanced their engagement. Puzzles, in particular, proved effective as they didn't divert the subjects from the task at hand. Additionally, breaking down the painting into different parts allowed the research subjects to observe the painting's details and examine the closer parts of the painting.

b) Occurrence of challenges in the think and wonder phases

In the "think" phase, the research subjects faced challenges in connecting the elements they observed in the artwork into coherent thoughts. They often required multiple examples before they could do so effectively. Another challenge was their tendency to hastily draw conclusions about the painting based on a single element, without considering other identified keywords. For instance, in the *Starry Night* painting, the 8-year-old thought it depicted a beach because he interpreted the swirling patterns as waves, disregarding the presence of the moon and the buildings in the scene.

During the wonder phase, the research subjects also struggled by not being sufficiently intrigued or motivated to wonder about the artwork or ask questions. They tended to focus their questions on aspects that personally interested them. The subject of the painting was nothing like what they were used to seeing on their gadgets. This lack of curiosity during the wonder stage can impede the depth of their exploration and constrain their learning experience.

c) Practice is key

As the research subjects progressively familiarized themselves with the routine, a noteworthy progress was discernible in their proficiency in observing the painting and structuring their thoughts and inquiries. Consistent practice nurtured a deeper comprehension of the routine and its underlying purpose.

d) Implementation of STW in online and onsite settings

The study reveals that the STW practice can be effectively implemented in both online and onsite settings. In an online setting, it allows the research subject to zoom in and out of the painting for effective engagement, while in an onsite setting, it enables researchers to narrow the research subject's focus and enhance their attention. The results emphasize the significance of customizing the approach according to the particular setting to maximize the engagement and observational abilities of the research subjects.

e) Intricate connections between language skills and art appreciation abilities

Through conversations with parents, it has come to light that both research subjects have language delays. This hinders their ability to effectively communicate their thoughts, experiences, and observations about paintings. Hence this research highlights the importance of strong language skills in conveying interpretations and observations of artworks. Developing their linguistic proficiency could enhance their capacity to articulate their thoughts and engage more deeply with the visual elements of the paintings.

f) Real-life theme associations

The children's ability to link the painting's theme to their daily experiences is crucial in increasing their interpretation and comprehension. Creating connections between the artwork and their existing knowledge and daily life encounters plays a pivotal role in this process. For example, if a child likes animals, he/she would be more engaged in observing an animal-themed painting, highlighting the importance of selecting paintings that align with his/her interests.

#### 4.1.3 Design result

The following primary learning goals of art appreciation for children were found from the analysis stage: a) Enhance observational skills by analyzing shapes, colors, and textures; b) Promote critical thinking by interpreting symbolism and forming well-reasoned opinions from their observations; c) Cultivate cultural awareness by exploring diverse artistic styles and traditions, fostering an appreciation for diversity and artistic expression.

On the other hand, challenges during the "think" stage were found in the observations, where children struggled to connect observed elements to form interpretations, and fostering curiosity proved difficult during the "wonder" phase. It was also found that incorporating games and real-life themes significantly increased engagement. A notable constraint identified was language skills; stronger language abilities enable children to articulate their observations more effectively. Additionally, the observations highlighted that the STW routine can be successfully adapted for both online and onsite settings, with consistent practice enhancing children's proficiency in engaging with the activity.

The learning kit was designed for children aged 7-11, suitable for both home and school settings, presented in Indonesian, and can be used individually or in groups. It is in the form of a book, providing a guided and structured framework for the STW routine, with arts and crafts activities included to reinforce understanding. The blueprint for the kit was formulated after conducting five iterations of the STW practice with the children, and taking art teachers' suggestions to use visual support, demonstration, and hands-on activities on the kit (Table 1).

To develop the blueprint for the kit, the authors worked collaboratively with art teachers to determine which

components should be included to support children’s learning and engagement. For example, the art teachers suggested providing examples at each stage of STW to help children get started. Additionally, they recommended incorporating hands-on activities after completing the learning exercises.

**Table 1.** Learning kit blueprint

<b>Stage</b>	<b>Learning Objectives</b>	<b>Props</b>	<b>Instructional Strategies</b>	<b>Assessment</b>	<b>Multimedia Elements</b>
<b>See (part 1)</b>	Enhancing observational skills	See instruction, and puzzle	Students are asked to put the puzzle pieces together to form the painting’s image.	Students are able to successfully assemble the image in the correct order.	-
<b>Think (part 1)</b>	Promoting critical thinking	Think (part 1) instruction, wipeable marker, think example, and the blank section in the book	Students are requested to write down five words that describe the painting (Students are asked to formulate words instead of sentences to support those with lower language proficiency in the STW routine).	Students can generate five words that describe the main subjects and details within the painting.	-
<b>Sharing (part 1)</b>		The filled section in the book	Students are instructed to share their chosen five words with either their peers or teachers and provide the reasons for selecting these words.	Students are able to provide logical arguments to support their chosen words.	-
<b>See (part 2)</b>	Enhancing observational skills	Complete picture of the painting	Students are instructed to revisit the painting for another observation.	Students are able to observe the painting in greater detail.	-
<b>Think (part 2)</b>	Promoting critical thinking	Think (part 2) instruction, wipeable marker, think example, and the blank section in the book	Students are tasked with writing down another set of five words to describe the painting.	They can generate five descriptive words that uncover hidden layers and subtle nuances within the artwork.	
<b>Sharing (part 2)</b>		The filled section in the book	Students share their favorite words related to the painting and explain why those words are their favorites.	They are good at selecting keywords that symbolize key themes, characteristics, and significant elements within the artwork.	
<b>Wonder</b>	Cultivating cultural awareness	Book QR code, wonder instruction, wipeable marker, and the blank section in the book	Students watch the background story of the painting and formulate wonder questions encompassing the aspects of what, who, when, where, why, and how.	They demonstrate their ability to ask thought-provoking questions that enhance their exploration, engagement, and comprehension of the subject matter.	A 3-minute video explains the background story of the painter and the painting.
<b>Create</b>	Fostering imagination and creativity	Arts and crafts instruction guide, and arts and crafts material	Students engage in arts and crafts activities related to the painting they are studying.	Students develop a unique interpretation, fostering a deeper comprehension and appreciation of the artwork.	-
<b>Wrap-up</b>	Promoting critical thinking	Wrap-up instruction, wipeable marker, prompt to induce reflection, and the blank section in the book	Students write reflections on the new insights they have gained from studying the painting.	They can clearly and effectively articulate their thoughts and ideas in their writing.	-

#### 4.1.4 Development result

The painting under discussion in the kit is *the Great Wave off Kanagawa*, also known as *the Great Wave* (Figure 5). It's a renowned woodblock print crafted by the Japanese artist Katsushika Hokusai during the early 19<sup>th</sup> century. This artwork is part of the "Thirty-Six Views of Mount Fuji" series and was originally published in 1831. As stated in the studies by Guth (2015) and Kochetkova (2022), *the Great Wave off Kanagawa* by Katsushika Hokusai represents the complex connection between humans and nature, along with the idea of resilience. The undulating waves portray the immense strength of nature, serving as a reminder of its unstoppable power and unpredictability. The painting shows small boats and their occupants courageously facing the big wave, emphasizing the tough resilience and determination of humans in the face of adversity. It represents the persistent spirit and ability of Japanese people to overcome challenges in their lives, adapt to their environment, and conquer obstacles, reflecting their strong work ethic and commitment to their professions.



**Figure 5.** The great wave off Kanagawa

Children aged 7-11 can gain several advantages by observing and understanding this iconic piece, including sharpening their observational skills, enhancing their capacity for logical thinking and understanding of concrete concepts, fostering cultural awareness, nurturing critical thinking, and pondering a moral message about resilience in the face of challenges. Figure 6 shows the illustration design.



**Figure 6.** Illustration design

Table 2 shows the creation of the prototypes of the kit, aiming to assess how it can function in real-life situations. Table 3 provides a detailed breakdown of all the components of the kit, including instructional strategies and prototypes.

**Table 2.** Prototyping process of the learning kit

1 <sup>st</sup> Prototype	2 <sup>nd</sup> Prototype
<p>From the first prototype, it was discovered that the kit was too flat, resembling a standard book, and more tactile elements were needed to enhance its engagement and interactivity.</p>	<p>The second prototype improves with more 3D illustration and has a pop-up feature.</p>



**Table 3.** Learning kit development

Stage	Learning Objectives	Props	Instructional Strategies
<b>See (part 1)</b>	Enhancing observational skills	See instruction, and puzzle	Students are asked to put the puzzle pieces together to form the painting's image.
<b>Think (part 1)</b>	Promoting critical thinking	Think (part 1) instruction, wipeable marker, think example, and the blank section in the book	Students are requested to write down five words that describe the painting.
<b>Sharing (part 1)</b>		The filled section in the book	Students are instructed to share their chosen five words with either their peers or teachers and provide the reasons for selecting these words.
<b>See (part 2)</b>	Enhancing observational skills	Complete picture of the painting	Students are instructed to revisit the painting for another observation.
<b>Think (part 2)</b>	Promoting critical thinking	Think (part 2) instruction wipeable marker, think example, and the blank section in the book	Students are tasked with writing down another set of five words to describe the painting.
<b>Sharing (part 2)</b>		The filled section in the book	Students share their favorite words related to the painting and explain why those words are their favorites.
<b>Wonder</b>	Cultivating cultural awareness	Book QR code, wonder instruction, wipeable marker, and the blank section in the book	Students watch the background story of the painting and formulate wonder questions encompassing the aspects of what, who, when, where, why, and how.
<b>Create</b>	Fostering imagination and creativity	Arts and crafts instruction guide, and arts and crafts material	Students engage in arts and crafts activities related to the painting they are studying.
<b>Wrap-up</b>	Promoting critical thinking	Wrap-up instruction, wipeable marker, prompt to induce reflection, and the blank section in the book	Students write reflections on the new insights they have gained from studying the painting (Prompts are provided to encourage students to reflect on the meaning of the painting to them)

The learning kit incorporates a pop-up feature to enhance its visual aspect, adding an extra layer of visual appeal and interactivity (Figure 7). To foster students' imagination and creativity, arts and crafts activities were incorporated into the kit for creating a diorama, which allows children to pay closer attention to the details of the painting and delve deeper into its composition, colors, and subject matter. This can lead to a more profound understanding and appreciation of the artwork while also enhancing their imagination and creativity.



**Figure 7.** Pop-up feature of the learning kit

#### 4.1.5 Implementation result

User testing of the learning kit was conducted with five children aged 7 to 11, each representing different developmental stages and possessing unique cognitive and emotional characteristics (Figure 8). This testing was conducted in collaboration with school art teachers. The testing occurred in two phases, allowing for a thorough assessment of the kit's effectiveness. In the initial phase, each child interacted with the prototype individually, while in the subsequent phase, all five children used the kit together. This comprehensive approach provides insights into the strengths of the prototype and areas for potential enhancement.



**Figure 8.** Learning kit implementation

#### 4.1.6 Evaluation result

The kit was evaluated in two stages. First, the children used the kit individually, guided by the authors. In the second stage, they used the kit collaboratively without any guidance. During both evaluations, teachers assessed the children using the evaluation criteria established during the design phase and gave scores on a scale of 1-4, while the authors closely observed the children’s interactions and engagement.

Five children tested the kit: Azkia, aged 7; Ado and Fatin, both 8; Azzam, aged 10; and Dinda, aged 11. All the children lived in urban settings. Azkia, Fatin, and Dinda attended public schools, which often have limited access to art education, while Ado and Azzam attended private schools where art is included as part of the curriculum. Two of the children (Ado and Azzam) were the ones who had done the STW routines during the analysis phase.

The art teachers were requested to evaluate the kit by assigning a score within the range of 1 to 4 (i.e., 1= strongly disagree; 2 = disagree; 3 = agree; and 4 = strongly agree). The score displayed in Table 4 is the average score between the two teachers.

**Table 4.** Learning kit evaluation by teachers

Stage	Assessment	User 1 (7 years old)	User 2 (8 years old)	User 3 (10 years old)	User 4 (8 years old)	User 5 (11 years old)	Mean
<b>See (part 1)</b>	Students are able to successfully assemble the image in the correct order.	4	4	4	4	4	4
<b>Think (part 1)</b>	Students can generate five words that describe the main subjects and details within the painting.	2	2.5	2.5	2	1.5	2.1
<b>Sharing (part 1)</b>	Students are able to provide logical arguments to support their chosen words.	2.5	3.5	3	3	1.5	2.7
<b>See (part 2)</b>	Students can now observe the painting in greater detail.	3.5	4	3.5	4	3.5	3.7
<b>Think (part 2)</b>	They can generate five descriptive words that uncover hidden layers and subtle nuances within the artwork.	2.5	2	3	2	3.5	2.6
<b>Sharing (part 2)</b>	They are good at selecting keywords that symbolize key themes, characteristics, and significant elements within the artwork.	3	2.5	3	3	3.5	3
<b>Wonder</b>	They demonstrate their ability to ask thought-provoking questions that enhance their exploration, engagement, and comprehension of the subject matter.	2.5	2.5	3	3	2.5	2.7
<b>Create</b>	Students develop a unique interpretation, fostering a deeper comprehension and appreciation of the artwork.	3.5	4	4	3.5	4	3.8
<b>Wrap up</b>	They can clearly and effectively articulate their thoughts and ideas in their writing.	2.5	2.5	3	2	3	2.6
<b>Overall mean</b>		2.88	3.05	3.22	2.94	3	3.02

Based on the age group analysis, the following was found:

a) 7-8 years old

These children performed well in the “see” phase but struggled somewhat with the “think” and “wonder” phases,

particularly in generating descriptive or critical responses. Hence, it was found that younger children (7-8 years) need more guidance and practice in the “think” and “wonder” phases to develop their ability to generate descriptive words and engage in critical thinking.

b) 10-11 years old

These children demonstrated better engagement in the “think” and “create” phases, with higher ratings, indicating greater development of critical thinking and creativity in relation to art appreciation.

A deeper look into the results of User 2 (8-year-old Ado) and User 4 (10-year-old Azzam), who had been practicing the STW routine during observations, compared to other children who had never been exposed to STW, showed that Ado and Azzam performed relatively well, particularly in the observational and creative aspects, i.e., see (part 2) and create phases. However, they struggled more in the critical thinking areas such as think (part 1), think (part 2), and wonder, where their scores were similar to those of the younger 7-year-old user, Azkia. It was found that although the users had been exposed to STW five times, they still found the think and wonder stages challenging. Hence, it is suggested to focus on enhancing children’s language capabilities alongside using the kit, as increasing their vocabulary in describing artwork is important. According to the table, the mean score of Ado is 3.05, which is higher than the overall average, while Azzam’s score is 2.94, lower than the average. This analysis reveals that the learning kit’s effectiveness may vary by individual, even within the same age group. Further investigation in the future is needed to determine whether these differences are caused by the kit’s design or individual user characteristics.

The five children were asked to evaluate their overall learning experience using a scale of 1 to 4 as follows:

1 = I didn’t like it (I didn’t enjoy using the kit, and I didn’t learn anything new or interesting).

2 = It was okay (It was alright, but I didn’t find it very exciting or engaging).

3 = I liked it (I had fun using the kit, and I learned some interesting things).

4 = I loved it (I really enjoyed using the kit, and I learned a lot of cool stuff).

The qualitative findings from teacher assessments and authors’ note observations were interpreted using a rigorous thematic data analysis approach. The themes were identified by systematically examining the data for similarities and patterns, ensuring a comprehensive understanding of the key insights. Themes such as “high engagement”, “difficulty in critical thinking”, “low-quality questions”, and “need for additional guidance” were identified. From the themes, several conclusions can be drawn.

Firstly, the children were very interested in the kit, and they were all eager to follow the STW thinking routine. They were very engaged with the puzzle games. This enthusiasm is reflected in their overall rating of 3.6 (Table 5), indicating that they like the learning kit, have fun, and find it interesting.

**Table 5.** Learning kit development by children

User 1	User 2	User 3	User 4	User 5	Mean
3	4	3	4	4	3.6

Secondly, during the “think” phase, the children struggled to connect their observations to meaningful insights, specifically linking descriptive words about the painting to assumptions about its meaning. The average score for this phase was the lowest at 2.1. This indicates that they need more practice in formulating descriptive words to articulate the artwork. Although most of the children struggled during the “think” phase, there was significant improvement in the second stage, with the average score increasing to 2.6, indicating that they are becoming more familiar with the routine.

Lastly, during the “wonder” phase, the children’s questions lacked depth, and they were only able to formulate one question, struggling to generate additional inquiries. The challenges observed during the practice phase persisted in the testing phase. The mean score for this stage was 2.7, suggesting that the children would benefit from further guidance to foster their curiosity and encourage a deeper exploration of the artwork.

Beyond the learning content and activities within the kit, teachers expressed concerns that children may lose interest if they had already seen the painting. Therefore, it is recommended to design a learning kit with different artworks to foster creativity and imagination. Designers should also include adjustable prompts to cater to various play scenarios, keeping children engaged and entertained while supporting their growth and development.

Despite some lower scores in the thinking, wondering, and reflecting phases, the learning kit effectively initiates active engagement, critical thinking, and creative expression among children of 7-11 years old during the process of appreciating artwork. The kit received an overall mean score of 3.02 from the art teachers and 3.6 from the children on a scale of 1-4. However, there is still room for improvement in enhancing the children’s ability to generate descriptive words, creating more prompts for thought-provoking questions, and facilitating more effective writing in the future.

## 5. Discussion

The primary objective of this study is to design and develop a learning kit for art appreciation by incorporating

the STW routine following the RtD process guided by the ADDIE framework. The study's findings provide insights into the developmental process of the kit within the ADDIE framework and highlight the critical factors that need to be considered at each phase.

### 5.1 Analysis Phase

In this phase, the research underscored the importance of consulting multiple experts to gain valuable insights into the learning objectives achievable through art appreciation for children aged 7-10. The study included interviews with three art teachers to understand the educational goals. To explore the context and challenges faced by students, the study also emphasized the significance of direct observation. In this research, five observations were conducted involving two children engaging in the STW routine, providing a practical understanding of how students interact with and learn from the process.

Through interviews with the art teachers, learning goals for art appreciation were identified, namely, the development of observational skills, critical thinking, cultural awareness, perspective-taking, cognitive development, and creativity. These findings align with previous research that underscores the benefits of art education for children (Cantekin, 2019; Efland, 2002).

Based on the observations, several challenges were identified during the "think" and "wonder" stages, where children had difficulty formulating meaningful questions about the paintings. To address this, puzzle games were introduced, which divided the painting into pieces to encourage careful observation. The inclusion of games during the "see" phase effectively boosted children's engagement and excitement.

Regular practice of the thinking routine, ideally once a week, was found to enhance children's art appreciation skills, suggesting that this ability improves with continued practice. This finding is consistent with previous research by Tishman & Palmer (2006), which emphasizes the importance of regular practice and the detailed documentation of the process to track the development of children's art appreciation ability over time.

Besides incorporating puzzle games and consistent practice, another strategy that can be used to lower the challenges in the "think" and "wonder" stages is choosing paintings that children can relate to, such as things they like or have seen before, which can be effective. Starting with realistic paintings and moving to abstract themes can also be helpful.

On the other hand, language skills can also hinder children's ability for art appreciation, with higher language skills leading to more proficient descriptions of the painting. As emphasized by Bennett (1990), language development is crucial in cognitive processes and contributes greatly to the understanding of art concepts. Language helps individuals process and structure their experiences in art, highlighting its significance in art education. Teachers should cultivate a relevant vocabulary in the field of art, as the acquisition of an art vocabulary is fundamental in art learning, enabling individuals to effectively describe, discuss, and convey emotions about art objects.

### 5.2 Design Phase

In this phase, co-creating the learning kit blueprint with teachers is essential, as collaboration with teachers ensures that learning goals and needs are effectively addressed. The study also recommends incorporating elements of visualization, demonstration, and hands-on activities into the learning kit. These strategies are supported by several studies, which highlight that visual and kinesthetic learning approaches make abstract concepts more tangible and understandable for children (Tyas & Safitri, 2017) and can significantly enhance learning outcomes (Hussein Ibrahim & Hussein, 2015; Putri & Suryati, 2020).

Visual and kinesthetic learning styles are particularly effective because they cater to the diverse ways that individuals absorb and process information. Visual learning relies on visual stimuli and activities, allowing learners to better understand and retain information through observation (Norhidayah, 2023; Yelland, 2014). In contrast, kinesthetic learning emphasizes physical movement and hands-on experiences, which enhance both learning and memory retention (Fallace, 2023).

While previous studies have shown visual and kinesthetic learning strategies are effective to enhance learning, this research extends our understanding by exploring how visual elements can be presented in different formats, such as 2D and 3D. The learning kit was enhanced with innovative features, including pop-up visual components and the integration of static illustrations (e.g., images in the book) with dynamic motion graphics and video explainers. By combining static visuals with motion and audio elements, the kit engages multiple senses simultaneously. This multisensory approach creates a more interactive and immersive learning experience, leading to improved comprehension and knowledge application.

### 5.3 Development Phase

In the development phase, instructional strategies should serve as the guiding framework for the prototyping process. It is crucial to align the various components of the learning kit with these strategies to ensure each part

effectively contributes to achieving the learning objectives. This alignment ensures smooth and coherent progression through each step of the STW process. This approach aligns with the study by McLeod (2024), which highlights the importance of the prototype in reinforcing the course's vision and concept. Additionally, it is essential to carefully assess and refine the course content to ensure it remains consistent with the learning objectives.

#### **5.4 Implement Phase**

In the implementation phase, where the learning kit was tested by real users, it is advisable to involve children from various developmental stages. This enables the evaluation of the kit's effectiveness and engagement across a broad range of age-related factors. This approach is supported by the study by Hodder (2023), who underscores the importance of effective communication with diverse types of learners during this phase. It is essential to ensure that all learners understand the course content and objectives and that the material is delivered using appropriate methods.

Additionally, it is important to test the kit in both individual and group settings to assess its performance and identify areas for improvement in different contexts. This practice aligns with the study by DeBell (2015), which recommends gathering data from various usage scenarios to evaluate the learning content's overall effectiveness.

#### **5.5 Evaluation Phase**

During the evaluation phase, it is essential to conduct a thorough assessment of the kit based on the predefined criteria established in collaboration with art teachers during the design stage. These criteria allow for a clear connection to the instructional strategies, helping to identify ineffective components of the learning kit that require improvement. For instance, in this research, children faced challenges during the "think" phase, suggesting that components related to this stage should be re-evaluated and enhanced, possibly by incorporating additional prompts or games to support both the "think" and "wonder" phases.

Moreover, the study by Branch (2009) emphasizes that the purpose of the evaluation phase is to assess the quality of both the instructional products and the processes. Therefore, the assessment criteria used in the ADDIE phase must align with the intended learning outcomes and objectives.

To obtain comprehensive feedback, input from both teachers and students is beneficial to gain multiple perspectives. However, since none of the children had prior exposure to art appreciation activities, the study only evaluated learner satisfaction instead of assessing knowledge acquisition and skill application, which are crucial factors to consider during the evaluation phase according to the study by Branch (2009). Nevertheless, it is believed that the kit is the first step to foster skills in AT for children in Indonesia, where art appreciation learning materials are very scarce and hard to find.

### **6. Conclusion**

In conclusion, this study highlights the advantages of utilizing the ADDIE framework in the design and development of an innovative art appreciation learning kit. Through a comprehensive exploration, key elements that should be considered were identified when designing and developing an art-themed learning kit. First, it is recommended that designers co-create the learning blueprint in collaboration with educators. Second, the kit should incorporate a combination of 2D and motion graphic visualizations, along with prompts that provide demonstrations and hands-on activities. Additionally, the study emphasizes the importance of building children's vocabulary to describe artwork. By doing so, the kit not only enhances students' art appreciation skills but also contributes to the development of their language abilities. To address the challenges observed during the "think" and "wonder" phases, the study underscores the critical role of teachers as facilitators, providing prompts and examples to help students connect their observations into meaningful insights. Finally, the study recommends testing the kit in both individual and group settings to ensure its effectiveness across various learning contexts.

Furthermore, the study emphasizes the pivotal role of the ADDIE framework in crafting a robust art appreciation learning tool that not only fosters critical thinking, creativity, and cultural appreciation but also aligns with the broader ambition of "Goal 4: Education for All" of Sustainable Development Goals (SDGs). When considering how the kit supports SDG 4, it provides Indonesian students with access to art appreciation education, an area where learning resources were previously scarce. These findings resonate not just with designers but also educators and curriculum developers, signaling the promise of immersive learning experiences in advancing inclusive and quality education for children worldwide.

This study has several limitations. First, the kit was only tested with five children, which is a limited sample of Indonesian students, which may not represent the diversity of learners across different regions or cultural backgrounds. Hence, future studies should incorporate a larger and more diverse sample of students, representing different educational backgrounds and geographic regions. Second, due to time limitations, the learning kit was only played one time; hence it may be too short to fully assess its long-term impact on students' art appreciation,

critical thinking, and creativity. The effects of using the kit over extended periods or multiple learning sessions were not thoroughly explored. Future research should examine the long-term impact of the learning kit, assessing how sustained exposure influences students' critical thinking, creativity, and appreciation of art over time. This could involve longitudinal studies or repeated use in diverse classroom settings. Overall, the study results can be a valuable reference to not only designers but also educators and curriculum developers, signaling the promise of immersive learning experiences in advancing inclusive and quality education for children worldwide.

### **Informed Consent Statement**

Informed consent was obtained from all subjects involved in the study.

### **Data Availability**

The data used to support the research findings are available from the corresponding author upon request.

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### **Conflicts of Interest**

The authors declare no conflict of interest.

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