THE LEARNING MANAGEMENT USING THE VIRTUAL REALITY TECHNOLOGY TO IMPROVE LEARNING ACHIEVEMENT FOR SECONDARY 5 (GRADE 11) STUDENTS

HENG TAO

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION
PROGRAM IN CURRICULUM DEVELOPMENT
AND INSTRUCTIONAL INNOVATION
FACULTY OF TECHNICAL EDUCATION
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI
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Heng Tao

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Thesis Title	The Learning Management Using the Virtual Reality Technology to Improve Learning Achievement for Secondary 5 (Grade 11) Students
Name – Surname	Mr. Heng Tao
Program	Curriculum Development and Instructional Innovation
Thesis Advisor	Assistant Professor Rossarin Jermtaisong, Ph.D.
Academic Year	2022

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ABSTRACT

The objectives of this research were: 1) to compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the traditional approach, 2) to compare the learning achievement of students before and after the learning management using virtual reality technology, and 3) to compare the learning achievement of students using traditional learning management methods and those using virtual reality technology for learning management.

The research samples consisted of 2 classes of 60 Secondary 5 (Grade 11) students at the second middle school of Sichuan Province, China, in the 2022 academic year, selected by random cluster sampling. The research instruments were: 1) the learning management plans using the traditional approach, 2) the learning management plans using virtual reality technology, and 3) the learning achievement test. The statistic used to analyze the data were mean, standard deviations, and t-test.

The research results revealed that: 1) the learning achievement of Secondary 5 (Grade 11) students after learning management using the traditional approach was higher than before at the statistical significance level of .05., 2) the learning achievement of students after learning management using the Virtual Reality technology was higher than the before at the statistical significance level of .05., and 3) the learning achievement of students with learning management using the Virtual Reality technology was higher than learning management using the traditional approach at the statistical significance level of .05.

Keywords: traditional approach, virtual reality technology, leaning achievement

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CHAPTER 1
INTRODUCTION

1.1 Background and Statement of the Problems

In recent years, with the rapid development of science and technology, more and more modern science and technology have been applied to education and promoted education's modernization, informatization, and intellectual development (Gu & Wang, 2016, pp.5-13). In this context, to maximize the value of various advanced technologies, multiple technologies should be flexibly applied according to the characteristics of different disciplines (Huang, 2016, pp.37-42). As a new technology, Virtual Reality technology (VR) can be constructed by computer software and hardware equipment for a virtual reality space (Steuer, 1992, pp.73-93). It successfully simulates actual and made-up scenes with the help of contemporary information technology, such as network technology and cloud computing technology (Cao, 2019, pp.36-37). Users can conduct human-computer interaction with simulated scenes in this virtual reality space (Zhong & Ma, 2020, pp.6-7). This feature promotes VR technology as new technical support in the field of education to create different learning environments for learners, enhance learning interest and interaction, and ensure learning effectiveness (Gao, 2016, pp.113-115). Compared with other disciplines, the art discipline has relatively high requirements for students' aesthetic ability (Xie, 2020, pp.130-131).

Teachers will need to provide an aesthetic environment by using verbal description and guidance, picture display and viewing, multimedia scene creation, and other methods in order to effectively grow students' aesthetic ability (Li & Ma, 2018, pp.74-77) to accomplish the purpose of aesthetic ability training while subtly influencing students' aesthetic traits through a nice atmosphere (Li, 2021, pp.92-93). The use of virtual reality (VR) technology in art instruction will alter the way that traditional teaching situations are created, allowing students to have a more "personal experience" (Chen, et al., 2021, pp.171-180) so as to enhance students' acceptance of art teaching information, cultivate students' aesthetic ability, creative ability and imagination ability, comprehensively improve the effect of the art teaching and achieve the goal of the art teaching. With the continuous maturity of VR technology, its technical advantages in the field of art teaching

are becoming more and more prominent (Huang, 2020, pp.8-9). Compared with the traditional approach, VR technology cannot only create a teaching environment more in line with the needs of the art teaching and create a good teaching atmosphere through virtual reality space (Pan, 2020, pp.8-10) but also cultivate students' art aesthetic ability, creative ability, and imagination ability through rich teaching contents. This will lead to the achievement of the basic goal of the art teaching and cultivating students' comprehensive quality and ability and constructing a good foundation for students' future learning and development (Pei, 2017, pp.2-3).

From a theoretical point of view, most of the application achievements of the existing VR technology in the field of education focus on the "main subjects" such as Chinese and Physics, while there are relatively few studies on the subject fields such as art and music that can cultivate sentiment and cultivate students' innovative ability and aesthetic ability, (Li & Zhang, 2018, pp.97-105) and relevant studies were limited to art appreciation. In addition, the research on the combination of the traditional approach and VR technology in art teaching was slightly insufficient (Li, 2018, pp.105-110). Therefore, if the research focuses on art teaching and combines a traditional approach with VR technology to effectively improve the traditional approach, the existing research results can be supplemented and significantly improved (Kim et al., 2021).

From a practical point of view, VR technology can improve more comprehensive and reasonable teaching resources for art teaching. The combination of relevant teaching resources and the traditional approach cannot only expand the teaching content in the traditional approach (Lan & Liang, 2021, pp.144-147) but also change the boring teaching status of the traditional approach, enhance the interest in art teaching, stimulate students' interest in art learning, transform students' passive learning into active learning, improve the effect of the art teaching and achieve the basic goal of art teaching (Sun, 2017, pp.61-65). At the same time, VR technology can also cultivate students' art aesthetic ability, creative ability, and imagination, cultivating students' comprehensive quality in many aspects including constructing a good foundation for students' future learning and development (Song, 2018, pp.69-72).

In addition, VR technology can also allow students to master personal experience in drawing, and paintings, visit "inaccessible places" in past teaching, solve

problems such as teaching abstract content Traditional art approach (Zhang, 2020, pp.133-134), enhance the interaction between students and course materials, deepen students' understanding of Art learning, and finally improve students' art performance (Li & Geng, 2017, pp.66-74). There are relatively more research results on Virtual Reality (VR) technology in subject teaching at home and abroad, but most of the research results are concentrated in the field of knowledge subjects, while there are relatively few research results in the field of Art (Zhang, 2018, pp.3-4). In fact, the combination of Virtual Reality (VR) technology and the traditional approach can effectively expand the traditional contents and solve the abstract problem of traditional art approach (Ji & Li, 2017, pp.231-235) the combination of the traditional approach and VR technology in art teaching was more conducive to enhancing students' understanding and in-depth comprehension of art, strengthening their learning effectiveness, improving their academic performance, and cultivating their comprehensive qualities (Ming & Liu, 2021, pp.93-99). Therefore, the study of the application of Virtual Reality (VR) technology and the traditional approach in middle school art teaching brought about certain research value (Gao, 2016, pp.113-115).

This study aimed to improve the learning achievement of students at secondary school with Virtual Reality (VR) technology learning management which can effectively expand Virtual Reality (VR) technology and improve the students' learning achievement.

1.2 Research Questions

1.2.1 Was there a significant difference in the learning achievement of Secondary 5 (Grade 11) students between before and after the learning management using the traditional approach?

1.2.2 Was there a significant difference in the learning achievement of Secondary 5 (Grade 11) students between before and after the learning management using Virtual Reality (VR) technology?

1.2.3 Was there a significant difference in the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and the learning management using Virtual Reality (VR) technology?

1.3 Purpose of the Study

1.3.1 To compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the traditional approach.

1.3.2 To compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using Virtual Reality (VR) technology.

1.3.3 To compare the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and Virtual Reality (VR) technology.

1.4 Research Hypothesis

The researcher will test the following hypothesis at a .05 level of significance:

1.4.1 It was found that there was a significant difference in the learning achievement of Secondary 5 (Grade 11) students between before and after the learning management using the traditional approach.

1.4.2 It was found that there was a significant difference in the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using Virtual Reality (VR) technology.

1.4.3 It was found that there was a significant difference in the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and the learning management using Virtual Reality (VR) technology.

1.5 Scopes of the Study

1.5.1 Population and Sample

1.5.1.1 The population of this study comprised all Secondary 5 (Grade 11) students at the Second Middle School of Sichuan Province, China, in the 2022 academic year. The total number of students was 150, and they were distributed among 5 classrooms.

1.5.1.2 The research sample consisted of 2 classrooms with 60 Secondary 5 (Grade 11) students (30 students in the experimental group and 30 students in the control group) at the Second Middle School of Sichuan Province, China, in the 2022 academic year. The sample was selected using cluster random sampling.

1.5.2 Variables

1.5.2.1 The independent variable in the research was the learning management using the traditional approach and learning management using Virtual Reality (VR) technology.

1.5.2.2 The dependent variable in the research was the learning achievement on the color landscape course of Secondary 5 (Grade 11) students.

1.5.3 Scope of Contents

This course covered color landscape painting with 4 topics:

1) Composition (5 hours).
2) Treatment of reality and fiction (5 hours).
3) Comparison and application of complementary colors (5 hours).
4) Painting methods (5 hours).

1.5.4 Scope of Time

The duration of this research project was from September 2022 to March 2023.

1.6 Definition of Terms

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

1.6.1 Virtual Reality (VR) was an immersive and interactive environment that utilized multimedia computer technology and advanced sensor and simulation technologies to integrate visual, auditory, and tactile experiences, creating a realistic sensory environment.

1.6.2 Learning management using the traditional approach was a process of learning management that used the normal approach consisting of three steps: 1) the introduction stage, 2) the teaching stage, and 3) the conclusion stage.

1.6.3 Learning management using Virtual Reality (VR) technology was the process of teaching and learning that used Virtual Reality to create realistic sensor technology and simulation technology that integrated vision, hearing, and touch. Specifically, in a specific range of virtual environments, users could use a computer and a VR display to show flat things in a three-dimensional form, creating a feeling and experience of being in their real environment. The process of learning management

using Virtual Reality (VR) technology consisted of five steps: 1) the introduction using Virtual Reality (VR) technology, 2) the teaching using Virtual Reality (VR) technology, 3) the analysis and practice, 4) the conclusion using Virtual Reality (VR), and 5) the learner assessment technology using Virtual Reality (VR) technology.

1.6.4 Learning achievement was the score judgment of learning results of the color landscape course of Secondary 5 (Grade 11). It referred to the knowledge and skills of students obtained through learning management using the traditional approach and learning management using VR technology. It was measured by learning achievement tests.

1.6.5 Students are Secondary 5 (Grade 11) students of the second middle school, Sichuan Province, China in the 2022 academic year.

1.7 Conceptual Framework

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

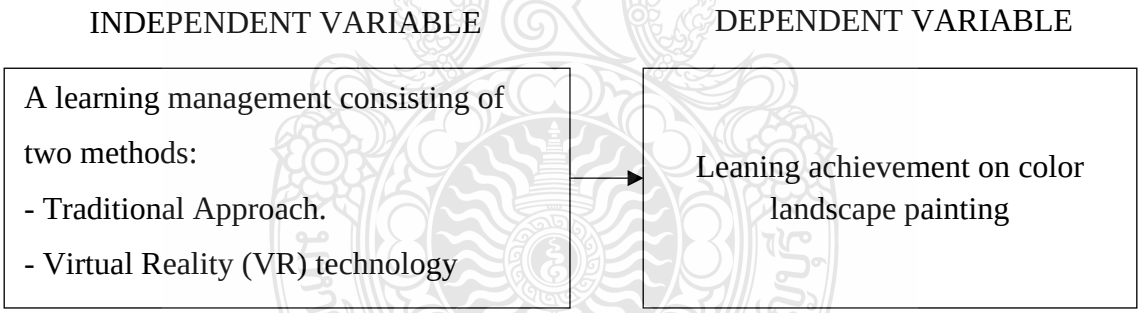

Figure 1.1 Conceptual Research Framework

1.8 Benefits

1.8.1 Students improve learning achievement using learning management innovations with VR technology.

1.8.2 There was an innovation in learning management using VR technology that could be applied in learning management in schools to increase student achievement.

1.8.3 Guideline to develop the learning management innovation with VR technology in the 21st century for other subjects.

CHAPTER 2
REVIEW OF THE LITERATURE

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

2.1 Theoretical Research Related to Learning Management

2.1.1 Definition of learning management

According to Li Jinqiu (2022, pp.23-26), learning management referred to the use of management methods such as planning, organizing, leading, controlling, and other techniques to standardize learning procedures and processes, and to create and update best practices to achieve efficient learning. Learning was and essential aspect of human development and was the source of human thought, knowledge, and ability. In fact, only by continuing to learn could we continue to succeed. If a person stopped learning, it meant they stopped growing and making advancements. Therefor, learning was crucial for individuals to achieve new levels of happiness.

The concept of learning management was derived from architectural design and could be best defined as design with intent, according to (Smith & Lynch, 2010, pp.73-79). Lynch & David (2012, pp.52-60), further elaborated that learning management emphasized the design and implementation of pedagogical strategies that achieved learning outcomes. The emphasis was on pedagogical strategies rather than curriculum development. Underlying the learning management premise was a new set of knowledge and skills, collectively referred to as a futures orientation, which attempted to prepare teaching graduates for the conditions of social change that pervaded local and global societies in the 2000s. The practitioner of learning management was referred to as a learning manager.

In conclusion, learning management was the process of gaining new skills, knowledge understanding, and values, which individuals could do independently. However, education could make this process easier by helping individuals or groups of people to learn. It was important to note that learning was not only important, but change and improvement were also crucial. Individuals should correctly handle the relationship between learning, change, and improvement to achieve their goals.

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2.1.2 Basic types of learning management

According to Pintrich (1999, pp.459-470) learner self-management can unleash learners' internal motivation, significantly enhance their overall competence and quality, and foster lifelong learning skills, helping them adapt to the rapidly changing times and social demands, and successfully confront various life challenges. Despite its pivotal role in promoting individual learners' development, there remain many obstacles and difficulties in the practical implementation of learner self-management.

Learning management was classified into four key aspects: 1) closed loop process, 2) knowledge base system, 3) knowledge management, and 4) task management. Each of these aspects had its own benefits, but it was essential for teachers not to rely on just one type of learning management. As students had diverse backgrounds, knowledge, and learning styles, what worked effectively for one student

may not have worked equally well for another (Gardner, 1999). By incorporating various teaching approaches, teachers were more likely to reach all their students effectively.

Self-paced learning management: In self-paced learning management, the learner set their own learning goals, chose their own learning resources, and completed the learning activities at their own pace. This type of learning management was often used in online courses and e-learning programs (Bernard, 2014, pp.87-122).

Instructor-led learning management: In instructor-led learning management, a teacher or trainer led the learning process and provided guidance, feedback, and support to the learners. This type of learning management was commonly used in traditional classroom settings, as well as in online courses where there was a live instructor (Rice, 2019, pp.279-297).

Blended learning management: Blended learning management combined self-paced and instructor-led learning management. It typically involved a mix of online learning and classroom instruction and may also have included other types of learning activities, such as group discussions, hands-on projects, and independent study. Blended learning management became increasingly popular in education and training, as it allowed for flexibility and personalized learning while also providing support and interaction with an instructor or teacher (Li, 2022, pp.56-57).

In conclusion, students are the object of management, but also the subject of self-management, students can be through various types of teaching management types, in the process of active self-management learning, students' subjectivity, initiative, self-awareness to develop, good self-management learning ability, not only to play an important role in student learning, this self-management learning ability can also be transferred to the student's life, psychological self-management, to promote the overall development of students, the future development of students and even lifelong learning will have a positive impact.

2.1.3 Traditional Approach

According to Kirschner et al. (2006, pp.75-86), traditionally, teachers believed that a teacher-centered approach was more effective for learning, where the teacher was the main controller of the classroom and the students were passive listeners throughout the discussion. However, this approach posed problems for classroom management,

as students were deprived of the freedom to express their views and collaborate with their peers. Moreover, it was an inefficient solution to education, resulting in issues with student learning and performance, limited student leadership and interaction, and a failure to prioritize open inquiry between teacher and student. Boredom and chaos often ensued as a result. While this approach had been commonly used in teaching methods for a long time, it was insufficient to meet the needs and interests of the students, who missed out on opportunities to function, collaborate, and report.

The traditional approach was very common in teaching, but it ignored the needs of both students and subjects for the context in which the training progressed and the mental level of interest of the students. Emerging trends, such as constructivism, were more moral and focused on innovative activities and knowledge acquisition (Phillips, 1995, pp.5-12).

Followers of the traditional approach assumed that there was a fixed body of knowledge that students must acquire. Students were expected to accept the information they were given without questioning the instructor blindly. The teacher's goal was to transfer thoughts and meanings to the passive student, leaving little room for student-initiated questions, independent thought, or interaction between students (Vast, 1998, pp.372). Even in activity-based subjects, although activities were done in a group, they did not encourage discussion or exploration of the concepts involved. This tendency overlooked critical thinking and unifying concepts that were essential to true science literacy and appreciation.

Classroom learning, in the traditional sense, remained highly competitive. However, the education system following the traditional approach had been undergoing transformation. It was now introducing new teaching methods that offered a completely different perspective and approach to learning and teaching. In modern teaching methods, teachers tailored their instruction to each student's level, recognizing that every student was unique (Marzano, 2007). They employed diverse educational practices based on individual student needs. Unlike the outdated approach to education, the progressive approach emphasized activities, questioning, explanation, demonstration, and the use of collaborative techniques.

In conclusion, the traditional approach was characterized by teaching and learning taking place within the same classroom, between teachers and students. The benefits that students typically derived from traditional school-based learning extended beyond mere academic knowledge. Interacting with their teachers enabled students to acquire social skills.

2.2 Virtual Reality (VR) Technology

2.2.1 Definition of virtual reality (VR) technology

Virtual Reality (VR) and Virtual Environments (VE) are two commonly used terms in the computer community to describe a computer-generated simulated environment. However, there are other terms that refer to the same concept, such as Synthetic Experience, Virtual Worlds, Artificial Worlds, and Artificial Reality.

VR technology was a new and innovative way of building virtual reality spaces using computer software and hardware equipment. With the help of modern information technologies like network and cloud computing, VR technology could effectively simulate real and non-real scenes, allowing users to interact with the simulated environment. VR comprised a specific set of technologies, such as headsets, gloves, and walkers (Vorderer & Klimmt, 2004, pp.388-408).

In essence, VR technology created a computer-synthesized, three-dimensional environment where multiple human participants, appropriately interfaced, could engage with and manipulate simulated physical elements in the environment. In some forms, VR also enabled participants to engage and interact with representations of other humans, past, present, or fictional, or with invented creatures. VR was a computer-based technology that simulated the visual, auditory, and other sensory aspects of complex environments (Azuma, 1997, pp.355-385).

1) Immersion involves placing users into a virtual environment using three-dimensional images generated by computers, which makes users feel like they are in the real world. The ideal simulation environment should make it difficult for users to distinguish between reality and fiction.

2) Interactivity refers to users' ability to control objects in the virtual space and the feedback and interaction of objects within the virtual environment. In the

virtual world, users can interact with objects just as they would in the real world. For example, users can pick up a virtual ball with their hands and feel its presence and texture. This type of interaction with virtual objects can be significant in creating an accurate sensory experience.

3) Imagination means that the virtual world has infinite space for imagination. Users can create and observe things that do not exist in the real world, inspiring imagination and cognitive leaps. The immersive experience of virtual reality technology can provide unique learning environments for learners, enhance their learning interest and interactivity, and improve learning outcomes.

Virtual Reality (VR) technology referred to a simulated experience that could be similar to or completely different from the real world. It typically involved the use of computer-generated environments with which the user could interact and explore. The goal of VR technology was to immerse the user in a three-dimensional, computer-generated environment, enabling them to experience a sense of presence and interact with the virtual world.

According to Jerald (2015), VR systems typically consist of a headset or goggles that display the virtual environment to the user, accompanied by various input devices such as motion controllers or gloves that facilitate interaction with the virtual world. The headset usually tracks the user's head movements and adjusts the visual display accordingly, thereby creating a sense of presence within the virtual environment.

According to Jeremy (2018, pp.66-73), Virtual Reality can provide highly immersive experiences by stimulating multiple senses, including vision, hearing, and, in some cases, touch. The technology has the ability to transport users to both fictional and realistic settings, ranging from virtual landscapes and historical periods to fantastical realms. VR applications extend beyond entertainment and gaming, and are increasingly being utilized in various fields, such as education, healthcare, architecture, training simulations, and more.

Virtual reality technology has become a crucial tool in the field of education, creating new and exciting learning environments for students. The technology offers increased interactivity and immersion, stimulating imagination and promoting better learning outcomes.

In conclusion, Virtual Reality technology aims to create a compelling and realistic illusion of being physically present in a virtual world, enabling users to explore, interact, and engage with digital environments in ways that transcend traditional media experiences.

2.2.2 The importance of Virtual Reality (VR) technology

The integration of virtual reality technology in art teaching transformed the traditional approach, enabling students to experience art in a virtual environment, enhancing their engagement with art information, and cultivating their aesthetic, innovation, and imagination abilities. Virtual reality education was immersive, interactive, imaginative, and intelligent, providing students with realistic learning scenes that improved teaching quality and student motivation.

However, virtual reality teaching in China primarily focused on theory and case application, with limited research on virtual reality teaching quality evaluation (Jiang et al., 2019, pp.62-75). Developing a unified index evaluation system to comprehensively assess teaching quality and effectiveness was necessary. Using the Delphi method, researchers could determine index factors and weightings for the evaluation system, which established quantitative standards for schools and provided reference suggestions and data support for improving virtual reality teaching quality.

The concept of affordance, originally proposed by American Ecological psychologist Gibson, was widely used in other professional fields. Scholar Donald Norman defined it as the possibility of actions that things can provide in an environment (Norman, 1999, pp. 38-43). Building upon this concept, scholars extended and expanded its meaning, proposing "technology availability", which could be an effective theoretical framework for user-centered research on technology. Availability was a mutual interaction between actors and technology, rather than a one-way relationship.

According to Beyer et al., (2017, pp.559-560) Research and Scientific Visualization: VR technology assists researchers and scientists in visualizing complex datasets, models, and simulations. It enables them to explore and analyze data in three-dimensional space, thereby gaining deeper insights and facilitating a better understanding. This technology finds applications in fields such as astronomy, molecular biology, engineering, and geology.

Therapeutic and Rehabilitation Applications: Virtual Reality (VR) has demonstrated promising outcomes in the realms of therapy and rehabilitation. It can be employed to construct immersive and captivating settings for patients, offering distraction, pain management, and therapy for various conditions such as anxiety disorders, phobias, post-traumatic stress disorder (PTSD), and physical rehabilitation. VR simulations have the capability to replicate real-world situations, enabling therapists to expose patients to controlled environments designed for specific treatments.

According to Slater et al. (1997, pp.603-616), Improved Entertainment and Gaming: Virtual Reality (VR) has brought about a revolutionary change in the entertainment and gaming sectors, delivering an unparalleled level of immersion and engagement. Users can step into virtual worlds and engage with characters and objects, resulting in an exceptionally immersive and lifelike experience. This technology introduces new avenues for storytelling, gameplay mechanics, and interactive experiences that were once inconceivable.

According to Mahdjoubi et al. (2011, pp.245-258), Architectural visualization and design: VR technology has evolved into an indispensable tool for architects, interior designers, and urban planners. It empowers them to generate virtual renderings of buildings, spaces, and environments, granting clients and stakeholders the opportunity to experience and assess designs prior to their actual implementation. This aids in the identification of potential issues, facilitates informed decision-making, and elevates the overall design process.

In conclusion, the technical advantages of virtual reality technology in art teaching are becoming increasingly evident, particularly as the technology continues to mature. In comparison to traditional approach, virtual reality technology offers an ideal educational environment that fosters a conducive learning atmosphere and nurtures students' aesthetic skills, creativity, and imagination. Virtual reality teaching effectively fulfills the fundamental objectives of art education, while simultaneously cultivating students' comprehensive abilities and laying a robust foundation for their future learning and development. Moreover, VR technology holds immense significance across various fields such as education, entertainment, design, healthcare, communication, and research. Its capacity to create immersive and interactive experiences opens up new possibilities,

Enhanced learning and training processes, and provided practical solutions to real-world challenges. As technology advanced further, it was anticipated to have a profound impact on our lifestyle, work practices, and interactions within the digital realm.

2.2.3 Benefits of Virtual Reality (VR) technology

According to Chen & Chen (2021, pp.57-68), from a theoretical perspective, existing research on virtual reality (VR) technology in education focused mostly on "main subjects" such as Chinese and physics, with few studies in art and music. While some research explored art appreciation, there was a lack of research on integrating VR technology with the traditional approach in art education (Vasilakos et al., 2020, pp.3997-4016). Therefore, focusing on art education and using VR technology to enhance the traditional approach could supplement and improve existing research results.

Although many studies have explored VR technology in subject teaching, most have focused on knowledge-based subjects. Combining VR technology with traditional approach in art education can expand teaching content (Yuen & Yao, 2018, pp.112-120) solve abstract problems in traditional art approach and improve students' understanding and engagement with fine arts. This approach can also cultivate students' aesthetic and innovation abilities, laying a foundation for their future learning and development.

According to Bowman & McMahan (2007, pp.36-43) Immersive Experience: Virtual Reality (VR) offers a profoundly immersive experience through the creation of computer-generated environments that users can interact with using specialized headsets and controllers. It has the ability to transport users to virtual worlds, simulating real or fictional scenarios, and allowing them to feel as if they are physically present in those environments.

According to Chang & Tsai (2019, pp.74-84) training and Education: Virtual Reality (VR) offers a safe and controlled environment for training and educational purposes. It can be effectively utilized in various fields such as medicine, aviation, engineering, and military training to simulate realistic scenarios and enable trainees to practice without facing real-world risks. Additionally, VR enhances learning experiences by transforming educational content into a more engaging and interactive format.

According to Elsayed (2020, pp.16-25) design and Visualization: VR enables architects, engineers, and designers to visualize and present their creations in a more immersive and interactive manner. It allows stakeholders to experience virtual walkthroughs of buildings, prototypes, or product designs before their physical construction. This capability helps identify and address issues early on, ultimately saving time and resources.

Marketing and Sales: VR offers innovative opportunities for marketing and sales efforts. It enables businesses to showcase their products or services in a virtual environment, providing potential customers with an immersive and interactive experience. VR can be utilized in industries such as real estate, automotive, tourism, and others to offer virtual tours, product demonstrations, or virtual showrooms.

In conclusion, VR technology provides a comprehensive and dynamic resource for art education. Combining VR technology with traditional approach can expand teaching content, enhance interest in art learning, and improve students' academic achievements and comprehensive quality. By providing students with immersive experiences of art masters and inaccessible places, this approach can deepen students' understanding of art and ultimately improve their performance in the subject.

2.2.4 Reasons to use virtual reality in education and training.

Virtual reality can be used for the same reasons as a two-dimensional computer-assisted instruction simulation (Pantelidis, 1993, pp.23-24). At all levels of education, virtual reality has the potential to make a difference by leading learners to new discoveries, motivating and exciting them. By participating in a virtual environment, learners can feel a sense of presence and being part of the learning experience.

According to Winn (1993) in A conceptual basis for educational applications of virtual reality, virtual reality was beneficial for education and training for several reasons. Firstly, it provided immersive first-person experiences that were designed to help students learn the material. Secondly, these experiences could not be obtained through any other means in formal education. Thirdly, this kind of experience was the bulk of our daily interaction with the world, yet schools tended to promote third-person symbolic experiences. Fourthly, constructivism was the best theory for developing educational applications of VR. Lastly, the convergence of theories of knowledge

construction with VR technology allows learning to be enhanced through the manipulation of the relative size of objects in virtual worlds, transduction of otherwise imperceptible sources of information, and reification of abstract ideas.

According to Winn (1993), it was concluded that VR was the best and perhaps the only strategy that allowed students to learn from non-symbolic first-person experience. As many students failed in school because they did not master the symbol systems of the disciplines they studied, VR could provide an alternative route to success for children who might otherwise have failed in the current education system.

Mantovani (2000, pp.32-38) discusses the potential benefits of using VR in education and training. These benefits include visualization and reification, an alternative method of presenting material; learning in contexts that are impossible or difficult to experience in real life; motivation enhancement; fostering collaboration; adaptability, offering the possibility for learning to be tailored to the learner's characteristics and needs; and evaluation and assessment, offering great potential as a tool for evaluation due to easy monitoring and recording of sessions in a virtual environment.

In conclusion, Virtual Reality (VR) has the potential to revolutionize education and training by providing immersive and interactive experiences. The following are some of the potential benefits of using VR in education and training:

1) Visualisation and representation: VR enables learners to visualize abstract concepts and complex information in a more concrete and engaging way. It can transform theoretical concepts into interactive 3D models or simulations, allowing learners to explore and manipulate objects, environments, or phenomena that may be difficult to imagine or master.

2) Real-life contexts and experiences: VR can transport learners to virtual environments and situations that are impossible, unsafe, or costly in real life.

3) Enhanced motivation: VR provides a highly engaging and immersive learning environment that can increase learner motivation and interest. By utilizing the sense of presence and interactivity, VR can engage learners and make the learning process more enjoyable. This increased motivation can lead to knowledge retention and a deeper understanding of the subject matter.

4) Collaboration and social interaction: VR can facilitate collaborative learning experiences by allowing multiple users to interact and communicate in a virtual environment. Learners can collaborate on projects, work together to solve problems, or participate in role-play scenarios. This can develop teamwork, communication skills, and the ability to work effectively in diverse groups.

5) Adaptive and personalized: VR offers the potential for adaptive and personalized learning experiences. By tracking learners' interactions and behaviors in a virtual environment, VR systems can provide targeted feedback, adjust difficulty, and personalize content to individual learning needs. This adaptability of VR can enhance learning and cater to different learning styles.

Safe and risk-free training: VR was particularly useful for training in high-risk or dangerous environments where real-life situations were not feasible or safe. VR had the potential to provide an inclusive learning experience by adapting to different learning abilities and needs.

2.3 Learning Achievement

2.3.1 Definition of learning achievement.

Learning achievement referred to a score that reflected the outcome and results of learning, while performance referred to a behavior. Academic achievement was typically measured using examinations to assess a student's ability to comprehend and apply knowledge effectively (Li, 2011, pp.65-68). Good academic performance was dependent on having the correct attitude and a clear learning purpose. The level of academic achievement was an important outcome variable that educational psychology focused on as it directly reflected the quality of education and teaching. With the new curriculum reform, basic education professionals were highly interested in the evaluation system for students' academic achievements. For adolescents in middle school, that period was critical for their physical and mental development, as well as their active participation in social activities. While there were various indicators of evaluation, academic performance remained an essential factor. Students who aimed to develop more fully and effectively, either holistically or in a specific aspect, had to complete the learning content for a specific stage as a prerequisite.

According to Crede & Kuncel (2008, pp.425-453), Academic performance referred to a student's level of achievement in academic pursuits, typically assessed through standardized tests, assignments, and grades. Several factors, such as intelligence, motivation, effort, study habits, and resource accessibility, could impact academic performance. Success in academic disciplines like reading, writing, mathematics, science, and social studies was commonly associated with academic achievement. However, academic achievement could also encompass other areas, such as music, art, and sports, which were frequently taught in school. In summary, academic achievement served as a significant indicator of a student's progress and potential for future success in academic and career pursuits. Examples of learning achievements can include acquiring a certain level of proficiency in a foreign language, demonstrating mathematical problem-solving skills, understanding complex scientific concepts, developing critical thinking abilities, or mastering specific techniques in an artistic field (Ennis, 2016, pp.399-419). These achievements are often measured against predefined standards or learning outcomes that reflect the desired level of knowledge and competence in a particular subject.

In conclusion, the concept of learning achievement was frequently employed in educational contexts to assess the effectiveness of teaching and learning processes. It offered a means to evaluate the progress and success of learners in attaining specific educational objectives or goals. Learning achievements could encompass both short-term and long-term outcomes, and they might vary across diverse domains and disciplines.

2.3.2 Effectively improve learning achievement

Several critical learning theories can help guide curriculum development and project planning in environmental education. These theories include Piaget's cognitive development theory, constructivism, multiple intelligences, and learning styles. Suggestions are given for further research, discussion, and training on the impact of environmental education on student learning, academic achievement, and environmental behavior change.

According to Dweck (2010, pp.34-37), A multidimensional approach was utilized to enhance the academic performance of students who had severe academic deficiencies and were under-prepared in all subjects. These students confronted non-

academic challenges that needed to be addressed as well. and personal problems that create additional barriers to their success. The study's findings suggest that student success and retention could be improved by developmental educators who also address non-academic and personal factors associated with student success through (a) clear student guidelines, (b) integration of first-year transition courses, (c) intrusive academic advising to address non-academic and personal factors, and (d) traditional developmental education courses and tutorials to address academic factors. The mean GPA of Pathways to Success students increased significantly from 1.503 to 2.151 ($p = 0.000$), compared to non-program students. Participating students also reported an increase in the number of students in good academic standing, success in developmental education courses, and a higher 1-year retention rate.

According to Sarason (1996), Comparisons between school climate and student achievement can help schools focus on improving student achievement. noted that if we want to change and improve schooling outcomes for students and teachers, we must change some features of school culture. Simply changing the structure and expectations of schools over the past 50 years has failed. Structural change without the support of cultural change will fail because any organization finds meaning and stability in its culture. Study after study has confirmed that a school's culture and resulting climate must support that change or improvement will not happen. Improvements in student achievement will occur in schools with a positive and professional culture that reflects a positive school climate.

The study found that high self-regulation students displayed significant differences among different learning methods, whereas low self-regulation students did not exhibit any significant differences in their learning methods. Additionally, in line with the objectives of self-regulation strategies, students set goals for the next stage of learning based on their current performance. In summary, integrating self-regulation strategies into learning can enhance students' self-efficacy and their ability to plan and use study time effectively, leading to better academic performance. (Dignath & Büttner, 2008, pp.231-264)

In conclusion, The following theories, including curriculum development and program planning for environmental education, self-regulation strategies, cognitive

developmental theory, constructivism, multiple intelligences, multidimensional approaches, and a strong school culture, are ways that can motivate teachers to achieve greater success in terms of student performance and achievement. To improve student performance, administrators should concentrate on improving the school's culture by establishing good relationships among themselves, teachers, students, and parents. Measuring the school's climate and using assessments to focus the school's goals on learning are crucial in the process of enhancing student achievement.

2.4 Relevant Research

2.4.1 Domestic research

Fan et al. (2019), Conducted research on the feasibility of using VR technology in art courses in China. They found that VR technology can be an effective tool to enhance the learning experience of students in art education by providing a new dimension of conceptualization, interactivity, and profundity. The use of digital language and VR technology in art classroom teaching can help students develop a correct aesthetic outlook and stimulate their creativity.

Huang et al. (2019), Also explored the application of VR technology in art teaching. They defined VR technology as an immersive interactive environment that uses multimedia computer technology and computer technology to create a realistic sensor technology and simulation technology that integrates vision, hearing, and touch. They also highlighted the significance of VR technology in providing a three-dimensional form of flat things, creating a feeling and experience of being in a real environment. Lanier's proposal to use "Virtual Reality" to express virtual reality in 1989 further promoted the development and application of VR technology.

Zhao & Zhang (2021), Conducted research on the application of virtual reality technology in public art creation. They noted the increasing use of high-tech methods, such as virtual reality, in public environment design, which enhance the overall artistic sense of the design with its interactive, comprehensive, and realistic features. Public art creation involves various disciplines and serves as a medium for displaying environment and culture, catering to the people's sensory needs in modern society. In this paper, the authors provide an in-depth analysis of virtual reality technology's application

in public art creation, including its design principles and application modes, to provide valuable insights for future practical creations.

In 2015 Xie & Zhou (2021), Conducted research on the application of virtual reality in art design, which had become increasingly popular as technology advanced. Virtual reality constructed an artificial environment using high-tech means, and the challenge was how to provide users with a realistic experience in the virtual world. This study focused on the integration of technology and art techniques to improve the visual properties and effectiveness of the simulation, taking into account the then-present virtual reality technology and virtual aesthetics.

Finally, Wu et al. (2013), Researched the new model of online education in colleges and universities based on virtual reality technology. The normalization of epidemic prevention and control has exposed the deep-seated contradiction between education and virtual technology, as universities initially turned to online teaching on a large scale. This paper examines the current situation of online education in colleges and universities and proposes the use of virtual reality technology to address the challenges faced by online education.

2.4.2 Foreign research

The paper by Christoph (2016) discusses the advancements in virtual reality (VR) technology over the past three years. The second wave of VR has brought in a multitude of new displays and input devices, along with innovative software and hardware solutions. These advancements are mainly driven by enthusiasts in the VR field, and the paper provides an extensive overview of the current state of technological advancements, considering upcoming devices and software improvements. The author discusses common issues with the new technologies, including approaches to solve them, such as motion-to-photon latency, barrel distortion, and low-persistence displays.

In her research, Manalo & Gavino (2020) asserted that although VR was recognized as an impressive learning tool, there were still many issues that required further investigation, such as identifying appropriate theories and/or models to guide its design and development, investigating how its attributes could support learning, finding out whether its use could improve performance, and understanding ways to achieve effective learning using this technology. She proposes an instructional design theoretical

framework, as well as an instructional development framework for VR-based learning environments.

Teo (2011) discuss the use of mixed, augmented, and virtual reality in history of art teaching in their case study. They developed a 3D object shaped by the artistic expressions of the Church of the Annunciation in Seville and worked with a group of 20 master's degree students at Seville University. A questionnaire based on the Technology Acceptance Model (TAM) was used to ascertain the degree of acceptance of the technology used among students. The study concludes that both augmented and virtual reality technologies can be applied in formal training environments.

Karnchanapayap & Chaetnalao (2020) researched multi-interaction levels in enlightenment Virtual Reality new media art. They developed three user interaction categories - spectator, actor, and creator-actor - based on the audience perspective of user interaction in VR. The researchers then designed a series of Enlightenment Virtual Reality artworks depicting events of Buddha's enlightenment. The study revealed that incorporating various user interaction levels in the artworks increased the audience's engagement level accordingly.

Garrison & Cleveland (2005) proposed a virtual learning environment (VLE) model that correlated spatial and social technologies with spatial and social presence, respectively, and with low - and high-level learning, respectively. Her findings offer valuable guidance for designing VLE that enhance low- and high-level learning through spatial and social presence.

In conclusion, VR technology had unique advantages in art education. VR art education was imaginative, interactive, and immersive, which could stimulate learners' interest and potential, enabling them to obtain a new learning experience and feel the charm of interactive art learning. To cater to the high demand for domestic art education, relevant personnel should adopt different promotion and teaching methods to provide learners with unique learning experiences, improve their aesthetic taste and creativity, and bring new changes to the art education industry. The continuous development and application of modern science and technology will bring new opportunities and challenges to the art education industry.

CHAPTER 3
RESEARCH METHODOLOGY

The Research on learning management using Virtual Reality (VR) technology to improve learning achievement for Secondary 5 (Grade 11) students will include the following components:

3.1 Research Design
3.2 Population and Sample
3.3 Research Instrument
3.4 Instrument Development
3.5 Data Collection
3.6 Data Analysis
3.7 Statistics Used in Research

3.1 Research Design

The design of the study was quasi-experimental research in which the experimental design was Pretest-Posttest Control Group Design.

Table 3.1 Pretest-Posttest Control Group Design

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

Symbols Used in Experimental Design

E = Experimental group
C = Control group
X = The learning management using the virtual reality (VR) technology
- = The learning management using the traditional approach
T_1 = Pre-test of experimental group and control group
T_2 = Post-test of experimental group and control group

3.2 Population and Sample

3.2.1 Population

The population of this study comprised all Secondary 5 (Grade 11) students at the Second Middle School of Sichuan Province, China, in the 2022 academic year. The total number of students was 150, and they were distributed among 5 classrooms.

3.2.2 Sample

The research sample was 2 classrooms with 60 Secondary 5 (Grade 11) students (experimental group 30 students and control group 30 students) at the Second Middle School of Sichuan Province, China, in the 2022 academic year. They were selected using cluster random sampling.

3.3 Research Instrument

The research instruments were used for data collection. With details as follows:

3.3.1 The learning management plan used the learning management approach with the traditional approach, focusing on the subject Color Landscape Painting (20 hours). The learning management plan included 4 topics as follows:

Topic 1 Composition (5 hours).

Topic 2 Treatment of reality and fiction (5 hours).

Topic 2 Comparison and application of complementary colors (5 hours).

Topic 4 Painting methods (5 hours).

3.3.2 The learning management plan used the learning management approach with Virtual Reality (VR) technology, focusing on the subject Color Landscape Painting (20 hours). The learning management plan included 4 topics as follows:

Topic 1 Composition (5 hours).

Topic 2 Treatment of reality and fiction (5 hours).

Topic 2 Comparison and application of complementary colors (5 hours).

Topic 4 Painting methods (5 hours).

3.3.3 The Learning achievement test was used to evaluate learning achievement of the Color Landscape Painting course. The learning achievement test has

25 multiple-choice questions and each of them has 4 options for the pre-test and post-tests in the experimental group and control group.

3.4 Instrument Development

3.4.1 Creating an Experiment Instrument

3.4.1.1 The learning management plan used the learning management approach with the traditional approach, focusing on the subject Color Landscape Painting (20 hours) and 4 topics. The steps of the instrument development were as follows:

1) The curriculum and subject, traditional approach, and the writing style of the learning management plan with the learning management using the traditional approach were studied. The following concepts were summarized: the traditional approach is the process of learning management that uses the normal method, including 3 steps: the introduction, the teaching, and the conclusion.

2) Create the learning management plan with the learning management using the traditional approach, the process of learning management that uses the normal approach consists of 3 steps: 1) the introduction stage, 2) the teaching, and 3) the conclusion stage The learning management plan includes the following components: learning management plan 1: composition (5 hours); learning management plan 2: treatment of reality and fiction (5 hours); learning management plan 2: comparison and application of complementary colors (5 hours); and learning management plan 4: painting methods (5 hours).

3) Propose the learning management plan to the thesis advisor for verifying the validity of the content and providing suggestions for improvement and correction. Improve the learning management plan based on the advisor's suggestions.

4) Propose the learning management plan to the experts 5 experts assessed the learning management plan, including two curriculum and instructional experts, one in measurement and evaluation, and two in Art, and made improvements. The evaluation criteria were as follows:

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

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

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

5) Analyze an IOC (Index of Item Objective Congruence) compliance index greater than or equal to .05 of the elements in the learning management plan. The analysis results showed that the IOC value was equal to 1.00.

6) Bring the revised learning management plan to try out with students who are not in the sample group of one classroom and improve the learning management plan with learning management using the traditional approach before collecting data.

7) Publish a learning management plan that has passed quality checks.

8) Collect data for the control group through the learning management plan using the traditional approach to color landscape painting

3.4.1.2 The learning management plan with learning management using Virtual Reality (VR) technology, the subject is Color Landscape Painting (20 hours) and 4 topics. The steps of the instrument development are as follows:

1) Study the curriculum and subject and analyze Virtual Reality (VR) technology. Summarize the following concepts: Virtual Reality (VR) technology as a new technology, can build virtual reality space by using computer software and hardware and effectively simulate real and non-real scenes with the support of modern information technology such as network technology and cloud computing technology. The user can interact with the simulated scene in this virtual reality space. This function makes virtual reality technology a new type of technical support in the field of education, to create different learning environments for learners, enhance learning interests and interactivity, and ensure learning effects.

2) Create the learning management plan with the learning management using Virtual Reality (VR) technology, it consists of 5 steps: 1) the

introduction using the Virtual Reality (VR) technology, 2) the teaching using Virtual Reality (VR) technology, 3) the analysis and practice, 4) the conclusion using the Virtual Reality (VR) and 5) the learner assessment technology using the Virtual Reality (VR) technology. The learning management plan includes the following components: learning management plan 1: composition (5 hours); learning management plan 2: treatment of reality and fiction (5 hours); learning management plan 2: comparison and application of complementary colors (5 hours); and learning management plan 4: painting methods (5 hours).

3) Propose the learning management plan to the thesis advisor for verifying the validity of the content and providing suggestions for improvement and correction. Improve the learning management plan based on the advisor's suggestions.

4) Propose the learning management plan to the experts. 5 experts assessed the learning management plan, including two curriculum and instructional experts, one in measurement and evaluation and two in Art, and made improvements. The evaluation criteria were as follows:

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

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

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

5) Analyze an IOC (Index of Item Objective Congruence) compliance index greater than or equal to .05 of the elements in the learning management plan. The analysis results showed that the IOC value was equal to 1.00.

6) Bring the revised learning management plan to try out with students who are not in the sample group of one classroom and improve the learning management plan using Virtual Reality (VR) technology before collecting data.

7) Published a learning management plan that had passed quality checks and was used to collect actual data.

8) Collect data for the experimental group through the learning management plan using Virtual Reality (VR) technology on Color Landscape Painting.

3.4.2 Creating a Data Collection Instrument

3.4.2.1 The learning achievement test was used to evaluate the learning achievement of the Color Landscape Course. The learning achievement test has 25 multiple-choice questions and each of them has 4 options for the pre-test and post-tests in the experimental group and control group. The steps are as follows:

1) Study the course manuals for learning management and research related to measurement and evaluation as a guideline for creating an achievement test.

2) Create a learning achievement test, which is a four-choice multiple-choice test of 50 items to select 25 items that pass the criteria to be consistent with the content and indicators.

3) Propose the learning achievement test to the thesis advisor to verify the validity of the content and provide suggestions for improvement and correction

4) Propose the learning achievement test to the experts. To validate and find an IOC (Index of Item Objective Congruence) compliance index greater than or equal to .05 of the elements in the learning achievement test, 5 experts assessed the plan, including two people in the curriculum, one in measurement and evaluation, two in technology and made improvements. The evaluation criteria were as follows:

Score 1: When sure of the congruence between the item of the learning achievement test and the learning objectives

Score 0: When unsure of the congruence between the item of the learning achievement test and the learning objectives

Score-1: When sure the incongruence between the item of the learning achievement test and the learning objectives

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

5) Bring the revised learning achievement test to try out with students who are not in the sample group of one classroom and then use it to improve the learning management plan before being put into collecting actual data

6) Test results from the learning achievement test to analyze the difficulty items and powers to classify each item by setting quality criteria of the test with a difficulty of 0.20 - 0.80 and a discriminating power from 0.20 - 1.00 to be used as a quality test, 30 items. The analysis results showed that the test with a difficulty of 0.40 - 0.80 and a discriminating power from 0.50 - 0.80.

7) The results were analyzed to determine the total confidence value by Cronbach's alpha coefficient; α. The analysis results showed that the total confidence value test was 0.985.

8) Published a learning achievement test that had passed quality checks and was used to collect actual data.

9) Collect data for the control group and experimental group through the learning achievement test on the Color Landscape Painting.

3.5 Data Collection

Researchers collected data in the following sequence:

3.5.1 Preparation Steps

3.5.1.1 Contact to obtain the official documents of the second middle school in Sichuan Province, China. The person in charge of the educational institution was required to assist and cooperate, and the researcher had to be permitted to collect data from the sample group.

3.5.1.2 The experimental group and control group consisted of two classrooms randomly selected from the students of grade 5 (Grade 11) of the second middle school of Sichuan Province in 2022-2023, which adopted the method of cluster random sampling.

3.5.1.3 Explain the process of learning management for the experimental group and control group. Let students understand their roles and responsibilities in learning.

3.5.2 Experimental Steps

3.5.2.1 Before the learning management, the pre-test for the control group and experimental group of Secondary 5 (Grade 11) students through the learning achievement test were used to evaluate learning achievement on the Color Landscape Painting course.

3.5.2.2 Collect data on the learning management including two groups: the experimental group using the traditional approach and the control group using the Virtual Reality (VR) technology.

3.5.2.3 After the learning management, the pre-test for the control group and experimental group of Secondary 5 (Grade 11) students through the learning achievement test were used to evaluate learning achievement on Color Landscape Painting Course.

3.5.3 Summary Steps

3.5.3.1 Analyze the scores through basic statistics and statistics used in hypothesis testing.

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

3.6 Data Analysis

3.6.1 Study Instrument Quality Analysis

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

3.6.1.2 The Index of Item Objective Congruence (IOC) was used to analyze the effectiveness of the learning achievement test.

3.6.1.3 Cronbach Alpha Coefficient; α formula was used to reliability of the learning achievement test.

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

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

3.6.2 Analysis Used in Hypothesis Testing

3.6.2.1 To compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the traditional approach, the dependent samples t-test was conducted and analyzed.

3.6.2.2 To compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the Virtual Reality (VR) technology, the dependent samples t-test was conducted and analyzed.

3.6.2.3 To compare the learning achievement of Secondary 5 (Grade 11) students with learning management by using the traditional approach and the Virtual Reality (VR) technology, the independent samples t-test was conducted and analyzed.

3.7 Statistics used in Research

3.7.1 Basic Statistics

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

3.7.1.1 Mean

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

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

$\sum x$ = was The summation of all observations

N = was the number of observations

3.7.1.2 Standard Deviation

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

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

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

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

3.7.2 Statistics Used in Quality Inspection of Instruments

3.7.2.1 Index of Item Objective Congruence (IOC)

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

IOC = was the Item Objective Congruence Index

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

N = was the number of items

3.7.2.2 Reliability (Cronbach Alpha Coefficient)

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

$\propto$ = was the Cronbach alpha coefficient

k = was the number of items

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

s_i^2 = was the variance of the total column

3.7.2.3 Difficulty

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

P = Difficulty index of the item

R = Number of correct answers to item

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

3.7.2.4 Discriminating Power

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

B = Discriminating Index

U = Correct answer in the upper group

L = Correct answer in the lower group

n_1 = No. of examinee in the upper

n_1 = No. of examinee in the lower

3.7.3 Statistics Used in Hypothesis Testing

3.7.3.1 The independent samples t-test was used to compare the means of two groups to determine whether there was statistical evidence that the associated sample means were significantly different.

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

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

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

n_1 = Sample size of the first sample

n_2 = Sample size of the second sample

S_1 = Standard deviation of first sample

S_2 = Standard deviation of second sample

S_p = Pooled standard deviation

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

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

$\sum D$ = Sum of the differences

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

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

CHAPTER 4
RESEARCH RESULT

The study the learning management using Virtual Reality technology to improve learning achievement for Secondary 5 (Grade 11) students. The objectives to answer the following: 1) to compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the traditional approach, 2) to compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using Virtual Reality (VR) technology, and 3) to compare the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and Virtual Reality (VR) technology. In this section, this section will also present the following:

4.1 Data analysis results to compare the learning achievement of students before and after the learning management using the traditional approach.

4.2 Data analysis results to compare the learning achievement of students before and after the learning management using Virtual Reality (VR) technology.

4.3 Data analysis results to compare the learning achievement of students between the learning management using the traditional approach and Virtual Reality (VR) technology.

4.1 Data analysis results to compare the learning achievement of students before and after the learning management using the traditional approach.

Comparing the learning achievement of students before and after the learning management using the traditional approach also presents in Table 4.1 and Figure 4.1.

Table 4.1 Data analysis results of the learning achievement of students before and after the learning management using the traditional approach.

The learning management using the traditional approach	n	$\bar{x}$	s	t	df	Sig.
Before	30	10.20	1.532	10.251*	29	0.000
After	30	11.73	1.701			

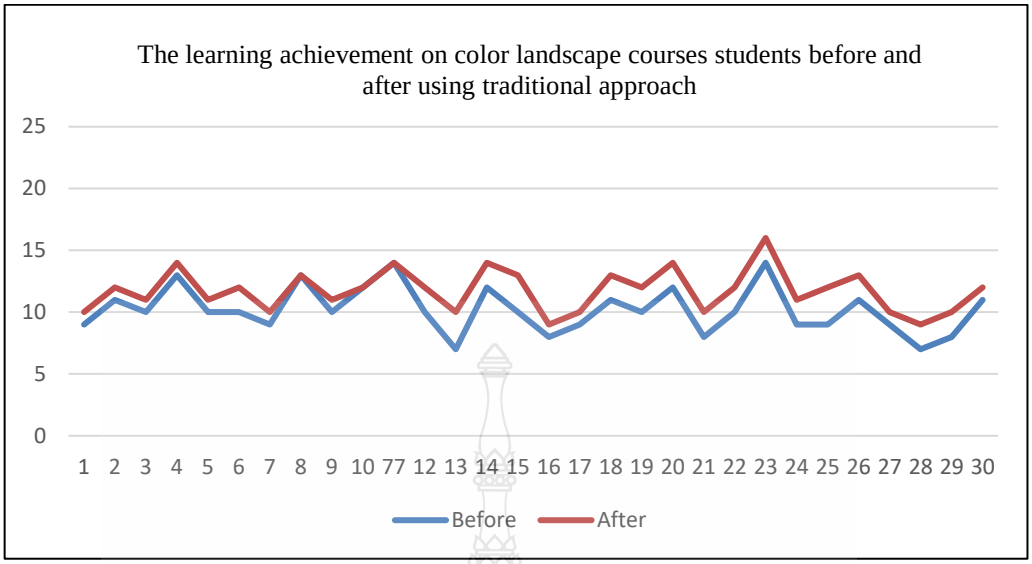

Figure 4.1 Comparison of the learning achievement on color landscape course of students before and after the learning management using the traditional approach.

Table 4.1 and Figure 4.1 show that the mean score for learning achievement on the color landscape course of Secondary 5 (Grade 11) students increased after they studied learning management using the traditional approach. The mean score was ($\overline{x}$=11.73, S=1.701), which was higher than before the study ($\overline{x}$=10.20, S=1.530). This suggests that the learning achievement for the color landscape course of students was higher after they studied the learning management using the traditional approach than before the study, with statistical significance at the level of .05.

4.2 Data analysis results to compare the learning achievement of students before and after the learning management using Virtual Reality (VR) technology.

Comparing the learning achievement of students before and after the learning management using virtual reality (VR) technology also presents in Table 4.2 and Figure 4.2.

Table 4.2 Data analysis results to compare the learning achievement on color landscape courses of students before and after using virtual reality (VR) technology for learning.

The learning management using the VR technology	n	$\bar{x}$	s	t	df	Sig.
Before	30	10.30	2.120	7.100*	29	0.000
After	30	13.83	2.102			

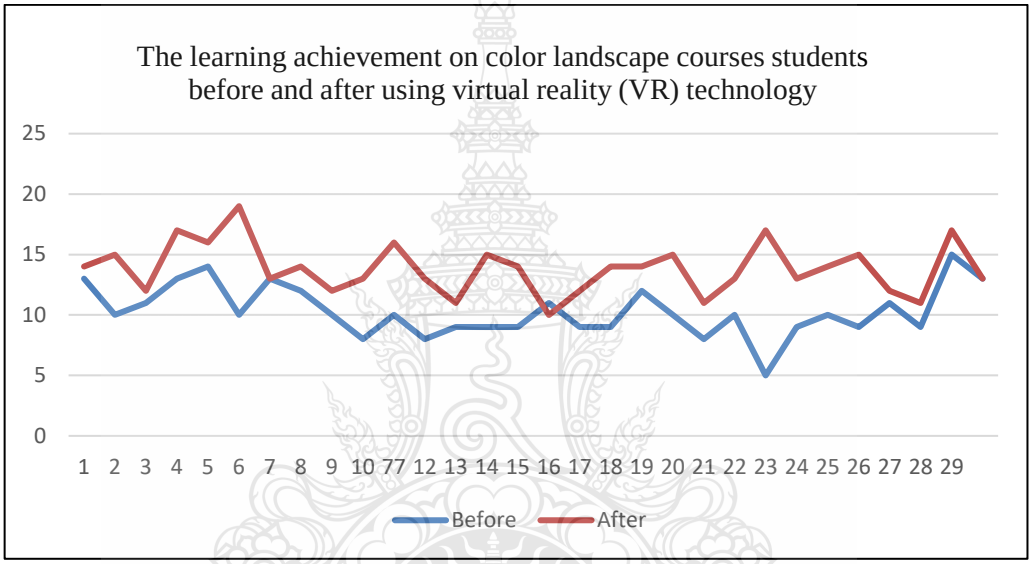

Figure 4.2 Comparison the learning achievement on color landscape courses of Secondary 5 (Grade 11) students before and after using virtual reality (VR) technology for learning.

Table 4.2 and Figure 4.2 show that the mean score for learning achievement on the color landscape course of Secondary 5 (Grade 11) students increased after they studied VR technology learning management. The mean score was ($\bar{x}$=13.83, S=2.102), which was higher than before the study ($\bar{x}$=10.30, S=2.120). It can be concluded that the learning achievement for the color landscape course of Secondary 5 (Grade 11) students was higher after they studied the VR technology learning management than before the study, with statistical significance at the level of .05.

4.3 Data analysis results to compare the learning achievement of students between the learning management using the traditional approach and Virtual Reality (VR) technology.

Comparing the learning achievement of students between the learning management using the traditional approach and Virtual Reality (VR) technology, also presents Table 4.3.

Table 4.3 Data analysis results to compare the learning achievement of students between the learning management using the traditional approach and Virtual Reality (VR) technology.

Learning Management	n	$\bar{x}$	s	t	df	Sig. (2-tailed)
The traditional approach	30	11.73	1.701			
The Virtual Reality (VR)				-4.254*	58	0.000
technology	30	13.83	2.102			

According to Table 4.3, show that the mean score for learning achievement on the color landscape course of Secondary 5 (Grade 11) students increased when they used Virtual Reality (VR) technology in the learning management system ($\bar{x}$=13.83, S=2.102) compared to when they used the traditional approach ($\bar{x}$=11.73, S=1.701). This finding indicates that the use of VR technology was more effective in improving students' learning achievement on the color landscape course. The difference between the mean scores of the two approaches was statistically significant at the .05 level.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

The study the learning management using Virtual Reality technology to improve learning achievement for Secondary 5 (Grade 11) students. The objectives to answer the following: 1) to compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using the traditional approach, 2) to compare the learning achievement of Secondary 5 (Grade 11) students before and after the learning management using Virtual Reality (VR) technology, and 3) to compare the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and Virtual Reality (VR) technology. The research sample was selected through cluster random sampling of 60 Grade 11 students from two classrooms (30 students in the experimental group and 30 students in the control group) at the Second Middle School of Sichuan Province, China, during the 2022 academic year. The statistical methods used to analyze the data were mean, standard deviations, independent samples t-test and dependent samples t-test.

5.1 Summary of Research Results

5.1.1 The results of the analysis compared the learning achievement of students before and after using traditional approach in learning management.

The analysis of results shows that the mean score of the learning achievement on the color landscape course of Secondary 5 (Grade 11) students after studying using the traditional approach was ($\overline{x}$=11.73, S=1.701), which was higher than the before the study ($\overline{x}$=10.20, S=1.701). This implies that the learning achievement of the students after using the traditional approach was statistically significantly higher than before, with a level of significance of .05.

5.1.2 The results of the analysis compared the learning achievement of students before and after using Virtual Reality (VR) technology in learning management.

The analysis of results shows that the mean score of the learning achievement on the color landscape course of Secondary 5 (Grade 11) students after studying using the Virtual Reality (VR) technology was ($\overline{x}$=13.83, S=2.102), which was

higher than the before the study ($\bar{x}$=10.30, S=2.120) ($\bar{x}$=10.30, S=2.120). This implies that the learning achievement of the students after using Virtual Reality (VR) technology was statistically significantly higher than before, with a level of significance of .05.

5.1.3 The results of the analysis compared the learning achievement of Secondary 5 (Grade 11) students between the learning management using the traditional approach and Virtual Reality (VR) technology.

The analysis of results shows that the mean score of the learning achievement on color landscape course of Secondary 5 (Grade 11) students after studying using Virtual Reality (VR) technology was ($\bar{x}$=13.83, S=2.102), which was higher than the traditional approach ($\bar{x}$=11.73, S=1.701). This implies that the learning achievement of the students using Virtual Reality (VR) technology was statistically significantly higher than after using the traditional approach, with a level of significance of .05.

5.2 Discussion and Recommendations

5.2.1 The data analysis results compared the learning achievements of students before and after learning management using traditional approach. It was revealed that the students' learning achievement after using traditional approach was higher than before, with a statistically significant difference at the level of .05. This may result from the traditional approach designed to implement pedagogical strategies that achieve learning outcomes. Zuo (2004, pp.24-28) mentioned in "Practice and Exploration of Reforming traditional approach and Developing Comprehensive Art Activities" that their scores have also improved after implementing the traditional approach. Similarly (Shi, 2012, pp.34-35).

The author "explained in Research on the Transformation of traditional approach and New Curriculum Teaching in High School Fine Arts" that the teaching concepts existed in the past, and they were outdated and finally separated from social needs. The teaching methodology was single, and students' participation was low, which led to narrow and shallow teaching objectives, ignoring students' personalities and other issues. Thus, the author explores how art teachers can use modern teaching methods to transform traditional approaches into a series of new curriculum teaching methodologies, content, and goals. Overall, middle school art education aims to cultivate and develop the overall quality of students, pay attention to developing their aesthetic perception ability, imagination, and performance, and promote the

development of students' personalities and overall growth. The traditional approach has a crucial impact in this regard, as it can lead to improved learning outcomes, as shown in the results of this study. Based on the results, It is recommended that traditional approaches continue to be used and implemented in middle school art education. Additionally, art teachers can experiment with and apply contemporary teaching techniques to reshape conventional ways into a variety of fresh curriculum methodologies, objectives, and objectives. By doing this, they can better cultivate and develop students' general qualities, encourage their artistic prowess, and support their overall development.

5.2.2 The data analysis results compared the learning achievements of students before and after learning management using VR technology. It was revealed that the students' learning achievement after using VR technology was higher than before, with a statistically significant difference at the level of .05. This may result from VR technology uses computer software and hardware equipment to build a virtual reality space with the support of modern information technology such as network technology and cloud computing technology to effectively simulate real and non-real scenes (Cao, 2019, pp. 36-37). Users can interact with simulated scenes in this virtual reality space, promoting VR technology as new technical support in the field of education, creating different learning environments for learners, enhancing learning interest and interaction, and ensuring learning effectiveness (Gao, 2016, pp.113-115). VR technology may improve students' overall ability in many areas and establish a solid foundation for their future learning and development. It can also cultivate students' artistic aesthetic ability, creative ability, and imaginative capacity (Song, 2018, pp.69-72). These findings are consistent with the research results of (Zhang & Li, 2022, pp.87-95) on virtual reality teaching, which focused on virtual reality teaching theories and case application evaluation systems. Yan found that students' academic performance improved after using scientific VR technology methods for learning management compared to before learning. Additionally Gu & Wang (2022, pp.109-113) presented an effective theoretical framework for user-centered virtual technology research, exploring the potential of providing students with a virtual technology environment and the advantage of using VR technology to optimize their performance.

5.2.3 Data analysis results comparing the learning achievement of students with learning management using the traditional approach and VR technology showed that the mean score of students after studying with VR technology was higher than those using the traditional approach, with a statistically significant difference at the level of .05. This may result from VR technology can improve comprehensive and reasonable teaching resources for art teaching, expanding teaching content in the traditional approach and changing the boring teaching status of the traditional approach, enhancing the interest of art teaching, stimulating students' interest in art learning, and transforming students' passive learning into active learning, improving the effectiveness of the art teaching and achieving the basic goal of art teaching (Sun, 2017, pp.61-65). In order to achieve the goal of art teaching, VR technology will transform the traditional approach situation creation mode and create a virtual environment for students to achieve a "personal experience." This will increase students' acceptance of art teaching information and cultivate their aesthetic, creative, and imaginative abilities. As VR technology continues to develop, its technological advantages in the area of art instruction are becoming more and more obvious (Huang, 2020, p.8-9). In comparison to the traditional approach, VR technology could not only create a learning environment that was better suited to the needs of art instruction and fostered a positive learning environment through virtual reality space (Pan, Y., 2020, pp. 8-10), but it could also develop students' artistic aesthetic ability, creative ability, and imaginative ability through rich teaching contents, achieving the fundamental goal of art instruction and developing students' all-round quality and ability (Pei, 2017, pp.2-3). These findings were consistent with the research results of Pantelidis (1993, pp.23-24).

5.3 Implication for Practice and Future Research

5.3.1 Suggestions for Applying the Research Results

5.3.1.1 It was recommended to set the correct virtual boundaries of the device in advance before conducting learning management using VR technology. Both HTC Vive and Oculus Rift headsets had virtual boundary systems that allowed teachers to set them themselves, so teaching could be conducted in a relatively safe space and avoid harming students or surrounding objects. However, a common problem that new

teachers were prone to commit was setting virtual boundaries too close to objects in the real environment, which was incorrect.

5.3.1.2 It is recommended that teachers control the number of frames accurately when making animated courseware for students to use, and let the student's inner ear tell him that he is sitting still when his eyes perceive that his simulated brush is flying in the air. After prolonged VR technology experience, this sense of detachment often leads to nausea or dizziness.

5.3.1.3 It is recommended that each student uses the VR technology course experience for up to 15 minutes each time. It is also recommended that teachers set up more than two versions of virtual scenes for different learning scenarios before class to provide to students.

5.3.2 Suggestions for Future Research

For further research, the topic should focus on:

5.3.2.1 Learning management using Virtual Reality (VR) technology to improve other skills or competencies Learning management using VR technology to improve other skills or competencies.

5.3.2.2 Learning management using VR technology in combination with teaching techniques to improve the learning achievements and skills of students.

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APPENDICES

APPENDIX A

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

List of Experts Reviewing Research Instruments

Specialists

1. Associate. Professor Chun Wang
   Sichuan University of Science and Engineering, Zigong, China.

2. Director Jie Nlu
   Sichuan University of Science and Engineering, Zigong, China.

3. Dr. Saengrung Poolsuwan
   Aksorn CharoenTat ACT Co., Ltd., Thailand.

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

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

No. 0649.02/0204

Faculty of Technical Education
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39 Moo 1, Rangsit-Nakhon Nayok Road,
Klong Hok, Khlong Luang, Pathum Thani
Postal Code 12110, Thailand

17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Associate Professor Chun Wang

Due to Mr.Heng Tao , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management using the Virtual Reality technology to Improve Learning Achievement for Secondary 5 (Grade 11) Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

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

Thank you for your kind consideration.

Sincerely Yours,

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

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Postal Code 12110, Thailand

17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Director Jie Niu

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Dean, Faculty of Technical Education

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Dr. Saengrung Poolsuwan

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17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Dr.Surat Kwanboonchan

Due to Mr.Heng Tao , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management using the Virtual Reality technology to Improve Learning Achievement for Secondary 5 (Grade 11) Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

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

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Postal Code 12110, Thailand

17 February 2022

Subject Invitation letter inviting experts to validate research instruments

Dear Asst. Prof. Dr. Methee Pikunthong

Due to Mr.Heng Tao , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "The Learning Management using the Virtual Reality technology to Improve Learning Achievement for Secondary 5 (Grade 11) Students" with Asst. Prof. Dr. Rossarin Jermtatsong , a research advisor.

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APPENDIX B

Instrument of Research

Course content structure

Topic	Title	Content	Duration
1	Composition	1.1 Appreciation of thematic art composition 1.2 Thematic composition 1.3 Exploration of composition language 1.4 Training guidance for composition creation	5 hours
2	Treatment of reality and fiction	2.1 Approaches to Close up Scenery in Theme Art of Landscape Course 2.2 Treatment method of middle scene in theme art of landscape course 2.3 Treatment method of perspective in theme art of landscape course 2.4 Overall contrast processing method of near, middle and far view in theme art of landscape course	5 hours
3	Comparison and application of complementary colors	3.1 Basic knowledge of complementary colors 3.2 Application principle of complementary color 3.3 Advantages of using complementary colors in works	5 hours

Topic	Title	Content	Duration
4	Painting methods	4.1 Use of strokes highlighted by the main object. 4.2 Use of color contrast highlighted by the main object. 4.3 Use of strokes described by secondary objects. 4.4 Use of color contrast described by secondary objects	5 hours
	Total		**20 hours**

Example

Lesson Plan 1: VR Teaching Method

Lesson Plan:	**Unit 1**	**Course Code:**	**135107-1-07**
Subject/ Course	Learning Landscape Course		
Lesson Title	Composition		
Level	secondary 5 (Grade 11)	**Lesson Duration**	5 hours

Lesson objectives

1. Students can understand the basic composition principles by appreciating the theme art composition.
2. Students can basically master the composition method.
3. Students can explore the composition language and expand their thinking.
4. students have skillfully solved composition problems.

Learning content

1. Appreciation of thematic art composition.
2. Teaching of thematic composition.
3. Exploration of composition language.
4. Training guidance for composition creation.

Activity

Step of the learning management using the Virtual Reality (VR) technology	**Activity of the learning management using the Virtual Reality (VR) technology**
1. The Introduction using the Virtual Reality (VR) technology	1. Organize students to enjoy VR thematic art composition, make full use of open practice links to carry out characteristic art practice activities. 2. Guide students' ability to solve problems and explore innovation in practice. Let students train their artistic ability in practice

Step of the learning management using the Virtual Reality (VR) technology	Activity of the learning management using the Virtual Reality (VR) technology
	and improve their aesthetic ability and creative level.
2. The Teaching using the Virtual Reality (VR) technology	3. In the special lecture, the VR system was used to carry out thematic research on composition around the award-winning works of previous national art exhibitions and interpret the composition characteristics of excellent works. Guide students to understand the significance of excellent composition and apply it to future artistic creation. 4. Teaching content: The focus of creation is to analyze how to construct the composition schema language of creation from several basic elements, and how to better use the visual language of composition to convey the central idea of the picture. Through the analysis of He Hongzhou's "Landscape on the Bridge", Dong Xiwen's "Founding Ceremony", Luo Zhongli's "Father" and other classic works in previous art exhibitions, the process of composition and creation is described. Inspire students to understand the relationship between composition and composition and other important factors.
3. The analysis and practice using the Virtual Reality (VR) technology	5. In the process of VR system case analysis, students have a certain understanding of

Step of the learning management using the Virtual Reality (VR) technology	Activity of the learning management using the Virtual Reality (VR) technology
	composition methods and forms of expression. This link should focus on solving the problem of exploring personalized composition language, that is, after defining the theme object, combine their own performance effect and their own good composition art language to transform ordinary materials into unique visual image of composition. Here, let students practice on the spot according to the above teaching methods.
4. The conclusion using the Virtual Reality (VR)	6. Through the VR system, we will create training topics for relevant composition themes, check the use of language and forms of expression with 1. golden section method 2. primary secondary relationship method 3. composition focusing method and determine sketches. In line with the principle of "stabilizing the teaching objectives, changing the teaching.
5. The learner assessment	7. Test the knowledge they have learned.

Materials/Resources

1. VR video display instrument, video production courseware.

2. Drawing tools: a piece of painting paper, a small brush, a set of gouache pens, a group of paints, a small bucket, a piece of color mixing paper, an easel, etc.

3. Classic Collection--Copying the book gouache painting tutorial Single model album launched the joint college entrance examination textbook of the Academy of Fine Arts Yang Jianfei.

4. The art authoritative textbook Color Scenery 2021 Knock on Bricks Li Jiayou Color Basis Single Composition Modeling Color Complete Draft Sketch Art Basis Introductory Textbook Painting gouache.

Assessment

Assessment method	Assessment Tool	Assessment Criteria
Observations	Observations Form	Pass 60 Percentage
Testing	Test	Pass 50 Percentage
Practice	Practice assessment form	Pass 50 Percentage

Practice Assessment Form

Course code 135107-1-07 **Course** Learning Landscape .

Title……

Semester at……**Academic Year**……..…… **school** .....

name – surname.....

No	Item	Scoring		
		3	2	1
1	The pattern in this picture is too simple			
2	The details of the depiction in this picture are too simple			
3	This picture lacks Complementary colors			
4	The thickness of the lines in this picture is too average			
5	The composition position of this picture is identical			
	Total			

Scoring criteria

Quality Level	Good	Moderate	Improvement
Score	**3**	**2**	**1**

Assessment Criteria Full Score …. points

Score 1 - 6 means good

Score 7 - 12 means moderate

Score 13 - 18 means improvement

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(…….)

Teacher / Assessor

Observations Form

Course code 135107-1-07 **Course** Learning Landscape .

Title……

Semester at……**Academic Year**……..…… school .....

No	name - surname	Behavior/Score															
		Enthusiasm for activities			cooperation in activities			work as assigned			answering questions			Responsibility for submission			Total
		3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	

Scoring criteria

Level 3 means having good behavior

Level 2 means having behaviors at a moderate level

Level 1 means having behaviors at the improvement level

Assessment Criteria Full Score 15 points

Score 13 - 15 means good

Score 9 - 12 means moderate

Score of 5 - 8 means improvement

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(…….)

Teacher / Assessor

Lesson Plan 1:

Traditional Method

Lesson Plan:	**Unit 1**	**Course Code:**	**135107-1-07**
Subject/ Course	Learning Landscape Course		
Lesson Title	Composition		
Level	secondary 5 (Grade 11)	**Lesson Duration**	5 hours

Lesson objectives

1. Students can understand the basic composition principles by appreciating the theme art composition
2. Students can basically master the composition method
3. Students can explore the composition language and expand their thinking
4. students have skillfully solved composition problems

Learning content

1. Appreciation of thematic art composition
2. Teaching of thematic composition
3. Exploration of composition language
4. Training guidance for composition creation

Activity

Step of the learning management using the traditional approach	**Activity of the learning management using the traditional approach**
1. The introduction	1. Teacher organizes students to appreciate the artistic creation of famous artists and make full use of open practice links to carry out characteristic art practice activities. 2. Teacher guide students to solve problems and explore innovation ability in practice. Let students train their artistic ability in practice and improve their aesthetic ability and creative level.

Step of the learning management using the traditional approach	Activity of the learning management using the traditional approach
2. The Teaching	3. Teacher lectures, the PPT courseware was used to carry on composition around the award-winning works of previous national art exhibitions and interpret the composition characteristics of excellent works. Guide students to understand the significance of excellent composition and apply it to future art creation. 4. Teacher tells the process of his composition and creation. Teachers inspire students by focus of creation is to analyze how to construct the composition schema language of creation from several basic elements, and how to better use the visual language of composition to convey the central idea of the picture. Through the analysis of The Hongzhou's "Landscape on the Bridge", Dong Xiwen's "Founding Ceremony", Luo Zhongli's "Father" and other classic works in previous art exhibitions, relationship between compositions and other important factors. 5. Students study case by analysis of composition methods and forms of expression. This analysis should focus on solving the problem of exploring personalized composition language, that is, after defining the subject object, combine their own performance effect and their own

Step of the learning management using the traditional approach	Activity of the learning management using the traditional approach
	good composition art language to transform ordinary materials into unique visual image of composition. Here, let students practice on the spot according to the above teaching methods, and test and post-test the knowledge they have learned.
3. The conclusion stage	6. Teacher creates topics based on relevant composition and student analysis to understand the use and expression of composition language. 1) Golden section method 2) Primary secondary relationship method 3) Composition focusing method. And determine the principle of sketch, in line with "stabilizing the teaching goal, changing the teaching content, opening the teaching evaluation, and controlling the teaching process". Teacher carries out strict process guidance to achieve the desired teaching effect, and require students to maintain the novelty of composition, diversity of expression forms, and controllability of the entire creation process.

Materials/Resources

1. Drawing tools: a piece of painting paper, a small brush, a set of gouache pens, a group of paints, a small bucket, a piece of color mixing paper, an easel, etc.

2. Classic Collection--Copying the book gouache painting tutorial Single model album launched the joint college entrance examination textbook of the Academy of Fine Arts Yang Jianfei.

3. The art authoritative textbook Color Scenery 2021 Knock on Bricks Li Jiayou Color Basis Single Composition Modeling Color Complete Draft Sketch Art Basis Introductory Textbook Painting gouache.

Assessment

Assessment method	Assessment Tool	Assessment Criteria
Observations	Observations Form	Pass 60 Percentage
Testing	Test	Pass 50 Percentage
Practice	Practice assessment form	Pass 50 Percentage

Learning achievement of the art subjects

color landscape course

1. Who was praised as "Four Gentlemen" by ancient literati painters?

   A. Bamboo Plum Holland

   B. Plum, Bamboo Chrysanthemum

   C. Pine Plum and Peach

   D. Pine plum, peach and plum

2. Da Vinci's performance of an elegant woman is a classic masterpiece in the field of traditional painting?

   A. Madame Matisse

   B. Mona Lisa

   C. Lady

   D. Shouting

3. The picture of the river during the Qingming Festival shows the prosperity of the capital?

   A. Song Dynasty

   B. Yuan Dynasty

   C. Qing Dynasty

   D. Tang Dynasty

4. What are the three main religions in the world?

   A. Buddhism, Catholicism, Islam

   B. Buddhism, Christianity, Islam

   C. Taoism, Catholicism, Islam

   D. Buddhism, Eastern Bishops, Islam

5. Picasso is_ National painter?

   A. France

   B. Soviet Union

   C. Spain

   D. Sweden

6. A kind of pottery in the Neolithic Age, which is painted with colorful patterns, is known as the "pottery"?

   A. pottery

   B. painted pottery

   C. black pottery

   D. earthen pottery

7. What are the five colors of the Olympic rings?

   A. red, yellow, blue, green, black

   B. red, white, yellow, purple, black

   C. red, yellow, white, blue, green

   D. red, yellow, white, purple, green

8. Zhu Taochang, a painter of the Qing Dynasty, expressed his indignation with symbolic meanings. What was his nickname?

   A. balsam pear monk

   B. Badashan people

   C. Sinomeni monk

   D. Bai Jushi

9. Under the conditions of different light sources and environments, the color of the object is:

   A. Solid color

   B. Conditional color

   C. Contrast color

   D. Three primary colors

10. What is the hue?

    A. The overall and large color tendency of the scenery, also known as harmony.

    B. The overall and large color tendency of the scenery, also known as the tone.

    C. The local and large color tendency of the scenery, also known as the tone.

    D. The overall and large cold and warm tendency of the scenery, also known as the tone.

11. The reason why "absurd drama" is considered as a western modern drama school is?

A. Has a certain organization and name.

B. It is summarized by later generations because of its similar artistic style.

C. Having a common artistic language.

D. Artists sing, communicate, and connect with each other.

12. What is the light source color?

A. Cold and warm

B. Light source. Color of light source

C. Component

D. The light source and nature of light source

13. What is solid color?

A. Color of objects without wireless

B. The color of an object under white light

C. The color of the object itself

D. The early color of objects under the rainbow

14. Characteristics of still life with low color purity?

A. The color is strong, the frequency is biased, and the relationship between light and dark is highlighted mainly by high brightness contrast.

B. Elegant color, weak broad direction, highlighting the relationship between light and dark color mainly by high brightness contrast.

C. Tends to be strong and highlights the relationship between color brightness and shade mainly by low brightness contrast.

D. Strong color and tendency.

15. Watercolor painting needs the coloring method of ( )?

A. From deep to light.

B. Start from the middle color.

C. Start from the dark color.

D. From light to dark.

16. As an objective entity, color has the basic physical characteristics of ?

A. Intermediate color, double color, primary color

B. Color, brightness, and purity

C. Red, blue, yellow

D. Cool, warm, gray

17. What is the primary color?

A. Red, yellow and blue are the three primary colors.

B. Red, yellow and green are the three primary colors.

C. Black, purple and yellow are three primary colors.

D. Red, blue, and green are three primary colors

18. Double color refers to?

A. Color composed of two inter-tones.

B. Color composed of three inter-tones and rain.

C. Color D formed by the sum of two complementary tones.

D. Color formed by the sum of two original tones.

19. Color phase refers to?

A. The appearance of different colors or refers to the name that accurately represents various colors.

B. The appearance of the same color or refers to the name.

C. That accurately represents various colors. The appearance of different kinds of primary colors, or the name.

D. The appearance of different kinds of multicolor, or the name that accurately represents various colors.

20. The color of light shining on the surface of an object is?

A. Light source color

B. Natural color

C. Ambient color

D. Contrast color

21. As an objective entity, color has the following basic physical characteristics?

A. Intermediate color, double color, and primary color.

B. Color phase, brightness, and purity.

C. Red, blue, yellow.

D. Cool, warm, gray.

22. In the actual color sketch, the conditional factors of color include the following aspects?

A. Observation methods and performance techniques.

B. Color sense and color temperature.

C. Light source color, solid color, environment color.

D. Color difference, multiple color, primary color.

23. What is the intermediate color?

A. The color is orange, green and magenta.

B. Which is the combination of two primary colors.

C. The color composed of two primary colors is yellow and red.

D. A color composed of two primary colors, namely, polar, green.

24. Light source color?

A. Cold and warm of light source.

B. Color of light source.

C. Component the light source.

D. Nature of light source.

25. The training methods of color perception include?

A. Change the perception of fixed color: pay attention to comparison and overcome one-sided perception: long-term color perception training.

B. Lin Cai, sketch.

C. Combination of rational thinking and perceptual cognition.

D. Silent writing, closing, sketching.

APPENDIX C

IOC (Index of Item Objective Congruence)

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IOC (Index of Item Objective Congruence)

Learning Management Plan using the traditional approach

for Secondary 5 (Grade 11) students.

Research Instrument		Expert results					total	IOC	Result
		1	2	3	4	5			
Learning Management Plan using the traditional approach									
Unit 1	Composition in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 2	The virtual and real treatment of near, medium, and long-range in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 3	The comparison and application of complementary colors in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 4	The key depictions of main objects and the painting methods of secondary objects in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes

IOC (Index of Item Objective Congruence)

Learning Management Plan using the Virtual Reality

for Secondary 5 (Grade 11) students

Research Instrument		Expert results					Total	IOC	Result
		1	2	3	4	5			
Learning Management Plan using the Virtual Reality									
Unit 1	Composition in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 2	The virtual and real treatment of near, medium, and long-range in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 3	The comparison and application of complementary colors in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes
Unit 4	The key depictions of main objects and the painting methods of secondary objects in the color landscape course								
	1. Learning Objectives	1	1	1	1	1	5	1	yes
	2. Learning Subject Matter	1	1	1	1	1	5	1	yes
	3. Learning Media Resources	1	1	1	1	1	5	1	yes
	4. Teaching and Learning Activities	1	1	1	1	1	5	1	yes
	5. Measurement and Evaluation	1	1	1	1	1	5	1	yes

IOC (Index of Item Objective Congruence)

Learning achievement test on The Color Landscape Painting

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

Biography

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