A Practical Study of Mind Mapping in the Teaching of Experimental Art Modules in High School Fine Arts—A Case Study of the Middle School Affiliated to Northeast Normal University

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Abstract: The experimental art module course breaks through traditional paradigms and explores new artistic possibilities through new media and methods. The "General High School Art Curriculum Standards (2017 Edition)" propose the cultivation of "creative practice" literacy, which requires students to engage in creative practice through association and imagination. The experimental art module course stimulates students' creativity and provides space for expression through diverse creative practices. Guided by the principle of "cultivating core literacy in the art discipline and promoting overall development," the experimental art course plays a significant role in enhancing students' creativity and core literacy, contributing to the achievement of the goals of art education. Creativity originates from divergent thinking, and the ability to create through thinking can be cultivated using methods such as mind mapping. This approach can also be integrated as a teaching and learning tool throughout the teaching and learning processes. Mind mapping has an inherent connection with the divergent and visual nature of the high school art experimental module course, and it has certain advantages in the teaching process.

Keywords: Mind Mapping; Art Education; Divergent Thinking; Art Teaching; Creative Thinking

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1.Overview of Mind Mapping and Relevant Theories in the High School Fine Arts Experimental Art Module

1.1 Definition of the Concept of Mind Mapping

"Mind mapping is an effective graphic thinking tool for expressing divergent thinking. It employs the technique of combining images and text, representing the relationships among topics at various levels through hierarchically structured diagrams of subordination and correlation. By linking thematic keywords with images, colors, and other visual elements, it creates memory associations, making full use of both the left and right brain. Utilizing the principles of memory, reading, and thinking, it helps individuals develop a balanced growth between science and art, logic and imagination, thereby unlocking the limitless potential of the human brain."

1.2 The Relationship Between Mind Mapping and the Teaching of the High School Fine Arts Experimental Art Module

1.2.1 The Divergence of Mind Mapping and the Innovativeness of Art Teaching

The divergent nature of mind mapping represents an open-ended cognitive approach that enables the development of ideas through multiple directions, pathways, and strategies. The cultivation of divergent thinking directly supports students' creative capacities, aligning with the pedagogical goals of innovative and art education. For instance, in the module themed "The Artistic Transformation of Discarded Materials," students are encouraged to place a relevant keyword at the center of a mind map. From this node, multiple branches emerge, such as"Material Types"(plastic,fabric,metal,wood),"Form Characteristics"(fragmented,intact,soft,hard),and"Emotional Associations" (nostalgia, environmentalism, conflict). Taking "Plastic Bottle"as an example,students may extend branches toward: Form Transformation: cutting and reassembling, stacking and reshaping, heat-melting.Functional Conversion:repurposing into lamps, installations, or accessories.Material Integration: combining with fabric through stitching, welding with metal, or painting with pigments.This spiderweb-like divergence challenges conventional assumptions (e.g.,"a plastic bottle can only be recycled") and facilitates the emergence of innovative ideas, such as stacking bottles into a cityscape installation or assembling fragments into a figurative collage.

In this pedagogical context, the divergent quality of mind mapping provides students with a "borderless"

cognitive space, freeing them from rigid creative models. As they extend and interrelate nodes, students naturally cultivate associative and hypothetical reasoning. Simultaneously, the experimental art module's emphasis on "breaking media boundaries and reconstructing artistic language"is realized in practice, effectively aligning cognitive cultivation with curricular objectives.

1.2.2 The Imagery of Mind Mapping and the Diagrammatic Nature of Art Teaching

Mind mapping also strengthens students' analytical capacity by transforming abstract and complex concepts into accessible visual forms, while enhancing their ability to read and interpret images. By translating abstraction into graphics and imagery, mind maps simplify complexity, concretize the abstract, and render three-dimensional ideas into two-dimensional representations. These visual elements replace purely textual descriptions, rendering the abstract notion of "emotion" visible and comprehensible.On the "Anger" branch, for instance, students further elaborate through imagery: jagged flames combined with clenched fists, tilted geometric forms paired with spiky lines, or human silhouettes intersected with shattered glass motifs. Such visualizations not only provide immediate interpretations of "anger" but also serve as creative resources for subsequent artworks, enabling the transformation of symbolic elements into paintings, installations, or digital media.

In this way, mind mapping not only enables knowledge condensation and visualization but also provides structural coherence, linking linguistic, visual, and technical elements. Through the process of creating mind maps, students develop their skills in interpreting visual–conceptual relationships while also learning to condense and reorganize knowledge in diagrammatic form. Consequently, abstract creative ideas are transformed into concrete and operational visual schemes, thereby deepening diagrammatic thinking and advancing innovation within the field of art education.

2.Analysis of the Advantages of Integrating Mind Mapping into the Experimental Art Curriculum in Senior High Schools

2.1 Students'"Thinking" — Visualization of Cognitive Processes

Mind mapping, which mirrors the neural pathways of the brain and resembles the way the brain processes information, serves as an effective graphic tool for externalizing thought. By using mind maps, students can quickly organize their ideas, construct knowledge structures, and express themselves with clarity and coherence. Compared with lengthy textual notes, mind maps highlight key concepts, emphasize relationships among ideas, and enhance both organization and memory retention. The reliance on keywords rather than long passages allows students to shift flexibly between the whole framework and specific nodes of each branch, thereby promoting both holistic understanding and detailed exploration during learning and expression.

2.2 Curriculum "Structuring" — Integration of Teaching Resources

Mind mapping also provides teachers with an efficient tool for instructional design. In constructing lesson plans, teachers can designate each course, unit, chapter, or learning stage as a central node and then expand outward to incorporate essential elements for further analysis. When applied systematically, the use of mind maps allows individual lesson plans to be integrated into broader curricular frameworks at the unit or grade level. This not only facilitates the accumulation of teaching resources into a personal instructional database but also supports flexible adjustments to course design over time. The ability to modify maps at any stage significantly reduces preparation time while promoting the integration and effective utilization of teaching resources.

2.3 Teachers' "Guidance" — Fostering Communication and Collaborative Learning

The use of mind maps acknowledges student individuality and developmental diversity, thereby supporting differentiated instruction.Furthermore, mind maps can serve as tools for peer review and collaborative learning within groups. Within the senior high school experimental art module, the integration of mind mapping provides an effective medium to facilitate this process. By beginning with keywords, each student first creates an individual mind

map to externalize personal ideas. These maps are then compared to identify both differences and commonalities among peers. Through group discussion and integration, students collaboratively determine the essential elements that must be considered, while also extending their thinking in new directions. The group then refines, modifies, and synthesizes these contributions into a collective mind map, which is used for the final course presentation.In such classroom settings, the use of mind maps emphasizes student-centered learning while positioning the teacher as a facilitator. Ultimately, teachers and students co-construct a comprehensive final course mind map that reflects both individual creativity and collective effort.

2.4 Classroom "Map" — Visualization for Review and Synthesis

After completing a lesson within the Design and Application unit, students can employ mind maps to display both their learning reflections and outcomes. By examining the structure of their mind maps, both students and teachers can quickly identify the stability of knowledge frameworks as well as the clarity of design concepts, chosen materials, and practical applications. This process not only helps them identify the most appropriate approach but also highlights more efficient strategies. Careful inspection of each node within the map allows for an immediate evaluation of whether the design concept aligns with its intended implementation.

For both teachers and students, mind maps function as a shared analytical tool. At the initial stages of project planning, mind maps facilitate the organization of essential factors—such as materials, methods, and conceptual frameworks—into logical sequences. By mapping out every potential idea or viewpoint, participants can construct a coherent, accessible visual plan. For teachers, this makes mind mapping an effective instrument for structuring personal teaching plans, curriculum design, and research projects. For students, it becomes a practical strategy for developing study plans, sequencing learning steps, and supporting group-based collaborative projects. In this sense, mind mapping bridges individual and collective learning, offering a clear, systematic pathway from idea generation to project realization.

3.Application Strategies of Mind Mapping in High School Experimental Art Education

3.1 "Composition" — Constructing Divergent Thinking through Keywords

The American educator Edgar Dale proposed the "Cone of Learning" theory, which illustrates that learning effectiveness increases progressively from passive modes (e.g., listening, reading) to active modes (e.g., discussion, demonstration, immediate application). Within this framework, the timely recording of keywords through divergent thinking can be effectively facilitated by mind mapping, which supports knowledge retention and active learning in art classrooms.

3.1.1 Expanding Memory Capacity and Enhancing Recall

Mind mapping functions as a tool for refining and consolidating knowledge in the high school experimental art module. Traditionally, teachers stimulate students' creativity through brainstorming around keywords; however, the natural limitations of memory capacity and retention often hinder this process. By integrating mind maps, students can immediately record fragmented ideas, which enables deeper divergent exploration, enhances memory, and fosters more nuanced understanding.Within the experimental art module, this approach accelerates the process of recall and strengthens cognitive connections, breaking through traditional "memory bottlenecks" and improving students' capacity to think creatively.

3.1.2 Keyword-Driven Thinking and Divergence

In mind maps, each keyword is interconnected, and the interpretation of each node plays a critical role in determining the trajectory of learning and cognitive development. Within the experimental art classroom, teachers often employ specific keywords to activate students' prior knowledge and life experiences, guiding them toward understanding final tasks and requirements. Gaps in knowledge structures are filled through students' self-construction under teacher guidance, reflecting both individual differences and collective learning outcomes.

Thus, teaching design with mind maps is not limited to the delivery of content; it embodies pedagogical wisdom in structuring classroom activities. Through color, images, and hierarchical relationships, mind maps foster student engagement, encourage integration of new and prior knowledge, and respect each student's individuality and creative perspective.

3.1.3 Multi-Dimensional Visualization and Flexible Choice

Comprehensive visual representations stimulate imagination, associative thinking, and integrative understanding. Through exposure to diverse representations, students not only retain knowledge more effectively but also develop enthusiasm for visual composition, aligning with the objectives of experimental art education. Continuous reflection, evaluation, and revision during the mind-mapping process encourage students to test the feasibility of their design projects while strengthening cognitive structures.

In this sense, art educators can employ various forms of mind maps to scaffold divergent thinking, present curriculum knowledge in multi-dimensional ways, and stimulate students' creative potential. By leveraging the hierarchical and flexible nature of mind mapping, teachers help students clarify learning objectives, enhance design thinking, and promote overall cognitive development.

3.2 "Reading Images" — Transforming the Roles of Teachers and Students

The integration of mind mapping in art education fundamentally reshapes classroom dynamics, particularly the roles of teachers and students. Through the process of interpreting and constructing visual maps, students' autonomy and initiative are activated. The traditional model of "teacher speaks, student listens" is replaced by a more interactive paradigm in which students become active agents of both teaching and learning, while teachers serve as facilitators who inspire and guide divergent thinking.

3.2.1 Stimulating Student Initiative and Establishing Learner-Centered Models

The primary purpose of mind mapping in teaching is to foster students' cognitive development, as the cultivation of thinking skills directly enhances creativity and innovation. John Dewey, in *How We Think*, emphasized that reflective thinking represents a higher-order mode of cognition. It transcends mere perception, memorization, repetition, or application, requiring instead continuous judgment, exploration of associations, and structured integration around keywords or central problems. Mind map–based pedagogy aligns with this principle, as it prompts students to analyze problems, identify truths, and uncover hidden relationships by organizing knowledge in logical and hierarchical structures.

By embedding mind mapping within art education, teachers create additional time and space for intellectual exploration, nurturing the ability to cycle between problem identification and problem-solving. This approach ultimately strengthens students' capacity for deep thinking and equips them with the skills to accumulate, connect, and creatively apply knowledge in daily practice.

3.2.2 Teachers as Facilitators and Enhancers of the Learning Process

The growing autonomy of students in mind map–based learning necessitates a transformation of the teacher's role from knowledge provider to learning facilitator. For instance, when students encounter difficulties in generating divergent ideas, teachers may offer prompts or heuristic strategies to stimulate thinking. Similarly, when design challenges such as structural inconsistencies arise, teachers may provide demonstrations, analyses, or references to accelerate progress.Their role is to scaffold students' understanding, sharpen problem-solving skills, and support the cultivation of innovative design thinking.

In sum, the integration of mind mapping into art pedagogy redefines teacher–student relationships. Students emerge as active, reflective creators, while teachers evolve into facilitators of inquiry, critical reflection, and creative exploration.

3.3 "Explaining through Diagrams" — Expression of Divergent Thinking

The systematic construction of curricular knowledge helps students develop multidimensional and multilayered cognitive structures. Taking the Experimental Art Module in senior high school as an example, the process of theme selection, idea generation, development of creative schemes, actual artistic creation, and final exhibition parallels the branching logic of a mind map. Both share similar thinking patterns and operational logic, enabling students to quickly enter a state of focused thinking. Teachers, in turn, can adjust the pace of "diagram explanation" according to students' cognitive states during class.

3.3.1 From "Explaining through Diagrams" to the Construction of Point-Line-Plane Thinking

The mental representation of knowledge is crucial to advanced cognitive activities, with thinking at the forefront. To regulate cognitive energy, thinking must be organized hierarchically or categorically. During teaching, students, guided by teachers, progressively expand outward from this central idea, deepening their cognitive dimensions in the process of "diagram explanation." The application of mind maps in art education thus allows knowledge to be structured, visualized, and hierarchized in a way that fosters logical awareness and systemic thinking.

Within art curricula, the concept of a textbook volume often extends beyond the scope of a single course. It represents a broader knowledge structure that builds on the foundations of individual courses, thereby allowing greater expansion and extension. Line thinking, in this context, signifies relational cognition—connections along a continuum. Emerging from central keywords, line thinking radiates into multiple directions and themes. In the Experimental Art Module, once the theme and direction of creation are determined, students can analyze issues comprehensively from multiple perspectives, thereby developing plane thinking.This type of thinking unfolds along internal structures and developmental stages of phenomena, involving layered, hierarchical relationships. The choice of mind map models, therefore, requires attention to relational patterns and confirmation strategies.

In practice, teachers can guide students by anchoring instruction in targeted knowledge dimensions while encouraging divergent expansion. This approach not only enhances coherence and depth of the curriculum but also cultivates students'holistic understanding of artistic phenomena, enriches imagination, and broadens creative thinking pathways.

3.3.2 Experiencing the Transition from Plane to Three-Dimensional Thinking through "Diagram Explanation"

In authentic problem-based scenarios, the processes of discovery, analysis, and problem-solving are embedded in "diagram explanation." This enables students to extend their cognition from planar to three-dimensional thinking, ultimately leading to flexible solutions and practical application. In this way, teachers externalize their thinking visually, while students internalize and reconfigure it into three-dimensional structures. Mind maps thus serve as a key mediating tool for cognitive transformation, facilitating the cyclical process of translating between three-dimensional and two-dimensional cognition, and back again. This iterative dynamic helps address conceptual difficulties and key challenges in the curriculum.

The demand for solving real-world problems acts as the driving force behind constructing such knowledge structures. In this process, research, discussion, reflection, evaluation, and judgment cultivate students'creativity, design thinking, and divergent cognition. Teachers, therefore, should design authentic problem scenarios that demand multilayered responses. They must establish multi-domain, multi-perspective knowledge structures while guiding students selectively at key junctures, helping them build complete cognitive pathways for discovering, analyzing, and solving problems with three-dimensional thinking.

3.4 "Evaluating through Diagrams" — Articulation, Communication, and Reflection

3.4.1 Active Student Engagement and Use of Diverse Instructional Materials

In teaching, the interplay between teachers' input and students' output is mutually reinforcing. Teachers must

continuously capture students' cognitive breakthroughs, transforming tacit knowledge into explicit knowledge, thereby stimulating active thinking. By recognizing underlying cognitive structures, students are motivated to think more deeply, enriching both their understanding and the instructional use of thinking materials.

3.4.2 Group Collaboration and Reflective Divergence across Branches

When teachers pose questions, it is essential to provide students with adequate time for thought, ensuring a meaningful pause between inquiry and response. As mind maps evolve, both teachers and students must engage in conscious reflection. Reflection is a vital component of higher-order cognition, essential for learning and problem-solving. It cultivates students' ability to reevaluate linkages among branches, reorganize structures, and engage in self-assessment. Teachers, therefore, should guide students in practicing reflective thinking during both action and dialogue, encouraging them to generalize knowledge to solve real-world problems. Reflection, combined with peer evaluation within groups, further strengthens metacognitive awareness and reinforces the development of divergent and creative thinking.

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