



# Effect of Mastery Learning Combined with Mind Mapping Technique on the Students' Sculpture Performance Ability for Junior University Students

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## Abstract

**Background and Aims:** The Chinese government has issued a series of policy documents to support the development of the cultural industry, providing policy guarantees and guidance for the development of sculpture education. Traditional teaching methods usually use unified teaching content and teaching methods, which cannot meet the individual needs of students. The comprehensive application of "Mastery Learning with Mind Mapping" theory and methods can provide solid technical support and rich teaching methods for the reform of sculpture education. Through the application of personalized learning plans and mind mapping, students' learning content and space can be expanded, and their learning efficiency and learning quality can be improved. This comprehensive approach can not only meet students' learning needs but also stimulate their learning interest and creativity and promote their all-round development. Therefore, the promotion and application of this method in sculpture education are of great significance and value. This study aims to explore and evaluate the impact of mastery learning combined with mind mapping technique on college students' sculpture learning achievements and performance ability through mastery learning combined with mind mapping technique.

**Materials and Methods:** The instruments for the experiment were four lesson plans. To evaluate the quality of a curriculum plan, it can be assessed using a Likert five-point scale. The quality of the scale can be measured using the Item-Objective Congruence (IOC) The assessment process involves analyzing each component of the lesson plan, attributing scores on the Likert scale, and then calculating the average score and the standard deviation (SD) for each component. The instruments for collecting data were two instruments needed to collect the sampling data, as the detailed list showed: sculpture score assessment and sculpture performance competency assessment. The sample was 30 students (one class) among the 120 junior students in the 2023 academic year. The procedures for data collection are as follows, the sample learning achievement before and after learning through Mastery Learning with Mind mapping and sculpture performance ability after learning through Mastery Learning with Mind mapping with the established 70 percent

**Results:** The study evaluated the effectiveness of employing mastery learning combined with mind mapping techniques to enhance students' learning achievement and sculpture performance ability. Significant improvement was observed, with posttest scores surpassing pretest scores ( $t = 13.06^*$ ,  $p = 0.05$ ). Furthermore, students' sculpture performance ability scores after mastering learning with mind mapping (81.1%) exceeded the 70% criterion, with statistical significance ( $t = 11.05^*$ ,  $p = 0.001$ ).

**Conclusion:** Compared with previous related studies, the results of this study showed that using mastery learning combined with mind mapping technique teaching had a significant positive effect on the sophomore research on sculpture performance ability. This is consistent with the findings of Chen Linsheng (2022), who found that the use of mind-mapping techniques in art education can improve students' learning achievement. Combining the findings of previous studies and the results of this study, we can conclude that mastery learning combined with mind mapping technique teaching has positive effects on the ability of sculpture performance in sophomore students. However, further research still needs to explore the impact of different teaching methods on students of different grades and specialties to get a more comprehensive understanding of the effects of mastery learning combined with mind-mapping technique teaching.

**Keywords:** Mastery Learning; Mind Mapping; Learning Achievement; Sculpture Performance Ability

## Introduction

The provided text discusses the evolution of sculpture education in Chinese colleges and universities, particularly focusing on the reforms and challenges faced in recent years. Since 2009, there has been a concerted effort by national and local governments to promote cultural industries, including



the development of experimental art courses. This has led to an increased emphasis on the design and development of teaching courses by college teachers, necessitating adaptation to new educational trends and teaching models.

The text highlights the need for humanizing college art courseware systems and breaking away from traditional teaching methods. It stresses the importance of embracing new forms, experiences, and learning approaches to facilitate leapfrog development in sculpture teaching. (Olufunke & Blessing, 2014) However, it acknowledges challenges such as the lack of perception of 3D space among students, varying levels of art foundation and aesthetics, and the inadequacy of traditional teaching methods to meet the diversified needs of sculpture education.

An important policy in China is to focus on art learning and the background of sculpture education, addressing the challenges faced in teaching practice, meeting the new requirements for sculpture art development, and enhancing the integration of sculpture education with societal needs. The research aims to deepen the reform of sculpture education by exploring new teaching methods, improving student learning achievement and sculpture performance ability, fostering innovation in sculpture, and promoting sustainable development in teaching practices. (Wang, 2015) The comprehensive application of "Mastery Learning with Mind Mapping" theory and methods can provide solid technical support and rich teaching methods for the reform of sculpture education. Through the application of personalized learning plans and mind mapping, students' learning content and space can be expanded, and their learning efficiency and learning quality can be improved. This comprehensive approach can not only meet students' learning needs but also stimulate their learning interest and creativity and promote their all-round development. Therefore, the promotion and application of this method in sculpture education is of great significance and value.

## Research Objectives

1. To compare learning achievement before and after learning through mastery learning combined with the mind mapping technique.
2. To compare sculpture performance ability after learning through mastery learning combined with mind mapping technique with the established 70 percent.

## Literature Review

The mastery learning theory is a teaching method that aims to ensure that each student thoroughly masters the learning content, rather than simply moving forward according to a fixed timetable. The core concept of this theory is that each student must achieve a certain level of mastery or "mastery" before learning the material. Only when students fully understand the current concept or skill can they move on to new content. The main characteristics of mastery learning include five: Step 1. Set clear goals: teachers need to identify learning goals and ensure that students know what they are trying to achieve. Clear goals help students focus their attention, clarify their direction, and allow them to measure learning progress. Step 2. Independent learning: to encourage students to learn independently, and they are encouraged to think and explore independently even under the guidance of teachers. This independent learning method can cultivate students' independent learning ability and improve their ability to solve problems and apply knowledge. Step 3. Personalized learning plan: the students have different learning needs and learning styles. Personalized learning plans can be developed according to the characteristics and needs of each student to ensure that they get the most effective learning experience.

Step 4. Periodic evaluation: In Mastery Learning, students are not only evaluated during the learning process but also have regular evaluations to measure their mastery of knowledge and skills. These assessments help students understand their learning progress and identify and solve learning problems.

Step 5. Feedback and improvements: Mastery Learning emphasizes timely feedback and improvement mechanisms. Students understand their learning through feedback, discover their mistakes and deficiencies, and take steps to improve. Teachers can also provide personalized feedback and guidance to help students overcome difficulties and improve learning outcomes. Mastery Learning theory aims to



improve the quality of education and ensure that every student can achieve learning success without being missed or left behind due to different learning speeds

### Current course situation

The population of this study is 120 sophomore students (4 classrooms) in the 2023 academic year sculpture course of the Department of Public Art, Department of Environmental Art, Suzhou Institute of Art and Design Technology. The sample of this study was 30 students (1 classroom) in the Sculpture Course of the Public Art Department of the Department of Environmental Art, Suzhou Institute of Art and Design Technology. which was selected by using the cluster random sampling method. This chapter covers the following topics;

#### **Independent variable: mastery learning combined with mind mapping technique.**

American psychologist Benjamin Bloom (1968) proposed the mastery learning theory. This theory emphasizes a personalized learning approach, advocating that each student should achieve success in mastering basic concepts and skills before moving on, rather than adhering to a fixed timetable. Bloom argued that students should be provided with adequate time and resources to understand and master learning objectives, ensuring that every student can achieve learning success. The core concept of mastery learning theory is to allow students to learn at their own pace and attain mastery levels in acquiring knowledge and skills.

The mind mapping technique is a theoretical and practical method proposed by Tony Buzan (1974) Presents the mind mapping technique, its concepts, functions, and advantages. Explain the core principles of mind mapping technique, including focusing on a central idea, using visual elements such as graphics, colors, and keywords, free association, and creative thinking. The author explains the working principle of the brain, including the functional division of labor between the left and right brains, the brain's learning and memory processes, etc. By understanding how the brain works, readers can better understand why the mind-mapping technique is so effective at improving thinking and memory. It introduces how to make a mind-mapping technique, starting from selecting a topic, constructing a central idea, adding branches, using keywords and graphics, and using colors. Through examples and cases, the author shows how to create clear, orderly, and creative mind-mapping techniques. Mind mapping techniques are used in various fields, including learning, memory, creativity, decision-making, planning, etc. Through practical cases, the author demonstrates the application scenarios of mind-mapping techniques in improving learning efficiency, solving problems, and improving work efficiency. Including how to overcome thinking obstacles, improve thinking efficiency, continuously improve and develop mind mapping techniques, etc. The author provides some practical suggestions and techniques to help readers better use mind mapping techniques to improve personal and work efficiency and achievements.

#### **Mastery learning with mind mapping**

Olufunke & Blessing (2014). Students when taught use the mastery learning approach and mind mapping technique. It established the influence of mastery learning and mind mapping in enhancing students' attitudes towards Physics. These were to develop positive attitudes of students towards Physics and thereby improve their performance in the subject.

Mastery learning combined with mind mapping technique is a comprehensive learning method that combines the theory and practice of mastery learning and mind mapping technique. This approach aims to promote students' in-depth understanding, knowledge mastery, and creative thinking through personalized learning processes and visual thinking tools.

There are 5 specific steps:

##### **Step1. Set clear goals:**

The first step is to set clear learning goals. Teachers need to identify the learning goals and standards that students should achieve and communicate these clearly to students. These goals should be specific, measurable, and consistent with course content and student needs.

##### **Step2. Independent learning:**

This approach encourages students to learn independently, that is, to acquire knowledge and skills through personal effort and independent thinking. Students should be motivated to become



autonomous learners, able to actively explore, ask questions, and actively seek answers during the learning process. In this process, students can use mind-mapping techniques to organize and express their thinking, helping them better understand and remember the learning content.

**Step3. Personalized learning plan:**

Personalized learning plans are one of the cores of this approach. Teachers should develop personalized learning plans based on each student's learning needs, interests, and learning styles. This includes determining learning content, teaching methods, and learning pace, and ensuring that students complete learning objectives within an appropriate time. When formulating study plans, teachers can encourage students to use mind-mapping techniques to organize and plan the learning process.

**Step4. Periodic evaluation:**

Regular assessment is an important way to ensure student learning progress. Teachers should regularly assess students' learning outcomes to ensure they meet expected learning goals. Assessment can take a variety of forms including exams, assignments, projects, and oral performances. During the assessment process, students can use mind-mapping techniques to organize and display their knowledge structures and ways of thinking, helping teachers better understand their learning situations.

**Step5. Feedback and improvements:**

Feedback and improvement are critical aspects of the student learning process. Teachers should provide timely feedback to students, point out their strengths and weaknesses, and provide suggestions and guidance to help them improve their learning methods and improve learning effects. Students should actively accept feedback and adjust learning strategies based on feedback to continuously improve and improve their learning level. In this process, the mind mapping technique can help students organize and analyze feedback information for better understanding and application. It is concluded that in this method, students adopt the principle of mastery learning, that is, they constantly repeat learning and practice before fully mastering a knowledge point to ensure a deep understanding and mastery of the knowledge point. At the same time, mind mapping techniques are used to present learning content in a graphical form, helping students better organize and understand the knowledge structure, and improve learning efficiency and memory. This comprehensive learning approach is designed to promote deep learning and creative thinking in students, improving academic performance and learning experience.

**learning achievement**

learning achievement is an important indicator of teaching quality and development in higher education. learning achievement has become one of the most important issues for Chinese scholars, and it is also a yardstick to measure the quality of teaching. learning achievement refers to the synthesis of students' academic achievements, comprehensive ability, and ideological quality. learning achievement is the result and comprehensive quality of college students in school learning activities, which can directly reflect the quality of college education. The learning results mainly focus on the ability to acquire knowledge, problems, and problem-solving problems. In this study, the learning achievement and sculpture performance ability of college students is composed of class attendance, class performance, sculpture completion, sculpture beauty, etc.

**Sculpture performance ability**

Sculpture performance ability refers to the skills, techniques, and proficiency that students possess in sculptural creation. It encompasses various aspects such as understanding of materials, proficiency in sculpting techniques, creativity in design and composition, and the ability to convey intended concepts or emotions through sculptural work. Sculpture performance ability indicates students' mastery and level of competence in sculpture, which can be assessed through the quality, complexity, and originality of their sculptural creations.



## Conceptual Framework

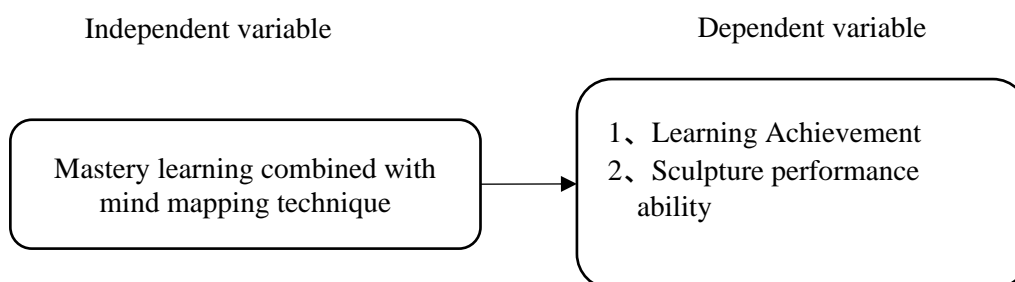


Figure1. Independent variable and dependent variable

## Methodology

**Population:** The population of this study is 120 sophomore students (4 classrooms) in the 2023 academic year sculpture course of the Department of Public Art, Department of Environmental Art, Suzhou Institute of Art and Design Technology.

**Sample:** The sample of this study was 30 students (1 classroom) in the Sculpture Course of the Public Art Department of the Department of Environmental Art, Suzhou Institute of Art and Design Technology, which was selected by using the cluster random sampling method.

Time duration October-November 2023

### Research instruments

Research instruments were the tools for collecting data. The research instruments which were used in this study were: 1. Instruments for experiment. 2. Instruments for collecting data.

#### Instruments for the experiment:

a. Four lesson plans based on the mastery learning combined with the mind mapping technique learning method (1 Lesson Plan per 2 hours)

b. Instruments for collecting data: Check the exam paper for Learning achievement and Sculpture performance ability evaluation form;

The research instruments were evaluated by a total of five experts from Suzhou Art and Design Technology Institute in China and Valaya Alongkorn Rajabhat University in Thailand, including three Chinese experts and two Thai experts.

After experts evaluated the research tools, the researchers followed the four teaching plans and implemented the teaching strategy of mastery learning combined with the mind mapping technique. After implementation, the researcher used two tools, test papers, and evaluation forms, to collect data and evaluate learning results. Data collection.

The procedures of data collection were as follows:

1. Provide students with guidance on mastery learning combined with the mind mapping technique learning method,
2. Pre-test the sample using the constructed instrument to measure learning performance,
3. Use mastery learning combined with mind mapping technique learning method to conduct sample teaching.
4. After the study, a post-test will be conducted, using the same instrument as the pre-test, to detect the students' learning achievement and provide an observation sheet to evaluate the students' sculpture performance ability.

**Data analysis:** In this study, data were analyzed by using the statistical program according to the research objectives, (1) To compare learning achievement before and after learning through mastery learning combined with the mind mapping technique. (2) To compare sculpture performance ability after learning through mastery learning combined with mind mapping technique with the established 70 percent.



## Results

This paragraph summarizes the findings based on these two objectives.

Through the mastery learning combined with the mind mapping technique, the comparison results of learning achievements and sculpture performance abilities before and after the sculpture course are as follows:

**Table 1:** The mastery learning combined with the mind mapping technique learning method to compare the average scores of students' academic performance before and after learning through the learning method.

Group	n	Pretest scores		Posttest scores		t	p
		M	SD	M	SD		
Experimental group	30	42.7	9.21	86.5	11.22	13.06*	0.05

\* $P < 0.05$

As presented in the table the paired samples t-test results indicate, that the mean scores of the pretest of students' achievement of sculpture was 42.7 (SD = 9.21) and the post-test of students' achievement of sculpture 86.5 (SD = 11.22). Specifically, the posttest scores were significantly higher than the pretest scores at level 0.05 of statistically significant ( $t = 13.06^*$ ,  $p = 0.05$ ). The average scores of the study developed increasingly higher than pretest

**Table 2:** To present the average scores of students' sculpture performance ability after learning achievement and sculpture performance ability. A one-sample t-test was conducted to establish the 70 percent criterion.

Group	n	Full score	Criterion score	M	SD	t	p
Experimental group	30	60	42	81.1	7.48	11.05*	0.001

\* $P < 0.05$

As presented in Table the results of the t-test indicate, that the mean scores of t students' sculpture performance ability after learning through mastery learning with mind mapping was 81.1 % from a possible full mark of 100 and the standard deviation was 7.48% which was statistically higher than the criterion of 70 percent at 0.05 level of statistical significance ( $t = 11.05^*$ ,  $p = 0.001$ ).

## Discussion

The mastery learning combined with the mind mapping technique method can better improve students' learning achievement and sculpture performance ability. The reasons may be related to the following aspects:

1. Through mastery learning combined with the mind mapping technique approach, students' learning achievement has seen a significant boost. Following the learning process, the average post-test score soared to 86.5, a considerable leap from the pre-test average of 42.7. This remarkable improvement can be attributed to the method's ability to ignite students' interest in learning, thereby enhancing their enthusiasm and proactive approach to studies. The method encompasses five key steps: Step 1: Setting clear objectives, Step 2: Encouraging independent learning, Step 3: Developing personalized learning plans, Step 4: Regular assessments, and Step 5: Providing feedback and avenues for improvement. Students acquire theoretical knowledge during their studies and actively engage in class discussions to synthesize important concepts based on their comprehension. These findings align with the research of Olufunke & Blessing (2014), who observed that mastery learning combined with mind mapping techniques enables students to actively participate in the learning process, thereby fostering a heightened interest in learning and enhancing classroom engagement. Additionally, it cultivates students' ability to sustain focus during extended study periods.

2. Through mastery learning combined with the mind mapping technique learning method, students' sculpture ability has been significantly improved. The average score of students' sculpture performance ability is 81.1 percent, with a full score of 100 points, a standard deviation of 7.48, and a statistical significance level higher than 70 percent. standard ( $t = 11.05^*$ ,  $p = 0.05$ ). This achievement was achieved thanks to the learning methods implemented by the researchers, including learning to use the mastery learning combined with the mind mapping technique and apply it to the features of the sculpture course. This method not only improves students' practical ability but also strengthens their understanding and trains them to quickly memorize complex sculpture production processes. Ultimately, the students were able to design and produce high-quality sculptures quickly and effectively and achieved the expected goals of the course.

However, after learning through mastery learning with mind mapping, students' sculpture performance ability improved statistically significantly, according to the t-test results. The criterion of 70 percent was significantly exceeded by the mean score of 81.1%, indicating that the instructional approach was effective in improving students' mastery of sculpting techniques (Cohen, 2013). The robustness of the observed improvement is further supported by the standard deviation of 7.48%, which indicates relatively consistent performance among students (Gravetter & Wallnau, 2014). This research highlights the potential of mind mapping in conjunction with mastery learning as an instructional strategy to support deep learning and skill acquisition in the sculpture domain.

Furthermore, the t-value of 11.05 and the p-value of 0.001 show a statistically significant difference, which strongly suggests that the alternative hypothesis should be accepted and the null hypothesis should be rejected. This suggests that students who learned through mastery learning with mind mapping and those who did not have a significant difference in their ability to perform sculpture (Pallant, 2016). The effectiveness of the instructional intervention is supported by the high level of statistical significance, which also supports the validity and reliability of the observed improvement in students' performance (Field, 2013). These findings suggest that mastery learning in conjunction with mind mapping can be an effective pedagogical approach for improving student learning outcomes in sculpture education. These findings have significant implications for instructional practice.

Overall, the t-test results offer empirical evidence in favor of the efficacy of mastery learning combined with mind mapping in raising students' performance levels in sculpture. Together with the low p-value, the statistically significant increase in mean scores points to a significant and consistent improvement in students' mastery of sculpting techniques (Cohen, 2013). These results add to the expanding corpus of research on cutting-edge teaching techniques in the field of art education and demonstrate how mastery learning in conjunction with mind mapping can be an effective pedagogical strategy for improving student learning outcomes in the visual arts.

## Recommendation

1. Student interests and needs are considered vital. This course not only meets students' learning needs but also significantly improves students' learning achievement and sculpture performance ability. This teaching method pays more attention to the concept of students as learning subjects and has achieved remarkable results in actual teaching.

2. As the leader of teaching, teachers can successfully apply this teaching method to other courses such as painting and design, which will help cultivate students' multi-faceted abilities and comprehensive qualities.

3. For other schools, applying this research method and results to their courses will not only improve efficiency but also try the mastery learning combined with the mind mapping technique learning method in other subjects to achieve better teaching results.

## Conclusion

The selection of teaching strategies should be based on course principles and instructional objectives. Mastery learning combined with the mind mapping technique, grounded in student-centered learning theory, has the potential to spark students' interests, enhance their learning motivation, and



cultivate active reflection and synthesis. Experimental results demonstrate that integrating combined significantly improves students' learning achievement and sculpture performance ability, thus achieving teaching objectives and meeting policy and school requirements. Other educators and researchers can introduce more courses following the steps of this learning method.

## References

- Benjamin S. Bloom (1968). "Learning for Mastery." *Evaluation Comment*, 1(2), 1-2.
- Buzan, T. (2003). *"The Mind Map Book: Unlock your creativity, boost your memory, change your life."* Pearson Education Limited.
- Chen L. (2022). *Research on the application of mind mapping in the learning field of "Appreciation and Commentary" of art in junior high schools.* Master's thesis, Guangdong Technical Normal University.
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences.* Academic Press.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics.* Sage.
- Gravetter, F. J., & Wallnau, L. B. (2014). *Statistics for the behavioral sciences.* Cengage Learning.
- Olufunke, B.T., & Blessing, O.O. (2014). Achievement in Physics using mastery learning and mind mapping approaches: Implication on gender and attitude. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 1(12), 154-161.
- Pallant, J. (2016). *SPSS survival manual.* McGraw-Hill Education.
- Wang, J.-X., (2015). *Exploration of teaching reform of sculpture course in universities.* China Sculpture Yearbook: China Light Industry Press.

