

**THE EFFECTIVENESS OF SELF-REGULATED LEARNING VIA INFOGRAPHICS  
ON THE TOPIC OF THE TRADITIONAL CHINESE ARTISAN TOOLS: A CASE  
STUDY OF SICHUAN VOCATIONAL COLLEGE OF HEALTH AND  
REHABILITATION, REPUBLIC OF CHINA**

**ZENG YING**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION  
PROGRAM IN LEARNING TECHNOLOGY AND INNOVATION  
FACULTY OF TECHNICAL EDUCATION  
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THAYANBURI  
ACADEMIC YEAR 2023  
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**Thesis Title** Effectiveness of Self-regulated Learning via Infographics on the Topic of Traditional Chinese Artisan's Tools: A case study of Sichuan Vocational College of Health and Rehabilitation, Republic of China

**Name-Surname** Ms. Zeng Ying


**Program** Learning Technology and Innovation


**Thesis Advisor** Assistant Professor Metee Pigultong, Ph.D.


**Academic Year** 2023

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### ABSTRACT

The objectives of this study were to: 1) compare learning achievement after using infographics of traditional Chinese artisan's tools, 2) study the effectiveness after using infographics of traditional Chinese artisan's tools and 3) explore student's satisfaction after using infographics of traditional Chinese artisan's tools.

The population of this study were 30 students from Sichuan Health Rehabilitation Vocational College in the first semester of 2023. The research instruments included 1) infographics of traditional Chinese artisan's tools and 2) learning achievement papers.

The research results showed that: 1) the achievement scores after using infographics of traditional Chinese artisan tools were different at a statistical significance level of .05 ( $t = 29.373, p = .000$ ), 2) the effectiveness after using infographics of traditional Chinese artisan's tools could improve the achievement scores in art design which was 0.6253, in other words, students had higher post-test scores of 62.53 percent of cognitive score improvement and 3) students had the highest satisfaction after using infographics of traditional Chinese artisan's tools ( $\bar{x} = 4.86, SD = 0.34$ ).

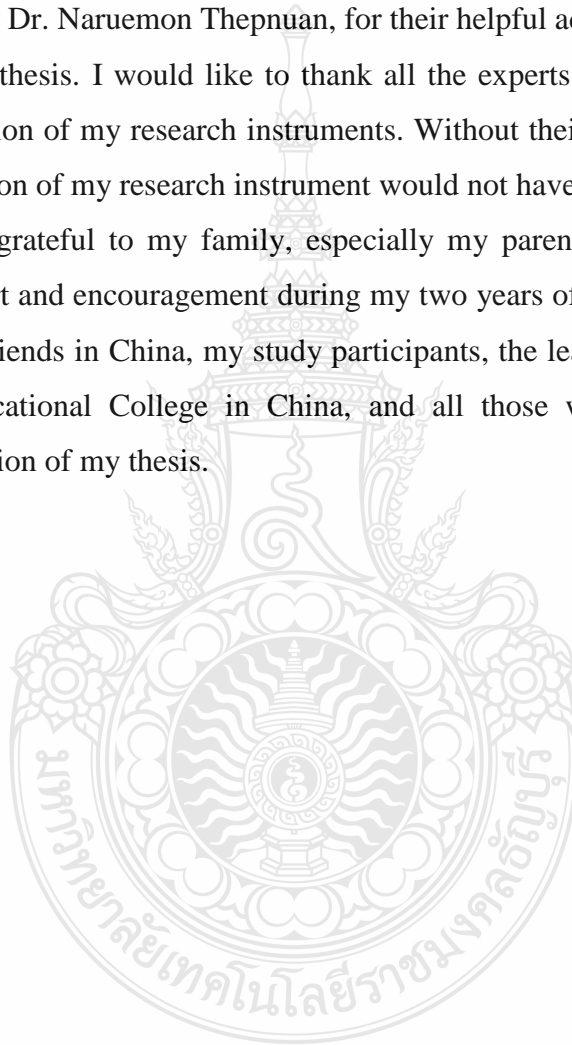
**Keywords:** Infographics, effectiveness, art design, learning achievement, self-regulated

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Zeng Ying



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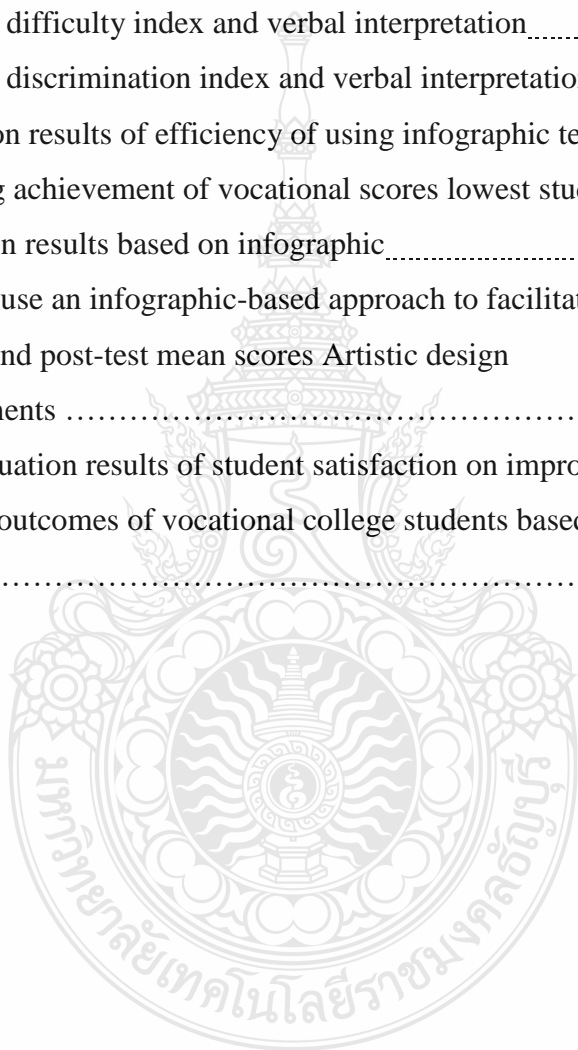
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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background of statement**

##### **1.1.1 Overview of art education in the world**

Art courses are more abstract and subjective than other subjects. Art involves the expression of personal emotions, aesthetic perspectives, and creativity, which makes the learning process relatively subjective and difficult to quantify. Students need to master the theory and skills of art through perception, expression and creation, which is a challenge for students.

Art courses focus on cultivating students' creativity and imagination. However, the learning process is relatively subjective and abstract, which can be a challenge for students. Many traditional teaching methods focus on the infusion of theoretical knowledge and technical training, ignoring the cultivation of students' individual differences and creativity. Such teaching methods often limit students' artistic expression and exploration, making it difficult for students to truly use their imagination and creativity. Art is a practical subject that requires continuous practice and experience to truly understand and master. However, the traditional education system often lacks sufficient practical opportunities and practical environments in art courses. It is difficult for students to apply the knowledge they have learned in real life and they only stay on book knowledge, which limits the development of their artistic creation and expression abilities.

China's Higher Education SDGs Action Report released the Sustainable Development Goals (SDGS) , which are 17 goals unanimously adopted by United Nations member states in 2015, including no poverty, zero hunger, good health and well-being, quality education, etc. It aims to solve the major problems facing the common human society. The China Higher Education SDGs Action Report aims at disseminating the concept of sustainable development to the public, showcases the achievements of China's higher education sustainable development work, focuses on 17 sustainable development goals such as poverty eradication, public health, life and health, digital economy, green development, and climate change, and quantifies data by scientific

research output. It reviewed the progress and achievements made by China's higher education in implementing the 2030 Agenda for Sustainable Development from 2016 to 2020, highlighting the achievements of Chinese universities. Among them, SDG4 ensures inclusive and equitable quality education, promotes lifelong learning opportunities for all, and expands higher education and lifelong learning opportunities.

#### 1.1.2 Problem of China's education

The main reason for the problems with the learning methods and curriculum of art courses is that the traditional education system pays more attention to the instillation of theoretical knowledge in art courses, while neglecting the cultivation of creative thinking and practical experience. This results in students often facing problems such as the disconnect between theory and practice and lack of creative thinking and expression skills in their studies.

The study of art courses needs to focus on practice. Traditional art courses often focus on the teaching of theoretical knowledge and use a large number of explanations and demonstrations in class, leaving little opportunity for students to engage in actual creation and performance. This method can easily cause students to only stay at the theoretical level and find it difficult to deeply understand the essence and essence of art. Therefore, practical courses should be added to the curriculum, focusing on the interaction and practice of students' participation in artistic activities, thereby promoting students' learning methods that combine theory and practice.

Secondly, the study of art courses needs to focus on individualization. Traditional art course arrangements often apply general curriculum plans and lack personalized teaching for different students. In actual teaching, each student has his own characteristics and style. Students' personality and expertise should be fully respected, and they should be encouraged to use their creativity and imagination. Therefore, the curriculum should explore diversified teaching methods, conduct corresponding personalized teaching according to the different situations of students, and help students better explore their potential and advantages.

#### 1.1.3 Specific situation of vocational students' problems

Most Chinese vocational college students have low self-efficacy, self-efficacy refers to a person's assessment of one's confidence and ability to successfully

complete a specific task or domain. It reflects an individual's beliefs and expectations about their ability to effectively cope with challenges and achieve goals. Self-efficacy comes from an individual's personal experience and the experience of observing others. When a person achieves positive results or achieves success in a certain area or task, his or her self-efficacy increases. Conversely, if a person consistently experiences setbacks or failures, his or her self-efficacy may decrease. Self-efficacy has an important impact on individual behavior and mental health. When a person feels confident in his or her abilities, he or she is more likely to actively face challenges, maintain persistence and effort, and be better able to cope with difficulties and stress. Self-efficacy is also closely related to an individual's goal setting, motivation level, and emotional state.

Among art students, some students have low cultural scores, in art course learning, there are problems of low self-efficacy and insufficient learning confidence. In my classroom, there are some problems in art courses, such as lack of individualized teaching, limited creative thinking, and disconnection between theory and practice. The traditional teaching mode often adopts the unified teaching content and evaluation standard, ignoring the individual differences and characteristics of students. There are two main reasons. The first is the subjective evaluation standard: the evaluation of art subjects is often subjective and there are no clear standards and quantitative indicators. This makes it difficult for students to accurately assess their learning results and ability levels, and they lack recognition and affirmation of themselves, resulting in low self-efficacy and lack of learning confidence. The second is creative anxiety and pressure: in the process of artistic creation, students need to face many pressures such as creative challenges, technical difficulties, and audience reaction to their works. These factors may lead to students' lack of confidence in their creative abilities and fear of failure and criticism, thereby affecting their self-efficacy and confidence in learning.

Infographics have the advantage of addressing these disadvantages and issues. The first is to provide clear learning goals and evaluation standards: through information graphics, the goals and evaluation standards of art learning can be presented in the form of images, so that students can more clearly understand the requirements and standards they need to meet. This helps to improve students' goal orientation, enhance their awareness and evaluation of their learning achievements, thereby enhancing self-

efficacy and learning confidence. The second is personalized learning support: the flexibility of infographics allows them to be personalized and adapted to the needs of students. In art learning, different students may have different learning styles and needs. Through information graphics, customized learning support can be provided for each student to meet their learning characteristics and needs, and enhance the autonomy and effectiveness of learning. The third is to stimulate learning interest and motivation: infographics can present successful works of art or creative experiences through case presentations. This intuitive display method can stimulate students' interest and motivation in learning, allow them to see the actual effects of excellent works, and enhance their confidence in their own achievements.

#### 1.1.4 Solution

In the field of art, each student has a unique artistic style and creative ideas, so personalized teaching methods are needed to meet students' needs. Informative charts can help teachers understand students' interests, talents and learning styles and provide personalized teaching plans based on this information. For example, collect data through student questionnaires or personal work displays, use information charts to classify and analyze students, and then design personalized learning plans and evaluation methods according to the needs of different groups to better meet students' learning needs. Secondly, the college's art courses suffer from limited creative thinking. Art creation requires students to have creative thinking and imagination, but the traditional teaching model often places too much emphasis on skills and norms, resulting in students lacking the ability to innovate and think independently. Informative charts can stimulate students' creative thinking by displaying information such as various artworks, artists' creative experiences and thinking processes. At the same time, the use of information graphics can also provide a wealth of creative materials and reference materials to help students broaden their ideas and horizons, thus promoting the development of their innovation and imagination. Third, there is a disconnect between theory and practice in the college's art courses. Artistic creation requires the support of theoretical knowledge, but pure theoretical indoctrination cannot help students truly master artistic skills and applications. Informative charts can provide a large number of practical content such as practical cases, demonstration videos, and skill teaching to help students combine

theoretical knowledge with practical operations. By displaying practical cases through informational charts, students can watch the actual creative process and understand the application of techniques and methods of artistic expression, thereby better understanding and mastering art theory and applying it to actual creation.

Information graphics are very necessary to solve these problems. Informational charts can integrate and present a large amount of student data and teaching resources to help teachers understand students' needs and learning situations more comprehensively. Informational charts can provide personalized teaching plans and evaluation methods, promote students' development and growth, and make teaching more targeted and effective. In addition, information graphics can also provide a wealth of practical cases and skill teaching, helping students combine theory with practice and cultivate creative thinking and practical operation abilities. Therefore, in the previous research, this paper combined with the main characteristics of vocational school students, using the method of combining theory and practice, to explore the feasibility and effectiveness of infographic in teaching. Based on the United Nations SDG4 on equitable education, this paper takes the students of Sichuan Health Rehabilitation Vocational College as an example, and adopts infographic teaching technology to improve the art design performance of the students with poor performance.

### **1.2 Research questions**

- 1) Have infographics be used effectively in art design teaching?
- 2) How is the differences in scores before and after using the infographic?
- 3) How about the effectiveness of achievement scores after using infographic?
- 4) How about the student opinion after using infographic?

### **1.3 Research Objectives**

- 1) To Comparing the learning achivement of art in this research the course instruction by using infographic.
- 2) Studying student effectiveness after using infographics in teaching.
- 3) To study about the validity of the infographics for using to teaching.

#### 1.4 Scopes and Limitations of the Study

We select a class with a purpose and select students with poor performance after testing. Students with more than 70 points pass the 70-point standard, and students with less than 70 points use the infographic teaching method. By comparison, an independent T-test was used to explain.

#### 1.5 Research Framework

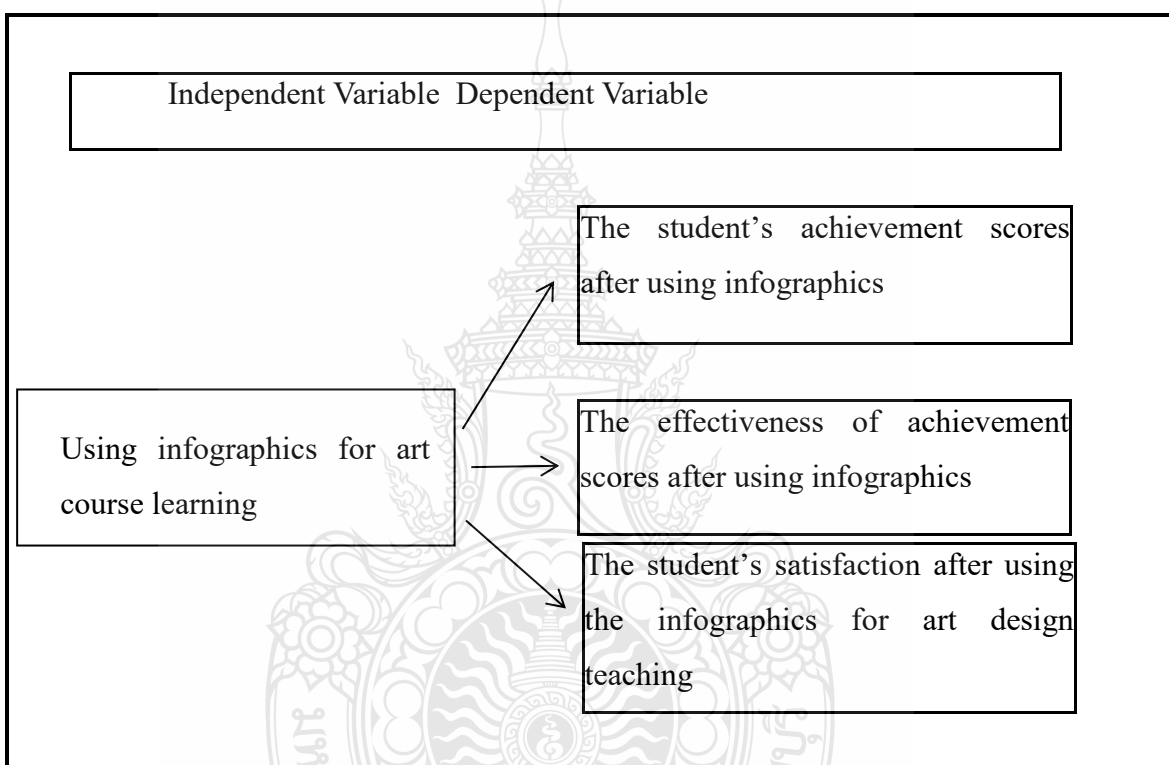


Figure 1.1

#### 1.6 Expected results

- 1) The sample will have gained knowledge from the infographics teaching.
- 2) The sample will get higher scores after the infographics teaching.

#### 1.7 Scope of the study

The research on the improvement of art and design performance of students with low scores by infographic teaching can be defined as using infographic teaching as an educational tool to explore the methods and effects of improving the academic

performance of students with relatively low art and design performance. The scope of this study includes the following aspects:

Teaching methods: This study will focus on teaching methods that use infographics, such as art design, painting creation, etc., to determine which methods are most effective for poor students' learning.

Student groups: The study will target students with poor score learning, including differences in age, language ability and subject ability.

Academic achievement: The study will measure students' performance in art and design subjects, including progress in design, drawing and painting.

Psychological and emotional factors: This study also examined students' attitudes, motivation and self-confidence towards art design learning to understand the impact of these factors on academic performance.

In conclusion, this study aims to explore the methods and effects of infographic teaching to improve the academic performance of low-scoring students and to help them improve their artistic design performance.

### **1.8 Definitions of keywords of the Study (Only in this research)**

1) infographics: infographics are visual presentations of information and data designed to present complex information easily and quickly. In simple terms, infographics attempt to present a set of data and complex information in a visual way that readers can quickly and easily understand by utilizing visual elements such as images, graphs, maps, and charts. Today's students have been living in an auditory, visual and multimedia dynamic environment since birth, and the use of past methods and teaching models is boring and ineffective for them, unable to produce satisfactory teaching results. Teachers need to be informed about new technologies and media in teaching and learning and have a positive attitude towards them. Research shows that using modern technology in the classroom can lead to better learning experiences and higher classroom satisfaction for students.

2) The effectiveness: Effective learning refers to the learning in line with the principles of education and teaching, its purpose is to spend less time, learn more, more solid, better, with the right way of learning to achieve twice the result with half the effort.

Effective learning should be to help students spend less time, gain more knowledge, let students "learn one know ten"; Effective learning should make learning more interesting, it should not make students feel boring, but should be "edutainment".

3) self-regulated:Self-Regulated Learning (SRL) , proposed by American psychologist Bandura in the 1970s, means that learners actively motivate themselves and actively use appropriate learning methods to learn. It can not only be regarded as a dynamic learning process or learning activity, but also as a relatively stable learning ability. Learners must have four conditions for self-regulated learning. Self-regulated learning is a circular process.

4) SDGs: The China Higher Education SDGs Action Report aims at disseminating the concept of sustainable development to the public, showcases the achievements of China's higher education sustainable development work, focuses on 17 sustainable development goals such as poverty eradication, public health, life and health, digital economy, green development, and climate change, and quantifies data by scientific research output. It reviewed the progress and achievements made by China's higher education in implementing the 2030 Agenda for Sustainable Development from 2016 to 2020, highlighting the achievements of Chinese universities. Among them, SDG4 ensures inclusive and equitable quality education, promotes lifelong learning opportunities for all, and expands higher education and lifelong learning opportunities.

5) Republic of China:The education of China's national conditions is the education that enables students to understand the basic situation of the country's politics, economy, natural ecology and so on, so as to arouse patriotic enthusiasm. It mainly includes the education of Chinese history in the last hundred years, the education of the inevitability of socialism, the education of the current situation of economic and cultural development, the education of economic resources and population issues, and the education of the excellent tradition of the Chinese nation.

## **1.9 Significance of the Study**

This paper mainly explores and analyzes the application method of infographic in the art design classroom teaching in higher vocational colleges. Through the sampling method of questionnaire and test, 30 students with the lowest score are selected as the



research objects. Its main purpose is to analyze the teaching effect of using infographics in class through empirical research, improve the learning interest of students with poor performance, effectively find better application methods, improve the performance of students with poor performance, promote the educational equity policy of the United Nations SDGs, and achieve better results in the development process. The main significance of the research on this subject is as follows:

1. Stimulate the interest of students with the lowest scores in learning art and design. The biggest motivation for learning is interest, interest is the best teacher, which can stimulate students' better creative ability while actively participating in it. When we use more direct and intuitive teaching, we can fully capture their attention. If they are taught in a traditional way, such as looking at pictures in a book, they will not produce better learning results. Infographic teaching mode is more vivid and intuitive, showing a lively classroom learning atmosphere, fully activating the internal motivation of learning, making students' brains active, fully engaged in learning and exploration, and obtaining twice the learning effect. Once students have a strong interest in the class, they will be willing to participate.

2. Improve students' level of design aesthetics. In order to keep students' interest and rich imagination, teachers implementing the course should use infographics to fully display the design scene, and gradually make students' minds become free and open. Using infographics can make students only pay attention to a lot of data and information, and the content of the diagram may be a long article if presented in text form. But with visual graphics and images, students are likely to remember them at a glance. And in a relatively comfortable and free environment to learn knowledge, maximize their creativity. Students experience the happiness of success is the highest level of happiness class, after the successful experience, students can fully stimulate their self-confidence and affirmation, students can also continue to meet their needs, and baptize your mind and thinking.

3. Enhance students' learning efficiency and atmosphere, after using the infographic, the learning efficiency and learning atmosphere of students in the classroom will be significantly higher than in other regular teaching classrooms. The use of information graphics can effectively improve students' academic performance and

satisfaction. Infographic teaching is a method to solve the learning problems of art courses for students in Sichuan Health and Rehabilitation Vocational College. This is a great way to improve student academic performance. Other teachers can also apply it in the classroom to increase students' interest in art courses. We can look to schools as an example of this.



## **CHAPTER 2**

### **LITERATURE REVIEW**

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

#### 2.1 information chart

##### 2.1.1 Infographic definition

2.1.2 The teaching elements of information graphics in the construction of educational learning resources

##### 2.1.3 Practical exploration of introducing information graphics into teaching

##### 2.1.4 Things to note about the infographic teaching model

#### 2.2 Infographic Teaching Tool

2.3 The distinctive features of producing diverse information graphics for classroom use

##### 2.3.1 Make learning more interesting

##### 2.3.2 Improve the richness and flexibility of classroom content

#### 2.4 cognitive learning theory

#### 2.5 Literature review of the relevant research

### **2.1 information chart**

#### 2.1.1 Infographic definition

The so-called information chart or information graphics is a form of information expression that uses abstract graphics as design elements to visualize data, information, and knowledge. Charts, like graphic symbols, capture elements such as pictures, images, logos, and text, and classify and design content and things according to the order and type of information. The information is presented to the audience from complex and boring to clear and easy to understand, conveying the essence of the information and simplifying things. Help the audience digest, understand and disseminate information more quickly in front of infographics. We first saw the familiar infographics in magazines, newspapers or news publications. At that time, information graphics mostly appeared in the form of statistical charts, bar charts, etc. Compared with

the development of the current era and the development and innovation of infographic design, the previous infographics seemed too boring and single. We should make up for our weaknesses, take the best of them, and remove the bad stuff to create novel infographics. Today's diagrams are designed as visual tools, and common ones include diagrams, travel maps, flow charts, chronology, etc. In this environment, designers use the intuitive and visual effects of charts, and use graphics, colors, symbols, etc. to add beauty and vitality to chart design, making information chart design more and more popular among more people. Love and acceptance. (Figure 1) Based on the design of the U.S. government budget proposal produced by the New York Times, the U.S. government budget is analyzed and organized by setting up all total expenditures, departmental expenditures, and fragmentary expenditures, and each data is visualized. The design of this infographic comprehensively considers the needs of the audience, so that the audience can understand the content of the information more clearly and consult the budget chart according to their own needs. At the same time, they can also understand the financial information analysis of this time period based on the above information prompts. The colors of the entire data are fresh and generous, giving people a relaxed and happy feeling. The information on the reports is very rich in content layout, and the classification of information is also very clear and easy to understand, allowing the audience to search for information without thinking. key content to achieve better transmission of information.

#### 2.1.2 The teaching elements of information graphics in the construction of educational learning resources

Infographics are visual presentations of information and data designed to present complex information easily and quickly. Simply put, infographics attempt to present a set of data and complex information in a visual way that readers can quickly and easily understand by utilizing visual elements such as images, graphs, maps, and charts. Today's students have been living in a dynamic environment of hearing, vision and multimedia since birth. Using past methods and teaching models is boring and ineffective for them and cannot produce satisfactory teaching results. Teachers need to have relevant information about new technologies and new media in education and teaching, and treat them with a positive attitude. Research shows that using modern

technology in the classroom leads to students having a better learning experience and greater classroom satisfaction. A large number of research results show that different senses do not play an equal role in human learning. 75% of learning is done through sight, 13% through hearing, 6% through touch, and 3% through smell. Additionally, multiple studies have shown that infographics have a significant boost in memorization and retention of the information received. Our brains tend to analyze data visually, preserving relationships between things and information in a visual way. For example, when you think of pencils, phones, and televisions, what is the first thing that comes to mind? Our brains understand and learn data and information more easily in physical and visual form than in written form. Using infographics allows students to focus solely on a large amount of data and information, which would probably be a long article if presented in text form. But with visual graphics and images, readers are likely to remember them at a glance. Therefore, rationally arranging teaching content and topics through information graphics is an effective way to strengthen the teaching process. When teachers need to explain a specific topic to students, but the information provided in the textbooks or reading materials is not enough, or is not easily understood by students, additional information charts need to be provided to students to help students understand and remember. When you need to provide explanations related to processes or fixed rules, you can use infographics to show the process and rule connections of things. When comparisons need to be made across several categories, infographics can play an important role as an appropriate tool to present the comparison results. For example, a bar chart in a statistical chart can visually display the number of monomers and the differences between groups. Infographics can also be used to represent data or show changing trends. Data and numbers contain a lot of useful information, but they need to be presented in an orderly, intuitive way. Infographics allow teachers to make logical connections between numbers and verbal expressions. When it comes to historical knowledge or time event information, such as an introduction to art history or the development and changes of something, the information can be transformed into a visual story or time chronology chart. Students can also participate in it and summarize key dates, characters, and events. events and features, thereby helping students deepen their memory.

### 2.1.3 Practical exploration of introducing information graphics into teaching

The research on infographics in China emerged relatively late and started relatively late. However, domestic experts and scholars have a high ability to accept new things produced by the development of information technology. Research on infographics soon began in China. Domestic research on information graphics The research on graphs mainly focuses on three aspects: theoretical research and teaching application of thinking information graphs and knowledge information graphs. For example: the concept of knowledge information graphs was first proposed by scholar Zhao Guoping (2005) . Since then, knowledge information graphs The research on infographics officially kicked off in China. Scholar Zhang Weizhongjie (2010) analyzed the theoretical basis of information graphics teaching and put forward the design principles of information graphics teaching content based on specific teaching cases. Zhao Huichen (2012) elaborated on the method of visual representation of knowledge information charts from three levels: form, content and utility<sup>⑥</sup>. Zhao Guoqing (2016) introduced the use of mind maps, including detailed instructions on the eight major mind maps. In the book, he explained and discussed the illustration production of thinking information charts<sup>⑦</sup>. Chai Lina (2016) demonstrated that information graphics teaching is an innovative teaching model through the specific application of information graphics teaching in English vocabulary, grammar, and reading teaching. When teaching English, this new teaching model must be effectively designed and applied. It can turn English reading texts and abstract letters into visible, visual information charts and images, making the English teaching model richer and effectively improving students' learning interest and English teaching efficiency. Professor Wu Xiaohong from Ningxia University proposed the information graphics method in terms of the theoretical basis, design tools, teaching activities, teaching situations, and teaching evaluation of information graphics teaching design. Jodye Selco and others explore discovery-based curriculum that allows students to explore the organization of the periodic table and learn how to read the information embedded within it. This approach guides students through practical exercises, allowing them to develop a visual-spatial image of the role of valence electrons in the formation of atoms and molecules and in the organization of the periodic table of elements. This new constructivist approach to teaching has been used

successfully with students of many ages, from 8 years old to adulthood. For example, they made an infographic by moving atoms through a model. Tian Yali (2015) used Gaussion09 and Gaussview5.0 software in the teaching of chemical information graphics in middle schools. Sun Qiangyan (2017) used Gaussion09, Gaussview5.0 and ChemDraw8.0 software to teach information graphics on organic chemistry reaction mechanisms in middle schools. Chen Wei et al. (2017) used information graphics teaching such as creating situations, building models, associative structures, and innovative experiments in the teaching process of ethanol. Zhou Changlin (2019) used the virtual chemistry experiment software IrYdium Chemistry Lab as a basic tool to design an infographic teaching design for "Hydrolysis of Salts". Kong Mingliang (2020) applied information graphics teaching to junior high school chemistry teaching and proposed teaching strategies for microscopic world information graphics and experimental information information graphics.

#### 2.1.4 Things to note about the infographic teaching model

The teaching of information graphics design in the information communication design major has its own unique difficulties. We can learn from traditional art teaching methods, absorb excellent educational concepts, and form the characteristics of information graphics design teaching: experience-based, task advancement, and personalized interaction. Experiential learning emphasizes students' practice and understanding of abstract "information" and "diagrams" in practice. Under the guidance of teachers, students act as experiencers, so that the knowledge learned can form deep memories. The task-driven task of designing information graphics in a variety of spatial situations stimulates students' creative autonomy and develops the ability to observe research problems from different perspectives. In the interaction between teaching and learning, teachers should provide students with self-affirmation, self-evaluation and appropriate competitive situations to promote the shaping of students' artistic personality. In the information graphics teaching model, there are three main things that need to be paid attention to.

First, experience is the focus. The lack of experience caused by the design objects, design processes and design results of information graphics needs to be solved by combining the expertise and knowledge reserves of art students. In the first step,

students acquire first-hand information through questionnaire surveys, photography, etc., and use original data or information as design objects. For example, a student designed an infographic based on observing the changes in clothing, appearance, and personality of his classmates. The second step, the infographic design process, emphasizes the use of multiple tools to enrich the experience. It has expanded from monotonous computer design and production to diversified creative methods, such as painting, sculpture, model making, and even needlework, origami, etc. that art students are good at. Teachers can arrange the entire design and teaching process into short fixed cycles to be completed in a reasonable order. Situations that can bring different experiences are created in each cycle to reduce students' negative emotions caused by repeated design work and maintain their interest in learning. The third step is to diversify the design results of information graphics. The design results of each cycle are different, each student's design results are unique, and teachers need to use multiple methods to guide students. Integrate knowledge teaching into practical interaction; use colorful cases to inspire students' thinking; the results display link not only appears after the classroom teaching, but the display, sharing and evaluation of design results in each cycle are also very important.

Second, the task is the main line. The teacher guides the students to test and summarize the learning process based on the completion results of the tasks. From one-sided teacher lectures and demonstration teaching to students' active inquiry-based learning. First of all, the overall task volume and the difficulty of each stage must be reasonably arranged. The tasks of each stage are closely related, that is, the tasks of this stage are the in-depth tasks of the previous stage, and the tasks of the next stage are the extension of the tasks of this stage... This forms an iterative and spiral design teaching task model. This iterative design method is also one of the basic design methods that students majoring in information communication design must master. Secondly, teachers should create a good task situation. For example, in the creative space situation of information chart design, the author sets the same information chart design in two-dimensional, three-dimensional, or even four-dimensional space to allow students to complete tasks. Due to different spaces, the methods of completing tasks change, which also provides students with new ideas for understanding, analyzing, and solving problems. Furthermore, the task form should be open-ended. Students have different



personal abilities and grades, and their ability to complete tasks is also different. They must treat them differently and adjust tasks in a timely manner. The degree of completion of tasks at each stage will also be different, and teachers also need to pay attention to the teaching effect and the completion of tasks at each stage to make adjustments. Finally, task evaluation should emphasize artistry over technical aspects. Because what we want to cultivate are art and design talents, not technicians, aesthetic level, modeling ability, creativity, etc. are the fundamental criteria for evaluation.

Third, personality is the orientation. Infographic design can be displayed in a virtual graphical interface, or it can be completed with a realistic paper prototype or three-dimensional model, but it must have the personal style of the creator. What art pursues is a hundred schools of thought contending and a hundred flowers blooming. The training of artistic talents should not only cultivate students' abilities, but also provide fertile ground for them to form distinctive artistic personalities. Classroom teaching can allow students to consciously discover their own position through teacher-student interaction, group discussions, personal work display and design idea presentation. On the other hand, information graphics design teaching respects individual development and encourages the formation of artistic personality, which also allows each student to have his or her own unique learning "experience."

## **2.2 Infographic Teaching Tool**

Information graphics teaching is the application of information graphics technology combined with specific subjects. Taking the art subject as an example: in the teaching process, teachers use information graphics teaching tools to present various abstract reading and learning materials to students in a visual way to help students form intuitive and concrete knowledge and understanding. At the same time, they can also build students' own knowledge during teaching. thinking framework to promote the development of students' thinking ability. "Reading pictures is better than literacy" because viewing and reading pictures can activate the cerebral cortex, enhance memory effects, and make information search, extraction and association easier. People can design various lines and various patterns according to their own needs. Graphics and images with similar colors and various types of text can be keenly identified and captured

by observing such graphics and images with the eyes. Information graphics are used in specific teaching to take advantage of the characteristics of graphics and images that are easy to remember and understand. However, information graphics teaching not only allows students to observe and recognize pictures, and allows teachers to impart knowledge with the help of graphics and images, but also presents teaching methods, thinking processes and learning skills. It should not only give students "fish", but also teach students "fishing" method. The general model of reading classroom teaching is that the teacher combines existing information such as text and illustrations in the textbook, sets up teaching situations related to the topic, introduces teaching content, and assists multimedia teaching tools to explain key words and phrases to help students understand the main idea of the article and complete the lesson. Later exercises, etc. This teaching model can help students read through articles and learn important and difficult points. However, due to the lack of systematic knowledge learning, it is relatively difficult to remember. In addition, the diversity of art materials makes it difficult for students to understand, and the teaching effect will be affected to a certain extent. limit. Using the teaching method of information graphics, different teaching activities can be designed for different contexts, themes and topics. Combining graphics can help students remember the knowledge they have learned.

The development of information graphics has gone through a long process. Through the unremitting efforts of previous experts and scholars, many information graphics tools have gradually been formed. With the development of modern educational technology, multimedia has begun to be widely used in teaching and reading teaching. Common types of infographic teaching methods are listed below:

(1) Concept map

Concept mapping is a teaching technique proposed by Dr. Novak (1984) of Cornell University based on Ausubel's meaningful learning theory. Not only can it be used to assist learning, but it can also help teachers detect students' understanding of knowledge. Novak believes that concept mapping is a learning tool that can be used to organize and represent large modules of complex knowledge to make it easy to understand. The concept map starts with a core theme, and related concepts around this theme will be placed in the box below the theme. The number of related concepts at each

level can be multiple, and they are arranged side by side under the topic words, with lines connecting them with the core Concepts are connected, and on the connecting line there is a short text that expresses the relationship between the two, that is, a connecting word. Concept maps basically consist of core concepts, concepts at all levels, connecting lines and connecting words. Concept maps can clearly present the connections between concepts and knowledge points. The process of drawing concept maps is also a process of knowledge construction by the mind. Therefore, the application of concept maps in subject teaching has been recognized to a large extent. With the help of concept maps to sort out subject knowledge, a systematic knowledge network can be established to facilitate the understanding and mastering of knowledge; combined with English reading teaching, concept maps can help Students clarify the reading content so that the structure of the article is clear and clear, and they can better understand the main idea of the article and what the author wants to convey to the readers.

## (2) mind Mapping

The inventor of mind mapping is the world-famous educationist Tony Bazin. Mind mapping is a concept he proposed when he published the book *Use Your Head*. As soon as mind mapping was proposed, it caused a huge sensation around the world. . Mind mapping was originally a new form of note-taking created by Tony Bazin to solve the shortcomings of traditional linear notes. It uses a large number of graphic images and color lines to help build a knowledge network and more clearly highlight the main information and Secondary information allows people to quickly identify information and understand the hierarchical relationship between keywords and subtopics. A mind map consists of a central theme and branches at all levels. The branches at all levels spread out radially around the central theme. Each branch has its own keywords, and sub-branches can spread out around the keywords. The radial diagram composed of the central theme, first-level branches, second-level branches, third-level branches, etc. is called a mind map. Using mind mapping software can establish memory connections between central themes, keywords, images, and colors, making it more interesting. Tony Bazin (1999) believes that mind mapping can make up for the shortcomings of traditional notes. First of all, mind maps can highlight central themes and keywords, making the structure and key content of the article clear at a glance. Secondly, mind maps have

various graphics and rich colors, which can effectively stimulate the cerebral cortex, facilitate the storage of knowledge and information in memory for a long time, and save a lot of time and energy in memory. The graphic structure presented in a mind map reflects the brain's thinking process. By observing, analyzing and summarizing the articles, complex content is finally presented in concise images, which to a certain extent reduces students' memory burden and improves students' logical thinking abilities.

### (3) circle diagram

The circle diagram can be said to be an efficient brainstorming tool that can be used to associate knowledge. circle diagram It consists of two circles, the outer circle is a large circle, and the inner circle is a small circle. The small circle is the core of the circle diagram, and the center is present within the small circle.word, and the outer large circle is used to express information related to the center word. It can be a descriptor describing the center word, or it can

It is a picture or graphic that embodies the central word. The main function of the circle diagram is to think about problems from multiple angles without restrictions, making the thinking The test is more comprehensive and detailed, and stimulates imagination and thinking ability through constant thinking.

### (4) flow chart

The description of the operation or behavior process is often in the form of a flow chart. According to the actual situation of the thing, corresponding simple or complex diagrams can be drawn. The flow chart can express the behavior analysis process very intuitively. The flow chart is mainly composed of two parts, one is the step description, and the other is the direction guide. Most of its expressions are a combination of rectangular boxes and straight lines with arrows. The implementation steps are presented in the boxes, and each step is separated by arrows. The behavioral process or system relationship is expressed. When a step requires multiple operations to be implemented, sub-steps of the step process will be derived, also called "sub-steps", which are branches of the main step and can also be said to be a refinement step. When writing the steps, try to use short sentences to summarize. There are no strict restrictions on the shape and arrangement of the boxes. The shape and layout can be drawn based on the

actual situation. Applying flow charts in learning can help cultivate the integrity and logic of students' thinking and exercise procedural thinking.

#### (5) bubble chart

When it is necessary to describe the characteristics and properties of things, the use of flow charts is not suitable, because it represents a step-by-step operation process rather than the independent essence of things, but the bubble chart can describe the characteristics of things as a whole<sup>②</sup>. The bubble chart can encircle a thing that needs to be expressed (the central thing) with a circle. At the same time, the words or sentences that can be used to briefly describe the characteristics of the central thing are also circled and distributed around the central thing. The one-to-many method uses straight lines to connect the central object with the surrounding circles. Bubble charts are an effective information graphics tool for understanding things. By drawing bubble charts to describe things, you can deepen your understanding of things, improve the breadth and depth of thinking, and the accuracy of describing things. Bubble charts have been widely used in life and teaching because of their simple and intuitive expression. You can use bubble charts to describe people or things in English learning. The more words you learn, the more detailed, accurate and specific the description can be.

#### (6) Tree

The shape of a tree diagram is like a tree, with three core parts: trunk, branches, and leaves. The trunk represents the central theme, and the branches represent the categories of the theme, and each category contains sub-projects. In this sense, the main trunk and branches at all levels reflect the relationship between the upper and lower levels. The main trunk is an abstract summary of things, while the branches are more specific explanations of things. Tree diagrams are widely used in life and study, and are a good way to classify and organize complex things. When using tree diagrams for classification, certain criteria must be followed to ensure that each sub-item has a category to which it belongs. However, the classification standards are not fixed. Different standards can be used to classify the same thing, or the same standard can be used to classify different things. Classification, using tree diagrams for classification has great flexibility and can be adjusted according to specific things. You can use tree

diagrams to classify and organize knowledge points during learning, making learning more organized and efficient.

#### (7) Fishbone Diagram

Mr. Kaoru Ishikawa of Japan invented the fishbone diagram based on management, which is a new type of thinking diagram for analyzing the causes of problems. It is shaped like a fish bone. The fishbone diagram can present the shape of the "fish" more completely. The fish head represents the central theme. Each fish bone represents a step of analyzing and solving problems. Each step contains multiple steps, reasons, and so on to discover the root cause of the problem and find the fundamental method to solve the problem. In teaching, the fishbone diagram can present the content and structure of the article as a whole, which is conducive to comprehensive and systematic learning of the article content and display of the thinking process.

#### (8) Bracket diagram

The bracket diagram consists of a whole and a part. The whole is the central thing and the parts belong to the whole. The parts at each level are further detailed descriptions of the whole, so the bracket diagram can also be regarded as a mental diagram showing the relationship between the whole (central thing) and the elements of each part. In daily life and study, the bracket diagram is the most common and most frequently used diagram. It can use the form of braces to summarize the content and present the relationship between the whole and the parts in a concise form. Helps understand things or concepts with complex structures.

### **2.3 The distinctive features of producing diverse information graphics for classroom use**

#### **2.3.1 Make learning more interesting**

In terms of visual expression, it is highly intuitive and has a very short transient memory. It takes about 50 seconds to process external information in a directly coded form. Visual stimulation during this period can stimulate learning efficiency. The purpose of information visualization is to reduce the amount of information that must be learned and reduce the memory load.

Infographic is to greatly stimulate the visual expression of the content taught, and to promote the mutual study and discussion of students with eye-catching graphic content. The teaching time of infographic is relatively short, usually 5 ~ 8 minutes. The infographic makes the complex data set in the classroom clear and easy to understand. By graphizing the teaching data and statistical results, the complex teaching concepts and information can present more profound meanings in a shorter time. Students can easily master the main information in class during the learning process.

Interest in the process of learning the interest of infographic in classroom learning mainly refers to form interest. Form interest refers to a kind of aesthetic taste produced by the intuitive form in teaching, which mainly acts on students' senses and has the aesthetic intuitive effect of "pleasing to the ear and pleasing to the eye". The graphic uses a large number of illustrations, diagrams, charts, rich colors on the screen, the use of visual concept, visual metaphor, etc., in the new, different, change, seek different design information and ideas to achieve the teaching purpose of convincing students. Visual AIDS, give a person to the picture; Visual language, give a person with aesthetic feeling. High quality classroom teaching requires teachers to have strict logical thinking as well as perfect image thinking. The graphic art form changes the traditional teaching mode of blackboard writing. Graphic design and visual stimulation enhance the interest and appeal of modern teaching. Class is fragmented learning, learning only one knowledge point at a time. The strong visual impact of infographic in the visual language of visualization in class can instantly capture students' interest in learning within a short 5-10 minute class period, and promote the efficiency of learning.

### 2.3.2 Improve the richness and flexibility of classroom content

Infographic extracts the essence of information visualization in class performance. With the help of the main direction of graphic artistic expression form, the use of infographic, the direct sensory stimulation of color, and the expanded application of rich graphic visualization, the teaching performance of micro class is flexible and the content of class is enriched.

In graphic art, infographic is an addition to the visualization and visualization of classroom information. The teaching method of micro-classroom is presented in the form of learning from multiple perspectives.

Shen Hao, president of 21st Century Media, said: "In the situation of information flooding and accelerated fragmentation, only structure can carry the overall view; However, when reading time is limited and there are a lot of homogenized content, diagramming can simplify complexity and gain insight into new trends." In infographic, visual language is used as a way to convey information. By comprehensively applying visual information such as images, characters, colors and symbols in the chart, some means are used to deal with the relationship between some information that is difficult to be expressed and explained by data or text alone. Through visual language, To improve the richness, infectivity and efficiency of information exchange in infographic. In micro class, infographics are mainly used to present data, show trends, compare data, sort out processes, suggest key points, reveal relationships, analyze and interpret organizational structure, etc., which can be communicated visually.

#### **2.4 cognitive learning theory**

Cognitive learning theory is a theoretical framework that dominates the field of educational psychology, emphasizing the cognitive activities and processing processes within individuals during the learning process. It believes that learning is an active and conscious activity in which individuals establish new understanding and meaning by organizing and reorganizing existing knowledge structures in the process of receiving and processing information.

Cognitive learning theory emphasizes that learning is based on the cognitive process within the individual, which reveals the nature of learning and the key elements in the learning process. According to this theory, learning is an active psychological activity that establishes and changes cognitive structures through an individual's processing, organization, understanding, and application of information.

Cognitive learning theory has been widely researched and applied since the 1960s, and its research status at home and abroad is numerous, covering theoretical development, teaching methods and practical applications. Many scholars pay attention to the application of cognitive learning theory in the field of education, especially its guiding role in classroom teaching. For example, Li Ming and Li Hong (2018) explored the significance of cognitive learning theory in the application of educational equipment.



and Gao Zhigang and Zhang Xin (2016) reviewed the application and research of cognitive learning theory in higher education. There are also a large number of studies exploring and applying cognitive learning theory. "Cognitive Psychology and its Implications" by Anderson (2009) is a classic textbook that elaborates on the basic principles and applications of cognitive learning theory. Schunk's (2011) Learning Theories: An Educational Perspective provides a review of multiple learning theories, including cognitive learning theory.

In addition, Mayer (2014) explained the application of cognitive learning theory in multimedia learning in "The Cambridge Handbook of Multimedia Learning". Sweller, Ayres, and Kalyuga (2011) introduced the concept and application of cognitive load theory in detail in the book Cognitive Load Theory.

Key elements in cognitive learning theory include:

1) Individual cognitive structure: Cognitive learning theory believes that individual knowledge and cognitive structure are the basis of learning. An individual's cognitive structure includes knowledge, concepts, models, thinking strategies, etc. During the learning process, individuals continuously develop and reorganize these cognitive structures through interaction with new information.

2) Information processing process: Cognitive learning theory focuses on the individual's active processing and regulation of information. It involves the processes of perception, attention, selection, encoding, storage, retrieval, processing and organization of information to construct knowledge and understand information.

3) Learning strategies: Learning strategies are methods and techniques that individuals consciously choose and apply to enhance learning effects and promote the mastery and transfer of knowledge. Learning strategies include choosing appropriate learning methods, making plans, organizing information, paying attention to learning goals, monitoring the learning process, etc.

4) Metacognition: Cognitive learning theory also focuses on an individual's metacognitive ability, that is, an individual's ability to recognize and control his or her own learning process and learning strategies. Individuals monitor and regulate their own learning through metacognition to improve learning effects and self-adjustment abilities.

5) Social Environment: Cognitive learning theory recognizes the importance of

social environment for learning. Social factors such as social interaction, collaborative learning, and model learning have a certain impact on individual learning processes and cognitive development.

Cognitive learning theory is a discipline about how humans acquire, process, and apply knowledge. Information graphics and knowledge visualization, as tools for knowledge communication and presentation, are closely related to cognitive learning theory.

Cognitive learning theory emphasizes the process by which learners actively construct knowledge. According to cognitive learning theory, learning is not only the reception and storage of information, but also a process in which individuals actively organize and reconstruct existing cognitive structures when acquiring new knowledge. Information graphics and knowledge visualization provide learners with an information structure that is easy to understand and organize through clear visual forms. Learners can quickly acquire and integrate relevant knowledge through infographics and knowledge visualization, promoting in-depth understanding and application of knowledge.

Cognitive learning theory focuses on the development of individual thinking processes and cognitive abilities. Infographics and knowledge visualization present knowledge in a visual way, emphasizing the use of visual elements such as graphics and images. This form enables learners to perceive and connect concepts, relationships, patterns, etc. more intuitively. For example, by using charts and images, learners can more easily understand trends and patterns in data, or understand complex concepts and models more intuitively. This visual expression is in line with the human brain's processing mechanism of visual information and helps improve learners' attention and memory abilities.

In addition, cognitive learning theory also emphasizes the social and situational dependence of learning. Infographics and knowledge visualizations can help learners better share and communicate knowledge with others. By visualizing abstract concepts and relationships, communication and mutual understanding between different individuals are easier. At the same time, in specific learning environments, information graphics and knowledge visualization can also be customized according to different needs and backgrounds to meet the needs of different learners and improve learning effects and efficiency.

## 2.5 Literature review of the relevant research

Research on infographics soon began in China. Domestic research on information graphics The research on graphs mainly focuses on three aspects: theoretical research and teaching application of thinking information graphs and knowledge information graphs. For example: the concept of knowledge information graphs was first proposed by scholar Zhao Guoping (2005) . Since then, knowledge information graphs The research on infographics officially kicked off in China. Scholar Zhang Weizhongjie (2010) analyzed the theoretical basis of information graphics teaching and put forward the design principles of information graphics teaching content based on specific teaching cases. Zhao Huichen (2012) elaborated on the method of visual representation of knowledge information charts from three levels: form, content and utility<sup>⑥</sup>. Zhao Guoqing (2016) introduced the use of mind maps, including detailed instructions on the eight major mind maps. In the book, he explained and discussed the illustration production of thinking information charts<sup>⑦</sup>. Chai Lina (2016) demonstrated that information graphics teaching is an innovative teaching model through the specific application of information graphics teaching in English vocabulary, grammar, and reading teaching. When teaching English, this new teaching model must be effectively designed and applied. It can turn English reading texts and abstract letters into visible, visual information charts and images, making the English teaching model richer and effectively improving students' learning interest and English teaching efficiency. Professor Wu Xiaohong from Ningxia University proposed the information graphics method in terms of the theoretical basis, design tools, teaching activities, teaching situations, and teaching evaluation of information graphics teaching design. Jodye Selco and others explore discovery-based curriculum that allows students to explore the organization of the periodic table and learn how to read the information embedded within it. This approach guides students through practical exercises, allowing them to develop a visual-spatial image of the role of valence electrons in the formation of atoms and molecules and in the organization of the periodic table of elements. This new constructivist approach to teaching has been used successfully with students of many ages, from 8 years old to adulthood. For example, they made an infographic by moving atoms through a model. Tian Yali (2015) used Gaussion09 and Gaussview5.0 software

in the teaching of chemical information graphics in middle schools. Sun Qiangyan (2017) used Gaussion09, Gaussview5.0 and ChemDraw8.0 software to teach information graphics on organic chemistry reaction mechanisms in middle schools. Chen Wei et al. (2017) used information graphics teaching such as creating situations, building models, associative structures, and innovative experiments in the teaching process of ethanol. Zhou Changlin (2019) used the virtual chemistry experiment software IrYdium Chemistry Lab as a basic tool to design an infographic teaching design for "Hydrolysis of Salts". Kong Mingliang (2020) applied information graphics teaching to junior high school chemistry teaching and proposed teaching strategies for microscopic world information graphics and experimental information information graphics.



## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

This paper uses infographic teaching techniques to improve the quality of education in China through the four elements of Sustainable Development Goals (SDGs), which have statistical significance, learning motivation, and satisfaction, and thus improve achievement. This chapter mainly describes the problems in the research, research objects, teaching methods and specific research processes, as well as the collection and analysis of research data.

- 3.1 Research Design
- 3.2 Population and sample
- 3.3 Research Instrument
- 3.4 Data Collection
- 3.5 Data and Statistical Analysis

#### **3.1 Research Design**

The research design was conducted according to the following structure in the objective of the research; it has been moving with steps as flowing:

The researcher used a quantitative approach in experimental design for conducting this study. The data was collected in a quantitative or numerical form derived from the test, and the experimental data of this study mainly consisted of pre-test experimental data and post-test experimental data

#### **3.2 Population and sample**

1) The subjects of this study are about 60 students from Sichuan Health Rehabilitation Vocational College in the second semester of 2023.

2) The sample for this study was 30 students. They were the worst of the 60 students. The front side of 60 students, after the test to select the underperforming students. With 70 points as the standard, students with more than 70 points pass, and students with less than 70 points do not pass, and infographic teaching method is adopted

for students who do not pass. Through comparison, independent t test was used to explain.

### **3.3 Research Instrument**

3.3.1 This study mainly uses three research tools: questionnaire, interview and testing (pre-study test + post-study test) . The research tools used are technical examination, creative ability and expressive ability.

#### **(1) Questionnaire**

A questionnaire is a survey method in which the investigator uses a uniformly designed questionnaire to gain information or solicit the opinions of selected respondents. This study collected information and data by sending questionnaires to study participants. This questionnaire is a survey of students' art design status in class before the experiment. The questionnaire consists of 10 questions. These questions understand students' learning of art design from the aspects of learning status, learning strategy, learning attitude, learning difficulties and knowledge of art design.

#### **(2) Test method**

In order to test whether students' design mastery has improved after using infographic teaching in class, this study divided the examination content into two parts: creative direction and design scheme. Front and rear problems are of the same type. The total score is 100 points, the creative direction is 50 points, the design plan is 50 points, all about the professional skills of art design. In order to ensure the efficiency of the examination, the structure before and after the examination is the same, and the difficulty of the content is comparable.

#### **3.3.2 Research Materials**

The infographic used in this experiment selects the classic design trademark picture, which is suitable for the beginner students of Sichuan Health Rehabilitation Vocational College. Moderate difficulty, creative and interesting, easy for students to understand, through learning these infographics can not only consolidate knowledge, but also because of the original knowledge can be expanded. The infographic is below:



### 3.3.3 Research Process

The subjects selected for this experiment are 30 students from my 60 students in Sichuan Health Rehabilitation Vocational College. Our school is a national public vocational school with students from higher vocational colleges. As a teacher in a higher vocational school, I participate in the guidance of classroom teaching and carry out research on the effectiveness of classroom implementation.

The study was divided into two parts: the investigation test stage and the infographic teaching experiment stage, which lasted for 4 weeks, two lessons per week for one month.

The first step of the infographic teaching experiment: two weeks before the experiment, questionnaire survey and prediction of students' design ability were conducted to understand the problems existing in students' learning.

The second step was infographic teaching, which lasted for 4 weeks.

The third step is to test the teaching effect. In the last week of the experiment, students' artistic design ability and satisfaction survey are conducted, and then summarized.

### 3.3.4 Study the efficiency of infographic to enhance learning achievement of low score students.

#### 3.3.4.1 Research on the validity of the songs for using to infographic teaching enhance learning achievement of low score students.

#### 3.3.4.2 Evaluation of using infographic teaching to enhance learning achievement of low score students from three content experts. Content experts working in the field of A design teacher are asked to check the appropriateness of the content used in infographic used in art design teaching instruction.

This is a close-ended questionnaire that was based on the five (5) point Likert-type scales. The participants were asked to rate their degree of agreement on each statement from numbers 1-5. The interpretation of each number is described as follows:

- 5 = Excellent
- 4 = Good
- 3 = Average
- 2 = Poor
- 1 = Very Poor



**Table 3.1** Range of mean and verbal interpretation

Range Value	Verbal Interpretation
4.50-5.00	Excellent
3.50-4.49	Good
2.50-3.49	Average
1.50-2.49	Poor
1.00-1.49	Very Poor

**Table 3.2**

Questions:	+1	0	-1
Can the teacher's teaching be accessible to all students?	1		
How long do students spend on independent learning and training in class?	1		
How satisfied are you with the teaching methods and teaching methods of your classroom teachers?	1		
How satisfied are you with your personality development?	1		
Has the teacher carried out research-based learning, comprehensive practice and other activities?	1		
Do you think teachers should use more infographics in their teaching?	1		
Has the teacher conducted information graphics teaching?	1		
Does the teacher often ask questions and pay attention to students during class?	1		
Can students easily master the design knowledge in infographics?	1		
Can learning infographics increase students' interest in art design?	1		
OVER ALL $\geq 0.5$			

#### 3.3.4.3 The achievement assessment (Pre-test and Post-test)

Pre-test and post-test share the same item. Both contain questions related to the design they are learning in the classroom, consisting of two sections with a total score of 100, 50 points in creative direction, and 50 points in design proposal, all about professional skills in art design. In order to ensure the efficiency of the exam, the

structure before and after the exam is the same, and the difficulty of the content is comparable.

Table: Pre-test and Post-test(Grading criteria) :

1) To design a brand LOGO as the ultimate goal, check whether students correctly understand the basic characteristics of art design and understand the basic rules of marking product design.

2) Check that students have mastered the basic methods and skills of logo product design and creation. Allow students to demonstrate the basic processes and norms of logo design, and show students' creative direction. Check whether the idea is in line with the theme, whether the idea is novel, etc.

3) After the students determine the creative direction of the design, they will examine their independent design schemes, discuss the definition and sketch of the logo elements with the students, discuss and study the concept of logo design, select some representative logo patterns as the final design scheme among many design schemes, and check whether the design scheme conforms to the theme and whether the color patterns are coordinated

### **3.4 Data Collection**

Step1: This paper conducts real data collection work during the study. A questionnaire was conducted, 30 copies of which were distributed to 30 students at the beginning of the semester, and after explaining the specific requirements to the students, they were asked to fill in accordingly, and after completing them, they were taken back on the spot.

Step2: After that, the questionnaire data are statistically analyzed and summarized. The survey aims to understand the purpose and interests of students studying art design. Two design proficiency tests. I score pre - and post-test scores based on the design effects. Valid answers were obtained from pre - and post-study tests.

Step 3: At the end of the teaching, all students were interviewed with satisfaction, including students' views on infographic teaching, harvest, interest and confidence in art design after the experiment. I recorded the satisfaction survey in text to ensure the authenticity of the content.

### 3.5 Data and Statistical Analysis

3.5.1 Using manual pre- and post-performance test comparisons, infographic teaching are used to improve the academic performance of low sores students by applying t-tests.

3.5.2 To study student opinion with infographic teaching instruction, the academic performance of vocational school students was questionnaire.

3.5.3 The basic statistics in data analysis are:

Statistical Package for the Social Sciences (SPSS)

where  $\bar{X}_1$  and  $\bar{X}_2$  are the means of the two samples, S is the combined standard deviation, and  $n_1$  and  $n_2$  are the sizes of the two samples.

3.5.4 The basic statistics in data analysis are:

3.5.4.1 The formula for calculating the arithmetic mean ( $\bar{X}$ ) is:

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

Whereas  $\bar{X}$  = Average or Arithmetic Mean

$\sum X$  = Sum of all score results

$N$  = Number of students

3.5.4.2 The formula for calculating the standard derivation ( $SD$ ) is:

$$S.D. = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$$

Whereas  $SD$  = Standard derivation

$N$  = Number of students

$\bar{X}$  = Mean value

$X$  = Student's score

3.5.4.3 The formula used to determine the quality of the instruments were: In finding content validity of the achievement test, we conducted the IOC formula (Item Objectives Congruence) by following the formula below:

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

Whereas IOC = Index of correspondence between the test and the objective

$\sum R$  = Sum of individual expert's value

R = Expert's rating

N = Number of experts

3.5.4.4 The formula used in finding the difficulty index of the achievement test were

$$P = \frac{R_H + R_L}{N_H + N_L}$$

Whereas P = difficulty level

RH = the number of people who chose the highest option rate

RL = the number of people who chose the lowest option rate

NH = the total number of people in the high group

NL = the total number of people in the low group

**Table 3.3** Range of difficulty index and verbal interpretation

Difficulty Index	Verbal Interpretation
0.00-0.20	Very Difficult
0.21-0.40	Difficult
0.41-0.60	Average / Moderately Difficult
0.61-0.80	Easy
0.81-1.00	Very Easy

3.5.4.5 The formula for calculating the item discrimination of the achievement test is:

$$r = \frac{R_H - R_L}{N_H \text{ or } N_L}$$

Whereas r = Discrimination index

$R_H$	=	Number of correct responses in the high group
$R_L$	=	Number of correct responses in the low group
$N_H$	=	Total number of students in the high group
$N_L$	=	Total number of students in the low group

**Table 3.4** Range of discrimination index and verbal interpretation

Discrimination Index	Verbal Interpretation
0.40 and above	Very Discriminating / Very Good Item
0.30 to 0.39	Discriminating / Good Item
0.20 to 0.29	Moderately Discriminating Item
0.10 to 0.19	Not Discriminating / Marginal Item
Below 0.10	Poor / Questionable Item

3.5.4.6 The formula for calculating the reliability of the achievement test K-R#20 by Kuder-Richardson is:

$$r_{tt} = \frac{k}{k-1} \left[ 1 - \frac{\sum pq}{S^2} \right]$$

Whereas $r_{tt}$	=	Reliability index
$k$	=	Number of test items
$p$	=	The proportion of the correct answer
$q$	=	The proportion of the incorrect answer
$S^2$	=	The variation of the entire test

3.5.4.7 The formula for calculating the variability of the achievement test is:

$$S^2 = \frac{n \sum fx^2 - (\sum fx)^2}{n(n-1)}$$

Whereas $S^2$	=	Variance
$n$	=	Number of students
$x$	=	Achievement test score
$f$	=	Data of frequency

3.5.4.8 The formula used to verify the hypothesis were: The formula used in analyzing the differences in achievement scores using the dependent t-test was:

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

Whereas  $\sum D$  = Sum of variance score of achievement test  
 $\sum D^2$  = Sum of different squares of achievement  
test scores  
 $(\sum D)^2$  = Sum of variance score of the square test  
 $n$  = Number of students  
 $D$  = Difference between pre-test and post-test  
scores

3.5.4.9 The formula for calculating the effectiveness index (E.I.). values are as follows:

$$E.I. = \frac{\sum X_2 - \sum X_1}{(total) - \sum X_1}$$

Whereas E.I. = Efficiency of the process  
 $\sum X_1$  = Pretest scores  
 $\sum X_2$  = Posttest scores  
Total = Full scores multiplied by the number of students

## CHAPTER 4

### RESEARCH RESULT

In this chapter, answers to the research questions will be given in the form of data analysis and presentations. This paper mainly analyzes the influence of infographic on students' learning ability and the attitude of infographic to students' learning. The findings are analyzed and discussed below.

#### 4.1 Descriptive data statistics

#### 4.2 Analysis Results

### 4.1 Descriptive Data Statistic

4.1.1 The effectiveness index is used to study the effectiveness of infographic to improve the learning outcomes of art design in vocational college students (E.I.) .

4.1.2 Using the infographic based classroom, the T-test is used to compare the students' learning performance before and after the test, so as to improve the learning performance of art design.

4.1.3 Through the mean and standard deviation research based on infographic to improve students' satisfaction with art design learning outcomes.

### 4.2 Analysis Results

4.2.1 This paper studies the effectiveness of infographic based teaching to improve the learning outcomes of art design in vocational college students.

4.2.1.1 Improve the efficiency of art design learning outcomes of vocational students based on infographic.

**Table 4.1** Evaluation results of efficiency of using infographic teaching to enhance learning achievement of vocational scores lowest students

Average Pretest score	Average Posttest score	Total of pre-test scores	Total of post-test scores	Full scores multiplied by the number of students	Effectiveness Index (E.I.)
63.17	86.20	1895	2586	100 x 30	0.625

As can be seen from Table 4.1, the average score of the pre-test is 63.17, and the average score of the post-test is 86.20, indicating that the infographic teaching method has a great improvement in improving the artistic design learning performance of vocational students. The results show that the value of the effective index (E.I.) . The result revealed that the value of Effectiveness Index (E.I.) . as 0.62 or calculated as 62 percentage. To sum up, this infographic teaching method has improved the learning results of art design for vocational college students.

4.2.1.2 Three content experts evaluated infographic teaching methods to improve art design learning outcomes of vocational college students

The 10 evaluation items are composed of a form prepared by three content experts. This section uses a 5-point rating scale to represent the opinions of content experts. The identification of each standard level is shown in the table below.

Three content experts put forward the idea of improving the learning outcomes of art design for vocational students.

**Table 4.2** Evaluation results based on infographic

Evaluation Items	$\bar{X}$	S.D.	Result Interpretation
1. Consistency between content and learning objectives.	4.33	0.58	Good
2. The content is interesting.	5.00	0.00	Excellent
3. The content increases students' interest.	4.67	0.58	Good
4. The capacity of each activity is appropriate.	4.33	0.58	Good
5. Content sorting is appropriate.	5.00	0.00	Excellent
6. Content accuracy.	4.00	0.00	Good
7. The content is in line with the situation of Chinese higher vocational students.	5.00	0.00	Excellent
8. Activities are consistent with the content.	5.00	0.00	Excellent
9. Infographics stimulate learners' interest in learning.	5.00	0.00	Excellent
10. The overview of the content is complete.	5.00	0.00	Excellent
Total	4.73	0.17	Excellent



Table 4.2 shows the evaluation results of three content experts on the content quality of infographic based teaching to improve art design learning outcomes. The overall quality was excellent ( $\bar{X}=4.73, S.D.=0.17$ ). When considering each project, it was found that the content was interesting, the content was properly organized, the content was in line with the actual situation of Chinese vocational college students, the activities were consistent with the content, the content of micro-lessons stimulated learners' interest, and the content was complete in summary, respectively reaching the excellent level ( $\bar{X}=5.00, S.D. = 0.00$ ).

4.2.2 The use of infographic teaching classroom to compare students' learning results before and after the test, improve the art design of vocational students' learning results.

After completing the test, students can learn art design based on infographics and take a post-test, which is consistent with research objective 2. The analysis results are shown in Table 4.3.

**Table 4.3** Students use an infographic-based approach to facilitate the comparison of pre-test and post-test mean scores Artistic design achievements

Items	n	$\bar{X}$	S.D.	df	t-test	Sig.(2-tailed)
Pre-test	30	63.17	1.48	29	29.3	0.000
Post-test	30	86.20	1.91			

\*\*p< .05

Table 4.3 shows the effect of learning based on infographic on improving the artistic design achievements of vocational college students. The mean pre-test score was 63.17, and the standard deviation (sd) score was 1.48. After the application of infographic-based learning to improve the learning performance of art design in higher vocational students, the students' academic performance was significantly improved, with the post-measured height value of 86.20, standard deviation (sd) of 1.91 and t-test analysis before and after the treatment 29.3 which demonstrated a considerable difference

was statistically significant at the .05 level.

4.2.3 This paper studies the effect of infographic based teaching on the improvement of artistic design learning performance of vocational students.

The study satisfaction questionnaire evaluation based on infographic can improve the art design learning achievement of vocational college students

**Table 4.4** The evaluation results of student satisfaction on improving art design learning outcomes of vocational college students based on infographic teaching

Evaluation Items	$\bar{X}$	S.D.	Result Interpretation
1. Learn art design in your own time and place through infographic-based instruction.	4.83	0.46	Strongly Agree
2. Learn art design in infographic-based instruction and you can remember more about art and culture.	4.90	0.31	Strongly Agree
3. Learning art design through infographic based instruction makes it easier to view art works.	4.93	0.25	Strongly Agree
4. Learning art design through infographic-based instruction makes it easier to view designers' work.	4.47	0.51	Strongly Agree
5. Learning art design through infographic based teaching can exercise the ability of independent learning.	4.97	0.18	Agree
6. Learning art design through infographic-based instruction can make learning more fun.	4.77	0.63	Strongly Agree
7. Learning art design in infographic based teaching can understand the course content in advance and strengthen the learning effect.	4.97	0.18	Strongly Agree
8. Learning art design in infographic-based teaching can be consolidated at any time.	4.90	0.31	Strongly Agree
9. Learn art design through infographics-based instruction that can be viewed repeatedly at your own pace.	4.90	0.31	Strongly Agree
10. Learn art design through infographic-based instruction, and get involved in learning quickly.	4.93	0.25	Strongly Agree
Total	4.86	0.34	Strongly Agree

Table 4.4 shows the satisfaction evaluation results of 30 students on the improvement of art design learning outcomes of vocational college students based on infographic teaching. Overall student satisfaction was strongly consistent ( $\bar{X}=4.86, S.D.=0.34$ ). When considering each project, it is found that learning art design

through infographic-based teaching can remember more art culture and facilitate viewing more artists' art works. Learning Chinese art design through infographic-based teaching can make learning more interesting, strongly agree level ( $\bar{X}=4.77$ ) ; S.D.=0.63) , learning art design through infographic-based teaching in their own time and place, and learning art design through infographic-based classrooms to be able to participate in learning quickly, are strongly agreed levels ( $\bar{X}=4.93$ ,S.D.=0.25) .



## **CHAPTER 5**

### **CONCLUSION AND DISCUSSION**

In objectives of this study are as follows :1) To study the effectiveness of infographic teaching in improving art design learning achievements of vocational students; 2) Compare the pre-test and post-test scores of higher vocational students in art design learning based on infographic teaching; 3) To study the degree of student satisfaction in improving art design learning outcomes of vocational college students based on infographic teaching. This study selected 30 first-year students from Sichuan Health and Rehabilitation Vocational College in 2023 as samples.

According to the global state of education, the United Nations proposed the Sustainable Development Goals (SDGs) . The fourth goal is quality education. Ensure inclusive and equitable quality education. This study uses infographic teaching technology to improve the art design performance of students with poor performance. The purpose of this study is: 1) To study the effectiveness of infographics in art design teaching. 2) Determine the learning achievement after infographic teaching. 3) Determine its effectiveness. 4) Identify student opinions after using these infographics in teaching. The subjects of this study are about 60 students from Sichuan Health Rehabilitation Vocational College in 2023. In this study, 3 students were selected using Chung Tefan technique. Research tools include: 1) Achievement test papers. 2) Questionnaire. The statistical data used in this study include: 1) the form of the item objective conformance index 2) dependent T-test 4) validity indicators 5) content analysis techniques. The conclusions, discussions and recommendations of this study are as follows:

5.1 Discussion

5.2 Conclusion

5.3 Recommendation

5.4 Suggestion

## 5.1 Discussion

The research on improving the learning effectiveness of art design of vocational college students based on infographic teaching is as follows:

5.1.1 This paper studies the teaching mode based on infographic to improve the learning results of art design of vocational college students.

5.1.1.1 The effect of infographic teaching mode to improve the learning results of art design of vocational college students

The average score of the pre-test was 63.17 points, and the average score of the post-test was 86.20 points, indicating that the infographic teaching mode has a great promotion effect on improving the artistic design learning performance of higher vocational students. The results show that the value of the effective index (E.I.) . The result revealed that the value of Effectiveness Index (E.I.) . as 0.62 or calculated as 62 percentage. Based on the concept of infographic teaching, the class has improved the learning performance of secondary vocational students in art design and improved their academic performance.

5.1.1.2 Evaluation results of three content expertson the improvement of art design learning outcomes of vocational college students based on infographic teaching

Three content experts evaluated the evaluation results of micro-classroom content quality based on infographic teaching to improve art design learning outcomes of vocational college students. The overall quality was excellent ( $\bar{X}=4.73, S.D.=0.17$ ) . The results show that teaching based on infographic can improve students' performance in art design.

When considering each project, it was found that the content was interesting, the content was reasonably organized, the content was in line with the actual situation of Chinese vocational college students, the activities were consistent with the content, the infographic content stimulated the interest of learners, and the content integrity reached the excellent level ( $\bar{X}=5.00, S.D.=0.00$ ) .

When considering each project, we found that "making it easier for students to understand what they are learning", "making it easier for students to understand what they are learning" and "details are clear and understandable" were

respectively excellent levels ( $\bar{X}=5.00, S.D. = 0.00$ ) . The order and content of the activities are appropriate, able to present the learning content clearly, these activities are suitable for learners and easy for students to use were scored at high levels ( $\bar{X}=4.33, S.D.= 0.58$ ) . The results of this experiment are basically consistent with those of similar studies.

5.1.2 Compare students' learning performance before and after the test, and improve the efficiency of art design learning performance of higher vocational students based on infographic teaching.

The classroom based on infographic teaching can improve the efficiency of art design learning outcomes of vocational college students. The mean pre-test score was 63.17 and the standard deviation (sd) score was 1.48. The classroom efficiency of infographic teaching can improve the learning performance of art design of vocational college students, and the students have significantly improved, with a post-test high of 86.20, standard deviation (sd) 1.91, and the difference is statistically significant at 0.05 level. This is due to the classroom philosophy of infographic teaching, which can better allow students to understand what they are learning and remember it. This result is basically consistent with that of Zhou Changlin. Her findings suggest that courses taught using infographics can significantly improve academic performance among college students. The standard deviation was greater than 0.5. According to the research results of Shen Hao(2022) , using the classroom concept of infographic teaching, students' advanced oral learning achievement in school reached a statistically significant level of 0.05. The results of Chai Lina (2022) also show that the use of infographic teaching mode can significantly improve the geography achievement of high school students, reaching 0.05. This is consistent with the research results of Zhou Changlin (2023) , and is also close to the research results of this paper.

5.1.3 This paper studies the effect of infographic-based classroom teaching on students' satisfaction in improving the learning effectiveness of art design.

The statistics of the satisfaction results of vocational students with the application of infographic-based teaching in the classroom to improve the learning performance of art design show that: The evaluation results of 30 students on the classroom satisfaction of infographic-based teaching to improve the learning effect of art

design of vocational students show that the overall satisfaction of students is at a strong consistency level ( $\bar{X}=4.86, sd =0.34$ ) . When considering each project, we found that infographic teaching learning art design, can remember more art culture, but also more convenient to see the designer's art works. Learning about art design in an infographic-based classroom can make learning more fun.

Strongly agree level ( $\bar{X}= 4.97$ ; S.D.=0.18) , learn art design in your own time and place through an infographic-based teaching classroom. The proportion of students who learned art design through infographic-based instruction reached a strong identification level ( $\bar{X}=4.93, sd =0.25$ ) . This may be because the classroom design of infographics is interesting, which can stimulate students' interest in learning and improve students' self-efficacy. This is consistent with the findings of Zhou Changlin, who has shown that classroom teaching using infographic teaching concepts can effectively increase learners' satisfaction and enthusiasm for learning.

## 5.2 Conclusion

The analysis result of the above information answers to the research objectives as follows:

5.2.1 This paper studies the effectiveness of infographic based classroom teaching to improve art design learning outcomes.

5.2.1.1 Micro-classroom evaluation efficiency results of improving art design learning outcomes based on infographic teaching

The average score before the test was 63.17, and the average score after the test was 86.20, indicating that the class based on the infographic teaching concept greatly improved the learning effect of art design, and thus promoted the academic performance of students in Sichuan Health and Rehabilitation Vocational College. The results showed that the effective index (E.I.) was 0.62. To sum up, the classroom application of infographic teaching is formulated in accordance with the performance standard 0.5 of art design learning for Chinese higher vocational students.

5.2.1.2 Evaluation results of three content experts on infographic-based teaching to improve art design learning outcomes

When considering each item, it was found that making it easier for students to understand what they are learning, Making it easier for students to understand what they are learning and details that are clear and easy to understand were rated as excellence levels ( $\bar{X}=5.00$ , S.D. = 0.00) . The order and content of the activities are appropriate, able to present the learning content clearly, these activities are suitable for learners and easy for students to use were scored at high levels ( $\bar{X}=5.00$ , S.D.= 0.00) .

5.2.2 Compare the learning achievement of students between pre-test and post-test

The use of infographic based teaching classroom to improve the academic performance of art design.

The conclusion is that the classroom teaching based on infographic can effectively improve the learning performance of art design in vocational college students. The mean pretest score was 63.17. A posteriori of 86.20, and the difference was statistically significant at the 0.05 level.

5.2.3 This paper studies the effect of infographic-based classroom teaching on students' satisfaction in improving their academic performance in art design.

The results of satisfaction evaluation showed that the overall satisfaction of students was at a strong consistency level ( $\bar{X}=4.86$ , S.D.=0.34) . When considering each project, we found that learning art design in a course based on infographic teaching can remember more art culture and make it easier to see the artist's work. Learning about art design in an infographic-based classroom can make learning more fun. Strongly agree level ( $\bar{X}= 4.77$ ; S.D.=0.63) , learn art design in your own time and place through an infographic-based teaching classroom. Students who learned art design through infographic-based classrooms achieved a strong identification level ( $\bar{X}=4.93$ , S.D.=0.25) .

### 5.3 Recommendation

In this research, researcher have suggested that the results of the study should be applied as follows:



5.3.1 The classroom application of infographic teaching concept should be carried out step by step according to the best practices in the field, so that researchers can achieve the goal of building a classroom application curriculum based on infographic teaching concept, so as to improve efficiency and achieve greater success.

5.3.2 Infographic-based classroom development allows for more interesting activities to be designed by adding images, sounds and video clips. His plan will help attract students to participate in activities and enjoy more sports.

5.3.3 Art and design have had a profound impact on the surrounding market, and the impact of this course can be further expanded through the use of infographic-based teaching classrooms. At the same time, this research method can also provide reference for other disciplines.

#### **5.4 Suggestion for Further Study**

Based on the summary and discussion of this study, the researchers' suggestions for further research are as follows:

5.4.1 New technologies should be introduced into the curriculum to stimulate more interest in learning.

5.4.2 Other arts courses and subjects of interest to students should be developed using infographics.

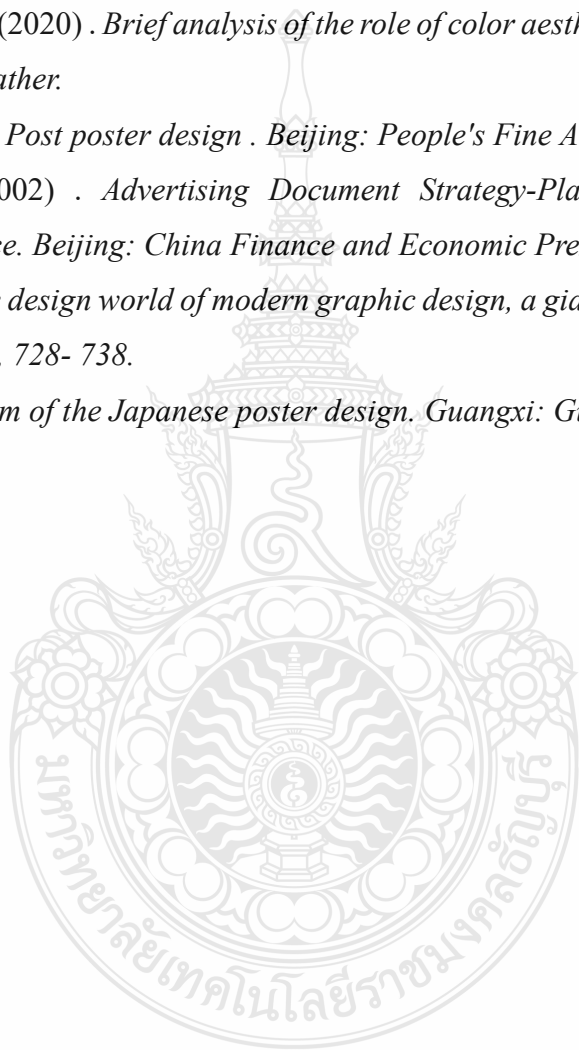
5.4.3 Further research on the application of infographics to teaching should be combined with other teaching methods such as cognitive skills, systems thinking skills and critical thinking skills.

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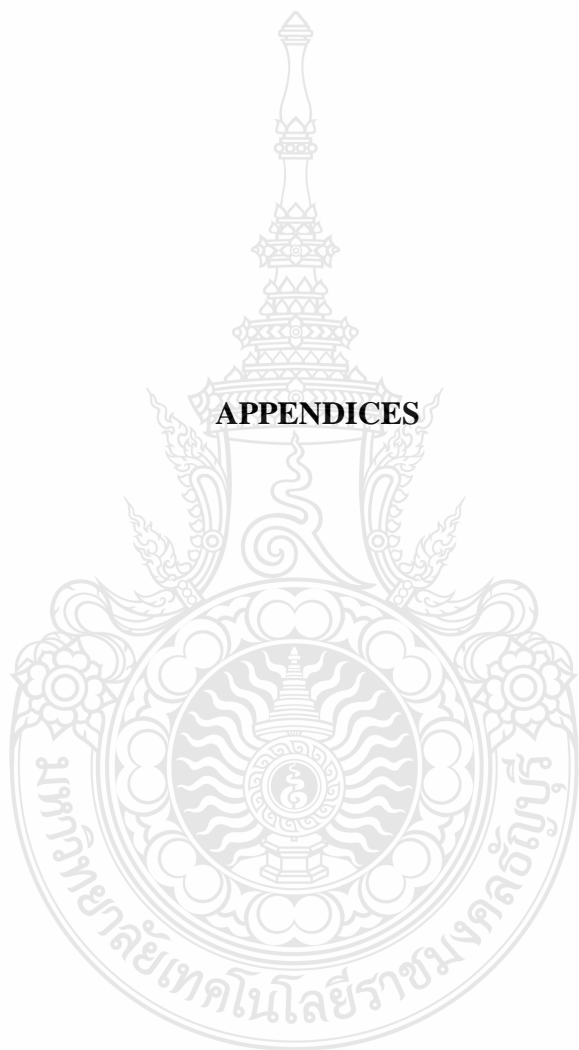
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## APPENDICES





## APPENDIX A

- List of Experts
- Invitation Letter to experts to examine research instruments

## **Content Experts**

1. PhD: Ms. Ms. Chen Tong

College of Education. Sichuan Health Rehabilitation Vocational College

2. PhD: Ms. Xiong Jing Yun

College of Foundation . Sichuan Health Rehabilitation Vocational College

3. PHD: Ms.Zhen Gui Xin

College of Education. Sichuan University of Science & Engineering



MHESI 0106.9/2024



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Rajamangala University of Technology Thanyaburi  
Klong Luang, Pathum Thani 12110 Thailand  
Tel:+66-2-549-4710 Fax:+66-2-577-5049

24 January, 2024

Dear Ms. Chen Tong

Subject: Respectfully Requesting for letter of Invitation of Experts for M.Ed.Thesis

I am writing to request your assistance as an honorary external research reviewer in evaluating the research instruments of Ms.Zeng Ying, Master of Education Program in Technology and Learning Innovation Rajamangala University of Technology Thanyaburi, who has been working on the thesis titled “The Effectiveness of Self – regulated Learning Via Infographics on the Topic of the Traditional Chinese Artisan Tools : A Case Study of Sichuan Vocational College of Health and Rehabilitation, Republic of China”. under the supervision of Assistant Professor Dr.Metee Pigultong. In this regard, I would like to request your valuable time to evaluate the research instruments as I strongly believe that your expertise will be of great value in improving the research instruments.

If you have any questions or need further information, please feel free to contact Ms.Zeng Ying, on the e-mail: zeng\_y@mail.rmutt.ac.th

Yours sincerely,

(Assistant Professor Arnon Niyomphol)  
Dean of Faculty of Technical Education

MHESI 0106.10/2024



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Klong Luang, Pathum Thani 12110 Thailand  
Tel:+66-2-549-4710 Fax:+66-2-577-5049

24 January, 2024

Dear Ms. Xiong Jing Yun

Subject: Respectfully Requesting for letter of Invitation of Experts for M.Ed.Thesis

I am writing to request your assistance as an honorary external research reviewer in evaluating the research instruments of Ms.Zeng Ying, Master of Education Program in Technology and Learning Innovation Rajamangala University of Technology Thanyaburi, who has been working on the thesis titled “The Effectiveness of Self – regulated Learning Via Infographics on the Topic of the Traditional Chinese Artisan Tools : A Case Study of Sichuan Vocational College of Health and Rehabilitation, Republic of China”. under the supervision of Assistant Professor Dr.Metee Pigultong. In this regard, I would like to request your valuable time to evaluate the research instruments as I strongly believe that your expertise will be of great value in improving the research instruments.

If you have any questions or need further information, please feel free to contact Ms.Zeng Ying, on the e-mail: zeng\_y@mail.rmutt.ac.th

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Anon'.

(Assistant Professor Arnon Niyomphol)  
Dean of Faculty of Technical Education



MHESI 0106.11/2024



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Rajamangala University of Technology Thanyaburi  
Klong Luang, Pathum Thani 12110 Thailand  
Tel:+66-2-549-4710 Fax:+66-2-577-5049

24 January, 2024

Dear Ms. Zhen Gui Xin

Subject: Respectfully Requesting for letter of Invitation of Experts for M.Ed.Thesis

I am writing to request your assistance as an honorary external research reviewer in evaluating the research instruments of Ms.Zeng Ying, Master of Education Program in Technology and Learning Innovation Rajamangala University of Technology Thanyaburi, who has been working on the thesis titled “The Effectiveness of Self – regulated Learning Via Infographics on the Topic of the Traditional Chinese Artisan Tools : A Case Study of Sichuan Vocational College of Health and Rehabilitation, Republic of China”. under the supervision of Assistant Professor Dr.Metee Pigultong. In this regard, I would like to request your valuable time to evaluate the research instruments as I strongly believe that your expertise will be of great value in improving the research instruments.

If you have any questions or need further information, please feel free to contact Ms.Zeng Ying, on the e-mail: zeng\_y@mail.rmutt.ac.th

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Arnon'.

(Assistant Professor Arnon Niyomphol)  
Dean of Faculty of Technical Education



## **APPENDIX B**

- Assessment of content quality
- Questionnaire of Students' Satisfaction
- Achievement Test



**The effectiveness of self-regulated learning via infographics on the topic of the traditional Chinese artisan tools: A Case study of Sichuan Vocational College of Health and Rehabilitation, Republic of China  
(For Content Experts)**

---

**Thesis Title**      The effectiveness of self-regulated learning via infographics on the topic of the traditional Chinese artisan tools: A Case study of Sichuan Vocational College of Health and Rehabilitation, Republic of China

**Name Surname**      Ms. Zeng Ying

**Program**              M.Ed. (Technology and Learning Innovation)

**Thesis Adviser**      Assistant Professor Metee Pigultong, Ph.D.

This assessment is a part of the thesis writing for a Master's degree in Education Program in Educational Technology and Communications, Rajamangala University of Technology Thanyaburi.

**Research of Objectives:**

- 1) To Comparing the learning achievement of art in this research the course instruction by using infographic
- 2) Identify about learning achievement scores after using infographics for art teaching.
- 3) Studying student effectiveness after using infographics in teaching

**Directions:** This questionnaire aims to explore the development of infographic based teaching in order to improve the academic performance of vocational students in art

design. Please answer all questions to the best of your ability. Your answer will be kept confidential. The questionnaire is divided into the following two parts:

**Part 1:** Please write √ in the box that corresponds to your opinion.

**Direction:** Please mark √ in a box that best describes the degree of your agreement with each statement.

- 5 = Strongly Agree  
 4 = Agree  
 3 = Undecided  
 2 = Disagree  
 1 = Strongly Disagree

Items	Level of agreement				
	5	4	3	2	1
1. Consistency between content and learning objectives.					
2. The content is interesting					
3. The content increases students' interest.					
4. The capacity of each activity is appropriate.					
5. Content sorting is appropriate.					
6. Content accuracy.					
7. The content is in line with the situation of Chinese higher vocational students.					
8. Activities are consistent with the content.					
9. Infographics stimulate learners' interest in learning.					
10. The overview of the content is complete.					

**Part 2:** Additional advice

.....  
 .....

Signature.....  
 (.....)

Date.....



## Questionnaire of Students' Satisfaction

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<b>Thesis Title</b>	Improve students' performance in art design based on infographic teaching
<b>Name Surname</b>	Ms. Zeng Ying
<b>Program</b>	M.Ed. (Technology and Learning Innovation)
<b>Thesis Adviser</b>	Assistant Professor Metee Pigultong, Ph.D.

This assessment is a part of the thesis writing for a Master's degree in Education Program in Educational Technology and Communications, Rajamangala University of Technology Thanyaburi.

### Research of Objectives:

- 1) To Comparing the learning achievement of art in this research the course instruction by using infographic
- 2) Studying student effectiveness after using infographics in teaching
- 3) To study about the validity of the infographics for using to teaching.

**Directions:** This questionnaire aims to explore the development of infographic based teaching in order to improve the academic performance of vocational students in art design. Please answer all questions to the best of your ability. Your answer will be kept confidential. The questionnaire is divided into the following two parts:

**Direction:** Please mark  $\surd$  in a box that best describes the degree of your agreement with each statement.

Items	Level of Consistency		
	+1	0	-1
1. Learn art design in your own time and place through infographic-based instruction.			
2. Learn art design in infographic-based instruction and you can remember more about art and culture.			
3. Learning art design through infographic based instruction makes it easier to view art works.			
4. Learning art design through infographic-based instruction makes it easier to view designers' work.			
5. Learning art design through infographic based teaching can exercise the ability of independent learning.			
6. Learning art design through infographic-based instruction can make learning more fun.			
7. Learning art design in infographic based teaching can understand the course content in advance and strengthen the learning effect.			
8. Learning art design in infographic-based teaching can be consolidated at any time.			
9. Learn art design through infographics-based instruction that can be viewed repeatedly at your own pace.			
10. Learn art design through infographic-based instruction, and get involved in learning quickly.			

**Part 2:** Additional advice

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Signature.....

(.....)

Date .....



## Achievement Test

### (For Measurement and Evaluation Experts)

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**Directions:** This questionnaire aims to explore the development of infographic based teaching in order to improve the academic performance of vocational students in art design. Please answer all questions to the best of your ability. Your answer will be kept confidential. The questionnaire is divided into the following three parts:

- 1) To design a brand LOGO as the ultimate goal, check whether students correctly understand the basic characteristics of art design and understand the basic rules of marking product design.

2) Check that students have mastered the basic methods and skills of logo product design and creation. Allow students to demonstrate the basic processes and norms of logo design, and show students' creative direction. Check whether the idea is in line with the theme, whether the idea is novel, etc.

3) After the students determine the creative direction of the design, they will examine their independent design schemes, discuss the definition and sketch of the logo elements with the students, discuss and study the concept of logo design, select some representative logo patterns as the final design scheme among many design schemes, and check whether the design scheme conforms to the theme and whether the color patterns are coordinated







## APPENDIX C

- Result of content validity by index of item objective congruence (IOC) of achievement test
  - Result of difficulty index (p) and discriminant index (r)
    - Result of reliability of the achievement test
  - Result of comparison of average score before and after

### **Result of content validity by index of item objective congruence (IOC) of achievement test**

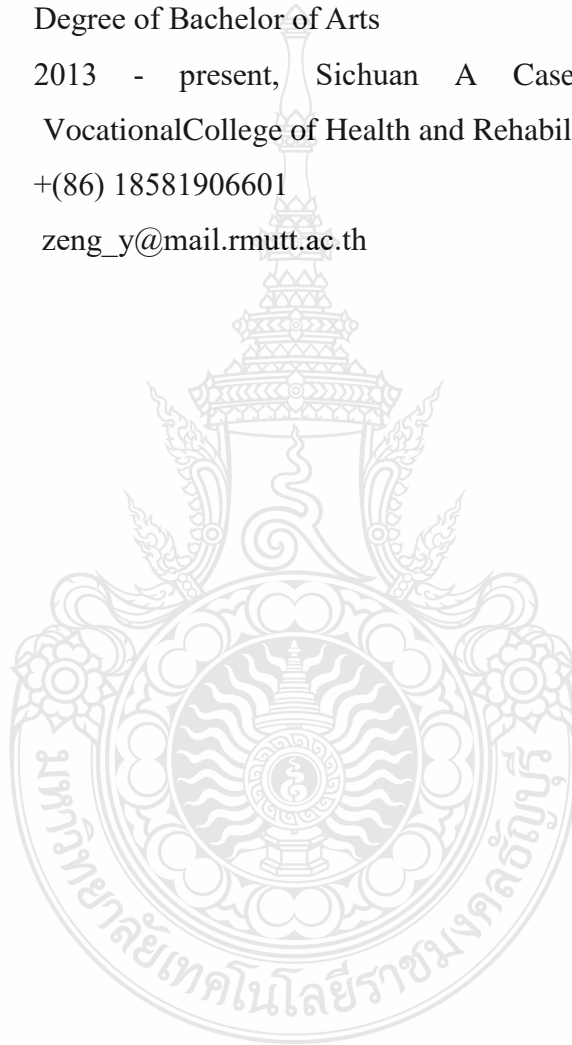
The quality analysis of the achievement test is determined by using the project Objective conformance Index (IOC) formula to determine content validity, in which three measurement and evaluation experts are assigned to score each question according to its correspondence to the total number of test markers. 20 of the criteria used for consideration are valid questions with an IOC value of 0.50 or higher. If the IOC value is less than or equal to 0.50, it is a problem that needs to be improved or eliminated. After checking the consistency of the questions with the experts' goals, it was found that the experts agreed on 40 consistent questions with an IOC of 0.5 or higher, and the researchers selected 20 questions for pretest and posttest.

**Table C.1** Result of content validity by index of item objective congruence (IOC) of achievement test

<b>Items</b>	<b>Score of experts</b>		
	<b>Expert1</b>	<b>Expert 2</b>	<b>Expert 3</b>
<b>Question:</b>			
Consistency between content and learning objectives.	1	1	1
The content increases students' interest.	1	1	1
The capacity of each activity is appropriate.	1	1	1
The content is in line with the situation of Chinese higher vocational students.	1	1	1
Infographics stimulate learners' interest in learning.	1	1	1
OVER ALL $\geq 0.5$			

## Biography

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วิทยานิพนธ์ฉบับนี้เป็นงานวิจัยที่เกิดจากการค้นคว้าและวิจัย ขณะที่ข้าพเจ้าศึกษาอยู่ใน คณะครุศาสตร์อุตสาหกรรม มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี ดังนั้น งานวิจัยในวิทยานิพนธ์ ฉบับนี้ถือเป็นลิขสิทธิ์ของมหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี และข้อความต่าง ๆ ในวิทยานิพนธ์ ฉบับนี้ ข้าพเจ้าขอรับรองว่าไม่มีการคัดลอกหรือนำงานวิจัยของผู้อื่นมานำเสนอในชื่อของข้าพเจ้า

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*Zeng Ying*

(Ms. Zeng Ying)

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RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI

ลิขสิทธิ์ พ.ศ. 2565  
คณะครุศาสตร์อุตสาหกรรม  
มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี