Drawing as a Structured Inquiry: A Comparison Between Artistic and Scientific Visualization

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Abstract

This presentation explores a pedagogical approach that treats drawing as a form of structured inquiry mirroring the framework of scientific research. Based on years of teaching practice with children aged 6–12 and adults, the method applies the logic of the IMRaD structure (Introduction, Method, Results, and Discussion) to art education. Instead of offering students pre-made templates or step-by-step models, each drawing session becomes a mini-research journey: it begins with a question or hypothesis, is followed by observation and exploration of materials, and ends with a reflective discussion. This approach supports critical thinking, autonomy, and decision-making. Students learn to observe attentively, make creative choices, and interpret their outcomes. The presentation includes visual examples of student work, classroom strategies, and comparisons between artistic and scientific reasoning. It resonates with the growing body of research that positions artistic processes as parallel to cognitive development and problem-solving (e.g., Eisner; Hetland et al.). The proposed model demonstrates that drawing, when taught as an inquiry, becomes a powerful tool for learning that connects the arts with broader educational goals and reaffirms the relevance of visual thinking in the 21st-century classroom.

Keywords: drawing education, visual inquiry, art pedagogy, structured creativity, visual thinking, IMRaD

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Introduction

The capacity for creative expression, analytical reasoning, and adaptability in uncertain situations is now recognized as fundamental to twenty-first-century learning. Global educational policies, curricular standards, and systemic reforms consistently highlight the importance of developing these skills to equip students for navigating intricate social, cultural, and workplace challenges. In many public education systems, art education is marginalized and positioned as optional rather than central to the curriculum. This results in reduced classroom time, limited funding, and lower institutional priority.

This sidelining is clear in post-Soviet educational systems. Step-by-step projects and results-driven documentation remain common. Drawing classes often focus on templates or imitation. These classes provide little structure or support for students. Though the methods may look different, they share a common flaw: they hide the thinking behind artistic creation. As a result, students rarely learn to observe, define visual problems, make choices, or evaluate their work. This approach does not foster perceptual skills or personal creativity.

Two beliefs sustain this situation. The first is that progress in the arts is hard to measure, standardize, or compare. The second assumes that creative ability is an inborn gift for a select few, not a skill that can be taught. These views are especially persistent in post-Soviet education.

Art education is at risk in accountability-driven education systems. These systems focus on results that can be measured. The arts use qualitative judgment, interpretation, and experience, but are judged by unsuitable metrics. This leads to the arts being further marginalized. Bamford (2006) found that arts education is often sidelined because its outcomes are difficult to document.

Viewing artistic learning as intangible does not imply an absence of cognitive structure. Rather, it reflects a failure to make the processes of artistic thinking visible and intelligible within educational contexts. Art education research has long demonstrated that artistic practice involves rigorous forms of cognition. Eisner (2002) emphasized that the arts cultivate sensitivity to nuance, qualitative judgment, and openness to multiple possible solutions. Similarly, research on studio-based learning identifies key habits of mind central to artistic practice, including observation, reflection, persistence, and problem framing (Hetland et al., 2013).

At the level of individual skills, these cognitive capacities are often successfully developed in educational settings. However, when the artistic process is considered as a whole, these elements are rarely organized into a coherent structure that can guide teaching and learning. As a result, art education continues to rely heavily on assumptions about innate talent rather than on explicitly articulated processes of inquiry and thinking.

Despite their theoretical recognition, these cognitive dimensions remain infrequently articulated in everyday classroom instruction, particularly in drawing education. In contrast, scientific fields rely on established research traditions that make inquiry visible, structured, and assessable. This article explores how a similar level of clarity can support inquiry in drawing education without limiting artistic freedom.

Drawing and Inquiry in Art Education

Both artistic and scientific practices are fundamentally concerned with producing knowledge about the world. A perspective that helped clarify this parallel comes from Andrew Freiband's lecture *"Art as Research — Research as Art"* (2019) at Cornell University, in which he describes artists and scientists as "cousins." According to this view, both fields rely on observation, experimentation, iteration, and synthesis. The primary difference lies in the vocabulary used to describe these processes.

This view aligns with Sullivan's concept of *art practice as research*, which positions artistic activity as a legitimate mode of knowledge production. Sullivan (2010) argues that artists generate knowledge through inquiry-driven processes that integrate making, reflection, and interpretation, emphasizing that artistic cognition operates through structured yet open-ended investigation.

Despite this theoretical recognition, the logic of inquiry in art education often remains insufficiently articulated. Students are frequently expected to be creative by nature, while little attention is given to how creative thinking is developed through inquiry, decision-making, and reflection. As Sullivan (2010) notes, when the processes underlying artistic inquiry remain unarticulated, they are easily misunderstood or undervalued within educational systems that prioritize methodological transparency. Making artistic inquiry visible is therefore essential for its recognition within institutional and pedagogical contexts.

In seeking a framework capable of articulating this structure, attention was drawn to the National Core Arts Standards, which define the artistic process through the categories of Creating, Presenting, Responding, and Connecting (Table 1).

Table 1
National Core Arts Standards: Artistic Processes and Learning Goals

National Core Art Standards	
CREATING	● Generating and shaping ideas through observation and imagination ● Using tools, media, and techniques to develop visual work ● Refining work through reflection and critique
PRESENTING	● Selecting and contextualizing work for presentation ● Preparing and refining work for display ● Communicating meaning through presentation
RESPONDING	● Analyzing and perceiving visual work ● Interpreting meaning, intent, and context ● Evaluating work using articulated criteria
CONNECTING	● Relating art to cultural, social, and historical contexts ● Integrating personal experience into art-making

These processes closely align with how artistic inquiry unfolds in practice, yet they do not specify a transferable structure for guiding learners through each stage. This raised a further question: if clear standards and goals for art education exist, what system can articulate the steps required to achieve them?

This question prompted an exploration beyond art education toward established research frameworks used in other disciplines. Through this process, it became apparent that a familiar structure was already in use through academic writing in the sciences. The following section introduces how this structure can be adapted as a pedagogical framework for drawing education.

Pedagogical Framework: Adapting IMRaD to Drawing Education

The proposed framework reinterprets each component of the IMRaD structure (Table 2), commonly used in empirical and practice-based research across the sciences and social sciences (Day & Gastel, 2012; Swales, 1990), as a stage within the drawing process.

Table 2
Structure of the IMRaD Research Model

IMRaD	
INTRODUCTION	● Overview of relevant research (literature review) ● Theoretical background and context of the study ● Identification of the research problem and its significance
METHODS	● Description of the research design ● Participants or context of the study ● Data collection methods, procedures, and instruments ● Analytical approach
RESULTS	● Presentation of the findings ● Description of outcomes without interpretation ● Statistical significance, if applicable
DISCUSSION	● Interpretation of the results ● Relationship between findings and research questions or hypotheses ● Study limitations ● Implications for practice and directions for future research

Building on this structure, the following section considers how the IMRaD components can be applied to the drawing process as stages of inquiry. Importantly, the framework does not impose a rigid sequence or constrain creative outcomes. Instead, it provides a flexible scaffold that supports inquiry while preserving openness, uncertainty, and exploration as core qualities of artistic practice.

In scientific research, *the introduction* clarifies the purpose of the study and what it aims to investigate. In drawing education, this stage involves framing a visual or conceptual question that gives purpose to the drawing process. Students in a classroom are invited to identify what they want to observe, investigate, or communicate visually.

Inquiry questions may emerge from personal experience, direct observation, environmental exploration, or engagement with historical, cultural, or social themes. For younger learners, these questions may remain concrete, such as examining how an object changes when viewed from multiple perspectives. Older students may engage with more abstract inquiries, for example, how posture, gesture, or spatial relationships convey emotional states. Framing the drawing task as a question-oriented investigation increases engagement by clarifying intent and shifting attention from outcome to process.

Within the scientific IMRaD model, *methods* describe how research is conducted. In drawing education, methods include the selection and testing of materials, tools, techniques, and visual strategies used to explore the inquiry question. This stage emphasizes experimentation and technical mastery. Students actively test how different materials, surfaces, and mark-making approaches affect visual outcomes and meaning.

Equally important is engagement with visual references and artworks. Similar to a *literature review* in scientific research, students examine how other artists have approached comparable questions. This comparative analysis situates individual drawing practice within a broader visual dialogue and reinforces the understanding of drawing as a form of collective knowledge-building rather than isolated self-expression.

In scientific research, *results* consist of the findings of the study, indicating what was discovered and whether the research questions or hypotheses were supported. Within drawing education, results take the form of sketches, drafts, studies, and completed works that document the inquiry process. Treating unfinished and iterative drawings as valid outcomes challenges the focus on polished results and reframes drawing as an ongoing process of inquiry and learning.

The discussion phase in scientific research involves interpreting results, addressing limitations, and identifying future directions. In drawing education, this stage centers on reflection, dialogue, and interpretation. Students analyze their visual outcomes, articulate decision-making processes, and consider how effectively their drawings respond to the initial inquiry.

Peer discussion and teacher feedback play a central role in this phase. Meaning emerges through interaction with others and with contextual frameworks. Through reflective dialogue, students develop visual literacy, critical vocabulary, and the ability to articulate artistic intent, which are skills essential for both artistic and academic development.

Taken together, these stages show that art education follows a coherent internal logic, even when it is not explicitly taught. To make this logic visible and communicable, the following section outlines how the IMRaD research structure can be systematically adapted to the drawing process (Table 3).

Table 3
Applying the IMRaD Research Structure to Drawing Pedagogy

IMRaD framework adapted for drawing education	
INTRODUCTION	● Introduction of a visual or conceptual question ● Connection to personal experience, observation, or societal themes ● Clarification of why this question matters ● Activation of curiosity and purpose
METHODS	● Selection of materials and techniques (e.g., charcoal, watercolor, collage) ● Experimental testing of tools, surfaces, and mark-making strategies ● Study of artistic references (artists, styles, visual strategies) ● Iterative trials and material decision-making
RESULTS	● Production of sketches, drafts, studies, and finished works ● Visual outcomes ● Observation of patterns, variations, and emerging solutions
DISCUSSION	● Analysis of performed work ● Reflection on how effectively the work addresses the initial question ● Peer and teacher feedback ● Identification of new questions or future directions ● Articulation of meaning and learning gained through the process

Classroom Implementation

The IMRaD-based framework is grounded in long-term teaching practice with diverse learner populations, including children aged 6–12 and adult students with varying levels of prior experience. Across educational contexts, several recurring patterns appear.

First, framing drawing as inquiry increases engagement, particularly among students who identify as “non-artistic.” An emphasis on questioning reduces fear of failure and shifts attention away from external evaluation toward exploration. Under identical conditions and shared starting points, this approach results in distinctly different and authentic visual outcomes, as shown in Figure 1.

Figure 1

Authentic Variation in Student Drawings Created Under the Same Conditions, Illustrating Increased Engagement and Exploratory Decision-Making

Second, the framework provides teachers with a clear and communicable planning structure. Inquiry-based drawing lessons are easier to explain to parents, administrators, and institutions seeking evidence of learning outcomes. The framework makes visible cognitive processes such as observation, decision-making, and reflection that are typically difficult to articulate in art education.

Third, the approach supports inclusivity. Because success is defined by engagement with inquiry rather than technical proficiency, learners with diverse abilities and backgrounds can participate meaningfully. Drawing becomes accessible as a mode of thinking rather than a test of innate talent.

Conclusions

The proposed approach presented in this paper carries important implications for art educators, educational institutions, and broader educational systems. When drawing is approached as a form of structured inquiry, it becomes possible to articulate its educational value in terms that align with widely accepted goals such as critical thinking, reflective practice, and problem-solving. This reframing has the potential to shift how drawing education is perceived, implemented, and evaluated across different learning contexts.

At the institutional level, this framework confronts the ongoing marginalization of arts instruction within assessment-focused systems. By demonstrating that drawing relies on cognitive processes similar to those in scientific research, the model challenges the divide

between art and intellectual rigor. Positioning drawing as organized investigation brings arts education into alignment with current educational emphases such as cross-disciplinary integration and STEAM initiatives while maintaining the unique characteristics of artistic reasoning.

Future work may focus on testing this framework in school settings, particularly within general education classrooms where students often enter with limited confidence in their artistic abilities. Possible directions include the development of pilot curricula, classroom-based studies, and qualitative assessment tools that document changes in student engagement, persistence, and diversity of visual outcomes. Such studies could help translate the framework into transferable teaching strategies and provide empirical evidence to support its use across educational settings.

Ultimately, this paper suggests that the key question for educators and policymakers is no longer whether art education is necessary, but how it can be taught in ways that fully realize its cognitive and educational potential. When drawing is understood as structured inquiry, it becomes a powerful and inclusive tool for visual thinking, questioning, and meaning-making. Teaching drawing in this way opens new possibilities for more equitable, meaningful, and intellectually robust educational practices.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that Grammarly, an AI-assisted writing software, was used solely for proofreading and language refinement. Its use was limited to correcting grammatical and spelling errors and rephrasing sentences for clarity and accuracy. Apart from Grammarly, no AI or AI-assisted tools were used to generate content for this manuscript. All ideas, design, procedures, findings, analyses, and discussions are the author's own and are based on the careful and systematic conduct of the research.

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