THE LEARNING MANAGEMENT THROUGH THE STUDENT TEAM ACHIEVEMENT DIVISION COMBINED WITH MIND MAPPING TECHNIQUES TO DEVELOP LEARNING ACHIEVEMENT FOR 1ST YEAR OF SECONDARY VOCATIONAL STUDENTS

XIAOLING ZHU

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION
PROGRAM IN CURRICULUM DEVELOPMENT
AND INSTRUCTIONAL INNOVATION
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Thesis Title	The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students
Name – Surname	Mrs. Xiaoling Zhu
Program	Curriculum Development and Instructional Innovation
Thesis Advisor	Assistant Professor Rossarin Jermtaisong, Ph.D.
Academic Year	2022

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ABSTRACT

The objectives of this research were to: 1) compare the pre- and post- learning achievement of 1st year secondary vocational students studying learning management through the traditional approach, 2) compare the pre- and post- learning achievement of the students studying learning management through the Student Team Achievement Division combined with mind mapping techniques, and 3) compare the post learning achievement of students studying learning management through the traditional approach and the Student Team Achievement Division combined with mind mapping techniques.

The research samples were 40 students, selected by cluster random sampling, 1st year of tourism major students at the secondary vocational school, Beijing, China in the academic year 2022-2023. The research instruments consisted of: 1) the learning management plan based on the traditional approach, 2) the learning management plan based on Student Team Achievement Division combined with mind mapping techniques, and 3) a learning achievement test. The statistics used for data analysis were mean, standard deviations, independent samples t-test, and dependent samples t-test.

The research results showed that: 1) the post-learning achievement of 1st year secondary vocational students studying learning management through the traditional approach was higher than the pre-learning at a statistical significance level of .05., 2) the post-learning achievement of students studying learning management through the Student Team Achievement Division combined with mind mapping techniques was higher than the pre- learning at a statistical significance level of .05., and 3) the learning achievement of students studying learning management through the Student Team Achievement Division combined with mind mapping techniques was higher than those studying through the traditional approach at a statistical significance level of .05.

Keywords: learning achievement, student team achievement division, mind mapping

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Xiaoling Zhu

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CHAPTER 1
INTRODUCTION

1.1 Background and Statement of the Problems

The important role of vocational education in China's education system has been re-emphasized in the Implementation Plan of National Vocational Education Reform released by The State Council in 2019. The plan points out that under the condition that the framework of China's modern vocational education system has been preliminarily perfected, vocational education has become an important driving force for the upgrading of China's industrial structure and economic development, and an important basis for training all kinds of professional and technical personnel (Bai, S., 2016, pp.74-78). At the same time, the "plan" also clearly put forward the concept of strengthening the development of secondary vocational education in China, providing a good external policy environment for the development of secondary vocational education.

Within the vocational education system, the training of tourism professionals assumed a significant role as a fundamental major and subject. This significance primarily stemmed from the swift evolution of China's tourism industry in recent years. The gradual optimization of the tourism demand structure and the rapid escalation in the need for skilled tourism professionals contributed to this importance. As an important base for training intermediate tourism professionals who combine theory and practice, secondary vocational tourism plays an increasingly prominent role in the development of China's tourism industry (Chen, D., 2018, pp.84-86). In the tourism industry, the proportion of tour guides accounted for more than 80%. For tour guides, the relevant theoretical knowledge and practical skills required to master are multifarious, and the learning and mastering of this knowledge and skills should be based on a solid foundation of basic knowledge of tour guides (Crocker, L., and Algina, J, 1986). Therefore, It was directly related to the service quality and level of the tour guide practitioners, as well as the development potential of personal careers (Fran, Purwati, 2014). As a compulsory course for students majoring in secondary vocational tourism, basic knowledge of tour guides plays a very important role in teaching secondary vocational tourism. However, due to the vast territory of China, there are great differences in culture and customs which lead

to the content of the course "Basic Knowledge of tour guides" being numerous and boring. Furthermore, the knowledge structure was complex and extensive. Simultaneously, the vast majority of secondary vocational schools continued to employ the traditional "lecturing" approach in delivering this course. The students' enthusiasm for learning was not high, and the teaching effectiveness was poor.

The course "Basic Knowledge of Tour Guides" has more teaching content with strong theory in which students need to recite a lot of knowledge points. Students in secondary vocational schools usually do not have the basic knowledge related to tour guides, and the traditional "cramming" teaching method was easy to cause resistance among students, resulting in thelow initiative and enthusiasm of students in learning, and the teaching quality cannot be effectively improved for a long time. Under the modern secondary vocational education system, how to improve the teaching quality of "Basic Knowledge of Tour Guides" for secondary vocational tourism major students and help them better master the theoretical knowledge required for the occupation of tour guides was one of the main problems in the teaching of tourism major in domestic secondary vocational schools.

By analyzing the teaching content of Basic Knowledge of Tour Guides in secondary vocational schools, it was determined that this course exhibited two primary characteristics: a substantial volume of foundational knowledge with a robust systematization, and minimal knowledge-related challenges but significant memory-related difficulties. This was also the primary challenge encountered by secondary vocational schools in the instruction of "Basic Knowledge of Tour Guides". Under the conventional "lecturing" approach, the learning experience was relatively monotonous, students displayed limited enthusiasm for learning, and often fell short of achieving the intended educational objectives.

This research mainly aimed at the learning achievement of the Basic Knowledge of Tour Guide course. The main basis of this study was Mind Mapping and Student Teams Achievement Division teaching mode, together with constructivist learning theory and information processing theory are also used as theoretical support.

STAD teaching refers to Student Teams Achievement Division, in which students are divided into groups according to the distribution of scores. Each teaching

group member reflects the overall distribution of students' scores (Gustiawan, D., and Bisri, H., 2018, pp.374-386). It was a teaching method of cooperative learning mode. Student Teams Achievement Division was designed by Gustiawan and Bisri in 2018. Teaching activities include Class Presentations, Team Study, Student tests, Score Calculation, and Team Recognition. Student Teams Achievement Division teaching method can improve students' school effect overall by employing group study and progress together (Hong, B. Q., 2021, pp.54-58).

Tony Buzan's mind map gained prominence as an auxiliary tool introduced by the renowned British scholar in the late 1970s. It facilitated the connection of thoughts to thematic information and the integration of semantic and cognitive aspects, and connected into a system of cognitive image, with a highly visual, divergent, systemic, intuitive, etc., can be associated with knowledge, methods, and concepts for effective integration (Indah, Pidarta, and Prasetyo, 2018). It provides support for learners' knowledge structure, improves memory efficiency, and can also be used in the creative thinking process (Jamaludin, M., and Mokhtar, M. F., 2018, pp.1251-1267).

The "mind map" served as the foundation for innovating teaching methods, visualizing the organization of curriculum knowledge and knowledge structures. A more adaptable STAD (Student Teams Achievement Division) teaching approach was designed, aimed at stimulating students' autonomous learning abilities and enthusiasm, thus enhancing the instructional quality of Basic Knowledge of Tour Guide in secondary vocational schools. In this study, to enhance the teaching quality of Basic Knowledge of Tour Guides in secondary vocational schools, a STAD teaching mode rooted in "Mind Mapping" was introduced. This mode guided students in creating visual network structure maps of fundamental tourism knowledge. It facilitated a better understanding and retention of this knowledge through graded-based teaching groupings.

1.2 Research Questions

1.2.1 Was there a statistically significant difference in the learning achievements of first-year secondary vocational students in "Basic Knowledge of Tour Guides" before and after undergoing learning management through the traditional approach?

1.2.2 Was there a statistically significant difference in the learning achievements of first-year secondary vocational students in "Basic Knowledge of Tour Guides" before and after undergoing learning management through the combination of Student Team Achievement Division and mind mapping techniques?

1.2.3 Was there a statistically significant difference in the learning achievements of first-year secondary vocational students in "Basic Knowledge of Tour Guides" between learning management through the traditional approach and learning management through the combination of Student Team Achievement Division and mind mapping techniques?

1.3 Purpose of the Study

1.3.1 To compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach.

1.3.2 To compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques.

1.3.3 To compare the achievement of students studying through the traditional approach and the learning management through the Student Team Achievement Division combined with Mind Mapping techniques.

1.4 Research Hypothesis

The researcher will test the following hypothesis at 0.05 level of significance:

1.4.1 The learning achievement of first-year secondary vocational students in "Basic Knowledge of Tour Guides" after undergoing learning management through the traditional approach was statistically significantly higher than before, with a significance level of .05.

1.4.2 The learning achievement of first-year secondary vocational students in "Basic Knowledge of Tour Guides" after undergoing learning management through the combination of Student Team Achievement Division and mind mapping techniques was statistically significantly higher than before, with a significance level of .05.

1.4.3 The learning achievement of first-year secondary vocational students in "Basic Knowledge of Tour Guides," under the learning management through the combination of Student Team Achievement Division and mind mapping techniques, was statistically significantly higher than that achieved through the traditional approach, with a significance level of .05.

1.5 Scopes of the Study

1.5.1 Population and Sample

1.5.1.1 Population, the population in this study was 113 of 1st year of tourism major studying at the secondary vocational school, Bei Jing, China, during the academic year 2022-2023.

1.5.1.2 The research sample was divided 2 classes: 1) one class of 34 students were selected as the experimental group with learning management through the Student Team Achievement Division combined with Mind Mapping techniques for the course "Basic Knowledge of Tour Guides", and 2) one class of 33 students, was selected as the control group with learning management through the traditional approach.

1.5.2 Variables

1.5.2.1 The independent variable in the research comprised learning management encompassing two methods: 1) the traditional approach, and 2) learning management through the combination of Student Team Achievement Division and mind mapping techniques.

1.5.2.2 The dependent variable in the research was the learning achievement of first-year secondary vocational students in "Basic Knowledge of Tour Guides."

1.5.3 Scope of Contents

The Basic Knowledge of Tour Guides subject for 1st year of secondary vocational students with 15 academic hours. The content includes 3 chapters as follows:

1) Knowledge of Chinese history and culture 5 hours.
2) Geological and geomorphological tourism landscape 5 hours.
3) Scenic water tourism landscape 5 hours.

1.5.4 Scope of Time (Time: History/Current Situation)

The research project took place from September 2022 to March 2023.

1.6 Definition of Terms

For ease of understanding, the following terms were hereby defined conceptually and or operationally:

1.6.1 The Student Team Achievement Division techniques were a collaborative learning strategy in which small groups of learners with varying levels of ability worked together to achieve a common learning objective. The stages in implementing the STAD learning model were as follows: 1) presentation of the class, 2) learning groups, 3) tests or quizzes, 4) individual score improvement, and 5) group awards.

1.6.2 Mind mapping was a knowledge organization structure based on hierarchy, type, and network. It typically relied on subjects and key words to establish a graphical framework and structure for knowledge.

1.6.3 The learning management through the Student Team Achievement Division combined with mind mapping techniques involved a collaborative learning strategy wherein small groups of learners with varying levels of ability collaborated to achieve a common learning objective. The stages in implementing the STAD learning model were as follows: 1) Presentation of the class, 2) Learning groups wherein students collectively engaged in mind mapping within their teams to ensure comprehensive understanding among all team members, 3) tests or quizzes, 4) individual score improvement, and 5) group awards.

1.6.4 The learning management through the traditional approach involved a process of learning management consisting of three stages: the introduction stage, teaching stage, and conclusion stage.

1.6.5 Learning achievement encompassed the knowledge acquired by students, including memory, comprehension, and application resulting from the learning management. It was assessed through scores obtained in the multiple-choice test on the Basic Knowledge of Tour Guides.

1.6.6 Secondary vocational students are the 1st year of secondary vocational students studying the Basic Knowledge of Tour Guides at the secondary vocational school, Beijing, China, during the academic year 2022-2023.

1.7 Conceptual Framework

Since this research paper will employ experimental research design, the framework below will serve as the researcher's guide in the conduct of the study:

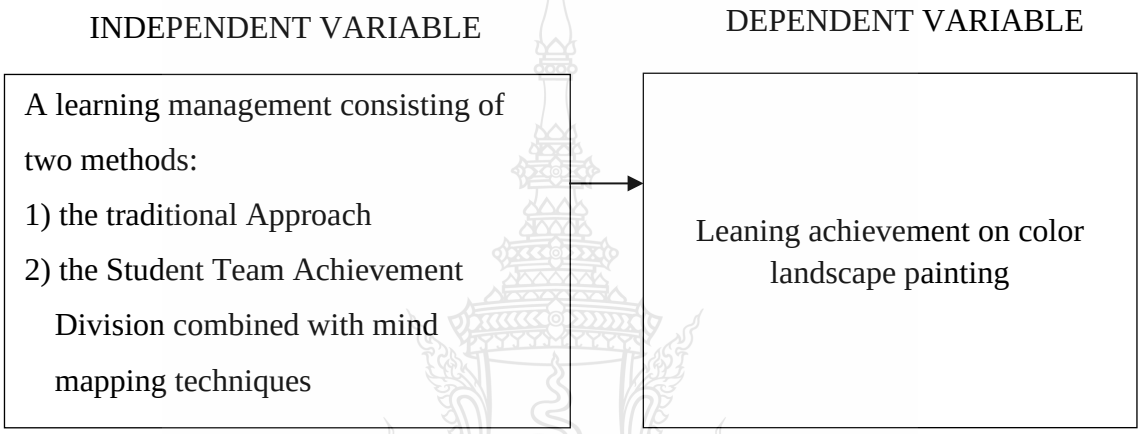

Figure 1.1 Conceptual Research Framework

1.8 Benefits

1.8.1 The basic knowledge of a tour guide had many contents, but it had a clear internal structure. Through this research, I was able to present a kind of knowledge structure for the tour guide curriculum by drawing a mind map to outline the implementation path.

1.8.2 A learning management approach combining the Student Team Achievement Division and mind mapping techniques was proposed and implemented in the teaching of Basic Knowledge of Tour Guides. Its purpose was to guide students in drawing visual network structure maps of the basic knowledge of tourism. Furthermore, this approach aimed to assist students in better understanding and memorizing the knowledge by utilizing a grouping teaching method based on scores.

CHAPTER 2
REVIEW OF THE LITERATURE

This chapter focused on reviewing the previous studies related to the following area relevant to this research.

2.1 Cooperative Learning

2.1.1 Definition of Cooperative Learning

The theory of the Cooperative Learning Model emerged in the American educational field during the 1970s. In recent years, it has gradually evolved into a new teaching concept and strategy in education, garnering significant attention from both the educational field and frontline teachers. Slavin (1990, pp.231-238) asserted that cooperative learning was a teaching model centered around student grouping. Building

upon this foundation, it incorporates a range of teaching and learning activities, classroom teaching models, and technologies. However, the Johnson brothers, American educationalists (Johnson, 2000, pp.25-34), first introduced the cooperative teaching model in actual classroom settings through the establishment of the "Cooperative Learning Center" at the University of Minnesota. They emphasized the importance of communication and interaction among students to enhance overall learning outcomes.

Based on the various correlations among students in the Cooperative Learning model, it can be categorized into three types: Individual Learning Relationship, Competitive Learning Relationship, and Cooperative Learning Relationship. Among these, the cooperative learning relationship represents the primary aspect of student interactions (Johnson, 2009, pp.365-379). Cooperative learning relationship involves learning through group activities, where students collaborate and communicate to accomplish specific learning objectives. Key components of the cooperative learning relationship include the learning group, group members, instructors, and the external learning environment. Within the cooperative learning mode, dialogue, discussion, communication, and coordination between students and teachers serve as crucial learning methods. By effectively communicating and demonstrating the learning objectives, the predetermined teaching goals are ultimately attained.

Hence, the cooperative learning model effectively enables the exploration and utilization of students' comprehensive thinking abilities throughout the learning process. It also enhances communication and coordination skills among students, fostering a shared learning experience and progress among students with varying qualities and levels of knowledge.

2.1.2 The features of cooperative learning

Due to significant variations in learning abilities, interests, and hobbies among group members, their perspectives on various matters differ greatly, resulting in divergent understandings of shared concepts. It was precisely because of these differences that students can learn from one another through effective communication, fostering their personal development. Simultaneously, the cooperative learning model cultivates a sense of collaboration (Zhang, 2021, pp.131-136).

Through the implementation of cooperative learning, students of all levels can mutually benefit from each other's knowledge and skills, leading to collective progress. Cooperative learning fosters a relaxed learning atmosphere by promoting cooperation and communication among students. Within this environment, students are encouraged to express their ideas, providing a particularly beneficial opportunity for introverted students. Undoubtedly, students have more opportunities to voice their thoughts compared to traditional group lectures. Guided by the teacher, all group members can engage in open communication, leveraging their individual strengths while also learning from the strengths of their peers. They can share their knowledge with classmates and enjoy studying in a relaxed and enjoyable environment (Zhong, 2021, pp.85-97).

Through the implementation of cooperative learning, students have the opportunity to showcase their individual characteristics. Within group studies, students can freely express their opinions. In order to gain agreement from fellow group members, students typically engage in extensive preparatory work, which effectively becomes a form of research-based learning. By presenting their viewpoints more clearly, students can effectively utilize their existing knowledge, carefully analyze and learn new information, and subsequently update their understanding. Simultaneously, attentively listening to others' perspectives enables students to rectify their own mistakes, thereby reconstructing their knowledge and fostering active thinking (Zhang, 2021, pp.95-104).

Through cooperative learning, the comprehensive quality of students was significantly improved. All students have their own characteristics, and in many cooperative learning activities, students learned from their own strengths through communication and cooperation. On one hand, they expanded their knowledge, and on the other hand, they enhanced the relationships between students. Simultaneously, students' sense of cooperation was greatly enhanced. Group cooperative learning accelerated the development of students' cognitive ability and intelligence factors, thereby promoting the improvement of their cooperative ability. Furthermore, cooperative learning enhanced students' communicative ability and enriched their social emotions through the generation of an "affection" factor (Wang, 2020, pp.34-40).

In summary, cooperative learning was achieved through students' collaboration, leading to an improvement in the efficiency of learning tasks. It was through assisting one another in problem-solving that group members accomplish their respective learning tasks. Consequently, cooperative learning promotes the development of individual intelligence, fosters strong social skills, and enhances team cooperation abilities.

2.1.3 The elements of cooperative learning

In order to fully utilize the advantages of cooperative learning in mobilizing students' enthusiasm and creativity and implement cooperative learning teaching practices based on local conditions, it was necessary to explore its essential characteristics, analyze its fundamental elements from various perspectives, and facilitate cooperative learning practical teaching activities.

In cooperative learning, the relationship between middle school students becomes interdependent. They came to realize that their own performance was not only linked to their individual learning but also connected to the support and attention given to the learning progress of other students within the group. Students in the same group could develop a shared sense of honor. This positive interdependence was primarily established through interconnected learning objectives., shared rewards, interactive roles, and common learning materials. Group activities foster an atmosphere of interdependence, enabling students to experience the collective strength and develop a sense of belonging as a team (Xiao, 2017, pp.147-148). Creating such an atmosphere not only allows each team member to recognize their own value but also establishes a mutual supervision mechanism, encouraging active participation, self-expression, and assuming appropriate responsibilities within the team (Shi, 2017, pp.81-83).

In cooperative learning, apart from emphasizing the interdependence among students, it was essential to also focus on individual responsibilities within group cooperation. Individual responsibility, in the context of cooperative learning activities, entails each group member assuming specific responsibilities and completing assigned tasks, as the achievement of group objectives relies on the completion of each member's tasks (Wang, 2014, pp.102-106). Several approaches can be employed to determine individual responsibility. Role interdependence allows students to identify their roles and

tasks within the group. Responsibility contracting involves dividing group tasks into smaller components, with each member sharing a portion of the tasks to collectively achieve the group's goals. Individual responsibility fulfillment can be assessed through methods like "random questions" or "individual tests." Random questioning involves posing questions randomly to group members to assess task completion and measure performance. Individual testing requires group members to independently complete tests, with the results combined to evaluate the overall group performance. Another method involves students correcting each other's homework to foster a sense of "individual responsibility". These approaches collectively apply collective pressure while recognizing the individual worth of each member (Wu, 2014, pp.44-47).

In cooperative learning, students are expected to possess specific social skills. The ability to engage in social communication not only ensures the achievement of cooperative learning objectives but also serves as a goal in itself, with far-reaching implications for students' future development (Xu, 2007, pp.120-121). When teaching social skills, teachers typically follow the following steps: helping students recognize the significance of acquiring particular social skills, facilitating students' comprehension of how these skills are expressed through discussions, motivating students to apply these skills in their daily lives and learning, providing opportunities for students to practice these skills in the classroom, assessing students' utilization of these skills during cooperative learning activities, and encouraging students to master these social skills (Zhou, 2003, pp.33-35)."

To summarize, the fundamental components of cooperative learning encompass the interdependence of students during the learning process, the requirement for individuals to undertake their respective responsibilities within cooperative learning, and the significance placed on students' social skills.

2.2 Student Team Achievement Division (STAD)

The Student Team Achievement Division (STAD) teaching model was initially introduced by Slavin, an American educator, in 1978. According to Slavin, STAD encompasses essential steps in classroom instruction, such as student grouping, effectiveness assessment, individual progress, and group recognition (Jamaludin and

Mokhtar, 2018, p.8). In China, certain scholars refer to the STAD teaching model as group achievement division teaching or student achievement division teaching (Wang and Tan, 2012).

2.2.1 Steps of Student Team Achievement Division (STAD)

The steps involved in practical teaching of the Student Team Achievement Division (STAD) model are typically as follows (Yue, 2018, pp.103-107):

Step 1: Students are classified based on their characteristics, which typically include their learning abilities, academic performance, and gender distribution. It was typically recommended to have four to five students in each group.

Step 2: Teachers deliver instruction in the classroom, following the requirements of the curriculum.

Step 3: Cooperative learning takes place within the student groups, involving activities such as mutual discussion, communication, and assistance. Through collaborative learning within their respective groups, all students collectively complete the course content, as well as the knowledge and skills imparted by the teacher.

Step 4: Following the conclusion of group cooperative learning, individual assessments are conducted based on the specific characteristics of the course and the teaching material.

Step 5: The teacher analyzes the teaching effectiveness by evaluating the test results, including a comparison with students' previous scores. Additionally, the individual learning outcomes and the overall group learning outcomes are quantitatively evaluated based on the grouping situation of the students, serving as a standard for recognition and rewards.

Step 6: Once the learning assessment and evaluation test are concluded, rewards are allocated based on individual and team test results. In certain cases, study groups may be reassigned to address issues such as poor performance within groups or the distribution of excellent students, ensuring a balanced distribution of characteristics and elements among team members.

Therefore, in contrast to traditional teaching methods, the steps of the Student Team Achievement Division (STAD) model skillfully integrate cooperative learning and learning evaluation. It utilizes students' academic progress scores as the

evaluation standard, enabling everyone to achieve results rather than solely focusing on students' final academic achievements (He, 2011, pp.107-110). In the Student Team Achievement Division (STAD) teaching model, teachers are encouraged to group students heterogeneously based on their respective levels, providing opportunities for active thinking, sharing, discussion, and group practice. This approach aims to break away from the conventional approach of direct instructional delivery (Syarwan Ahmad, 2015, pp.256-271).

In other words, during the process of cooperative learning, each student bears the responsibility of completing their own learning tasks, while also assisting other group members in their learning. Through collaborative efforts, the group strives for common progress, with each member dedicated to achieving the team's shared goal, thereby fostering a sense of "coexistence" within the team.

2.2.2 Teaching effectiveness evaluation method of Steps of Student Team Achievement Division (STAD)

The concept of the progress score holds significant importance within the framework of the Steps of Student Team Achievement Division (STAD). According to Slavin, within STAD teaching, the foundation score represents the level of student and group learning prior to STAD instruction, while the progress score indicates the extent of improvement observed in both the student and the group subsequent to STAD teaching. Since the STAD model revolves around group-based instruction, the progress score encompasses both individual progress scores of students and the overall progress score of the group. Slavin proposes a quantitative approach for calculating and measuring progress scores (Silitonga, 2019, pp.517-524).

1) 0 points: After STAD teaching, the students' individual test scores decreased by more than 10 points compared to their baseline scores.

2) 10 points: After STAD teaching, the students' individual test scores decreased by less than 10 points compared to their baseline scores.

3) 20 points: After STAD teaching, the students' individual test scores increased by less than 10 points compared to their baseline scores

4) 30 points: After STAD teaching, the students' individual test scores increased by more than 10 points compared to their baseline scores.

After calculating the progress score for each individual student, the group's progress score was determined by averaging the progress scores of all the students within the group.

2.3 Mind Mapping Techniques

2.3.1 Definition of Mind Mapping

The mind map was a tool utilized for processing information. When students became proficient in mastering it, they could effectively apply it to reading and learning from relevant textbooks. Through activities like creating, communicating, and discussing mind maps, along with other associated exercises, their comprehensive abilities were enhanced.

Mind Mapping, also referred to as a Mind Map, was introduced by the British educationalist Tony Buzan in 1960. The key characteristic of Mind Mapping was known as Radiant Thinking. Essentially, this approach emphasizes the organization of information in a hierarchical, categorized, and interconnected manner. It involves starting with one or a few central topics or keywords and then expanding them radiantly to form a visual framework or structure representing knowledge (Jenkins, 2009, pp.85). Mind Mapping typically utilizes lines, codes, and fonts of different colors to express the structure of knowledge. Some scholars consider Mind Mapping as a means to visually depict the thinking process and outcomes of individuals (Margulies, 2002, pp.122-134).

The mind map serves as a reflection of the brain's thinking process. Human thinking was influenced by various factors, including heredity, environmental conditions during growth, education, and level of knowledge. As a result, the thinking patterns and content within individuals' brains differ from one another. Consequently, the mind maps created by each individual will not be identical. Even when presented with the same keywords, different individuals' thinking processes often lead to remarkably diverse directions (Luo, 2022, pp.18-23).

Simultaneously, the mind map proves to be a valuable tool for processing information effectively. It plays a crucial role in acquiring, organizing, storing, and analyzing information. By employing mind maps, individuals can swiftly identify key points, prioritize tasks, clarify connections between elements, and enhance their

information processing efficiency. Additionally, the mind map serves as a visual thinking tool, rendering thoughts "visible" through the use of images, colors, lines, vocabulary, and other elements. This enables individuals to intuitively observe their thinking process and witness the progression of divergent thinking. As a versatile tool, the mind map finds widespread utility in daily studies, work, and life, allowing individuals to harness their brains more fully, efficiently, and creatively while maximizing their cognitive capabilities (Yang, 2022, pp.46-51).

In conclusion, the visual image serves as the external representation of the mind map. It provides an intuitive reflection of the brain's thinking process and proves to be a significant tool for facilitating information processing, stimulating creativity, and problem-solving. Drawing upon the aforementioned perspectives and a comprehensive review of relevant theoretical works on mind mapping, this study establishes a definition for the concept: Mind mapping was an effective graphical thinking tool that allowed the brain to process information and express divergent thinking.

2.3.2 Elements of Mind Mapping

The mind map was characterized by its structuring approach. It consists of key themes, keywords, lines, and other elements, with each component organically combined based on internal connections to form the overall structure of the mind map (Yan, 2016, pp.24-28). The structure of the mind map follows a hierarchical pattern, where it initiates from a central theme and radiates continuously towards the surrounding areas. Although theoretically, the mind map can expand indefinitely due to its divergent nature, it always maintains its internal structure and connections. Each branch invariably diverges from the central theme or keyword (Hu, 2021, pp.167-169).

The components of a mind map consist of key words or central images, lines, colors, and graphical notations. The key words and central image serve to activate the brain and facilitate associations (Swestyani, et al., 2018, pp.1022). In the creation of a word mind map, the central word acts as the point of origin for other words to branch out from. One of the most captivating aspects of mind maps lies in the skillful utilization of color and lines. These two elements play a crucial role in mind mapping, with lines providing external guidance for the direction and flow of thinking, while color serves as a triggering element that stimulates creativity, association, and mobilizes the sensory

system. These components bring the mind map to life. Furthermore, graphics can visually elucidate the meaning of corresponding words, offering learners a more intuitive impression of the presented words and aiding memorization.

Examining from the perspective of cognitive psychology, it becomes evident that mind maps consistently incorporate numerous vibrant pictures and symbols. This pictorial and intuitive structure transforms extensive and intricate knowledge systems into manageable, bite-sized paragraphs. It aids students in reinforcing key words, memorizing essential and challenging aspects of the text, and greatly stimulating their imagination. Simultaneously, it facilitates the establishment of a strong foundation, enables students to discern crucial and difficult learning points, and promotes the advancement of their thinking abilities. Furthermore, during the process of identifying keywords, clarifying the central content of the text, and grasping the emotional tone conveyed by the author, both teachers and students can deepen their comprehension of the acquired knowledge. Consequently, this enhances not only the teaching proficiency of educators but also elevates the utilization of cognitive capabilities among students, leading to shared progress in the learning journey (He, 2022, pp.163-166).

Through establishing causal relationships and distinguishing various levels of connections, mind mapping enables the visualization of relationships between different layers and organizations. It utilizes an intuitive approach to illustrate the structure and interaction of knowledge, thereby facilitating students' deeper understanding of the interconnections between "parts" and their relationships, rather than isolating them as disconnected fragments of thought. This approach prevents fragmented and incomplete thinking by promoting systematic thinking and comprehensive understanding (Li, 2019, pp.25-34).

In conclusion, mind mapping offers a fresh approach to learning for both teachers and students. Teachers incorporate constructivist principles into their teaching practices, establishing dynamic and flexible classrooms. Mind mapping facilitates meaningful learning and constructive interaction among group members, fostering a relaxed, lively, and enjoyable shared learning experience between teachers and students. It provides a cognitive learning tool for students' cooperative learning, enabling them to construct meaning collaboratively. Additionally, mind mapping cultivates an atmosphere

of equality, relaxation, and innovative communication within the learning environment. Under the guidance of teachers, students can study and analyze mind maps created by experts and scholars, finding inspiration and guidance to explore and innovate. Throughout the process of drawing and communicating, students continuously evaluate and modify their own mind maps while also learning from the mind maps of others. By comparing and contrasting with their peers, they study together and progress together.

2.3.2 Mind Mapping Drawing Process

When manually creating Mind Maps, the necessary tools mainly consist of white paper, colored pens, pencils, and so forth (Rosciano, 2015, pp.93-99). The process of Mind Mapping encompasses the following steps:

Step 1: The core theme words were determined, the purpose was defined, and the problem was addressed. Key words or key questions were written or depicted in the center of the white paper using visual imagery.

Step 2: Building upon the subject words or keywords, key words for each node are extended through concept classification. Nodes are connected using color lines, following natural curves. Additionally, specific symbols or graphics can be drawn beside each node to aid in memory retention.

Step 3: Following a similar approach, branch nodes such as the second level and third level are gradually added, forming an increasingly intricate hierarchical structure of knowledge nodes.

Step 4: It was advisable to leave some empty branch nodes in the Mind Map, enabling subsequent refinement and convenient addition of new content.

After undergoing continuous refinement and modification using the aforementioned methods, a complete Mind Map can be achieved. Throughout this process, each instance of drawing, modifying, and enhancing the Mind Map becomes a dynamic process of thinking and innovation.

With the rapid advancement of computer technology, numerous software tools have emerged that facilitate the creation of Mind Maps, such as Xmind and Mind Master. These software tools offer a wide range of features, including comprehensive rendering functions, enabling easy inspection, adjustment, and visualization of Knowledge nodes. Moreover, they provide an extensive collection of Mind Map templates tailored

to different application scenarios, mapping layouts, color configurations, and more. Leveraging these pre-designed Mind Map templates significantly enhances the efficiency and quality of rendering Mind Maps (Tang et al., 2021, pp.27-32).

When creating mind maps, meticulous attention should be given to the details of drawing various elements, especially considering the visual stimuli associated with each element. According to the dual coding theory, the visual channel serves as a crucial means of inputting information, with two independent coding systems: one for language processing and the other for non-language processing. Consequently, words and images form the foundation for constructing effective mind maps. The text utilized should consist of simple words rather than full sentences, and additional modifications can be made to the text, such as adjusting the font size and using different colors to emphasize different concepts. It was important to ensure uniformity of colors within branches while also distinguishing between branches by employing contrasting colors (Huo, 2021, pp.137-144). The use of images should be integrated throughout the entire mind map, including the central image and the images associated with each key word or branch node. While incorporating images proves effective, it was essential to strike a balance in terms of quantity and timing—avoiding excessive or insufficient use. Furthermore, there should be a meaningful correlation between the images and the content they represent.

In a comprehensive mind map, the arrangement of elements should convey a sense of hierarchy and fluidity. The spacing between branches ought to be appropriately organized, taking into account different levels and categories. These elements collectively serve to highlight and emphasize key points within the mind map in a moderate and effective manner, thereby enhancing individual memory and fostering creativity (Zhang, 2020, pp.556-559).

One of the primary functions of the mind map was to structure thinking and alleviate confusion in logical reasoning. Consequently, as the external representation of an individual's internal thinking process, the clarity of a mind map holds significant importance. A well-structured mind map signifies organized thinking, fostering the cultivation of logical reasoning skills. Conversely, a vague mind map can hinder the development of individual thinking. Therefore, during the creation process, it was

essential to ensure the production of a well-organized and logically structured mind map from both internal and external perspectives (Wang, 2022, pp.357-361).

In conclusion, the production of a mind map involved three distinct stages. The first stage was the acceptance stage, where the emphasis was on imitation. Drawing mind maps based on standard works was crucial during this stage, as it served as the fundamental training process. The second stage was the application stage. Once the drawing rules of mind maps are mastered, individuals can explore creating mind maps with their own unique style and apply them in various areas of life and learning. The third stage was the adaptation stage, which represents the pinnacle of mind mapping. During this stage, mind maps can fully unleash their potential in fostering divergent and creative thinking.

2.4 Learning Achievement

2.4.1 Learning Target

In this research, the focus was on the course "Basic Knowledge of Tour Guides" offered in secondary vocational schools. The primary subject matter of the course involves studying the distribution, characteristics, and content of tourist resources in various locations. Based on the findings of numerous scholars in China, it was typically expected that secondary vocational students attain the following objectives through their study of the "Basic Knowledge of Tour Guides" course (Qi Ying, 2020, pp.86-89).

1) Developed familiarity with and attained mastery over the knowledge pertaining to Chinese history and culture that was relevant to the tour guide industry.

2) Acquire and proficiently comprehend knowledge concerning the geological and geomorphological tourist landscapes across different regions of China.

3) Acquire and proficiently comprehend knowledge regarding the scenic water tourism landscapes present throughout China.

4) Acquire and proficiently comprehend knowledge concerning the landscape meteorology and climate-related tourist landscapes found across various regions of China.

5) Acquire and proficiently comprehend knowledge regarding the ornamental biological tourist landscapes in different parts of China.

6) Acquire and proficiently comprehend knowledge regarding the tourist landscapes of historical relics and historic sites across various regions of China.

7) To become acquainted with and achieve proficiency in the urban tourism landscapes present in different regions of China.

8) To gain familiarity with and achieve mastery in the ethnic and folk customs observed in various regions of China.

9) To develop familiarity with and acquire mastery over the scenic spots and world heritage sites located throughout China.

In summary, the Learning achievement of the "Basic Knowledge of Tour Guides" course necessitates students to acquire mastery and memorize a substantial amount of content. The chapters within the course may not have close interrelationships, demanding students to quickly memorize a significant number of knowledge points within a limited timeframe.

2.4.2 Course Features

In accordance with the learning objectives of the "Basic Knowledge of Tour Guides" course within secondary vocational schools, this course held significant importance as one of the key foundational courses for students majoring in Tour Guide studies. It was also a compulsory course for students seeking qualification in the Tour Guide industry. Consequently, the "Basic Knowledge of Tour Guides" course played a vital role in the development of students pursuing Tour Guide studies within secondary vocational schools. Given the distinctive nature of the course, numerous scholars in China had conducted extensive research. Based on a compilation of scholars' perspectives and research findings, the course exhibited the following characteristics:

1) The "Basic Knowledge of Tour Guides" course encompasses a wide range of subjects and features a diverse and intricate knowledge structure. It involves topics such as China's history, geography, religion, ethnicity, customs, architecture, and more. For secondary vocational students, mastering the contents and knowledge within these courses can prove to be quite challenging (Lu Linxin and Ge Jianjun, 2019, pp.245-247).

2) The "Basic Knowledge of Tour Guides" course involves a relatively high degree of knowledge integration. Typically, students learn about tourist landscapes

individually based on their characteristics within the course. However, in actual Tour guide services, they are required to classify tourist landscapes based on regions. This necessitates students to effectively integrate the knowledge points covered in the course, becoming well-versed in the contents, characteristics, and customs of various tourist landscapes found in different regions (Pan Qing, 2021, pp.48-50).

3) The teaching schedule for the "Basic Knowledge of Tour Guides" course was quite demanding. As a significant foundational course for Tour Guides in secondary vocational schools, it was typically taught during the first year, with a duration of one semester. Given the extensive teaching content of the course, students were expected to diligently study during class time and invest additional time in reviewing and reinforcing their understanding of the various knowledge points (Qian Wei, 2019, pp.91-93).

In conclusion, the basic knowledge course for tour guides in secondary vocational schools was characterized by its extensive and intricate content, comprising numerous small knowledge points. During the teaching process, there was a need to effectively integrate these knowledge points and assist students in memorizing them. Moreover, the knowledge system covered in the tour guide basic knowledge course served as the foundational skills that students had to acquire in order to pursue a career in the tour guide industry upon graduation.

2.4.3 Achievement Type

The assessment approach for the "Basic Knowledge of Tour Guides" course primarily consists of two types: "examination" and "practice" (Chen, 2018, pp.84-86).

1) The examination-based achievement evaluation involved assessing students' knowledge of various domestic tourism landscapes through closed-book examinations. Typically, the test was scored out of 100, with a minimum passing requirement of 60 points for students.

2) The practical achievement evaluation focuses on evaluating students' comprehensive application of course knowledge in practical settings, aligned with the objectives of the "Basic Knowledge of Tour Guides" course. This evaluation was often conducted through group simulations of landscape introductions and tour services,

mimicking real-life tour guide scenarios. It assesses students' ability to effectively utilize knowledge related to various domestic tourism landscapes.

The classification of achievement types outlined above was based on the objective orientation, content structure, teaching characteristics, and overall training program of the Tour Guide major in secondary vocational schools. This classification has received unanimous recognition from numerous domestic scholars.

2.5 Relevant Research

2.5.1 Domestic Research

Hong Bingqian (2021) conducted a study on the application of the STAD cooperative learning model in the context of the reform of ideological and political curriculum in Chinese high schools. Currently, ideological and political course instruction in senior high schools in China primarily focuses on one-way knowledge indoctrination, resulting in low student engagement and enthusiasm for learning, which leads to relatively poor teaching outcomes. In response to this, Hong Bingqian incorporated a group cooperation teaching program into the traditional classroom instruction. The specific steps involved teacher-led class teaching, group learning by students, assessments, student feedback, group adjustments, and recognition. By combining the STAD teaching model with traditional classroom instruction, it was proposed that the STAD model could maximize students' enthusiasm for learning and their engagement in discussions within the ideological and political courses, leading to a significant improvement in academic performance by approximately 10%. Furthermore, Hong Bingqian also highlighted important considerations for implementing the STAD model in high school ideological and political teaching, such as selectively applying it based on the course content, strengthening classroom management, and assigning learning responsibilities to each team member.

Zhang Ying and Wang Xiaoping (2020) conducted a study on the application of mind mapping in English writing instruction in Chinese senior high schools. Through the organization, compilation, and analysis of research findings from various Chinese scholars, they discovered that the combination of mind mapping technology and the STAD teaching model accounted for over 70% of all the studies

conducted. Additionally, Zhang Ying and Wang Xiaoping highlighted the limitations of current research in this field in China, such as one-sided research perspectives, reliance on a single research method, and insufficient research conclusions. They also provided specific implementation suggestions for incorporating mind mapping and the STAD teaching model in English writing instruction in Chinese high schools. These suggestions encompass aspects such as emphasizing the proper execution of mind map creation, forming student groups in a scientific manner, enhancing guidance throughout the student learning process, and enriching the collection and analysis of teaching data.

Zhang Cuiling (2021) asserts that with the rapid advancements in mobile devices and network technology, the potential and feasibility of group teaching have significantly increased. In light of this, an online group teaching experiment was conducted in two classes at the Chinese Department of Xinhua College, Sun Yat-sen University, Guangdong Province, China, during the second semester of 2018 to 2019. The experiment involved a total of 47 students, comprising 19 boys and 28 girls. The focus of the experiment was oral Mandarin teaching. The findings indicated that utilizing an online teaching platform and implementing group learning among students can enhance their enthusiasm for learning and facilitate communication between students and teachers. For instance, students were able to directly upload their Mandarin pronunciation exercises to the teaching platform through recorded submissions, allowing teachers to review and provide guidance. Additionally, fellow students could listen to these recordings and offer comments and feedback.

Yue Li (2016) conducted a study on the implications of the STAD model for English classroom teaching in primary and secondary schools in China. The study involved analyzing the basic characteristics and principles of STAD teaching, leading to the conclusion that the application of the STAD model had a relatively positive effect on English classroom teaching in primary and middle schools. The study also emphasized that when adopting STAD teaching, teachers should design teaching plans based on the specific contents of English instruction, rather than directly applying the prescribed principles of STAD. Additionally, it was highlighted that improving teachers' ability to formulate and implement evaluation schemes and strategies for each learning group in STAD teaching was necessary to eliminate any negative factors that may arise within and

between different groups. Furthermore, the study included an examination of five concrete teaching cases, which discussed the specific implementation process and experiences of STAD teaching. Based on these case studies, Yue Li concluded that the teaching content of English courses in primary and secondary schools in China was better suited for instruction through mind mapping. Consequently, a teaching scheme that combined STAD and mind mapping technology was proposed. Ji Yanling (2020) conducted a study on the methods and principles of utilizing mind mapping technology in undergraduate biology teaching. The study focused on the microbiology course and employed Xmind to create mind maps for several chapters by analyzing the course content and learning objectives. Building upon this foundation and considering the learning characteristics of undergraduate students, the study proposed a group learning teaching scheme based on mind maps. Additionally, specific suggestions were provided for implementing the scheme, including the fundamental aspects of mind map creation, the core principles for student groups, and the essential steps in the teachers' teaching process.

Snow White (2016) conducted a study on the application of mind map teaching in computer education in Chinese colleges. A teaching experiment was conducted, wherein specific mind maps and teaching cases were developed based on the computer teaching contents, schedules, and objectives of the college curriculum. The study concluded that although the content of computer courses in colleges and universities was extensive, it can be easily classified and summarized. Consequently, utilizing mind mapping technology in teaching activities can aid students in better understanding the course material and enhancing their performance in examinations. The study focused on the application of mind maps in college computer education for public courses.

We (2022) argued that the application of mind map technology should be strengthened in Chinese reading teaching in primary schools in China. This was because the content of Chinese reading courses in primary schools was limited, but there was a certain regularity in the arrangement of texts in terms of theme and teaching objectives. Therefore, by utilizing mind mapping and visual expression, structured knowledge could be presented, assisting students in better understanding new words and expressions, and enhancing their reading ability and writing skills.

Zhu Jing (2018) conducted a study on group learning issues in social investigation method courses in Chinese universities. Based on the primary practical teaching tasks, a specific group learning teaching plan was designed for the course. It was believed that by forming heterogeneous student groups and aligning them with the main teaching tasks of the social survey course, teachers would be better equipped to fulfill their teaching responsibilities and enhance students' social investigation skills. Additionally, attention was drawn to the importance of scientific supervision and evaluation of the groups, appropriate assignment of group tasks, the dynamics between individuals and groups, and the teacher's guidance throughout the group investigation process. These aspects were identified as significant factors to consider when implementing group teaching approaches.

From a domestic research perspective, there exists a substantial body of literature on STAD teaching and mind mapping technology, covering a wide range of research content, methods, and fields. However, the current literature on specific teaching experiments that combine STAD and mind mapping technology remains relatively limited in number.

2.5.2 Foreign Research

Indah, Pidarta and Prasetyo (2018) conducted a study on the application of the STAD teaching model to teach 4th-grade students in groups. Thirteen groups were formed, with five students in each group. Additionally, considering the content and characteristics of each 4th-grade course, the students were guided by teachers to create mind maps. The students then engaged in group discussions, cooperative learning, and mutual assistance to acquire knowledge from the courses. After a semester of teaching experiments, the students' test scores showed significant improvement, with an average increase of 12.8%. The teaching approach emphasized grouping students and employing a team-oriented method for instruction and interactive learning. Evaluation was conducted using regular grades, test scores, and students' learning feedback, which indicated that this learning mode effectively enhanced students' learning performance, enthusiasm for learning, and teamwork abilities.

Fran (2014) conducted a study on the English reading teaching challenges faced by senior middle school students in Indonesia. It was observed that the overall

English reading proficiency of junior middle school students in Indonesia was relatively low, and they encountered difficulties in comprehending texts. Fran S M proposed that cooperative learning could effectively address these issues, primarily by stimulating and fostering students' enthusiasm for English reading. To test this hypothesis, Fran, S. M. designed an English reading course teaching experiment based on the STAD model for a class of 48 junior high school students. The experimental plan, implementation method, process, and outcomes were outlined. It was concluded that by employing appropriate grouping, a well-designed teaching plan, and suitable text difficulty, students, with the guidance and support of the teacher, could quickly grasp and become familiar with the main content of the texts, comprehend their meaning, and improve their English reading proficiency.

Gustiawan and Bisri (2018) conducted a cooperative learning teaching experiment based on the STAD model in the fifth grade of Sukajaya Primary School. Taking into account the content, structure, and objectives of the fifth-grade curriculum, as well as the students' basic characteristics, the students were divided into groups and guided by the teachers. The teaching experiment was conducted for one learning period, utilizing a combination of online and offline teaching approaches. The findings of the experiment revealed that, although the teaching content of the fifth-grade curriculum was relatively straightforward, the implementation of online and offline group cooperative learning methods resulted in approximately a 5% improvement in students' academic performance.

Suwarto (2020) conducted a teaching experiment on cooperative learning using the STAD model among Grade 4 students at SDN 33 Sungai Raya. The experiment involved teaching 38 students in groups, comprising 18 girls and 20 boys. Suwarto implemented the teaching plan through four steps: planning, implementation, reflection, and evaluation. Teaching data was collected and analyzed through direct observation. The teaching experiments revealed that STAD teaching had a significant positive impact on improving students' performance. In the first cycle of the teaching experiment, the proportion of students who reached the "excellent" level was 68.42%. Following reflection and improvements, the proportion of students who achieved the "excellent" level in the second cycle of the teaching experiment increased to 89.47%.

Purba. (2018) Studied the teaching effect of STAD model in fourth grade 046573 Berastagi, Karo. By carrying out STAD teaching among the fourth-grade students, data collection and evaluation analysis were carried out from three aspects of students' individual learning performance, teaching completion degree and students' average score. The results showed that the implementation completion degree of teachers' teaching activities increased from 59% to 71.1% through the STAD teaching model. The completion of the content of the study increased from 62.4 percent to 74.9 percent. At the same time, the average score of the students increased from 64.58 to 76.25 through the quantitative statistics of the examination results.

Based on the existing research literature, it was evident that both the STAD teaching model and Mind Mapping technology have been extensively utilized in teaching activities worldwide, leading to significant research outcomes. The application of the STAD teaching model has been found to have a substantial positive impact on enhancing students' learning initiative, social skills, teamwork abilities, and overall academic performance, as concluded by numerous domestic and international researchers. Mind Mapping, being a technology grounded in brain science, has garnered considerable attention within the education field. Scholars from various regions have achieved remarkable results in utilizing Mind Mapping for teaching courses that require memorization and comprehension of numerous knowledge points or possess complex knowledge structures.

CHAPTER 3
RESEARCH METHODOLOGY

The research on the Student Team Achievement Division combined with mind mapping techniques to develop learning achievement for 1st year of secondary vocational students will have the following details or components:

3.1 Research Design

3.2 Population and Sample

3.3 Research Instrument

3.4 Instrument Development

3.5 Data Collection

3.6 Data Analysis

3.7 Statistics used in Research

3.1 Research Design

The design of the study was a quasi-experimental research, with the experimental design being a Pretest-Posttest Control Group Design.

Table 3.1 Pretest- Posttest Control Group Design

	Pre-test	Independent variable	Post-test
E	T_1	X	T_2
C	T_1	-	T_2

Symbols Used in experimental design.

E = Experimental group

C = Control group

X = The learning management through the Student Team Achievement Division combined with mind mapping techniques

\- = The learning management through the traditional approach

T_1 = post-test of experimental group

T_2 = post-test of control group

3.2 Population and Sample

3.2.1 Population

The population in this study was 113 of 1st year of tourism major studying at the secondary vocational school, Beijing, China, during the academic year 2022-2023.

3.2.2 Sample

The research samples were 40 students of 1st year of tourism major, selected by cluster random sampling, studying at the secondary vocational school, Beijing, China, during the academic year 2022-2023.

3.1.2.1 One class was selected as the experimental group, with 20 students, learning management through the Student Team Achievement Division Combined with mind mapping techniques was adopted in the course "Basic Knowledge of Tour Guides".

3.1.2.2 one class was selected as the control group, with 20 students, learning management through the traditional approach.

3.3 Research Instrument

The research instruments were classified into the types used in the experiment and the instruments used for data collection. With details as follows:

3.3.1 The learning management plan with learning management through the traditional approach on the Basic Knowledge of Tour Guides for 1st year of secondary vocational students. The learning management plan with includes 3 chapters as follows:

Chapter 1: Knowledge of Chinese history and culture

Chapter 2: geological and geomorphological tourism landscape

Chapter 3: scenic water tourism landscape

3.3.2 The learning management plan with learning management through Student Team Achievement Division combined with mind mapping techniques on the Basic Knowledge of Tour Guides for 1st year of secondary vocational students. The learning management plan with includes 3 chapters as follows:

Chapter 1: Knowledge of Chinese history and culture

Chapter 2: geological and geomorphological tourism landscape

Chapter 3: scenic water tourism landscape

3.3.3 Learning achievement test on the Basic Knowledge of Tour Guides for 1st year of secondary vocational students. The test paper contains 30 multiple-choice questions, each multiple-choice question has 4 choices.

3.4 Instrument Development

3.4.1 The learning management plan with learning management through the traditional approach on the Basic Knowledge of Tour Guides for 1st year of secondary vocational students. The steps to instrument development are as follows.

3.4.1.1 Study curriculum of Tour guide, the learning management plan and the learning activities of traditional method.

3.4.1.2 Create the learning management plan with the learning management through the traditional approach on the Basic Knowledge of Tour Guide for control group. The learning management contents include:

Chapter 1: Knowledge of Chinese history and culture

Chapter 2: geological and geomorphological tourism landscape

Chapter 3: scenic water tourism landscape

3.4.1.3 Propose the learning management plan with the learning management through the traditional approach to the advisor check the accuracy of the content and suggestions. Improve the learning management plan follow the suggestion of advisor.

3.4.1.4 Propose the learning management plan with learning management through the traditional approach to 5 experts, including 2 curriculum and instructional experts, 2 Tour Guide experts, and 1 measurement and evaluation education expert. Experts will check the consistent the elements of learning management plan, as well as the consistency of the learning objectives, learning contents, Process of learning management through the traditional approach, learning materials, and measuring learning. The scoring criteria are as follows:

Score 1: When sure that the elements of learning management plan are consistent.

Score 0: When unsure that the elements of learning management plan are consistent.

Score-1: When sure that the elements of learning management plan are not consistent.

3.4.1.5 Analysis of the item-objective Congruence (IOC) of the learning management plan with the learning management through the traditional approach by experts. The value of the item-objective congruence (IOC) index greater than or equal to 0.50. The analysis results showed that the IOC value was equal to 1.00.

3.4.1.6 Improve the learning management plan with the learning management through the traditional approach follow the suggestion of expert before try-out.

3.4.1.7 Try-out the learning management plan with learning management though the traditional approachwith33 of the1st year of secondary vocational students, who are not the sample.

3.4.1.8 Improve and publish the learning management plan with learning management though the traditional approach before collect data.

3.4.1.9 Collect data with control group by the learning management plan with the learning management through the traditional approach on the Basic Knowledge of Tour Guide.

3.4.2 The learning management plan with learning management through the Student Team Achievement Division combined with mind mapping techniques on the Basic Knowledge of Tour Guides for 1st year of secondary vocational students. The steps to instrument development are as follows.

3.4.2.1 Study curriculum of Tour guide, the learning management plan and the learning activities of the Student Team Achievement Division and mind mapping techniques. Summarizes the following concepts:

1) The learning management through the Student Team Achievement Division (STAD) was a collaborative learning strategy in which small groups of learners with different levels of ability work together to accomplish a shared learning goal. It was devised by Robert Slav in and his associates at Johns Hopkins University, students are assigned to four or five member learning teams that are mixed in performance level, gender, and ethnicity. The teacher presents a lesson, and then students work together within their teams to make sure that all team members have mastered the

lesson. Finally, all students take individual quizzes on the material, at which time they may not help one another. Students' quiz scores are compared to their own past averages, and points are awarded on the basis of the degree to which students meet or exceed their own earlier performance. These points are then summed to form team scores and teams that meet certain criteria may earn certificates or other rewards.

2) Mind mapping was a type of diagram that used images to organize information. It employed a central keyword or idea to connect all representative words, ideas, tasks, or other related items in a radial line. Various methods could be used to express people's ideas through mind mapping, such as priming, visual visualization, building systems, and taxonomy.

Drawing from the research of relevant concepts, theories, and methodologies, the Researcher designed the learning management plan through instructional models of cooperative learning by Student Team Achievement Division. In summary, the steps in implementing the STAD learning model were as follows: (Slavin, 1995).

Table 3.2 Steps of learning management through the STAD learning model.

Steps	Learning management through the STAD learning model
Steps1 Presentation of the class	The teacher presents the material in front of the class in the classical style that focuses on the concepts of matter to be discussed only. Furthermore, students are asked to learn in small groups to work on tasks assigned by the teacher.
Steps 2 Learning group	Students are organized into groups whose members are heterogeneous (both academic ability and gender). The trick with rank students based on grades or the last value obtained before the student STAD cooperative learning models. The function of this grouping was to encourage cooperation in the group study the material and complete the tasks assigned by the teacher. Mind mapping was a central keyword or idea to connect all representative words, ideas, tasks, or other related items in a radial line

Table3.2 Steps of learning management through the STAD learning model (Cont.)

Steps	Learning management through the STAD learning model
Steps 3 Test or quiz	After studying the group completed the test, quiz was held with the objective of identifying, or the ability to measure student learning of the material has been studied. In this case, the student was not allowed to work with his friend. The purpose of this test was to motivate students to try and individually responsible. Students are required to do my best as a result of group learning. In addition to individual responsibility, the students also must realize that businesses and their success will be very valuable to contribute to the success of the group. This test was conducted after one to two sessions of classes and group learning.
Steps 4 Score increase in the individual	This was done to provide the students with a attainable goal, achievable through their hard work and demonstrated improvement compared to their previous results. Manager scores the results of the cooperation of students performed in the following order: score early, score tests, and score of the group increased.
Steps 5 Award group	An award was given to the group as a token of appreciation for the efforts they had put forth during the study.

3.4.2.2 Create the learning management plan with the learning management through the Student Team Achievement Division combined with mind mapping techniques on the Basic Knowledge of Tour Guide for control group. The learning management contents include:

Chapter 1: Knowledge of Chinese history and culture

Chapter 2: geological and geomorphological tourism landscape

Chapter 3: scenic water tourism landscape

3.4.2.3 Propose the learning management plan with the learning management through the Student Team Achievement Division combined with mind mapping techniques to the advisor check the accuracy of the content and suggestions. Improve the learning management plan follow the suggestion of advisor.

3.4.2.4 Propose the learning management plan with learning management through the Student Team Achievement Division combined with mind mapping techniques to 5 experts, including 2 curriculum and instructional experts, 2 Tour Guide experts, and 1 measurement and evaluation education expert. Experts will check the consistent the elements of learning management plan, as well as the consistency of the learning objectives, learning contents, Process of learning management through the Student Team Achievement Division combined with mind mapping, learning materials, and measuring learning. The scoring criteria are as follows:

Score 1: When sure that the elements of learning management plan are consistent.

Score 0: When unsure that the elements of learning management plan are consistent.

Score-1: When sure that the elements of learning management plan are not consistent.

3.4.2.5 Analysis of the item-objective Congruence (IOC) of the learning management plan with the learning management through the Student Team Achievement Division combined with mind mapping techniques by experts. The value of the item-objective Congruence (IOC) index greater than or equal to 0.50. The analysis results showed that the IOC value was equal to 1.00.

3.4.2.6 Improve the learning management plan with the learning management through the traditional approach follow the suggestion of expert before try-out.

3.4.2.7 Try-out the learning management plan with learning management though the Student Team Achievement Division combined with mind mapping techniques with 33 of the1st year of secondary vocational students, who are not the sample.

3.4.2.8 Improve and publish the learning management plan with learning management though the Student Team Achievement Division combined with mind mapping techniques before collect data.

3.4.2.9 Collect data with experimental group by the learning management plan with learning management though the Student Team Achievement Division combined with mind mapping techniques on the Basic Knowledge of Tour Guide.

3.4.3 Learning achievement test on the Basic Knowledge of tour guides. The test was conducted according to chapters. The test paper contains 30 multiple-choice questions, each multiple-choice question has 4 choice. The steps to instrument development are as follows:

3.4.3.1 Study the curriculum and concepts, theories of learning achievement test and how to create learning achievement test.

3.4.3.2 Create the learning achievement test on the Basic Knowledge of Tour Guides which contains 60 multiple-choice questions. Each multiple-choice question has 4 choice.

3.4.3.3 After the researchers have created the learning achievement test on the Basic Knowledge of Tour Guides. Propose the learning achievement test to thesis advisor to check the accuracy of the content and suggestions.

3.4.3.4 Improve the learning achievement test according to the suggestions by the advisor.

3.4.3.5 Propose the learning achievement test to 5 experts, including 2 Tour Guides experts, 2 curriculum and instructional experts and 1 measurement and evaluation education expert. Experts will check the correctness and the consistency of item of exam and learning objectives. The scoring criteria are as follows:

Score 1: When sure that the item of exam to congruence the learning objectives

Score 0: When unsure that the item of exam to congruence the learning objectives

Score-1: When sure that the item of exam to not congruence the learning objectives

3.4.3.6 The evaluation scores of experts were analyzed to the learning achievement test whether the content of the paper was consistent with the learning objectives. The formula IOC (Index of Item Objective Congruence) was used for analysis,

and the IOC value was between 0.50 and 1.00. The analysis results showed that the IOC value was equal to 1.00.

3.4.2.7 Try-out the learning achievement test on the Basic Knowledge of Tour Guides with 33 of the 1st year of secondary vocational students, who are not the sample.

3.4.3.8 Analyze difficulty and discriminating power of the learning achievement test by specifying the quality criteria of the learning achievement test with a difficulty of 0.20 - 0.80 and a discriminating power from 0.20 - 1.00. Select a quality item of the test 30 items. The analysis results showed that the test with a difficulty of 0.40 - 0.80 and a discriminating power from 0.40 - 0.80.

3.4.3.9 Analyze Reliability of the learning achievement test by Cronbach's alpha coefficient; α. The analysis results showed that the total confidence value test was 0.979.

3.4.3.10 Improve and publish the learning achievement test that have passed the quality before collect data.

3.4.3.11 Collect data with control group and experimental group by learning achievement test on the Basic Knowledge of Tour Guide.

3.5 Data Collection

This research data was collected. Researchers collected data in the following sequence:

3.5.1 Preparation steps:

3.5.1.1 Contact to the graduate official, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, to make the letter request for collect data with the sample from the secondary vocational school.

3.5.1.2 Contact administrator of a secondary vocational school for assistance and cooperation to collect data from sample.

3.5.1.3 Explained the 1st year of secondary vocational students to understand their roles and responsibilities in the learning management with control group and experimental group.

3.5.2 Experimental steps

3.5.2.1 Before the learning management, pretest with control group and experimental group of the 1st year of secondary vocational students by learning achievement test on the Basic Knowledge of Tour Guide.

3.5.2.2 Collect data with control group by learning management through the traditional approach and experimental group by learning management though through the Student Team Achievement Division combined with mind mapping techniques.

3.5.2.3 After the learning management, posttest with control group and experimental group of the 1st year of secondary vocational students by learning achievement test on the Basic Knowledge of Tour Guide.

3.5.3 Summary steps

3.5.3.1 Analyzed the scores by basic statistics and statistics used in hypothesis testing

3.5.3.2 Summarize data in tabular form, describe research findings and discuss.

3.6 Data Analysis

3.6.1 Study instrument quality analysis

3.6.1.1 The Index of Item Objective Congruence (IOC) was used to analyze the effectiveness of the learning management plan and the learning achievement test.

3.6.1.2 Cronbach Alpha Coefficient; α formula was used to reliability confidence value (Reliability) of the learning achievement test.

3.6.1.3 Difficulty of a learning achievement test with a passing threshold of 0.20 to 1.00

3.6.1.4 Discriminating power of a learning achievement test should have a value of 0.20 or higher.

3.6.2 Analysis used in hypothesis testing.

3.6.2.1 To compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach used the dependent samples t-test.

3.6.2.2 To compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques used the dependent samples t-test.

3.6.2.3 To compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques used the independent samples t-test.

3.7 Statistics used in Research

3.7.1 Basic statistics

The descriptive statistics such as mean and standard deviation will be used by the researcher to primarily analyze the data gathered from the experimental units.

3.7.1.1 Mean

$$\bar{x} = \frac{\sum x}{N}$$

$\bar{x}$ = refers to the mean

$\sum x$ = Was the summation of all observations.

N = Was the number of observations.

3.7.1.2 Standard Deviation

$$\bar{x} = \frac{\sum (x-\bar{x})^2}{n-1}$$

$x - \bar{x}$ = Was the difference between the observation (score) and the mean of the distribution

$(x-\bar{x})2$ = Was the squared deviation of the scores from the mean

$n - 1$ = Was the number of observations minus the 1

3.7.2 Statistics used in quality inspection of instruments.

The statistics such as Index of item Objective Congruence (IOC), Reliability (Cronbach Alpha Coefficient), Difficulty, and Discriminating Power will be used in quality inspection of instruments.

3.7.2.1 Index of item Objective Congruence (IOC)

$$IOC = \frac{\sum R}{N}$$

IOC = Was the Item Objective Congruence Index

$\sum R$ = Was the summation of 1 in all raters

N = Was the number of items

3.7.2.2 Reliability (Cronbach Alpha Coefficient)

$$\propto = \frac{k}{k-1}\left[1-\frac{\sum s_i^2}{s_i^2}\right]$$

$\propto$ = Was the Cronbach alpha coefficient

k = Was the number of items

$\sum s_i^2$ = Was the sum of the variances of each item

s_i^2 = Was the variance of the total column

3.7.2.3 Difficulty

$$P = \frac{R}{N}$$

P = Difficulty index of item

R = Number of correct answers to item

N = Number of correct answers plus number of incorrect answers to item

3.7.2.4 Discriminating power.

$$B = \frac{U}{n_1} - \frac{L}{n_2}$$

B = Discriminating Index

U = Correct answer in upper group

L = Correct answer in lower group

n_1 = No. of examinee in upper

n_1 = No. of examinee in lower

3.7.3 Statistics used in hypothesis testing.

3.7.3.1 The independent Samples t-test was used to compare the means of two groups to determine whether there was statistical evidence indicating significant differences in the associated sample means.

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{s_p^2\left[\frac{1}{n_1} + \frac{1}{n_2}\right]}}$$

$\overline{x_1}$ = Mean of first sample

$\overline{x_2}$ = Mean of second sample

n_1 = Sample size of first sample

n_2 = Sample size of second sample

S_1 = Standard deviation of first sample

S_2 = Standard deviation of second sample

S_p = Pooled standard deviation

3.7.3.2 The dependent samples t-test (also referred to as the paired t-test or paired-samples t-test) was used to compare the means of two related groups in order to determine whether there was a statistically significant difference between these means.

$$t = \frac{\sum D}{\sqrt{\frac{n\sum D^2 - (\sum D)^2}{n-1}}}$$

$\sum D$ = Sum of the differences

$\sum D^2$ = Sum of the squared differences

$(\sum D)^2$ = Sum of the squared differences, squared

CHAPTER 4
RESEARCH RESULT

The study the learning management through the Student Team Achievement Division combined with mind mapping techniques to develop learning achievement for 1st year of secondary vocational students. The objectives to study: 1) to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach, 2) to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques, and 3) to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques. The following will also be presented in this section:

4.1 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach.

4.2 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques.

4.3 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques.

4.1 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach.

Table 4.1 Mean, Standard Deviation, dependent samples t-test, and the level of statistical significance in the analysis to compare the learning achievement before and after learning management through the traditional approach.

The learning management through the traditional approach	n	$\bar{x}$	s	t	df	Sig.
Before	20	16.10	1.861	15.377*	19	0.000
After	20	19.15	1.927			

From Table 4.1, it was found that the students' learning achievement has a mean before the learning management through the traditional approach at16.10 ($\bar{x}$=16.10, S=1.861) and after learning at 19.15 ($\bar{x}$=19.15, S=1.927). When comparing the test scores for both tests, it was found that students' learning achievement after learning management through the traditional approach was higher than before at the statistical significance level of .05.

4.2 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques.

Table 4.2 Mean, Standard Deviation, dependent samples t-test, and the level of statistical significance in the analysis to compare the learning achievement before and after the learning management through the Student Team Achievement Division combined with Mind Mapping techniques.

The learning management through the STAD combined with Mind Mapping techniques	n	$\bar{x}$	s	t	df	Sig.
Before	20	18.50	1.606	11.261*	19	0.000
After	20	23.20	1.399			

From Table 4.2, it was found that the students' learning achievement *has* a mean before the learning management through the Student Team Achievement Division combined with Mind Mapping techniques at 18.50 ($\bar{x}$=18.50, S=1.606) and after at 23.20 ($\bar{x}$=23.20, S=1.399). When comparing the test scores for both tests, it was found that students' learning achievement after learning management through the Student Team Achievement Division combined with Mind Mapping techniques was higher than before at the statistical significance level of .05.

4.3 The analysis to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques.

Table 4.3 Mean, Standard Deviation, Independent samples t-test, and the level of statistical significance in the test comparing the 2 groups of the learning achievement through the traditional approach and Student Team Achievement Division combined with Mind Mapping techniques.

Learning Management	n	$\bar{x}$	s	t	df	Sig.
Traditional approach	20	19.15	1.93	-7.606*	38	0.000
STAD combined with Mind-Mapping techniques	20	23.20	1.40			

From Table 4.3, it was found that the test for the difference in the means of 2 groups of students' learning achievement *has* a mean after the learning management through the traditional approach at19.15 ($\bar{x}$=19.15, S=1.927) and through the Student Team Achievement Division combined with Mind Mapping techniques at 23.20 ($\bar{x}$=23.20, S=1.399). Therefore, from the independent samples t-test, it was found that the mean between the students' learning achievement with learning management through the Student Team Achievement Division combined with Mind Mapping techniques was higher than through the traditional approach at the statistical significance level of .05.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

The objectives of this research were: 1) to compare the 1st year of secondary vocational students learning achievement between before and after learning management through the traditional approach, 2) to compare the student's learning achievement before and after learning management through the Student Team Achievement Division combined with mind mapping techniques, and 3) to compare the students learning achievement after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques. The research samples were 40 students in 1st year of tourism major, selected by cluster random sampling, studying at the secondary vocational school, in Beijing, China, during the academic year 2022-2023. The research instruments consisted of: 1) the learning management plan with learning management through the traditional approach, 2) the learning management plan with learning management through Student Team Achievement Division combined with mind mapping techniques, and 3) the learning achievement test. The statistics used to analyze the data were mean, standard deviations, independent samples t-test and dependent samples t-test. Also presented in this part will be the following:

5.1 Summary of Research Results

5.2 Discussion and Recommendation

5.3 Implication for Practice and Future Research

5.1 Summary of Research Results

5.1.1 Results to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the traditional approach.

The results revealed that the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides have a mean before the learning management through the traditional approach 16.10 ($\bar{x}$= 16.10, S= 1.861) and after 19.15 ($\bar{x}$= 19.15, S= 1.927). When comparing the test scores for both tests, it was

found that 1st year secondary vocational students learning achievement after learning management using the traditional approach was higher than before at the statistical significance level of .05.

5.1.2 Results to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the before and the after learning management through the Student Team Achievement Division combined with mind mapping techniques.

The results revealed that the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides have a mean before the learning management through the Student Team Achievement Division combined with mind mapping techniques 18.50 ($\bar{x}$=18.50, S=1.606) and after 23.20 ($\bar{x}$=23.20, S=1.399). When comparing the test scores for both tests, it was found that 1st year secondary vocational students learning achievement after learning management through the Student Team Achievement Division combined with mind mapping techniques was higher than before at the statistical significance level of .05.

5.1.3 Results to compare the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides between the after learning management through the traditional approach and the learning management through the Student Team Achievement Division combined with mind mapping techniques.

The results revealed that the test for the difference in the means of 2 groups of the 1st year of secondary vocational students learning achievement on the Basic Knowledge of Tour Guides has a mean after the learning management through the traditional approach 19.15 ($\bar{x}$=19.15, S=1.927) and the learning management through the Student Team Achievement Division combined with mind mapping techniques 23.20 ($\bar{x}$=23.20, S=1.399). Therefore, from the independent samples t-test, it was found that the mean between the 1st year of secondary vocational students learning achievement with learning management through the Student Team Achievement Division combined with mind mapping techniques was higher than the learning management through the traditional approach at the statistical significance level of .05.

5.2 Discussion and Recommendation

5.2.1 The comparative results of pre-and post-students' learning achievement in Basic Knowledge of Tour Guides of those studying through the traditional approach showed that the post-learning achievement was higher than the pre-learning at the statistical significance level of .05. This may result from the traditional teaching being the most direct and effective method. Teachers control and inspire students effectively when the students encounter problems or arise conflicts. Teachers take flexible teaching methods adjusting the content according to the actual requirement under the general teaching arrangement which was not only conducive to cultivating the basic technique but also for the good habit of forming students' self-study ability. Teachers' actions and language become the target imitated by learners whose outlook towards right and wrong, attitude, value orientation, and academic level have a great impact on students (Jenkins, A., 2019, pp.85). So, after traditional teaching, students' scores are higher than before and causing certain teaching effects. This reason was that the after-learning achievement through the traditional approach was higher than the before-learning management.

5.2.2 The comparative results of pre-and post-students' learning achievement in Basic Knowledge of Tour Guides of those studying through the Student Team Achievement Division combined with Mind Mapping techniques showed that the post-learning of those studying through the Student Team Achievement Division combined with Mind Mapping techniques was higher than before at the statistical significance level of .05. This may cause by such a learning type. It will be more effective if students are also allowed to contribute directly and develop creativity in pouring ideas. According to Theory and Vygotsky's theory, they believe knowledge arises from learners' creation by participating in the search for knowledge and interacting with friends. When knowledge was found beyond the level of wisdom to study by oneself, friends who study better than teaching, increase academic achievement such as the use of mind-mapping techniques in learning (Ji, Y. L., 2020, pp.4300-4308). One of the benefits of using collaborative learning was enhancing learning achievement and increasing social skills. The second benefits are as the more students work together in collaborative groups, the more they understand, retain, and feel better about themselves and their peers. Moreover, working together in a collaborative environment encourages student responsibility for learning. In

addition, This method of teaching was combined with mind-mapping techniques, which could have been an excellent alternative to applied learning, as it helped individuals understand concepts and memorize information using a learning tool that harnessed their creativity. Furthermore, this research was also supported by Johnson, D. and Stanne. M., (2000, pp.455-468), who studied the development of science process skills and learning achievement of Mathayomsuksa 4 students on "Genetic Transformation" using cooperative learning: Student Teams Achievement Division (STAD) integrated with Mind Mapping. At this point, it was found that the students' post-learning achievement was higher than the pre-learning at the .01 statistical significance level. The reason was that learning achievement after studying through the Student Team Achievement Division combined with Mind Mapping techniques had been higher than before.

5.2.3 The post-learning achievement comparative results of the 1st year of secondary vocational students learning in the Basic Knowledge of Tour Guides between those studying through the traditional approach and the Student Team Achievement Division combined with Mind Mapping techniques found that those studying through the Student Team Achievement Division combined with Mind Mapping techniques was higher than those studying through the traditional approach at the statistical significance level of .05. This could have been a result of Student Team Achievement Division being a form of cooperative learning where students worked in groups of four or five. The Student Team Achievement Division's learning model also aimed at enhancing students' academic learning outcomes. Students could benefit from diverse perspectives from their peers and develop social skills. To address disparities in student achievements, it was strongly recommended that a student-oriented learning process be employed across various cooperative learning models for all disciplines within educational units led by qualified instructors. (Johnson, J., 2009, pp.365-379). Therefore, different from traditional teaching, the steps of the Student Team Achievement Division (STAD) model skillfully integrate cooperative learning and learning evaluation and takes the assessment of a student's academic progress score as the evaluation standard so that everyone can achieve results instead of being limited to the final academic achievement of students (Linxin, L. and Jianjun G., 2019, pp.245-247).

Theoretically, learning with the STAD-type cooperative learning model was considered superior to the traditional learning approach. In STAD-type or cooperative learning, students must think and cooperate with their group in doing the LAS, helping each other, and ensuring that each student must understand the material (Margulies, N., 2002, pp.122-134). In addition, it was combined with mind-mapping techniques, which could help students construct a knowledge framework, promote their overall grasp of the curriculum, and strengthen their thinking logic and memory abilities through the completion of the mind map. It was beneficial for learning (Pan, Q., 2021, pp.48-50). Furthermore, this research was also supported by Purba, I. (2018, pp.102-111) who studied the effect of cooperative learning on academic achievement in Physics and it was found that students in the experimental group taught by cooperative learning (STAD technique) were more successful than those in the control group. At this point, it was found that cooperative learning increased students' academic achievement to a higher level compared to the traditional teaching method. This finding was consistent with the research results of Ying, Q. (2021, pp.86-89) who studied the Effectiveness of Students' Team Achievement Division on Students' Attitudes toward Physics. The study showed that the problem-solving ability of the experimental group taught through STAD was significantly higher than the control group who learned through the traditional teaching method. This was due to the fact that learning achievement with learning management through the Student Team Achievement Division combined with Mind Mapping techniques had been higher than the traditional approach.

5.3 Implication for Practice and Future Research

5.3.1 Suggestions for applying the research results.

Cooperative learning focuses on the interaction between individuals and group members to promote learning which not only improves the cognitive ability of individuals but also promotes the occurrence of win-win cooperation in groups. This was an unparalleled advantage compared to other teaching methods. It necessitated learners to maintain a friendly and mutually supportive relationship with their peers in the cooperative learning process, where the learning outcomes of individuals and others were closely intertwined. Cooperation among learners was even more essential in this context.

In this process, cooperative learning effectively promotes the development of students' intelligence in different modules and also helps promote the positive emotions of mutual learning between students. The effect was that collective wisdom surpassed the individual's solitary effort. Therefore, incorporating cooperative learning into the teaching design of the course "The Basic Knowledge of Tour Guides" aided in the development of a cooperative learning group formation method tailored to the class's actual situation. This approach was adjusted as per the specific circumstances, fostering an environment of group learning and mutual support. The emphasis was on mastering learning techniques, obtaining knowledge, and improving comprehensive student quality.

5.3.2 Suggestions for future research

For further research, the topic should be focused on:

1) The learning management through the Student Team Achievement Division combined with Mind Mapping techniques to improve other skills or competencies.

2) The learning management through the Student Team Achievement Division combination with other techniques.

3) The learning management through others-operative learning combined with other techniques with mind mapping techniques to improve the student's learning achievement.

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APPENDICES

APPENDIX A

- **List of Experts Reviewing Research Instruments**
- **Sample Letter to Experts and Specialists for Research Instruments Validation**

List of Experts Reviewing Research Instruments

Specialists

1. Asst. Professor Dr. Haijun Wang
   Sichuan University of Science and Engineering, Zigong, China.

2. Asst. Professor Dr. Lu Liu
   Sichuan University of Science and Engineering, Zigong, China.

3. Dr. Saengrung Poolsuwan
   Aksorn Charoen Tat ACT Co., Ltd., Thailand.

4. Dr. Surat Kwanboonchan
   Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Thailand.

5. Asst. prof. Dr. Methee Pikunthong
   Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Thailand.

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Dr. Saengrung Poolsuwan

Due to Mrs. Xiaoling Zhu, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs. Xiaoling Zhu for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

Thank you for your kind consideration.

Sincerely Yours,

(Asst. Prof. Arnon Niyomphol)
Dean, Faculty of Technical Education

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Dr.Surat Kwanboonchan

Due to Mrs. Xiaoling Zhu, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Asst. Prof. Dr. Methee Pikunthong

Due to Mrs. Xiaoling Zhu, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Asst. Prof. Haijun Wang

Due to Mrs. Xiaoling Zhu, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs. Xiaoling Zhu for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Asst. Prof. Lu Liu

Due to Mrs. Xiaoling Zhu, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management through the Student Team Achievement Division Combined with Mind Mapping Techniques to Develop Learning Achievement for 1st Year of Secondary Vocational Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs. Xiaoling Zhu for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

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APPENDIX B

Instrument of Research

Course content structure

Topic	Title	Content	Duration
1	Knowledge of Chinese history and culture	1.1 The development of ancient Chinese culture and ruins 1.2 Major events and important figures in Chinese history 1.3 Achievements in China's historical development 1.4 Common sense of Chinese history and culture	4hours
2	geological and geomorphological tourism landscape	2.1 Common landform types in China 2.2 Mountain tourism landscape in China	4 hours
3	scenic water tourism landscape	3.1 Common water landscape types in China 3.2 Water tourism landscape in China	4 hours
	Total		**12 hours**

Example

Lesson Plan 1: STAD with mind mapping

Lesson Plan:	**Chapter 1**		
Subject/ Course	tour guide service		
Lesson Title	Knowledge of Chinese history and culture		
Level	Secondary vocational grade 1	**Lesson Duration**	4hours

Lesson objectives

1. Students will gain an understanding of the progression of Chinese history, including renowned ancient cultures and significant historical sites.

2. Students will become acquainted with major events and prominent figures in Chinese history.

3. Students will comprehend the significant accomplishments and advancements in science and technology during different periods of Chinese history.

4. Students will acquire knowledge about the historical and cultural aspects of traditional Chinese philosophy and drama, traditional Chinese medicine, and the evolution of painting and calligraphy art.

Learning content

1. The development of ancient Chinese culture and archaeological sites.
2. Major historical events and significant figures in Chinese history.
3. Accomplishments and advancements throughout China's historical development.
4. Familiarity with essential knowledge and understanding of Chinese history and culture.

Activity

The learning management through STAD with mind mapping	**Activity of learning management through STAD with mind mapping**
Steps1 Presentation of the class	1. The learning materials aim to showcase Chinese historical and cultural knowledge, geological and geomorphic tourism landscapes, as well as scenic water tourism landscapes.
	2. Students will be grouped based on their academic ability and gender, and appropriate learning tasks will be assigned to each group.
Steps 2 Learning group	3. Learning materials will be distributed to the students, and specific goals for group learning will be outlined in detail. 4. The method and process of mind mapping will be introduced and demonstrated to the students. 5. Students will engage in group communication and discussion to draw mindmaps. 6. The mind maps created by each group will be checked and evaluated, which will include self-evaluation, peer evaluation within the group, and evaluation by the teacher.
Steps 3 Test or quiz	7. Based on the evaluation results, each team will be guided accordingly. 8. Each group will be guided to revise and improve their mind maps.

The learning management through STAD with mind mapping	Activity of learning management through STAD with mind mapping
Steps 4 score increase in the individual	9. Test assignments will be designed and distributed based on the group distribution. 10. The students' test work will be collected and their knowledge will be assessed through checking. 11. The test scores of each group member and the overall group score will be analyzed.
Steps 5 Award group	12. Students will be rewarded based on their individual and group test scores. 13. Special instruction and retesting will be provided to the group whose test results do not meet the standard.

Materials/Resources

1. The mind mapping tool
2. The course materials for the basic knowledge of tour guiding
3. The course materials related to the basic knowledge of guiding, including documents, pictures, and video materials.

Assessment

Assessment method	Assessment Tool	Assessment Criteria
Mind mapping	Mind mapping assessment	Pass 60 Percentage
Class attendance	Class attendance Form	Pass 70 Percentage

Example

Lesson Plan 1: traditional approach

Lesson Plan:	**Chapter 1**		
Subject/ Course	tour guide service		
Lesson Title	Knowledge of Chinese history and culture		
Level	Secondary vocational grade 1	**Lesson Duration**	4hours

Lesson objectives

1. Students can understand the development of Chinese history, famous ancient cultures and sites.

2. Students can be familiar with major events and important figures in Chinese history.

3. Students can understand the major achievements and scientific and technological inventions in various stages of Chinese history.

4. Students can master the historical and cultural knowledge of traditional Chinese philosophy and drama, traditional Chinese medicine, and the development of painting and calligraphy art.

Learning content

1. The development of ancient Chinese culture and ruins
2. Major events and important figures in Chinese history
3. Achievements in China's historical development
4. Common sense of Chinese history and culture

Activity

The learning management through STAD with mind mapping	Activity of learning management through STAD with mind mapping
Introduction to course objectives	1. Teachers briefly introduce the teaching objectives of "Knowledge of Chinese history and culture".
Course content teaching	2. According to the teaching requirements, teachers will use teaching PPT to teach students about the development of Chinese history, famous ancient culture and sites, major events and important figures in 3. Chinese history, major achievements and scientific and technological inventions in various stages of Chinese history, traditional Chinese philosophy and the development of drama, traditional Chinese medicine, calligraphy and painting art, etc.
Teaching result inspection	3. The teacher asked the students to answer the homework in the textbook. 4. Teachers check students' practice tests after class, evaluate teaching achievements, and require students to review the Knowledge of Chinese history and culture after class.

Materials/Resources

1. Tour guide basic knowledge course textbook
2.Tour guide basic knowledge course materials
3. PPT

Assessment

Assessment method	Assessment Tool	Assessment Criteria
Test	homework after class	Pass 60 Percentage
Class attendance	Class attendance Form	Pass 70 Percentage

Learning achievement on Tour Guide Service

1. The mother and aunt of the ancient Chinese emperors were referred to as ( ).
   A. The Empress Dowager and the Eldest princess
   B. The Empress Dowager and the eldest Princess
   C. The Empress Dowager,
   D. the eldest Princess
2. The posthumous name "Wen" belonged to the ancient rulers of our country. ( ).
   A. praise
   B. derogatory
   C. pity
   D. other
3. Wood is considered one of the five elements and is associated with birth. ( ).
   A. gold
   B. water
   C. fire
   D. earth
4. The Simuwu Square Ding, the largest bronze vessel in the world, was cast during the Chinese Dynasty.（ ）
   A. Shang Dynasty
   B. Zhou Dynasty
   C. Xia Dynasty
   D. Spring and Autumn Period

5. The title "Son of Heaven" began to be used to address the emperor during our period.（ ）

A. Qin and Han Dynasties

B. Xia Dynasty

C. Western Zhou Dynasty

D. Southern and Northern Dynasties

6. The authors of "Romance of the Three Kingdoms" and "Water Margin" are respectively ( ).

A. Cao Xueqin, PuSongling

B. LuoGuanzhong, Wu Cheng-en

C. Shi Naian,

D. LuoGuanzhong.LuoGuanzhong and Shi Naian

7. The first country with slavery in the history of our country was ( ).

A. Xia Dynasty

B. Shang Dynasty

C. Zhou Dynasty

D. Qin Dynasty

8. In ancient times, there was a figure known as the "saint of painting" in our country. ( ).

A. Li Bai

B. Wang Xizhi

C. Wu Daozi

D. Lu Yu

9. In ancient times, there was a term called "Shixian" in our country. ( ).

A. Li Bai

B. Wang Xizhi

C. Wu Daozi

D. Lu Yu

10. The "three provinces and six departments" system was established during the reign of which emperor in the history of our country? ( ).

A. Li Yuan, Emperor Taizu of Tang Dynasty

B. Zhao Kuangyin, Emperor Taizu of Song Dynasty

C. Yang Jian, Emperor Wen of Sui

D. ynasty. Kublai Khan in Yuan Dynasty

11. The largest natural cave in Asia is located in our country.（ ）

A. SangzhiJiutian Cave, Hunan

B. Xingwenshi Wind Tunnel, Sichuan

C. Main Cave, Benxi Cave, Liaoning

D. Zhijin Cave in Guizhou Province

12. The only famous mountain in the world that spans the Archaean, Proterozoic, Paleozoic, Mesozoic, and Cenozoic eras is located in our country.（ ）

A. Taishan

B. Huashan

C. Huangshan

D. Hengshan

13. The renowned scenic spot known as the "Welcome Guest Pine" is located in our country.（ ）

A. Yandang Mountain

B. Wuyi Mountain

C. Hengshan Mountain

D. Huangshan Mountain

14. The most typical quartz sandstone scenic area is located in ( )

A. Wuyi Mountain

B. Wulingyuan

C. Taishan

D. Yandang Mountain

15. Mount Danxia is the most representative scenic spot showcasing the Danxia landform in China. It is situated at ( ).

A. Anhui Province

B. Jiangxi Province

C. Fujian Province

D. Guangdong Province

16. The Yadan landform belongs to what type of landform?（ ）

A. dissolution landform

B. Glacial erosion landform

C. Wind erosion landform

D. Water alluvial landform

17. The most typical limestone scenic spot is located at ( ).

A. Wuyi Mountain

B. Wulingyuan

C. Taishan

D. Yandang Mountain

18. Among the Five Mountains, the one with the highest average altitude is ( ).

A. Taishan

B. Huashan

C. Huangshan

D. Hengshan

19. The largest and longest Tiansheng Bridge in the world is located in our country. ( ).

A. Guangxi

B. Chongqing

C. Guizhou

D. Yunnan

20. By 2020, the number of wetlands in China listed on the List of Wetlands of International Importance was ( ).

A. 31

B. 36

C. 41

D. 44

21. The world's largest estuarine alluvial sand wetland scenic spot is located in our country. ( ).

A. Mingzhu Lake in Xisha

B. Hongze Lake Wetland

C. Nansha Wetland

D. Xishan Yang Wetland

22. The largest natural lake in our country is ( ).

A. Poyang Lake

B. Dongting Lake

C. Qinghai Lake

D. Taihu Lake

23. Renowned nationwide for being "big, vibrant, abundant, and clean" is ( ).

A. Hongze Lake

B. Dongting Lake

C. Taihu Lake

D. Hulun Lake

24. Our country was the first to gain the reputation of being the "Home of China Hot Springs."（ ）

A. Enping, Jiangmen, Guangdong

B. Qionghai, Hainan

C. Xiaotangshan, Changping, Beijing

D. Chongqing Banan

25. The "Famous Lake Autumn Moon" is a renowned moon-viewing attraction located in our country. ( ).

A. Beijing

B. Wuxi

C. Guilin

D. Jinan

26. The optimal location in China for viewing mirages is ( ).

A. Putuo Mountain

B. Penglai Pavilion

C. Taishan

D. The Taklimakan Desert

27. "Jiangbo Evening Glow" is a renowned scenic spot in China.（ ）

A. Hangzhou

B. Lintong

C. Jinan

D. Chengde

28. Which of the following hot spring scenic spots is known for its transparent, pure, and blue water quality? ( )?

A. Buto Hot spring

B. Shiqian Hot Spring

C. Heta Hot Spring

D. Asahi hot spring

29. Which of the following hot spring scenic spots is distinguished by its transparent, pure, and blue water quality? ( )?

A. Buto Hot spring

B. Shiqian Hot Spring

C. Heta Hot Spring

D. Asahi hot spring

30. Which of the following does not belong to Dongting Lake? ( ).

A. Moping Lake

B. Dadao Lake

C. Hengling Lake

D. Nanyang Lake

APPENDIX C

IOC (Index of Item Objective Congruence)

IOC (Index of Item Objective Congruence)

Learning Management Plan through the traditional approach

Research Instrument		Expert results					total	IOC	Result
		1	2	3	4	5			
Learning Management Plan through the traditional method									
Unit 1	**Knowledge of Chinese history and culture**								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	0	1	1	1	4	0.8	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	0	1	1	1	1	4	0.8	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 2	**Geological and geomorphological tourism landscape**								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	0	1	1	1	4	0.8	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 3	**Scenic water tourism landscape**								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	0	1	1	1	1	4	0.8	yes

IOC (Index of Item Objective Congruence)

Learning Management Plan through the instructional models of cooperative learning by Student Team Achievement Division combined with mind mapping

Research Instrument		Expert results					total	IOC	Result
		1	2	3	4	5			
Learning Management Plan through the traditional method									
Unit 1	**Knowledge of Chinese history and culture**								
	1. Learning Objectives	0	1	1	1	1	4	0.8	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 2	**Geological and geomorphological tourism landscape**								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	0	1	1	1	1	4	0.8	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 3	**Scenic water tourism landscape**								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	4	0.8	yes

IOC (Index of Item Objective Congruence)

Learning achievement test

Item test	Expert results					Total	IOC	Result
	1	2	3	4	5			
1	1	1	1	1	1	5	1	yes
2	1	1	1	1	1	5	1	yes
3	1	0	1	1	1	4	0.8	yes
4	1	1	1	1	1	5	1	yes
5	0	1	1	1	1	4	0.8	yes
6	1	1	1	1	1	5	1	yes
7	1	1	1	1	1	5	1	yes
8	0	1	1	1	1	4	0.8	yes
9	1	1	1	1	1	5	1	yes
10	1	1	1	1	1	5	1	yes
11	1	1	1	1	1	5	1	yes
12	1	1	1	1	1	5	1	yes
13	1	0	1	1	1	4	0.8	yes
14	1	1	1	1	1	5	1	yes
15	0	1	1	1	1	4	0.8	yes
16	1	1	1	1	1	5	1	yes
17	1	1	1	1	1	5	1	yes
18	1	1	1	1	1	5	1	yes
19	1	0	1	1	1	4	0.8	yes
20	1	1	1	1	1	5	1	yes
21	1	0	1	1	1	4	0.8	yes
22	1	0	1	1	1	4	0.8	yes
23	0	1	1	1	1	4	0.8	yes
24	1	1	1	1	1	5	1	yes
25	1	1	1	1	1	5	1	yes
26	1	0	1	1	1	4	0.8	yes

IOC (Index of Item Objective Congruence)

Learning achievement test

Item test	Expert results					Total	IOC	Result
	1	2	3	4	5			
27	1	1	1	1	1	5	1	yes
28	0	1	1	1	1	4	0.8	yes
29	1	0	1	1	1	4	0.8	yes
30	1	1	1	1	1	5	1	yes

Biography

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This thesis consists of research materials conducted at Faculty of Technical Education, Rajamangala University of Technology Thanyaburi and hence the copyright owner. I hereby certify that the thesis does not contain any forms of plagiarism.

XiaoLingZhu

(Mrs. Xiaoing Zhu)