

# A New Teaching Mode: Logic Map

Lu Lu<sup>1</sup>, Shu Huang<sup>2</sup>, Xu Xin<sup>3\*</sup>, Yang Jing<sup>4</sup>

<sup>1</sup>School of Finance, Nanjing University of Finance & Economics, Nanjing, China

<sup>2</sup>Massey Institution in NUFE, Nanjing University of Finance & Economics, Nanjing, China

<sup>3</sup>Department of World Economy and Politics, Jiangsu Administration Institute, Nanjing, China

<sup>4</sup>NanJing XiaoZhuang University, Nanjing, China

Email: \*thringxx@126.com

**How to cite this paper:** Lu, L., Huang, S., Xin, X., & Jing, Y. (2024). A New Teaching Mode: Logic Map. *Creative Education*, 15, 398-406.

<https://doi.org/10.4236/ce.2024.153024>

**Received:** January 31, 2024

**Accepted:** March 23, 2024

**Published:** March 26, 2024

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## Abstract

Most undergraduate do not understand the position of a certain part of the content in a certain chapter or in the curriculum system. They have a poor macro grasp of the course content after lectures. In order to enhance students' overall understanding of the curriculum content framework. The innovation of the logic map teaching method can greatly enhance students' grasp of the macro logical framework of course knowledge content, as well as enhance their attention and participation in class. The logic map teaching method involves simplifying and detailing mind maps before and after each chapter, helping students form a macro framework and logical thinking for memorizing chapter content.

## Keywords

University Education, Teaching Mode, Logic Map

## 1. Introduction

We notice an interesting phenomenon that commonly occurs in university classrooms, students can only grasp the scattered parts of the lesson or chapter content after lectures, and these contents are scattered (Biktimirov & Nilson, 2006; Nettleship, 1992; Eriksson & Hauer, 2004; Mento, Martinelli, & Jones, 1999). They do not understand the position of a certain part of the content in a certain chapter or in the curriculum system. In other words, from classroom teaching, students have a poor macro grasp of the course content. We discovered this issue during the course "Financial Risk Management" in year 2020. It is interesting that due to the completion of the prerequisite course, students did not have significant difficulties in understanding the content of this course. However, their overall grasp and clarity of the chapter content were not sufficient. Stu-

dents are often able to accurately answer the content of a certain knowledge point, but cannot articulate the positioning of this knowledge point in the entire text, and it is also difficult to introduce the connection and logical relationship between the content and content of a certain chapter from a macro perspective.

Therefore, in order to improve students' comprehensive grasp of the course content, in response to the above issues, the method of "logic mapping" is gradually added in the subsequent course teaching process, allowing students to grasp the connection between courses, chapters, and content from a macro perspective, and improve the connection and logic of mathematical content. Logic map combines logical thinking with process graphics to vividly display teaching content, make it more logic and visualize complex framework structures, and stimulate students' interest and participation.

## **2. Literature Review**

### **2.1. Theoretical Basis of Mind Mapping**

#### **2.1.1. Constructivism Learning Theory**

The Constructivism Learning Theory posits that knowledge is not a purely objective reflection of reality, but rather people's interpretation, hypothesis, or theory about the objective world. Knowledge undergoes constant change and deepening as people's understanding evolves, leading to new interpretations and hypotheses. Constructivism Learning Theory suggests that learning is a process in which students actively construct knowledge for themselves. Instead of passively receiving information, students actively construct meaning from knowledge based on their own experiential backgrounds by selectively processing external information. The Constructivism Learning Theory emphasizes that teaching should not ignore learners' existing knowledge and experience, but should use it as a starting point for new knowledge. Teaching is not about the transfer of knowledge, but rather its processing and transformation. It requires joint exploration, communication, and questioning between teachers and students. Constructivism Learning Theory emphasizes students' initiative and constructiveness, viewing knowledge as dynamic and relative, and learning as a process of active construction based on individual experiential backgrounds. Teaching should facilitate the processing and transformation of knowledge, as well as communication and questioning between teachers and students, based on students' existing knowledge and experience.

Mind mapping can visualize people's internal cognitive structures, and the constructivist teaching model emphasizes that learning is a process in which learners actively construct internal mental representations. Therefore, applying mind mapping to teaching effectively reflects Constructivism Learning Theory. Firstly, constructivism emphasizes that knowledge is actively constructed by learners rather than passively received. Mind mapping encourages students to actively participate in knowledge construction. By creating mind maps, students need to organize knowledge points and ideas, thereby gaining a deeper under-

standing of the learning content. Secondly, the notion that knowledge is actively constructed by learners, rather than passively received, is reiterated. Mind mapping encourages students to actively participate in knowledge construction. By creating mind maps, students need to organize knowledge points and ideas, leading to a deeper comprehension of the learning material.

### **2.1.2. Humanistic Learning Theory**

The humanistic view of teaching is formed and developed based on its humanistic view of learning, which is rooted in its theory of natural human nature. Humanistic psychologists believe that humans are natural entities rather than social entities, and that human nature originates from nature, with natural human nature being people's inherent characteristics. They posit that each individual possesses the ability and motivation to develop their potential, and that behavior and learning are products of perception. Most of a person's behavior is a result of their own perceptions. True learning involves the whole person, not just providing facts to learners. Genuine learning experiences enable learners to discover their own unique qualities and characteristics as individuals. The humanistic view of teaching advocates a "people-centered, student-centered" approach, recognizing students as subjective and active individuals with emotions, thoughts, and independent personalities who are constantly developing. It promotes students' ability to learn, fosters personal growth, enhances adaptability, and equips students to more effectively meet the challenges posed by social change.

The application of mind mapping in teaching effectively embodies the core principles of humanistic learning theory. Humanistic learning theory emphasizes the student's subjective status, recognizing them as individuals with emotions, thoughts, and independent personalities. In mind mapping teaching, teachers guide students to actively participate in the construction of mind maps, encouraging them to exercise their imagination and creativity, thereby embodying their subjectivity. Humanistic learning theory views education as a means to help students achieve self-actualization and become more well-rounded individuals. In mind mapping teaching, teachers guide students in self-exploration, self-discovery, and self-reflection. Through the construction of mind maps, students discover their own potential and strengths, enabling them to better realize their self-value.

### **2.1.3. The Theory of Knowledge Visualization**

Knowledge visualization refers to the definition given by Eppler & Burkard: knowledge visualization is the application of visual representation means to promote the dissemination and innovation of group knowledge, and the study of the role of visual representation in enhancing the dissemination and innovation of group knowledge (Eppler & Burkard, 2004). The goal is to transmit insights, experiences, attitudes, values, expectations, perspectives, opinions, predictions, etc. and help others correctly reconstruct, remember and apply this knowledge.

Knowledge visualization refers to the application of visual representation

means to promote the dissemination and innovation of group knowledge. In essence, it represents individual knowledge of people in the form of graphic representation, forming an external manifestation of knowledge that can directly act on people's senses, thereby promoting the dissemination and innovation of knowledge. Educational technology is the theory and practice of designing, developing, applying, managing and evaluating processes and resources to promote learning, aiming to improve teaching processes and maximize teaching effectiveness (Liu, 2015). Therefore, knowledge visualization means will greatly optimize educational outcomes.

## **2.2. Application Review of Mind Mapping in Education**

### **2.2.1. Current Research Status of Mind Mapping**

The development of mind mapping can be traced back to the late 19th century, when psychologist Hermann Ebbinghaus proposed the “naming method” as the earliest form of brain memory model. However, the true origin of mind mapping can be attributed to psychologist and brain developer Tony Buzan in the 1970s. Dr. Buzan is known as the “father of modern brain development” and in the late 1970s, he launched the famous book “Mind Mapping”, which gradually made this skill widely recognized by people. Nowadays, mind mapping is widely used in academic, business, education and other fields. For example, business mind mapping is often used to help business managers make intelligent decisions and conduct strategic analysis (Liu, 2009).

Compared with the development of other countries, the application of mind mapping in China started relatively late, but in general, it has also received a lot of attention. In 1997, Dr. Sun Yixin, a psychologist from Taiwan region, was the first person to introduce mind mapping to the Chinese mainland and has continuously carried out localization and correction based on the cultural differences between the East and the West (North & Buzan, 1997). In 2004, Zhao Guoqing and Lu Zhizhan published the article “Comparison and Analysis of Concept Maps and Mind Maps”, which compared and analyzed the two methods (Zhao & Lu, 2004). In early 2000, Tony Buzan, the founder of mind mapping, conducted a series of promotional activities in China, and research on mind mapping began to become active (Buzan & Buzan, 1995). Various research articles on mind mapping also began to increase. On April 13, 2017, the press conference of the Chinese Mind Mapping Popularization Project was held in Beijing. Mr. Ji Guangliang, the founder of the Chinese Mind Mapping Popularization Project, proposed at the conference that the purpose of this popularization project is to make mind mapping enter schools allowing more Chinese teenagers to understand and master mind mapping and achieve “happy learning and healthy growth”. On November 30, 2019, the 11th World Mind Mapping Global Finals kicked off in Beijing with more than 200 mind mapping experts from 10 countries around the world participating.

### **2.2.2. Research on Mind Mapping in Education**

Mind mapping has also been widely applied and studied in the field of educa-

tion. Countries such as the United Kingdom and Singapore have already included mind mapping as a required teaching tool in national primary and secondary education, requiring teachers to be proficient in using mind mapping. In the United States, mind mapping is a required learning tool for teachers. In teaching examples and software resources listed in “The National Education Technology Standards” of the United States, many excellent lesson plans use mind mapping. Education institutions in countries such as South Korea, Japan, Germany, and Mexico have also begun to conduct research on this topic. Many countries have made promoting and popularizing the application of mind mapping as one of the strategies for education reform (Zheng, 2008).

After conducting literature retrieval on “CNKI” for keywords related to “mind mapping”, it was found that the number of related articles has reached more than 30,000, covering a wide range of disciplines from preschool education to higher education, from computer science to clinical medicine. Among them, there are more than 1800 articles related to higher education.

Some of these literatures analyze the theoretical basis, application advantages, feasibility and path of mind mapping in teaching from a more macro perspective. For example, Yan Shouxuan’s article expounded that applying mind mapping to classroom teaching can help integrate new and old knowledge, cultivate students’ divergent thinking skills, encourage students to participate actively in learning, strengthen cooperation and communication among students and teachers, and improve teaching effectiveness (Yan, 2006). Zhao Guoqing, Yang Xiaoyang, and Xiong Yake’s article explores that exploring the guiding principles for teaching application of visualization thinking tools, analyzing the core differences among eight thinking maps, mind maps, and concept maps, and finding specific focal points for their application in teaching can help improve teaching effectiveness (Zhao et al., 2019). Some other literatures explore mind mapping from specific disciplinary perspectives such as Dong Boxue’s article exploring that applying mind mapping to middle school physics teaching can help better understand and evaluate teaching functions, teaching goals, teaching forms, teaching activities, and ultimately improve teaching practice (Dong, 2014).

Through further combing, it is found that most of these literatures focus on the natural sciences (such as chemistry, biology, medicine, etc.), with relatively few application studies in the humanities and social sciences. In the humanities and social sciences, the application research of “mind map” in the basic principles of Marxism accounts for the majority, while its application in economics accounts for a minority.

These literatures indicate to some extent that: 1) the “mind map” method has been explored and applied in different disciplines to different degrees and types; 2) the “mind map” method itself has practical value that can be further promoted.

However, on the one hand, there is still a lot of room for exploration in the teaching optimization and improvement of financial and economic disciplines, especially in economics and finance related professional courses. On the other

hand, in the teaching process of the course of “Financial Risk Management”, the teaching tool of “mind map” has been put into practice and has received a lot of feedback from students.

Therefore, this study hopes to further deepen the existing research foundation and practical basis, in order to contribute to the improvement of teaching effectiveness of economic management professional courses.

### 3. A New Teaching Mode

#### 3.1. What Is Logic Map?

Logic map, also named with “Mind mapping”. It is a specific skill of teaching in university/college. Mind mapping teaching refers to using mind maps to guide students in organizing the internal logic of the learning content in the classroom. For example, in the explanation of VaR in Chapter 12 of Financial Risk Management, after introducing the background of the emergence of this new concept, students are presented with a simplified mind map. This map contains each key points/concepts in the chapter as well as the logic between them. Most importantly, it is like an introduction map of what content and their study sequence. Accompanied by an explanation, to understand the logical framework of the content in this chapter. Then start explaining the content of the chapter.

What are the key features of mind mapping? 1) Flexible. Mind mapping has a wide range of application scenarios. Not only in the business/finance lecture, but also in every discipline, even speech and self-learning. 2) Generalized. A key principle of Mind Mapping is using one word per branch. As it chunks information into core topics and themes, audience can easily grasp the key words of a particular chapter. 3) Logistic. Make abstract logical relationships more vivid and intuitive, making them easier to understand.

The factors that influence academic performance. 1) Structured diagrams. Pictures and structured diagrams are thought to be more comprehensible than just words, and a clearer way to illustrate understanding of complex topics. [Buzan & Buzan \(1995\)](#) argued that drawing maps of ideas and concepts rather than lineal lists is much more in tune with the way we think. 2) Strong connections. Mind maps can be particularly useful in making connections between ideas and forming a visual concept map of a reading, a lecture, or even the whole course. It can be a powerful memory & understand tool during teaching, studying, revising or preparing for an exam.

#### 3.2. Why We Use Logic Map?

In the teaching of college students, it is common to encounter the problem of students only mastering scattered knowledge points after completing a chapter and not grasping the framework and logic of the entire chapter content clearly ([Xi, Zhao, & Novak, 2006](#)). The innovation of the “mind map” teaching method can greatly enhance students’ grasp of the macro logical framework of course knowledge content, as well as enhance their attention and participation in class.

Mind mapping, in essence, is a visual tool that organizes information in a hierarchical and interconnected manner. When applied to teaching, it transforms the traditional linear presentation of knowledge into a dynamic, interactive experience. By condensing complex chapter content into simplified yet detailed mind maps, this method helps students see the forest for the trees. They are able to visualize the relationships between different concepts and identify the underlying logical structure of the material (Wang, 2000). The “mind map” teaching method involves simplifying and detailing mind maps before and after each chapter, helping students form a macro framework and logical thinking for memorizing chapter content.

In order to enhance students’ overall understanding of the curriculum content framework. Adhere to the educational philosophy of “student-centered” in the process of curriculum and teaching reform. Pioneering exploration and practice of the “mind map” teaching method (it is more like a teaching technique that can help improve teaching quality).

### 3.3. How to Use Logic Map?

After introducing the main content of this chapter, let the students to write a detailed mind map on the blackboard together. Of course, before class, the teacher needs to complete this logical mind map first, so that the students can complete it smoothly without lagging in class.

The utilization of simplified and detailed mind maps throughout the chapter serves multiple purposes. Firstly, it helps students to gain a deeper comprehension of the logical relationships between different sections and subsections within the chapter. By visualizing these connections, they are able to form a more coherent understanding of the material, which enhances their learning outcomes (Yang, 2006).

Secondly, mind maps act as a valuable tool for students to grasp the overall framework of the chapter. They provide a bird’s eye view of the content, allowing students to see the bigger picture and appreciate how various concepts and ideas fit together. This understanding of the overall structure helps students to navigate through the material more efficiently and effectively.

Moreover, involving students in the creation of mind maps not only enhances their engagement but also improves teaching effectiveness. As students actively participate in the mind-mapping process, they become more invested in their learning, taking ownership of their understanding and retention of the material. This active learning approach fosters a deeper understanding and long-lasting memories (Li & Hui, 2019).

### 3.4. What Happens after Using Logic Map?

It has been initially explored and practiced in the course teaching, and achieved certain feedback on the effectiveness.

1) In terms of the feedback from students in the classroom, the teaching effect has indeed been improved. During the simplified mind map introduction at the

beginning of the class, most students can concentrate and follow the teacher's rhythm to learn. After class, when the detailed mind map is being compiled, students' attention concentration is even higher, and more than half of them will join in the mind map drawing and actively answer the teacher's questions; after the detailed mind map is completed, all students will use notebooks or take pictures to record the detailed mind map of this chapter.

2) In terms of feedback from students at the post-class teaching discussion meeting, students hope this method can be continuously promoted. I received feedback from the department head that at the teacher-student discussion meeting every semester, student representatives have highly evaluated the teaching method of "mind map", given very positive praise, and hope that this method can be continued in future course learning. They also encourage other courses to learn from this course's teaching method of "mind map". Overall, the addition of "mind map" teaching methods in this course has improved teaching quality and student learning effectiveness, and has certain promotion and application value.

#### **4. Discussion**

Most undergraduate do not understand the position of a certain part of the content in a certain chapter or in the curriculum system. They have a poor macro grasp of the course content after lectures. In order to enhance students' overall understanding of the curriculum content framework. The innovation of the "mind map" teaching method can greatly enhance students' grasp of the macro logical framework of course knowledge content, as well as enhance their attention and participation in class. The "mind map" teaching method involves simplifying and detailing mind maps before and after each chapter, helping students form a macro framework and logical thinking for memorizing chapter content.

#### **5. Conclusion**

The integration of the "mind map" teaching method into undergraduate courses has demonstrated remarkable effectiveness in enhancing student learning outcomes and engagement. This innovative approach not only improves the clarity of content delivery but also fosters a deeper understanding of the logical relationships between course elements. The "mind map" teaching method has emerged as a powerful tool for enhancing student understanding, engagement, and overall learning outcomes. Its ability to simplify complex content and promote active learning makes it a valuable addition to modern educational practices. The widespread adoption of this method could significantly transform teaching and learning, leading to more effective and engaging classrooms.

#### **Funding**

This research is supported by the Teaching Reform Project of Nanjing University of Finance and Economics (JGY202242).



## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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