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From Free Flow to Structured Lines: Comparing Kindergarten Children's Drawings

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Abstract

This study examines the differences in drawing patterns of kindergarten children during free drawing and guided drawing, using educational video stimuli. The research aims to describe the characteristics of children's drawings in both contexts and analyze changes that occur after receiving visual guidance. Employing a descriptive quantitative approach with a one-group pretest–posttest design, the study involved 25 children aged 5–6 years selected through purposive sampling. Data were collected using observation sheets that assessed eight indicators of early childhood drawing development, including clarity and detail of form, balance of size and layout, and purposeful use of color. Pretest activities consisted of a 20-minute free drawing session, followed by a posttest after participants watched a 5–7-minute educational video about bees. Descriptive analysis showed an increase in the overall mean score from 2.5 (pretest) to 3 (posttest), indicating notable improvement across all indicators. Children's posttest drawings displayed clearer and more detailed bee forms, more balanced composition, and purposeful color application. These findings suggest that structured visual media effectively support children's perceptual-motor and visual-spatial skills, and can be used as a practical strategy to enhance artistic and cognitive development in early childhood classrooms.

Keywords Drawing; Early Childhood; Educational Video

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1. INTRODUCTION

Drawing is one of the most important activities for young children, as it enables them to express their ideas, imagination, and emotions through visual forms (Rose & Jolley, 2020a; Zakaria et al., 2021a). This activity not only serves as a form of entertainment but also as a learning medium that supports children's cognitive, motor, and socio-emotional development (Harris, 2020; Rose & Jolley, 2020b). Drawing can be done through free play, where children are given the freedom to express their creativity without specific direction or limitations. In this condition, children can explore their imaginations, create objects or characters as they wish, and showcase the unique creativity of each individual. Drawing activities can also be done in a directed manner, for example, by providing specific stimuli

such as educational videos, which guide children to draw specific objects. Research in Tanzania shows that children who watch educational animated series experience significant improvements in drawing skills, shape knowledge, and other cognitive abilities after four weeks of exposure (Borzekowski, 2018). Another study found that using educational videos, such as YouTube Kids, can make the art and craft learning process more effective and enjoyable, as videos engage the visual, auditory, and kinesthetic senses simultaneously (Pua & Jeu Ng, 2024). However, while drawing offers various developmental benefits, it also presents pedagogical challenges that educators must address to optimize learning outcomes (Ainsworth & Scheiter, 2021; Areljung et al., 2025; Gal, 2023; Rose & Jolley, 2020a).

The benefits of drawing activities for young children are very diverse. Besides developing fine motor skills and hand-eye coordination, drawing also trains children's cognitive abilities and creativity. Children who draw regularly can learn to express ideas and emotions through visual symbols, recognize shapes, colors, and composition, and enhance their imagination (Drake, 2021, 2023). This activity can also be a means for children to understand their social and natural environment, for example, by drawing people, animals, or objects around them (Howlett & Turner, 2023). Additionally, drawing can help children develop problem-solving skills, as they learn to plan their images, determine the sequence of steps, and complete their visual works according to the ideas in their minds.

Despite its many benefits, drawing activities for young children don't always go smoothly and optimally. Some of the problems that arise include children having difficulty expressing ideas clearly, the wide variation in drawing results making objective evaluation difficult, and children sometimes struggling to combine free imagination with specific instructions (Cox, 2005). This is especially evident when a child is asked to draw a specific object after viewing educational media. Difficulty expressing ideas can be caused by internal factors such as the child's readiness, familiarity with drawing tools and techniques, as well as external factors like a lack of support, motivation, and facilities from the surrounding environment (Awalini et al., 2023). The wide variety of image results also presents a challenge, as each child has different levels of creativity, experience, and ability, making objective assessment difficult, according to Ernawati et al., (2022). Some children may follow instructions precisely, while others exhibit variations in form that do not correspond to the stimulus. This problem indicates that the effectiveness of drawing activities is highly influenced by how they are implemented, whether freely or directionally, as well as the child's ability to process visual information from educational media.

The development of technology and educational media presents new opportunities in children's learning activities, including drawing (Yadav et al., 2022). One widely used medium is educational videos, which can stimulate children to draw specific objects in an engaging and interactive manner. Research indicates that using videos, such as video prompting on an iPad or animation applications, is effective in helping children learn drawing skills in a directed manner (Budiarti & Watini, 2024). Educational videos can help children pay attention to object details, understand shapes and colors, and adjust their creativity to the visual information presented. Through this medium, children not only learn to imitate but also develop their visual representation skills and cognitive abilities.

This perspective aligns with cognitive theories of learning, particularly Mayer's Cognitive Theory of Multimedia Learning, which posits that visual and auditory inputs, when presented coherently, enhance children's information processing and conceptual understanding (Mayer, 2002). This theory suggests that the learning process is more effective when children receive information through a combination of visual and auditory channels, presented in an integrated and coherent manner. Both channels have limited capacity, so presenting too much or unstructured information can cause cognitive overload and hinder comprehension. Therefore, learning that uses media such as educational videos, images, and complementary narratives can help children select, organize, and integrate information more meaningfully. In addition, Vygotsky's social constructivist theory emphasizes that children's learning develops through guided interaction and scaffolding, suggesting that educational videos can serve as a digital form of guidance that supports children's visual thinking and symbolic representation.

Educational videos, when accompanied by guidance (e.g., explanations from teachers/parents), can help children connect visual symbols on the screen with real objects, strengthening symbolic understanding and visual thinking.

The novelty of this research lies in the attempt to compare children's drawing patterns under two different conditions: free play and drawing based on educational video instructions. Most previous studies have focused more on children's drawings in a free context or on learning outcomes after teacher instruction; however, there hasn't been much specific analysis of differences in children's drawing patterns due to visual media stimulation. This research is expected to provide new insights into how educational media can influence children's ability to express ideas and adapt their creativity to specific directions visually.

Based on the description, this study aims to: first, describe children's drawing patterns during free play; second, describe children's drawing patterns after being guided through educational videos; and third, compare the differences in drawing patterns between these two conditions. By understanding the differences in children's drawing patterns within the context of free play and educational media guidance, this research is expected to guide early childhood educators and practitioners in designing more effective drawing activities. This is important for supporting the development of children's creativity, visual representation skills, and cognitive abilities, while also providing insights into the use of educational media as a tool for stimulation in early childhood learning. Ultimately, this study contributes to the field of educational media design by demonstrating how structured visual stimuli can enhance learning engagement and artistic growth in young children. It also offers practical implications for early childhood art pedagogy, highlighting the importance of integrating multimedia resources into creative classroom activities.

2. METHODS

This research uses a descriptive quantitative approach with a one-group pretest-posttest pre-experimental design. The research subjects were 25 kindergarten-aged children selected through purposive sampling, meeting the following criteria: aged 5–6 years, able to hold drawing tools independently, and with permission from their parents/guardians. The study was conducted in a public kindergarten located in the urban area of Yogyakarta, where students are already familiar with the use of technology in daily learning activities. This context was chosen because the school regularly integrates digital media into classroom instruction, providing an appropriate environment for studying children's drawing activities supported by educational videos.

The research procedure consists of two stages. The pretest stage was conducted by providing a free drawing activity for approximately 20 minutes, during which children were asked to draw without direction or stimulus, according to their own wishes. The teacher's role at this stage is to provide support so that the child can find ideas. The posttest stage is conducted after the child watches an educational video, approximately 5–7 minutes long, that clearly depicts the characteristics of bees. The supporting media used in this stage are a projector and an LCD. The teacher's role is to guide the children through each step in the video. The researcher themselves made the video.

The data collection instrument was an observation sheet for evaluating picture drawings, developed from indicators of early childhood drawing development, including: (1) line strokes, (2) clarity of form, (3) detail of form, (4) balance of size, (5) balance of layout, (6) color fulfillment, (7) using more than one color, and (8) color usage. Each indicator was scored on a scale of 1 to 3, ranging from "not yet evident" to "very evident."

The validity of the observation sheet was assessed through expert judgment involving two early childhood education lecturers and one art education expert, who evaluated the relevance and clarity of each indicator. Minor revisions were made based on their feedback to ensure content validity.

Instrument reliability was assessed using inter-rater reliability analysis, which involved two observers independently evaluating the drawings of ten children. The reliability coefficient obtained (Cohen's Kappa = 0.82) indicates a high level of agreement between raters, showing that the instrument is reliable for use in this study.

Data analysis was conducted descriptively by comparing the children's drawing results between the pretest and posttest. Researchers calculated the mean score for each indicator and the overall mean score to observe changes in children's drawing abilities. In addition to descriptive analysis, a paired-sample t-test was performed to determine whether the differences in mean scores between the pretest and posttest were statistically significant at the 95% confidence level ($p < 0.05$). This inferential analysis provides stronger quantitative support for interpreting improvements in children's drawing performance after receiving visual stimulation through educational videos. All research activities were conducted with the approval of the school and parents, and adhered to child research ethics, including ensuring participant comfort and maintaining data confidentiality.

3. FINDINGS AND DISCUSSIONS

Findings

The data analysis results show that there is a difference between free drawing (mean: 2.5) and directed drawing (mean: 3) (Table 1). When children are given the opportunity for free drawing, they tend to draw what they see in their daily lives, such as plants, people, and content from social media. Some children draw in imaginative forms, such as the 'tung tung sahur' shape, which is seen mainly in boys. Girls, on the other hand, draw more flowers, houses, mountain landscapes, and things they consider beautiful. The colors used tend to be limited to a single color. The children still look confused when the teacher asks them to draw according to their wishes. After children are guided to draw with educational videos, their drawings tend to be more detailed and colorful. The proportions of the object's parts are also more balanced. One example of the difference in children's drawing results is illustrated in Figure 1.

Table 1. Children's Drawing Score

Early childhood drawing development's indicators	Mean	
	Pretes	Postes
line strokes	3	3
clarity of form	2	3
detail of form	2	3
balance of size	3	3
balance of layout	3	3
color fulfillment	3	3
using more than one color	2	3
color usage	2	3
Average	2.5	3

Figure 1. Children's Drawing Process

At the pretest stage, most children had not yet reached the one-line drawing indicator because their drawings were still random scribbles that did not form specific objects. The resulting lines are exploratory, without a specific purpose, indicating that the child is still in the scribbling phase, where hand-eye coordination is not yet optimal for producing directed lines that form visual representations. Clear and detailed form indicators on the pretest were almost completely unachieved, with images that were difficult to identify as specific objects. However, in the posttest, a dramatic transformation occurred where all the children successfully produced bee drawings that were very clear and rich in detail. Each posttest image features anatomical elements of bees, such as a round head with eyes, antennae, a segmented body with striped patterns, proportionate wings, and even additional details like legs or decorative elements around the bee. This ability to create detail demonstrates a mature development of visual observation and representational skills.

The balanced size and layout aspects showed substantial improvement from the pretest to the posttest. In the pretest, there was no organized concept of proportion or composition. In contrast, in the posttest, the children were able to create images with reasonable proportions of the bee's head, body, and wings. The placement of objects within the picture plane also became more planned and balanced, with the bee image generally placed in the center area of the paper and supporting elements distributed proportionally around it. Full-color and multi-color indicators show an interesting and consistent improvement. Although some children were already using various colors in the pretest, their use was still exploratory without representational meaning. In the posttest, the use of color became very purposeful and meaningful, with the choice of yellow or orange for the wings reflecting a visual understanding of real bees. The color filling is also fuller and more consistent, indicating improved fine motor control and patience in completing the artwork. The color combinations used are not only diverse but also logical and esthetically pleasing, reflecting the development of artistic sense and conceptual understanding of the objects being drawn.

Based on an overall analysis of the children's drawings, the three indicators that showed the most significant changes were clear form, detailed form, and full color, indicating a fundamental transformation in the children's visual representation abilities. At the pretest stage, most children are still in the scribbling phase, where no identifiable shapes are clearly present. The pretest images show free strokes without structure or representational meaning, reflecting the normal developmental stage of children aged 2-4 years who are still in the process of motor exploration. The transformation in the clear form indicator was very striking at the posttest stage, where all children successfully created bee images that observers could easily identify. This transition from the scribbling stage to the pre-schematic stage indicates significant cognitive development, as the child is now able to make connections between their scribbles and objects in the real world. This ability to create clear forms reflects the maturation of visual-spatial skills and hand-eye coordination, which allows the child to plan and execute drawings with a specific purpose.

Detailed form indicators reveal remarkable developmental leaps, as evident in the emergence of bee anatomical elements, including eyes, antennae, wings, striped bodies, and even additional details such as patterns or decorative elements. This ability to create detail shows that the child is not only able to recognize objects as a whole but also understands the components that make up those objects. This development reflects an increase in visual observation and analytical abilities, allowing children to break down complex objects into visually representable parts. The full-color aspect also shows substantial improvement, where the use of color transitioned from mere exploration of drawing tools to a purposeful and meaningful application. In the posttest, the children consistently and fully colored the picture areas, indicating improved fine motor control and patience in completing their work. Choosing colors that match the bee object, such as yellow or orange for the wings, demonstrates the development of conceptual understanding and the ability to connect colors with objects in the real world. These three indicators collectively demonstrate a fundamental transition from the motor exploration stage to the symbolic representation stage, a significant developmental achievement in early childhood drawing abilities. This change not only reflects improved technical skills but also broader cognitive development in areas such as symbolic thinking, planning, and organized execution.

Discussion

The findings of this study suggest that using educational videos as instructional tools before drawing activities has a positive impact on the quality of children's artwork. After receiving dynamic visual stimuli, the children's resulting drawings appeared more detailed, with the addition of elements such as backgrounds, patterns, and supporting attributes for the main subject. The use of color also became more diverse, matching the characteristics of the objects, which indicated an improved ability to recognize and match colors. Additionally, the proportions of shapes in the image appear more balanced, indicating improved perceptual-motor skills and hand-eye coordination. A child's age maturity is closely related to fine motor skills and visual-motor coordination, where these abilities tend to increase with age (Gidion, 2020). This result can be explained through Vygotsky's sociocultural theory, where educational videos serve as scaffolding that expands children's zone of proximal development by providing concrete visual examples that can be imitated and modified (Margolis, 2020; Muntasir & Akbar, 2023). Exposure to moving and color-rich media provides stronger cognitive stimulation compared to verbal instructions or static examples, encouraging children to explore details, integrate colors, and arrange image compositions more proportionally. Thus, the use of educational videos can be seen as an effective strategy to support the development of artistic and cognitive skills in early childhood (Manullang et al., 2021). The mean score increased from 2.5 in the pretest to 3.0 in the posttest, indicating a 20% improvement in overall drawing quality. Although analyzed descriptively, this magnitude of change suggests a meaningful practical effect, showing that visual guidance through educational videos substantially enhanced children’s ability to depict clearer forms, balanced layouts, and purposeful color use.

At the posttest stage, a striking transformation was evident, with all children able to produce bee drawings that were far clearer and more detailed. Each work fully depicts the anatomical components of a bee, such as its round head with eyes and antennae, segmented body with distinctive striped patterns, proportionate wings, and additional details like legs or surrounding ornaments. The emergence of these elements indicates an improvement in visual observation skills and more mature mental representation, signifying that the child is not only imitating basic shapes but is also capable of identifying and expressing the specific characteristics of objects. As children get older, they become increasingly capable of incorporating diagnostic categorical information into their drawings, which not only reflects improved motor control but also a deeper understanding of the unique characteristics of the objects they observe and represent (Long et al., 2024). This development indicates a strengthening of perceptual skills and fine motor coordination, while also reflecting a deeper internalization of visual information after receiving learning stimulation through educational videos.

The size and layout aspects of the images show substantial improvement from pretest to posttest.

After the intervention using educational videos, the children were able to depict more harmonious proportions of objects and arrange the picture elements more neatly on the paper. This change indicates the development of spatial skills and improved hand-eye coordination, while also reflecting an increased understanding of the relationship between the sizes of parts and compositional balance. These results confirm that clear and structured visual stimuli can help children internalize the concepts of proportion and layout, resulting in images that are not only more esthetically pleasing but also demonstrate the maturity of their perceptual-motor skills. The use of directed visual stimuli has been shown to improve visual-motor integration, perceptual skills, and school performance in children, especially when these stimuli are delivered through interactive or technology-based media, such as augmented reality (Wuang et al., 2021). Additionally, studies using eye-tracking methods have shown that visual clarity and structure in educational materials can direct children's attention to target areas, facilitate information processing, and accelerate responses and deepen understanding (Smirnova, 2024).

The research results indicate significant improvement in the aspect of color usage after the intervention through educational videos. Color selection becomes more purposeful and meaningful, for example, using yellow or orange for the bee's body and wings, which indicates a conceptual understanding of the object's characteristics. The color filling also appears fuller, neater, and more consistent, reflecting progress in fine motor control, hand-eye coordination, and the ability to maintain focus during the drawing process. Additionally, the color combinations that emerge are not only more diverse but also logical and aesthetic, indicating the development of artistic sense and representational thinking abilities. Research confirms that the use of color in art is not merely an imitation of real-world colors, but also reflects the projection of the inner world and the child's understanding of the meaning and emotional atmosphere wants to convey (G. Chen, 2024; Wang, 2022). The harmony of colors created through analog, complementary, or triadic combinations can create an impression of balance, depth, and visual beauty, while also strengthening the message or symbol wants to express(Li, 2023). This increase supports the view that rich visual media, such as educational videos, can be an effective means of simultaneously stimulating children's color perception, artistic skills, and conceptual understanding.

Studies show that exposure to artwork, whether through digital media or direct experience, can develop children's ability to observe, understand, and combine colors more creatively and logically (Nikolova, 2021). Structured visual media also helps children build visual language, express ideas and emotions, and strengthen their understanding of art concepts and visual communication (Pantaleo, 2025a). Structured visual media helps children develop visual language by guiding them to recognize and use elements such as lines, shapes, and colors to convey meaning. It also enables children to express their ideas and emotions more clearly through visual forms. Additionally, it enhances their understanding of art concepts and visual communication as they learn to interpret and create images with purpose.

Additionally, the use of tools and technologies, such as graphic tablets or interactive devices, has proven effective in enhancing drawing skills, coordination, and understanding of color theory in early childhood (Qin, 2024). The use of tools and technologies such as graphic tablets or interactive devices has been shown to improve young children's drawing skills. These tools also help enhance their hand–eye coordination during creative activities. In addition, they support children's understanding of color theory by allowing them to explore and experiment with colors more freely (Y. Chen & Ding, 2024). A visually rich and interdisciplinary learning environment simultaneously fosters artistic, cognitive, and socio-emotional development (Marzidi et al., 2024). A visually rich and interdisciplinary learning environment supports children's artistic growth by exposing them to diverse visual stimuli and creative experiences. At the same time, it enhances cognitive development through opportunities to observe, analyze, and make connections across subjects. This environment also nurtures socio-emotional development as children express themselves, collaborate, and build confidence through creative exploration (Baker, 2025; Ramírez Pinargote et al., 2025; Zakaria et al., 2021b).

Rich visual media can effectively stimulate children's color perception, artistic skills, and

conceptual understanding (Pantaleo, 2025b; Velayutham & K, 2024). By presenting diverse and vibrant visuals, this type of media exposes children to a wide range of colors and forms that encourage exploration and creativity. It strengthens artistic skills as children experiment with shapes, textures, and creative techniques. At the same time, rich visual media deepen conceptual understanding by helping children notice patterns, identify relationships, and interpret meaning within images (Bock, 2023; Pantaleo, 2025c). Through these interconnected experiences, children develop visual awareness, creativity, and cognitive abilities that support their overall learning and development.

4. CONCLUSION

This study revealed significant differences in the drawing patterns of kindergarten children between free drawing and guided drawing using educational videos. In the free drawing condition, children tended to produce exploratory lines without clear intent, with unrecognizable shapes and limited color use. After watching the educational video, however, they were able to create clearer and more detailed drawings of bees, including identifiable anatomical components such as the head, eyes, antennae, segmented body, proportionate wings, and additional supporting elements.

The findings demonstrated three key outcomes: first, that free drawing patterns reflected the scribbling phase characterized by developing but uncoordinated motor skills; second, that guided drawing represented the preschematic phase, showing emerging structured visual representations; and third, that the comparison between the two conditions showed marked improvement in clarity, detail, and color use—indicating a transition from motor exploration to symbolic representation.

These results support Vygotsky's sociocultural theory, suggesting that educational videos serve as scaffolding that extends children's zone of proximal development by providing concrete visual examples that strengthen cognitive stimulation beyond verbal instructions. Practically, the use of educational videos enhances artistic and cognitive skills, fosters the internalization of proportion and layout concepts, and encourages the meaningful application of color. The novelty of this study lies in its comparative analysis of children's drawing patterns under two distinct conditions—free expression and guided visual stimulation—an aspect that has been rarely explored in previous research on early childhood art.

However, this study has certain limitations. The sample size was relatively small (25 children), and the intervention duration was brief, focusing on a single public kindergarten in an urban area of Yogyakarta where children were already familiar with technology. These factors may limit the generalizability of the findings. Future research is therefore recommended to involve larger and more diverse samples, explore various types of visual media, and conduct longitudinal studies to examine the sustained effects of visual stimulation on children's artistic and cognitive development.

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