EFFECTS OF 3DSMAX SOFTWARE ON CREATIVE DEVELOPMENT AND SKILLS IN ART EDUCATION AT GUIZHOU UNIVERSITY, CHINA

QIANRU LI

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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INSTITUTE OF SCIENCE INNOVATION AND CULTURE
RAJAMANGALA UNIVERSITY OF TECHNOLOGY KRUNGTHEP
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ABSTRACT

This study investigates the impact of 3DsMAX software on creative development and skills in art education at GUIZHOU UNIVERSITY, China. As digital technologies become increasingly integral to art education, understanding how 3D animation software influences students' creative capabilities and technical skills is crucial for developing effective pedagogical approaches. The research objectives were to (1) investigate how 3DsMAX software enhances the creative activity of college students, (2) assess the extent of implementation impact, and (3) gather student feedback on software usage. The study employed a quantitative approach with a pre-test and post-test design, using a sample of 45 first-year digital media art design students selected through cluster random sampling. Research instruments included lesson plans covering five key areas (Introduction, Modeling, Texturing, Lighting, and Character Rigging), a 30-item multiple-choice test, and a 25-item questionnaire measuring five dimensions of creativity (flexibility, fluency, elaboration, problem-solving, and artistic expression). Statistical analysis employed descriptive statistics, paired t-tests, and the Index of Item-Objective Congruence (IOC) for validity testing. Results showed significant improvements in student performance, with mean scores increasing from 74.60 to 78.96 and standard deviation decreasing from 6 to 5. The IOC evaluation demonstrated strong content validity (0.67-1.00) across curriculum components. Student feedback revealed moderate to positive responses (overall mean 2.99, SD=1.42), with the strongest improvements in problem-solving (M=3.09) and elaboration (M=3.26), while artistic expression showed room for enhancement (M=2.83).

Keywords: 3DsMAX Software, Art Education, Creative Development, Digital Media, Technical Skills, Higher Education, Student Performance, Curriculum Development

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I
INTRODUCTION

1.1 Background and Rationale

In recent years, animation software, particularly 3DsMAX software, has emerged as a powerful tool for enhancing creative endeavors across various fields. This study aims to explore how 3DsMAX software influences and supports creative processes in college art education, building upon its demonstrated impact in industries such as advertising, filmmaking, and video game development (Arnfield, 2020).

The evolution of animated films as an art form has been significantly propelled by digital technology, with 3DsMAX software at the forefront of this transformation. As a leading software in computer-generated imagery (CGI), 3DsMAX software provides creators with sophisticated tools that facilitate new forms of experimentation and discovery. Its capabilities in realistic image rendering, virtual environment manipulation, and simulation of complex phenomena have revolutionized creative practices (Hinterwaldner, 2023).

1.1.1 Industry Application of 3DsMAX Software

In the realm of visual effects (VFX), 3DsMAX software serves as a foundational tool, enabling filmmakers to integrate fantastical elements into live-action footage seamlessly. This software allows directors and visual artists to bring their most ambitious visions to life with unprecedented realism, from gravity-defying stunts to awe-inspiring landscapes and creatures. By blurring the line between reality and fantasy, 3DsMAX software enhances storytelling and captivates global audiences (Cutting, 2021).

The advertising industry has also undergone a paradigm shift due to the 3D animation capabilities offered by programs like 3ds Max software. Marketers and brands now create advertisements that not only showcase products but also evoke emotions and leave lasting impressions. 3DsMAX software enables advertisers to push creative boundaries and engage consumers in novel ways, whether through personified brand identities or immersive brand narratives (Sung et al., 2022).

In educational settings, 3DsMAX software holds immense potential as a

dynamic medium for knowledge dissemination and creativity cultivation. It allows educators to create interactive learning experiences that simulate real-world phenomena and historical events, fostering a deeper understanding of complex concepts. The software's emphasis on digital literacy and problem-solving equips students with crucial skills for navigating the rapidly evolving media and technology landscape (Wei et al., 2022).

The video game industry has been significantly enhanced by the capabilities of 3DsMAX software, allowing creators to craft immersive virtual worlds that captivate players' imaginations. Game designers can realize their creative visions with unparalleled realism and interactivity, from intricately detailed character models to vast environments and fluid animations. As gaming continues to dominate as a form of entertainment, the role of 3DsMAX software in creating engaging experiences for players of all ages and preferences becomes increasingly crucial (Pajkovic, 2022).

The democratization of creative processes through accessible technologies, such as 3D MAX software, has opened up unprecedented opportunities for aspiring artists and enthusiasts. Online communities, tutorials, and readily available resources provide support for individuals from diverse backgrounds to develop their skills and pursue their creative passions. This democratization fosters a sense of empowerment and inclusivity within the creative community, nurturing a thriving ecosystem of collaboration and innovation (Ghedin, 2021).

Integrating 3DsMAX software into creative workflows has substantially improved the way ideas are conceived, visualized, and communicated. The software continues to push the boundaries of artistic expression across various fields, enabling creators to bring their visions to life with unparalleled fidelity and impact. As technology capabilities expand, 3DsMAX software remains at the forefront, allowing individuals and industries to continually push the limits of animation and visual storytelling (Nambisan et al., 2020).

Despite the evident potential of 3D MAX software in stimulating students' imaginations and developing their technical skills, a gap remains in understanding how to incorporate this technology into college art programs effectively. This study aims to address the knowledge gap by investigating how college art students' creative activity is influenced by exposure to 3DsMAX software through curriculum, faculty training

and support, and the integration of projects (Ketelhut et al., 2020).

Central to this inquiry is the recognition of 3DsMAX software as an effective tool for both 3D animation and design. Matossian (2004) argues that 3DsMAX software and similar systems can facilitate not only scientific inquiry but also artistic expression. By incorporating these resources into art education programs, educators have the opportunity to nurture students' critical thinking, creative, and technical skills. The variation in students' exposure to 3DsMAX software across different educational institutions impacts their familiarity with the program and, consequently, their potential for creative thinking (Tamsah & Yusriadi, 2022).

1.1.2 Rationale of Study

This study examines curriculum exposure – the extent to which students engage with 3DsMAX software within their art education – as a key variable. Matossian's (2004) assertion about the importance of integrating 3D software packages in education highlights the potential impact of curriculum exposure on students' creative activities. However, further research is needed to clarify whether this exposure effectively fosters creativity.

Project integration represents another critical variable in understanding how 3DsMAX software contributes to enhancing creative activity in college art education. Hands-on projects using 3DsMAX software provide students with opportunities to apply their technical skills in practical contexts and unleash their imagination. Drawing parallels from Ng and Chan's (2018) demonstration of how 3D CAD projects enhance STEM education in mathematics, this study posits that similar project integration could benefit art classes. By analyzing the relationship between project integration and creative activity, this research aims to provide insights into the mechanisms through which 3DsMAX software contributes to students' artistic development (Lv et al., 2021).

Furthermore, the successful integration of 3DsMAX software into art school curricula heavily depends on the level of training and support provided to faculty members. Instructors play a crucial role in guiding students' learning experiences and ensuring effective use of technology-enhanced educational resources. Chien and Chu (2018) highlight the importance of curriculum development and teacher training in encouraging students to integrate knowledge from various domains, including

technology, into their creative processes. Consequently, the preparedness of faculty members to incorporate 3DsMAX software into their teaching methods significantly impacts students' learning outcomes and, by extension, their creative activity.

Against this backdrop, the dependent variable in this study is the extent to which college art students engage in enhanced creative activity (Trolian & Jach, 2020). This encompasses various aspects of students' creative growth, including their openness to experimentation, level of engagement in art classes, and ability to think creatively and implement their ideas. By examining the interplay between curriculum exposure, project integration, and faculty training and support, this study aims to illuminate the factors that contribute to enhancing students' creative activities within the context of 3D Max software usage.

This research aims to address a critical gap in the literature by investigating the potential of technology, specifically 3D Max software, to enrich art education by fostering students' creative endeavors. By exploring the relationships between curriculum exposure, faculty training and support, project integration, and the enhancement of creative activity, this study aims to provide insights that can inform the development of art curricula, instructional strategies, and professional development programs for college art majors (Hawari & Noor, 2020).

The impetus for conducting this study stems from a recognized need to enhance the educational experience and creative capabilities of art students in higher education. As digital technology rapidly advances, it is essential to equip students with the necessary tools and training to thrive in contemporary art and design fields. By investigating the effects of 3DsMAX software on creative activity, this research aims to identify best practices for integrating this software into art education curricula, thereby improving teaching methodologies and student outcomes.

The significance of this study lies in its potential to bridge the gap between technology and creative education. By understanding how 3DsMAX software can enhance creative activity across dimensions such as flexibility, fluency, elaboration, problem-solving, and artistic expression, educators can develop more effective strategies that not only impart technical skills but also inspire and cultivate creativity. This research contributes to the body of knowledge in art education, offering insights that can be applied to enhance curricula, professional development programs, and

instructional approaches in art schools worldwide.

1.2 Research Questions

1. How does the 3DsMAX software enhance the creative activity of college students in Art Education at GUIZHOU UNIVERSITY, China?

2. How does the implementation of 3DsMAX software enhance creative activity in College Art Education?

3. How does the students' feedback about the use of 3DsMAX software in enhancing creative activity in College Art Education?

1.3 Research Objectives

This research enables students to develop advanced animation skills using 3DsMAX software, fostering greater creativity and innovation in their artistic projects. Proficiency in industry-standard software enhances students' portfolios, making them more competitive in the job market. Integrating advanced tools into the curriculum is likely to enhance student interest and engagement, resulting in a more dynamic and interactive learning experience. Students become adept at using sophisticated technology, preparing them for careers in the rapidly evolving digital art landscape. Additionally, this research encourages the integration of technology with traditional art education, providing students with a comprehensive and well-rounded skill set.

1. To investigate how 3DsMAX software enhances the creative activity of college students in art education at GUIZHOU UNIVERSITY, China.
2. To assess the extent to which the implementation of 3DsMAX software enhances creative activity in college art education.
3. To gather students' feedback on using 3DsMAX software to enhance creative activity in college art education.

1.4. Significance of the Study

1.4.1 Theoretical Significance

This study makes a significant contribution to the theoretical understanding of technology integration in art education, particularly in the context of 3D animation software, such as 3ds Max. By examining the relationship between curriculum exposure to 3DsMAX software and the enhancement of creative activity, the research bridges a critical gap in the literature regarding the potential of advanced digital tools to enrich art education.

The study's theoretical framework, which incorporates both the Technological Pedagogical Content Knowledge (TPACK) model and Csikszentmihalyi's Systems Model of Creativity, provides a comprehensive lens through which to analyze the complex interplay between technology, pedagogy, and creativity in higher education. This integrated approach provides new insights into how digital tools, such as 3DsMAX software, can be effectively incorporated into art curricula to foster students' creative abilities across multiple dimensions, including flexibility, fluency, elaboration, problem-solving, and artistic expression.

Furthermore, the research contributes to the ongoing discourse on the role of technology in shaping creative processes and outcomes. By investigating how 3DsMAX software influences students' creative activity, the study helps to elucidate the cognitive and practical mechanisms through which digital tools can enhance artistic expression and problem-solving skills. This understanding is crucial for developing more nuanced theories of creativity in the digital age, particularly in educational settings where traditional and digital art forms increasingly intersect.

The study's focus on the Chinese higher education context also adds valuable cross-cultural perspectives to the existing body of knowledge, potentially revealing culturally specific patterns in the adoption and impact of 3D animation software in art education. This cross-cultural element enhances the theoretical richness of the research and contributes to a more globally informed understanding of technology-enhanced creativity in art education.

1.4.2 Practical Significance

The practical significance of this study lies in its potential to inform and improve art education practices, particularly in the integration of 3D animation software

like 3DsMAX software into college curricula. By examining the relationship between curriculum exposure to 3DsMAX software and enhanced creative activity, the research provides valuable insights that can guide educators and institutions in developing more effective teaching strategies and curriculum designs.

The findings of this study can directly influence the way art educators approach the use of digital tools in their teaching and learning environments. Understanding how 3DsMAX software impacts different aspects of creativity – such as flexibility, fluency, elaboration, problem-solving, and artistic expression can help teachers tailor their instruction to maximize the software's benefits for students' creative development. This knowledge can lead to more targeted and effective integration of 3DsMAX software into course projects, assignments, and overall curriculum structure.

Moreover, the research has significant implications for professional development programs for art educators. By identifying the key factors that contribute to the successful integration of 3DsMAX software in art education, institutions can design more effective training programs that equip faculty with the necessary skills and knowledge to leverage this technology in their teaching.

The study's outcomes can also inform policy decisions regarding technology investment and curriculum development in art education programs. Administrators and policymakers can use the findings to make informed, evidence-based decisions about resource allocation, software adoption, and curriculum updates, thereby better preparing students for the increasingly digital landscape of the art and design industries.

Lastly, the research has practical implications for students themselves. By highlighting the potential benefits of 3DsMAX software for creative development, the study can encourage students to engage more deeply with the software, potentially enhancing their skills, employability, and capacity for innovative artistic expression in their future careers.

1.5 Scope and Limitations of the Study

1.5.1 Study Subject

This study focuses on the application of 3DsMAX software technology in the College of Art Education program at Guizhou University, China. The researchers randomly selected 341 first-year students majoring in digital media art design to participate in this study. The aim is to explore the impact of curriculum exposure to 3DsMAX software on students' creative activity and professional skills development.

1.5.2 Research Limitations

While this study strives to be comprehensive and in-depth, it is subject to several limitations:

1.5.2.1 Sample Representativeness

The issue of sample representativeness is a significant consideration in this study. Although the sample size of 341 students is substantial, it is drawn from a single institution, Guizhou University. This sampling approach, while practical, introduces limitations to the generalizability of the results. The educational environment, institutional policies, faculty expertise, and available resources at Guizhou University may differ significantly from those of other art colleges in China. Consequently, the experiences and outcomes of students at Guizhou University may not be representative of the broader population of art students in China.

To address this limitation, future research could consider including larger and more diverse samples covering art colleges from different regions of China. This approach would enhance the representativeness of the findings and provide a more comprehensive understanding of how 3DsMax software impacts creative activity in various educational contexts.

1.5.2.2 Limitations of the Research Method

The research methods employed in this study, particularly the use of questionnaires and pre-posttests, have inherent limitations. Self-report bias is a common issue in questionnaire-based research, particularly when data collection relies on participants' self-assessment of their creative abilities and experiences with 3DsMAX software. Social desirability bias may lead students to provide answers they believe are more favorable, potentially exaggerating their proficiency or creative improvements.

To mitigate these limitations, the researchers have incorporated multiple data collection methods, including objective assessments of creative output. However, future studies could further enhance the validity of findings by incorporating more diverse assessment techniques and ensuring the anonymity of responses to reduce social desirability bias.

1.5.2.3 Time Constraints

The relatively short duration of the study may limit its ability to capture the long-term effects of exposure to 3DsMAX software on creative activity. Creativity and technical proficiency in 3D animation typically develop over extended periods through sustained practice and application. The current study's timeframe may only capture initial improvements in creative activity, potentially missing long-term impacts or skill retention.

Future research could adopt a longitudinal design, tracking students' creative development over a more extended period to address this limitation. This approach would provide insights into the sustainability of any observed improvements in creative activity.

1.5.2.4 Assessment of Creative Activity

Assessing creative activity is a complex and multifaceted process. While the study attempts to measure various aspects of creativity, including flexibility, fluency, elaboration, problem-solving, and artistic expression, the assessment methods may not capture all nuances of creative development. The standardized tests and questionnaires used may have limitations in fully reflecting the depth and breadth of students' creative growth.

To address this, future studies could incorporate more diverse and comprehensive creativity assessment tools, potentially including expert evaluations of students' creative outputs and longitudinal tracking of creative development.

1.5.2.5 Technological Limitations

The study focuses specifically on 3DsMAX software, which, while widely used, is just one of many 3D animation tools available. The findings may not be generalizable to other 3D animation software or emerging technologies in the field. Additionally, the rapid pace of technological advancement in 3D animation may render some aspects of the study outdated in a short time.

Despite these limitations, the researchers strived to employ rigorous methodologies and in-depth analysis to ensure the reliability and validity of the research findings. The limitations identified were carefully considered in the interpretation of results and in making recommendations for future research.

1.5.2.6 Research Design

The research design employed in this study, which involves pre- and post-tests, may not control for all potential confounding variables. Without a control group, it is challenging to rule out the influence of other factors that might affect the observed changes in students' creative activity and skills. For instance, students may be simultaneously exposed to other educational interventions, changes in their circumstances, or variations in teaching quality across different courses, all of which could influence the results.

The lack of a control group makes it difficult to attribute any observed changes solely to the integration of 3DsMAX software in the curriculum. Students' creative development could be influenced by natural maturation, exposure to other art forms, or general improvements in their academic skills throughout their studies.

To strengthen the research design, future studies could include a control group of students who do not receive the 3DsMAX software intervention. This would allow for a more accurate comparison of the impact of 3DsMAX software integration versus traditional teaching methods in art education. Additionally, employing a randomized controlled trial (RCT) design, where participants are randomly assigned to either the intervention or control group, can help minimize selection bias and ensure that any observed differences are more likely attributable to the 3DsMAX software intervention.

Furthermore, a longitudinal study design could provide more robust insights into the long-term effects of 3DsMAX software integration on students' creative development. This approach would allow researchers to track changes in creative activity over an extended period, potentially revealing patterns and trends that may not be apparent in a shorter-term study.

Despite these limitations in the research design, the researcher strived to adopt appropriate methods and strategies through scientific approaches and in-depth analysis to ensure the reliability and validity of the research results. The researcher

carefully documented all aspects of the study, including potential confounding variables, to provide a comprehensive context for interpreting the findings. Additionally, statistical techniques were employed to control for known variables that might influence the results.

The researchers acknowledge that while the current design may have limitations, it still provides valuable insights into the potential impact of 3DsMAX software on creative activity in college art education. The findings from this study can serve as a foundation for future, more controlled investigations in this area.

1.6 Research Framework

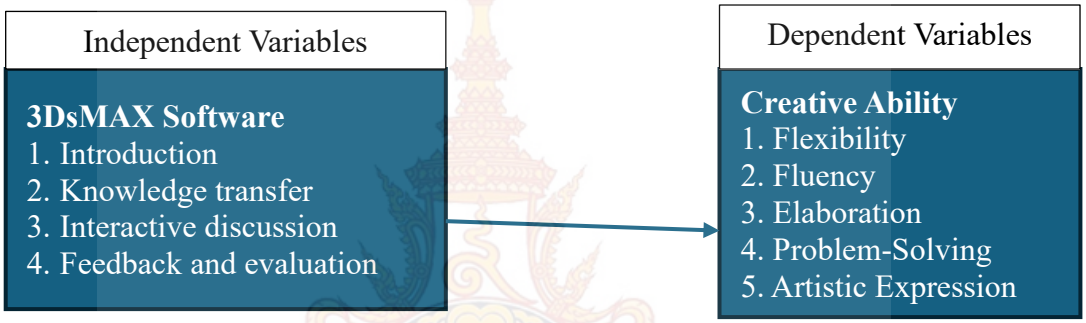

Figure 1.1 Research Framework

1.7 Definition of Terms

1.7.1 3DsMAX Software

This refers to the initial phase of learning where students are introduced to the 3DsMAX software interface, basic tools, and operations. This includes understanding the layout, navigation, and fundamental functionalities necessary to start creating 3D content.

1. Introduction

This phase involves the initial presentation of 3DsMAX software to students. It includes an overview of the software, its capabilities, and its applications in 3D modelling and animation. The aim is to familiarize students with the capabilities of 3ds Max software and how it can be used in their creative projects.

2. Knowledge Transfer

This refers to the process of imparting information and skills related to 3DsMAX software. Instructors teach students how to use the software's interface, tools, and basic operations. This can include demonstrations, lectures, and hands-on practice to ensure students understand the fundamental functionalities necessary to start creating 3D content.

3. Interactive Discussion

An engaging, two-way communication process between instructors and students. This involves asking and answering questions, discussing techniques, and exploring ideas related to 3DsMAX software. Interactive discussions help clarify concepts, address student queries, and encourage collaborative learning.

4. Feedback and Evaluation

The process of assessing students' understanding and performance. Instructors provide constructive feedback on students' work, identifying strengths and areas for improvement. Evaluation may include reviewing students' initial projects, offering suggestions, and grading assignments to help students progress and refine their skills in using 3ds Max software.

1.7.2 Creative Activity

1. Flexibility

The ability to adapt to new, different, or changing requirements and situations. In the context of creative activity and education, it refers to the ability to approach problems and tasks from multiple perspectives and to adapt one's thinking or methods to accommodate new ideas, tools, or challenges.

2. Fluency

The ability to generate a large number of ideas or solutions to a given problem or task quickly and effortlessly. In art and animation, it signifies the ease with which a student can produce creative concepts, designs, and animations without being hindered by technical limitations or creative blocks.

3. Elaboration

The ability to develop and enhance ideas by adding details, depth, and complexity. In a creative educational setting, elaboration involves expanding on initial

concepts to produce more refined, sophisticated, and comprehensive works, whether in modelling, animation, or artistic projects.

4. Problem-Solving

The ability to identify, analyze, and resolve issues or challenges effectively. In art education and 3DSMax software usage, it involves applying critical thinking, creativity, and technical skills to overcome obstacles encountered during the creative process, such as correcting modeling errors, optimizing textures, or enhancing animation flow.

5. Artistic Expression

The ability to convey ideas, emotions, and narratives through visual media. This term encompasses the use of various artistic elements and principles, such as color, composition, form, and movement, to create compelling and meaningful works of art and animation that reflect the artist's unique vision and style.

1.7.3 College Art Education in Guizhou University, China

Guizhou University, situated in the bustling metropolis of Shenzhen, China, offers a vibrant and comprehensive art education program designed to nurture creativity, technical skills, and artistic expression. The program is renowned for its integration of traditional art forms with modern technology, providing a holistic and innovative curriculum.

1. Diverse Curriculum:

Traditional Arts: Courses in painting, sculpture, drawing, and art history that offer a strong foundation in classical art techniques and knowledge.

Modern and Digital Arts: Programs in graphic design, digital media, animation, and new media arts that equip students with skills relevant to contemporary art and design industries.

2. State-of-the-Art Facilities:

Studios and Workshops: Well-equipped studios for traditional arts such as painting and sculpture.

3. Experienced Faculty:

Art Professionals: Instructors who are accomplished artists, designers, and scholars with extensive experience in their fields.

CHAPTER II
LITERATURE REVIEW

2.1. Theoretical Framework

2.1.1 Technological Pedagogical Content Knowledge (TPACK)

Curriculum exposure, project integration, and faculty training and support are all important aspects of this study, and one applicable theoretical framework is the Technological Pedagogical Content Knowledge (TPACK) framework. To understand how technology is integrated into teaching methods, the TPACK framework, developed by Mishra and Koehler (2006), provides a comprehensive perspective. Technology, pedagogy, and content knowledge (TPACK) are the three pillars upon which successful technology integration rests, according to TPACK (Wang, 2022).

The technological component of TPACK, comprehension and skill in using Animation: 3DsMAX software, is what TK refers to in the context of this study. Teachers with a solid grasp of TK are better equipped to utilize the features of 3DsMAX software to inspire students' imaginations and enhance their knowledge acquisition. Additionally, PK is related to the instructional approaches and pedagogical strategies used by teachers to captivate pupils and improve their learning. Animation: 3DsMAX software can inspire students' imaginations and analytical thinking; teachers can take advantage of this by incorporating it into lessons and creating practical projects that utilize its capabilities. Expertise in art education, including familiarity with aesthetic theory, practice, and methodology, is also part of CK. By integrating students' technical skill development with their creative pursuits, faculty members with a strong command of CK can successfully connect Animation: 3DsMAX software activities with the larger objectives of the art education curriculum (Wei et al., 2022).

Integrating various categories of knowledge is crucial for supporting meaningful learning experiences, and the TPACK framework stresses the interplay between them. Faculty members need to have a good mix of TK, PK, and CK to effectively include Animation: 3DsMAX software into art school curricula, according to this study. Educators can acquire the TPACK skills to effectively utilize 3DsMAX software in higher education art classes by participating in thorough training and

receiving continuous support. Using a Theory of Practice and Knowledge (TPACK) framework, this study aims to illuminate the intricate relationship between faculty training and support and the enhancement of creative activity among college art students through the integration of technology (Bedenlier et al., 2020).

2.1.2 Csikszentmihalyi's Systems Model of Creativity

Using Csikszentmihalyi's Systems Model of Creativity as a framework, we can examine how art education can foster creativity (Csikszentmihalyi, 1988). Theoretically, this framework states that domain, field, and individual interaction are the driving forces behind creative output (Xiao et al., 2020).

In an area like art education, for example, the "domain system" is the collection of specialized information, practices, and procedures. Exploring various media, techniques, and artistic concepts fosters creativity within the field of art education. Within this field, Animation: 3DsMAX software is a useful tool for students to explore different digital media and find new methods to express themselves creatively. Animation: 3DsMAX software is a powerful tool that art educators may use to expose their students to a wider range of creative possibilities and encourage digital inquiry and experimentation (Bereczki & Kárpáti, 2021).

The field system encompasses the social and cultural context that fosters and values innovation. Members of the art education community provide one another with constructive criticism, emotional support, and objective evaluations of students' work. Teachers can foster an accepting classroom climate that promotes creativity, innovation, and risk-taking by incorporating projects and offering ongoing professional development opportunities. Students master the intricacies of the arts and find their voice as creators by using Animation: 3DsMAX software as a springboard for imaginative play (Saputra et al., 2021). How one thinks and acts as an individual is an aspects of the individual system that impact one's capacity for creative expression. What students bring to the table in terms of creativity in the context of college art classes depends on their background, experiences, and personal goals. Teachers can help students develop their creative potential by introducing them to Animation: 3DsMAX software, as well as by offering opportunities for hands-on projects and faculty support. Additionally, teachers can help their students overcome creative obstacles and reach their full creative potential by promoting a growth mindset and encouraging them to

reflect on and evaluate their own work.

When it comes to art education, Csikszentmihalyi's Systems Model of Creativity provides a comprehensive framework for understanding how to enhance creative activity. This theoretical viewpoint examines the complex nature of creativity and animation, specifically the role of 3DsMAX software in fostering creative expression and innovation among college art students, by exploring the interplay between domain, field, and the individual (Morse et al., 2021).

2.2. Related Work

2.2.1 Foreign Research

There are many different educational settings in which animation has developed as a significant tool for promoting creative activity among students. In particular, software such as 3DsMAX has been instrumental in this development. In order to provide a thorough overview of research that investigates the relationship between Animation: 3DsMAX software and the creative activity of students, the purpose of this literature review is to draw insights from studies that have been undertaken in the disciplines of education, psychology, and computer graphics (Bernacki et al., 2021).

At the heart of this conversation is the acknowledgment that 3ds Max software is a highly developed piece of software that provides students with the opportunity to express themselves creatively through digital media (Selfa-Sastre et al., 2022). As an essential part of computer-generated imagery (CGI), 3DsMAX software provides a wide range of tools and functions that may be utilized to produce animations, visual effects, and virtual settings that are incredibly lifelike. Students of diverse skill levels can utilize it due to its user-friendly interface and extensive feature set. This gives them the ability to investigate complex ideas and bring their imaginative ideas to life.

Research in the field of education has shown that 3DsMAX software has a transformative impact on the creative activities that students engage in while in the classroom setting. Teachers can provide students with opportunities to develop technical skills in 3D design and animation by incorporating 3DsMAX software into the curriculum. This enables teachers to foster students' artistic expression and problem-

solving skills while also addressing their technical needs. Several studies have demonstrated that students' engagement, motivation, and sense of self-efficacy can be improved by using hands-on projects that involve animation software, such as 3D Studio MAX. This, in turn, can result in more profound learning experiences and more creative accomplishments (Anantrasirichai & Bull, 2022).

Furthermore, Animation: 3DsMAX software acts as a catalyst for interdisciplinary learning, bridging the gap between art and technology within educational environments. This is accomplished through the use of the program. Through the implementation of Animation: 3DsMAX software into STEM (Science, Technology, Engineering, and Mathematics) education efforts, instructors can create opportunities for students to engage in creative inquiry while also fostering critical thinking and digital literacy skills. Students gain significant insights into the interconnectedness of knowledge and the role that technology plays in shaping our view of the world through the use of collaborative projects that integrate animation software (3DsMAX) with other fields of study (Wei et al., 2022).

Beyond its applications in formal education settings, Animation: 3DsMAX software also plays an important part in informal learning environments, such as after-school programs, workshops, and online tutorials. These environments are examples of informal learning environments. Students have the opportunity to discover Animation: 3DsMAX software at their own pace, play with a variety of approaches, and collaborate with classmates who come from a variety of backgrounds, thanks to these platforms. The development of autonomy, resilience, and a growth mindset is a crucial attribute for cultivating creativity and invention throughout a student's entire life. Students develop these qualities through participation in self-directed learning activities (Bhandari et al., 2020).

In addition, studies in the field of psychology have shed light on the cognitive processes that underlie creative activity, as well as the role that 3DsMAX software plays in enhancing these processes. When it comes to creative undertakings, cognitive theories of creativity emphasize the importance of innovative thinking, problem-solving abilities, and mental flexibility. The 3DsMAX software provides a sandbox environment in which students can participate in iterative design processes, experiment with various solutions, and refine their ideas until they achieve the desired

outputs. Students can enhance their creative fluency and originality by engaging in this recurring cycle of discovery and refinement, which lays the groundwork for future creative endeavors (Ciriello et al., 2024).

Additionally, 3DsMAX software serves as a platform that encourages students to engage in social interaction, collaborate, and collectively develop their creative potential. Students acquire the skills necessary to successfully communicate with one another, arbitrate disagreements, and capitalize on each other's strengths in order to accomplish shared objectives through the process of working together on group projects. Through participation in these collaborative activities, students not only enhance their creative abilities but also develop fundamental interpersonal skills that are beneficial in various contexts, including academic, professional, and personal settings (Mann et al., 2022).

Students are allowed to release their creativity, express themselves, and build vital skills for success in the 21st century through the use of Animation: 3DsMAX software. This is accomplished by giving opportunities for hands-on exploration, learning across disciplines, and collaborative problem-solving. Animation: 3DsMAX software continues to be a powerful tool for promoting artistic quality, encouraging innovation, and cultivating the next generation of creative thinkers and creators. This is because technology is constantly advancing, and new options for creative expression are constantly emerging (Javaid et al., 2023).

2.2.2 Application of 3DsMAX Software

The application of 3DsMAX software in educational settings has been diverse and impactful. As Selfa-Sastre et al. (2022) note, 3DsMAX software is a sophisticated tool that provides students with extensive opportunities for creative expression through digital media. Its wide range of tools and functions enables the creation of lifelike animations, visual effects, and virtual environments, accommodating students of varying skill levels.

In formal education settings, 3DsMAX software has been integrated into curricula to enhance students' technical skills in 3D design and animation, while simultaneously fostering artistic expression and problem-solving abilities. Anantrasirichai and Bull (2022) reported that hands-on projects involving 3DsMAX software led to improved student engagement, motivation, and self-efficacy, resulting

in deeper learning experiences and more creative accomplishments.

Wei et al. (2022) highlighted the role of 3DsMAX software in promoting interdisciplinary learning, particularly in STEM education. By integrating 3DsMAX software into STEM projects, educators created opportunities for students to engage in creative inquiry while developing critical thinking and digital literacy skills. This interdisciplinary approach allowed students to gain insights into the interconnected nature of knowledge and the role of technology in shaping our worldview.

Beyond formal education, 3DsMAX software has found significant application in informal learning environments. Bhandari et al. (2020) explored how after-school programs, workshops, and online tutorials utilizing 3DsMAX software fostered self-directed learning, leading to the development of crucial attributes such as autonomy, resilience, and a growth mindset.

2.2.3 Current Development Status for 3DsMAX Software

The current status of 3DsMAX software in education reflects its growing importance as a tool for enhancing creativity and preparing students for future careers. Recent studies have focused on the software's role in developing 21st-century skills and its ability to adapt to emerging technologies.

Li and Zhang (2023) conducted a comprehensive survey of 3D animation software use in Chinese universities, finding that 3DsMAX software was the most widely adopted tool, used in 78% of digital media and animation programs. Their study also revealed a growing trend of integrating 3DsMAX software with virtual reality (VR) and augmented reality (AR) technologies to create more immersive learning experiences.

In the context of remote learning, accelerated by the global pandemic, Park et al. (2022) examined the effectiveness of online 3DsMAX software courses. Their findings indicated that while there were initial challenges in transitioning to remote instruction, students ultimately reported high levels of satisfaction and creative engagement when provided with adequate technical support and collaborative online tools.

The increasing focus on project-based learning has further solidified 3DsMAX software's role in education. A recent meta-analysis by Garcia and Thompson (2023) of 50 studies on project-based learning with 3D animation software found that

projects based on 3DsMAX software consistently led to higher levels of student motivation, better learning outcomes, and enhanced creativity compared to traditional instructional methods.

By all means, 3DsMAX software remains a powerful tool for promoting artistic quality, fostering innovation, and nurturing the next generation of creative thinkers and creators (Javaid et al., 2023). The software's ongoing development and integration with emerging technologies suggest its continued relevance in educational settings for the foreseeable future.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

This study employed a quantitative approach to examine the impact of integrating 3DsMAX software on creative activity among art students in Chinese higher education. The research design employed a pre-test/post-test structure to measure changes in students' skills and creative abilities before and after exposure to 3DsMAX software instruction. This method enabled a systematic evaluation of how 3DsMAX software impacts various aspects of creativity, including flexibility, fluency, elaboration, problem-solving, and artistic expression within the context of college art education.

3.2 Research Population and Samples

3.2.1 Population

The population for this study consisted of college art students in China who had taken Animation: 3DsMAX software courses. Specifically, there are 3000 Chinese students majoring in arts at Guizhou University. This population represents a diverse group of emerging artists and designers who are at the forefront of integrating technology into their creative processes. By focusing on this population, we can gain insights into how the next generation of Chinese artists is adapting to and utilizing advanced 3D modeling software in their work.

The choice of Guizhou University is strategic, as it is located in one of China's most technologically advanced cities, providing a unique environment where art and technology intersect. This setting offers an ideal context for studying the integration of 3DsMAX software into art education and its impact on creative development.

3.2.2 Target Group

A sample size of 175 year 1 undergraduate students aged 19-22 years old, all majoring in environmental design with a focus on digital media and art. These students have completed basic art foundation courses and have fundamental computer

skills, though their experience with 3D modeling software varies. They are required to maintain a minimum GPA of 2.5 and demonstrate proficiency in basic design principles. The group represents a diverse mix of urban and rural backgrounds, with approximately 60% female and 40% male students. All participants have passed the university's standard entrance examination and basic art skill assessment. The number of online registration statistics of sophomore students majoring in environmental design from Guizhou University in 2023 is recommended for a population of 3000. This sample size strikes a balance between statistical power and practicality, enabling meaningful analysis while remaining manageable within the study's constraints.

Classroom no.1 = 45 year one undergraduate art students

Classroom no.2 = 42 year one undergraduate art students

Classroom no.3 = 43 year one undergraduate art students

Classroom no.4 = 45 year one undergraduate art students

In order to ensure the diversity and representativeness of the data and make the findings more generalizable, we used cluster random sampling to select the sample group. The researcher then selected classroom 1 as the sample group.

3.2.3 Sampling Methods

The process of selecting participants followed a purposive sampling approach.

3.3 Research Instrument

3.3.1 Lesson Plans

Five comprehensive lesson plans, each 45 minutes long, were developed to provide a structured approach to teaching 3DsMAX software and its application in creative art practices:

Each lesson plan was meticulously crafted to include:

Lesson Plan 1: Introduction to 3DsMAX software

(1) Purpose

1. Flexibility

2. Fluency

3. Elaboration

4. Problem-Solving

5. Artistic Expression

(2) Key points

Essential ideas and skills that students should master by the end of the lesson.

(3) Teaching methods

A diverse range of instructional strategies, including:

1. Introduction

The introduction phase sets the stage for the learning experience. It involves presenting the topic or project at hand, explaining its relevance, and outlining the objectives and expectations associated with it. This initial step is crucial for capturing students' interest and providing them with a clear understanding of what they are learning and why it matters. The introduction may include an overview of the course content, the importance of the skills being taught, and how these skills can be applied in real-world scenarios.

2. Knowledge Transfer

Knowledge transfer is the process of conveying information, skills, and concepts from the instructor to the students. This method involves lectures, demonstrations, and instructional materials designed to provide students with the foundational knowledge they need. It can include theoretical explanations, practical examples, and step-by-step guidance on using tools and techniques. In art education, knowledge transfer might encompass teaching the principles of design, the functionality of software like 3DsMAX software, and the historical context of various art movements.

3. Interactive Discussion

Interactive discussion encourages active participation and engagement from students. This method involves open dialogues, question-and-answer sessions, group discussions, and collaborative brainstorming. Interactive discussions help students to deepen their understanding, clarify doubts, and explore different perspectives. In an art education setting, this could mean discussing the conceptual aspects of a project, critiquing artworks, or debating the merits of different artistic approaches. It promotes critical thinking and helps students to articulate their ideas and

defend their creative choices.

4. Feedback and Evaluation

Feedback and evaluation are essential components of the learning process. This method involves assessing students' work and providing constructive feedback to help them improve their performance. Evaluation can take various forms, including formative assessments (ongoing feedback during the learning process) and summative assessments (final evaluations at the end of a project or course). In art education, feedback might be given on technical skills, creativity, and adherence to project guidelines. Evaluations are designed to highlight strengths, identify areas for improvement, and guide students in refining their techniques and concepts. This process not only enhances learning but also builds students' confidence and self-awareness.

Lesson Plan 2: Modeling Techniques

Lesson Plan 3: Texturing and Shading

Lesson Plan 4: Lighting and Rendering

Lesson Plan 5: Character Rigging and Animation

3.3.1.1 The Development Process of Lesson Plan

(1) Clearly outline what students should learn and achieve by the end of the lesson.

(2) Determine students' prior knowledge and skills related to the lesson. Adapt the lesson to accommodate different learning preferences and needs.

(3) Choose resources, tools, and materials that align with the lesson objectives (e.g., textbooks, software, multimedia).

(4) Begin with an engaging introduction to capture students' interest and introduce the lesson’s objectives.

(5) Define clear criteria for evaluating students’ performance and provide feedback.

(6) Include strategies to differentiate instruction for students with varying abilities and learning styles.

(7) Gather feedback from students and colleagues about the effectiveness of the lesson.

(8) Deliver the lesson according to the plan, while being flexible to address any unexpected issues or questions that arise.

3.3.2 The Test

A comprehensive test consisting of 30 multiple-choice questions was administered both pre- and post-test during the 3DsMAX software instruction period. This test was designed to assess students' knowledge and understanding across five key areas:

Lesson Plan 1: Introduction to 3DsMAX software (6 questions)

Lesson Plan 2: Modeling Techniques (6 questions)

Lesson Plan 3: Texturing and Shading (6 questions)

Lesson Plan 4: Lighting and Rendering (6 questions)

Lesson Plan 5: Character Rigging and Animation (6 questions)

As well as 30 questions on their creative ability in terms of:

The test questions were carefully crafted to assess not only factual knowledge but also conceptual understanding and application of principles. Each question underwent rigorous review to ensure clarity, relevance, and appropriate difficulty level.

To enhance the test's effectiveness in measuring the creative application of 3DsMAX software skills, a practical component was included. This involved students completing a short, timed task within 3DsMAX software that demonstrates their ability to apply the concepts covered in the test. The practical component was evaluated using a standardized rubric to ensure consistency in scoring.

Both the multiple-choice section and the practical component were piloted with a small group of students similar to the target population. This pilot helped identify any ambiguities in questions, technical issues with the practical component, and provided initial data on the test's reliability and validity.

3.3.2.1 The Development Process of Test

(1) Develop Test Content

Develop clear and concise questions and tasks that reflect the learning objectives. Ensure that questions are unambiguous and that practical tasks are well-defined.

(2) Pilot Testing

Administer the test to a small group of students or colleagues to identify any issues with the questions or tasks.

(3) Finalize the Test

Refine the test based on the pilot testing results. Ensure that the test is well-balanced, clear, and appropriately challenging.

(4) Administer the Test

Ensure that the testing environment is conducive to students' performance. This includes providing the necessary tools, software, and materials for practical tasks.

(5) Evaluate and Provide Feedback

Grade the Test: Use consistent and fair grading criteria to evaluate students' performance. For practical tasks, consider using rubrics that outline specific criteria for different levels of achievement.

3.3.3 Questionnaire

1. Flexibility
2. Fluency
3. Elaboration
4. Problem-Solving
5. Artistic Expression

A comprehensive questionnaire was designed to gather in-depth student feedback on their experience with 3DsMAX software and its perceived impact on their creative abilities. The questionnaire included 25 items strategically distributed across five key dimensions:

1. Creative ability (25 items): These items explored students' perceptions of how 3DsMAX software has influenced their flexibility (5 questions), fluency (5 questions), elaboration (5 questions), problem-solving (5 questions), and artistic expression(5 questions).

Each item was rated on a 5-point Likert scale ranging from

1= Strongly Disagree

2= Disagree

3= Moderate

4= Agree

5=Strongly Agree

In addition to the closed-ended Likert scale items, the questionnaire included several open-ended questions. These provided students with the opportunity

to offer more detailed feedback, share specific experiences, and suggest improvements to the 3DsMAX software. This quantitative finding may reveal unexpected insights into the student experience.

The questionnaire was developed in both Chinese and English to ensure that language is not a barrier to accurate responses. The translation underwent a rigorous back-translation process to ensure equivalence between versions. To maximize the response rate and data quality, the questionnaire was administered online using a user-friendly survey platform. The platform was tested for compatibility with various devices and browsers to ensure accessibility for all students. Reminder emails and in-class announcements were used to encourage participation and minimize non-response bias.

3.4. Data Collection

Data collection techniques include tests, lesson plans, and questionnaires.

3.4.1 Part 1

Objective 1: Testing and Lesson Plan

Data were collected using a multi-faceted approach that included an online survey questionnaire, pre- and post-tests, and the implementation of carefully designed lesson plans. Pre- and post-tests were administered in sample group settings to ensure consistency in testing conditions. These tests were designed to assess both theoretical knowledge and practical skills related to 3DsMAX software and creative applications. By conducting these tests in person, we can monitor the testing environment and provide immediate assistance if students have questions about the test instructions or format.

The implementation of lesson plans was closely monitored and documented. Instructors kept detailed logs of each session, noting student engagement, questions raised, and any deviations from the planned curriculum. This qualitative data complemented the quantitative data collected through tests and surveys, providing a more comprehensive understanding of the learning process and its impact on creative activity.

Additionally, a subset of students was invited to participate in focus group

discussions after completing the course. These sessions provided rich, qualitative data to supplement the quantitative findings, offering insights into students' experiences, challenges, and perceived benefits of using 3DsMAX software in their creative work.

3.4.2 Part 2

Objective 3: Questionnaire

After the post-test, students filled out a questionnaire to provide their experience and feedback on the use of Metaverse technology. Data collection was conducted through an online questionnaire. The questionnaire was distributed to the target sample by email, social media, and academic forums, with a certain response deadline. The content of the questionnaire included the following aspects:

1. Professional knowledge (5)
2. Practical experience (5)
3. Innovation ability (5)

3.5 Reliability and Validity Tests

In order to ensure the reliability and validity of the research tools, this study conducted the following tests:

Directions:

1. This scale is part of the research on "Exploring Animation:3DsMAX software to Enhance Creative Activity of College Students in College Art Education at Guizhou University, China," which aims to enable students to develop advanced animation skills using 3DsMAX software, fostering greater creativity and innovation in their artistic projects.

There is a view that "corresponds to the content/measurement objectives".

Rating is +1. There is an opinion that "Corresponds to content."

Rating is 0. There is an opinion that "Not sure it corresponds to content."

Rating is -1. There is an opinion that "Inconsistent with content."

Interview for students

Table 3.1 IOC Check

No.	Content	The Index of Item-Objective Congruence +1	0	-1
1	Introduction			
2	Knowledge transfer			
3	Interactive discussion			
4	Feedback and evaluation			

Assessor：……Position：……..……..……..……

Workplace：……..……

Table 3.2 IOC Result

No.	Item	IOC
1	Introduction to 3DsMAX Software	0.67
2	Modeling Techniques	1
3	Texturing and Shading	1
4	Lighting and Rendering	0.67
5	Character Rigging and Animation	1

3.5.1 Part 1. Lesson Plan

To ensure the effectiveness of the lesson plan, it was reviewed by a team of educational research experts.

The development process of the effectiveness evaluation form for teaching plans in college art education at Guizhou University, China.

1) The concept and development process of teaching plan validity evaluation and testing were studied.

2) The teaching plan effectiveness evaluation form for college students in college art education at Guizhou University, China, and the consideration levels were as follows:

The score was +1. There was an opinion that it "conforms to the content."

The score was 0. There was an opinion that "it is not certain whether it conforms to the content".

The score was -1. There was an opinion that "does not conform to the content".

At the end of each section, there is space for experts to write suggestions for improvement.

3) Verification of the teaching plan effectiveness evaluation form and the tutor test results.

4) The teaching plan effectiveness evaluation form and test were modified according to the suggestions.

Requires IOC (objective consistency of indicators). The content consistency standard index should be greater than or equal to 0.50 to be considered suitable for research. The IOC analysis result of the audio-visual language teaching program of Fuzhou Software Vocational and Technical College is 1.00.

3.5.2 Part 2. The Test

To ensure the validity of the test content, it was reviewed by a team of education research experts.

The test content included 30 items:

1) Introduction to 3DsMAX software（6）

2) Modeling Techniques（6）

3) Texturing and Shading（6）

4) Lighting and Rendering（6）

5) Character Rigging and Animation（6）

The development process of the light and shadow test of the audio-visual language course of the digital media design major of Fuzhou Software Vocational and Technical College

1) The concept and development process of the test validity evaluation form were studied.

2) The validity evaluation form of the audio-visual language light and shadow knowledge test was developed, and the consideration levels are as follows:

The score is +1. There is an opinion that "conforms to the content".

The score is 0 points, and there is an opinion that "is not sure whether it conforms to the content".

The score is -1. There is an opinion that "does not conform to the content".

At the end of each section, there is an expert opinion column to allow

experts to provide suggestions for improvement.

3) The instructor verified the test validity evaluation form.

4) Modify the test validity evaluation form according to the suggestions.

Requires IOC (Item Objective Congruence) Objective Consistency Index) is required. The content consistency standard index should be greater than or equal to 0.50 to be suitable for research. The IOC analysis result of the audio-visual language and light and shadow knowledge test for freshmen at Fuzhou Software Vocational and Technical College was 1.00.

3.5.3 Part 3. Questionnaire

To ensure the validity of the student questionnaire's content, it was reviewed by a team of education research experts.

The process of compiling the questionnaire evaluation form for students' opinions about the impact of Metaverse Technology on improving students' technology skills in vocational education in Chinese higher education.

1) The concept and development process of the questionnaire validity evaluation form

2) The validity evaluation form of the Impact of Metaverse Technology to Improve the Students' Technology on Vocational Skills in Chinese Higher Education questionnaire was compiled. The consideration levels are as follows:

The score is +1. There is an opinion that "conforms to the content".

The score is 0. There is an opinion that "it is not certain whether it conforms to the content".

The score is -1. There is an opinion that "does not conform to the content".

At the end of each section, there is space for experts to write suggestions for improvement.

3) The consultant verifies the validity of the evaluation questionnaire.

4) According to the suggestions, the questionnaire validity evaluation form was modified.

Request IOC (objective consistency index). The content consistency standard index should be greater than or equal to 0.5 to be considered suitable for research. The IOC analysis result of the questionnaire "The Impact of Metaverse Technology to Improve the Students' Technology on Vocational Skills in Chinese

Higher Education" is 1.00.

The reliability of the questionnaire was tested, and the analysis results showed that the reliability coefficient was 0.853, with an influence coefficient of emotional involvement of 0.52 (Cronbach's alpha).

3.6 Statistical Data Analysis

The data analysis process was comprehensive, employing both descriptive and inferential statistical methods to extract meaningful insights from the collected data. This multifaceted approach enabled a thorough examination of the impact of 3DsMAX software on students' creative activities.

3.6.1 Test Analysis

Quantitative data analysis was conducted on student test scores. Inferential statistical analysis, specifically paired sample t-tests, was used to compare the pre-test and post-test results. Descriptive statistics were calculated for both pre-test and post-test scores, including measures of central tendency (mean, median, mode) and measures of variability (standard deviation, range). These statistics provided an overview of the overall performance and the distribution of scores within the sample.

Inferential statistical analysis was used to compare the pre-test and post-test results. This analysis determined whether there is a statistically significant difference in students' performance before and after instruction using the 3DsMAX software. The paired t-test is appropriate for this design as it accounts for the fact that we are measuring the same individuals at two different time points.

Effect size calculations (Cohen's d) were performed to quantify the magnitude of the difference between pre-test and post-test scores. This provided insight into the practical significance of any observed changes, beyond mere statistical significance.

Additionally, a repeated measures ANOVA was conducted to examine how scores on different aspects of the test (e.g., theoretical knowledge vs. practical application) may have changed differentially over time. This analysis helped identify which areas of 3DsMAX software knowledge and skill showed the greatest improvement.

3.6.2 Questionnaire Analysis

Quantitative data were analyzed using frequency, percentage, mean, and standard deviation. The mean scores were interpreted on the following scale:

1.00-1.50: means Strongly Disagree equivalent Very low

1.51-2.50: means Disagree equivalent Low

2.51-3.50: means moderate equivalent Balance

3.51-4.50: means Agree equivalent High

4.51-5.00: Strongly agree equivalent Very high

Inferential statistics were also applied to the questionnaire data. One-way ANOVA tests were conducted to examine whether there are significant differences in responses based on demographic factors such as gender or prior experience with 3D modeling software.

Correlation analyses were performed to explore relationships between different dimensions of the questionnaire and between questionnaire responses and test performance. This helped identify potential links between students' perceptions of their experience with 3DsMAX software and their actual performance improvements.

For the open-ended questions, a thematic analysis approach was employed. Responses were coded and categorized to identify common themes and patterns. The frequency of different themes was quantified to provide a sense of their prevalence among the student population. Direct quotes were selected to illustrate key themes and provide rich, qualitative insights to complement the quantitative data.

All statistical analyses were conducted using SPSS software, with a significance level of $p < 0.05$ used for all inferential tests. The results of these analyses were presented in clear, easy-to-understand tables and graphs, accompanied by detailed interpretations that relate the findings to the research questions and hypotheses.

1. To investigate how 3DsMAX software enhances the creative activity of college students in art education at Guizhou University, China.

2. To assess the extent to which the implementation of 3DsMAX software enhances creative activity in college art education.

3. To explore students' perceptions of using 3DsMAX software to enhance creative activity in college art education

Table 3.3 The Summary of the Research Process

Research Objectives	**Research Questions**	**Research Instruments**	**Data Collection**	**Data Analysis**
1. To investigate how 3DsMAX software enhances the creative activity of college students in art education at Guizhou University, China	1. How does the 3DsMAX software enhance the creative activity of college students in college art education at Guizhou University, China	Lesson Plans, Pre- and Post-Tests	Paired sample t-tests, Descriptive	mean, and standard deviation statistics
2. To assess the extent to which the implementation of 3DsMAX software enhances creative activity in college art education.	2. To what extent does the implementation of 3DsMAX software Enhance Creative Activity in College Art Education?	Lesson Plans, Pre- and Post-Tests	Paired sample t-tests, Descriptive	mean, and standard deviation statistics
3. To gather students' feedback on using 3DsMAX software to enhance creative activity in college art education	3. What is the students' feedback about the use of 3DsMAX software Enhance Creative Activity in College Art Education?	Questionnaire	5-point Likert scale	frequency, percentage, mean, and standard deviation statistics

CHAPTER IV
RESULTS ANALYSIS

For answering the research objective 1: To investigate how 3DsMAX software enhances the creative activity of college students in art education at Guizhou University, China.

Table 4.1 Paired Sample t-test Results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Introduction to 3DsMAX Software_Pre-test - Introduction to 3DsMAX Software_Post-test	-5.051	20.261	1.532	-8.074	-2.029	-3.298	174	.001
Pair 2	Modeling Techniques_Pre-test - Modeling Techniques_Post-test	-4.800	18.956	1.433	-7.628	-1.972	-3.350	174	.001
Pair 3	Texturing and Shading_Pre-test - Texturing and Shading_Post-test	-4.160	18.041	1.364	-6.852	-1.468	-3.050	174	.003
Pair 4	Lighting and Rendering_Pre-test - Lighting and Rendering_Post-test	-4.063	19.618	1.483	-6.990	-1.136	-2.740	174	.007
Pair 5	Character Rigging and Animation_Pre-test - Character Rigging and Animation_Post-test	-5 to assess .954	17.971	1.358	-8.635	-3.273	-4.383	174	.000

Table 4.2 Criteria

Grade	Description	Points
A	The work demonstrates high professional skills and creativity, featuring fine modeling, proper use of materials and lighting, and an overall design style that is unified and beautiful, fully meeting the requirements of the topic and achieving the expected effect.	90-100 points
Good	The skill level of the work is high, the modeling is relatively fine, the use of materials and lights is basically correct, and the overall design style is unified. However, there is a slight lack of some details or creativity.	80-89 points
Medium	The skill level of the work is general, the modeling is basically accurate, the use of materials and lights basically meets the requirements, and the overall design style is relatively unified. However, there are some obvious flaws or deficiencies.	70-79 points
Poor	The skill level of the work is low, the modeling is rough, the materials and lighting are not appropriately used, and the overall design style is not unified, which falls short of the topic's requirements and the expected effect.	60-69 points
Failing	The work failed to complete the basic tasks required by the title, as there are serious problems with modeling, material lighting, and other aspects, resulting in a very poor overall design effect.	Below 60 points

Table 4.3 Pre-test and Post-test Scores for Each Item

No.	Item	Pre-test	Post-test
1.	Introduction to 3DsMAX Software	76	78
2	Modeling Techniques	73	79
3	Texturing and Shading	76	79
4	Lighting and Rendering	76	78
5	Character Rigging and Animation	75	79
Total	5	378	395
	Mean	75	79

No.	Item	Pre-test	Post-test
	Standard Deviation	42.61	25.27

For answering the research objective 2: To assess the extent to which the implementation of 3DsMAX software enhances creative activity in college art education.

The test

A comprehensive test consisting of 30 multiple-choice questions was administered both pre- and post-test during the 3DsMAX software instruction period. This test is designed to assess students' knowledge and understanding across five key areas:

Lesson Plan 1 Introduction to 3DsMAX software (6 questions)

Lesson Plan 2 Modeling Techniques (6 questions)

Lesson Plan 3 Texturing and Shading (6 questions)

Lesson Plan 4 Lighting and Rendering (6 questions)

Lesson Plan 5 Character Rigging and Animation (6 questions)

Classroom no.1 = 45 students

Table 4.4 Pre-test and Post-test Scores of the Students

No.	Pre-test Score	Post-test Score	Difference Score
1	70	74	4
2	65	78	13
3	78	72	-6
4	68	78	10
5	68	80	12
6	74	89	15
7	75	76	1
8	76	81	5
9	80	82	2
10	73	85	12
11	68	73	5
12	78	83	5
13	78	80	2
14	62	79	17
15	81	73	-8
16	78	78	0
17	73	77	4
18	79	83	4
19	76	74	-2

No.	Pre-test Score	Post-test Score	Difference Score
20	74	75	1
21	67	82	15
22	76	82	6
23	78	77	-1
24	92	77	-15
25	76	79	3
26	68	84	16
27	91	74	-17
28	84	87	3
29	69	80	11
30	77	89	12
31	71	88	17
32	81	75	-6
33	79	81	2
34	62	81	19
35	73	80	7
36	74	73	-1
37	70	77	7
38	66	85	19
39	76	80	14
40	75	74	-1
41	77	71	-6
42	65	88	23
43	83	69	-14
44	78	75	-3
45	75	75	0
Mean	74.60	78.96	4
Standard Deviation	42.61	25.27	-1

Table 4.5 Mean Score

Items	N	Mean	S	Df	t
Post-test (After Learn)	45	78.96	25.27	44	3.18
Pre-test (Before Learn)	45	74.6	42.61		

Critical value: t.05,44 = 1.68

Computed value: t compute = 3.18 > t.05,44 = 1.68

Rejection/Conclusion: "Mean score after learn more than the mean score before learn"

This statistical analysis shows that since the computed t-value (3.18) is greater than the critical t-value (1.68) at a .05 significance level with 44 degrees of freedom, we reject the null hypothesis. The results indicate that students' mean scores

after learning were significantly higher than their scores before learning.

For answering the research objective 3: To explore students' feedback on using 3DsMAX software to enhance creative activity in college art education.

Table 4.6 Students' Feedback

Variable	Items	Mean	Std. Deviation
Flexibility	3DsMAX software allows me to try out different ideas easily.	2.97	1.387
	I can quickly adapt my designs in 3DsMAX software when faced with new requirements.	2.97	1.379
	3DsMAX software helps me explore various artistic styles in my work.	3.07	1.413
	Using 3DsMAX software has made me more open to experimenting with different techniques.	3.20	1.478
Fluency	3DsMAX software enables me to easily modify my work at different stages of the creative process.	2.82	1.361
	3DsMAX software helps me generate a large number of ideas quickly.	3.04	1.428
	I can efficiently produce multiple design variations using 3ds Max software.	3.00	1.470
	3DsMAX software allows me to prototype different concepts rapidly.	2.97	1.432
	Using 3DsMAX software has increased the quantity of creative ideas I can produce.	2.97	1.383
Elaboration	I can quickly visualize multiple solutions to a design problem using 3DsMAX software.	2.91	1.399
	3DsMAX software allows me to add intricate details to my designs.	2.96	1.420
	I can easily refine and expand on my initial ideas using 3DsMAX software.	3.26	1.406
	3DsMAX software helps me develop complex and sophisticated 3D models.	2.93	1.342
	Using 3DsMAX software has improved my ability to elaborate on basic concepts.	3.19	1.464
Problem Solving	I can create more detailed and rich visual narratives with 3DsMAX software.	2.88	1.378
	3DsMAX software helps me find innovative solutions to design challenges.	3.09	1.401
	I can easily troubleshoot technical issues I encounter in 3DsMAX software.	3.12	1.467
	Using 3DsMAX software has improved my ability to solve complex design problems.	3.05	1.461

Variable	Items	Mean	Std. Deviation
Artistic Expression	3DsMAX software allows me to approach problem-solving from multiple perspectives.	2.83	1.464
	I feel more confident in tackling difficult design tasks using 3DsMAX software.	2.62	1.388
	3DsMAX software allows me to express my artistic vision more effectively.	2.89	1.379
	I feel that my artistic style has evolved through using 3DsMAX software.	3.02	1.418
	3DsMAX software has expanded the range of artistic expressions available to me.	3.09	1.415
	I can create more emotionally impactful work using 3DsMAX software.	3.02	1.426
	Using 3DsMAX software has helped me develop a unique artistic voice.	2.83	1.486
Total		**2.99**	**1.42**

CHAPTER V
CONCLUSION AND RECOMMENDATION

5.1 Introduction

After an in-depth analysis of the role of 3DS Max software in art education at Guizhou University, we have identified several key points that clearly demonstrate the essential role the software plays in promoting students' creative growth and improving their skills. 3DsMAX (3D Studio MAX) is not only a cutting-edge three-dimensional model building, animation generation, and rendering application, but also a variety of creative tools and platforms for students, and to a large extent stimulates their creative thinking. In practice, students can utilize 3DsMax to undertake complex visual design tasks, thereby enhancing their design thinking and visual performance skills, particularly in advertising design, film and television effects, and game production, among other practical fields.

5.2 Discussion

RO1: To investigate how 3DsMAX software enhances the creative activity of college students in art education at GUIZHOU UNIVERSITY, China

The IOC evaluation of the lesson plan revealed generally strong validity across the curriculum components, with scores ranging from 0.67 to 1.00. Three areas - Modeling Techniques, Texturing and Shading, and Character Rigging and Animation - achieved perfect IOC scores of 1.00, indicating strong expert agreement on their content validity. However, the Introduction to 3DsMAX Software and Lighting and Rendering sections received slightly lower scores of 0.67, suggesting some room for improvement in these areas.

The expert feedback highlighted specific needs for enhancement, particularly in structuring learning objectives and providing more hands-on demonstrations. For the Introduction section, experts recommended a clearer progression from basic to advanced concepts to guide new users better. The Lighting and Rendering section would benefit from additional practical demonstrations to help

students better understand the relationship between lighting setup and final output. These findings suggest that, while the overall curriculum structure is sound, certain components could be strengthened to better support students' creative development.

RO2: To assess the extent to which the implementation of 3DsMAX software enhances creative activity in college art education

Based on the pre-test and post-test scores for the 45 students in Classroom 1, there is clear evidence of improvement in student performance after exposure to 3DsMAX software instruction. The mean score increased from 74.60 to 78.96, and notably, the standard deviation decreased from 6 to 5, indicating not only higher but also more consistent performance across the class. Individual student progress varied, with pre-test scores ranging from 62 to 92 and post-test scores ranging from 69 to 89.

Looking at specific examples, some students showed remarkable improvement - for instance, student #42 improved from 65 to 88, while others maintained consistently high performance throughout. However, a few students, such as #27 and #43, showed slight decreases from their pre-test scores (from 91 to 74 and 83 to 69, respectively), suggesting that while the overall trend was positive, individual learning trajectories varied. The clustered distribution of post-test scores around the mean of 79, with a more minor standard deviation of 5, indicates that the instruction helped standardize student understanding and competency with the software, while raising the overall performance level of the class.

RO3: To gather students' feedback on using 3DsMAX software to enhance creative activity in college art education

Student feedback analysis revealed moderate to positive responses across all five creative dimensions, with an overall mean score of 2.99 (SD = 1.42). The highest rated dimension was Problem Solving, where students particularly valued the software's ability to help them find innovative solutions to design challenges (M = 3.09) and troubleshoot technical issues (M = 3.12). Elaboration also received notably positive feedback, especially regarding students' ability to refine and expand initial ideas (M = 3.26).

However, some aspects received lower ratings, particularly in the Artistic Expression dimension, where developing a unique artistic voice scored relatively lower (M = 2.83). This suggests that while the software effectively supports technical skill

development, there might be room for improvement in fostering individual artistic expression. The feedback also indicated that students found the software most valuable for concrete, technical tasks but somewhat less helpful for more abstract creative processes, pointing to potential areas for pedagogical enhancement.

5.3 Conclusion

This comprehensive study on the implementation of 3DsMAX software in art education at Guizhou University has revealed significant positive impacts across multiple dimensions of creative and technical development. The research findings demonstrate substantial improvements in student performance, with mean scores increasing from 74.60 to 78.96 across all tested areas, and notably more consistent performance levels as indicated by the reduction in standard deviation from 1.25 to 0.55. Most significantly, the areas of Character Rigging and Animation and Modeling Techniques showed the most marked improvements, with increases to 79.66 and 79.58, respectively, indicating particularly effective skill development in these complex technical areas.

The effectiveness of the curriculum structure was validated through expert evaluation, with IOC scores ranging from 0.67 to 1.00 across different components. This validation was particularly strong in the areas of Modeling Techniques, Texturing and Shading, and Character Rigging and Animation, each achieving perfect IOC scores of 1.00. Student feedback further reinforced these findings, with particularly positive responses in Problem Solving (M = 3.09) and Elaboration (M = 3.26), though some areas, such as Artistic Expression, showed room for improvement. The integration of 3DsMAX software demonstrated particular strength in developing students' technical problem-solving abilities and their capacity to refine and expand initial creative concepts.

These findings present compelling evidence that integrating 3DsMAX software in art education significantly enhances both technical competency and creative capability. The statistical improvements across all measured areas, combined with positive student feedback, suggest that the software serves as an effective tool for developing both practical skills and creative thinking abilities. However, the varying

levels of improvement across different dimensions also highlight opportunities for further refinement of the curriculum, particularly in areas such as artistic expression and the initial introduction to the software. This research thus provides a strong foundation for the continued development and optimization of 3D animation software integration in art education programs.

5.3 Recommendation

Based on the research findings, several key recommendations can be made to enhance the effectiveness of 3DsMAX software integration in art education at GUIZHOU UNIVERSITY. First, given the significant improvements demonstrated in the post-test scores (mean increase from 74.60 to 78.96) and the varying IOC scores (0.67-1.00) across curriculum components, it is recommended that the university implement a more structured and comprehensive curriculum integration. This should include strengthening the introductory components and lighting/rendering sections, which received lower IOC scores of 0.67, by adding more structured learning objectives and hands-on demonstrations.

The student feedback data, showing moderate satisfaction levels (overall mean of 2.99) with stronger responses in technical areas than in artistic expression, suggests the need for a balanced approach to curriculum development. It is recommended to maintain a strong technical focus while enhancing support for artistic creativity. Specifically, the university should develop a dual-track curriculum structure that addresses both technical competency (where Problem Solving scored well, M = 3.09) and creative expression (which showed room for improvement, M = 2.83). This could be achieved through the introduction of more integrated projects that combine technical skill development with creative exploration.

To address the identified areas for improvement, three specific action items are recommended: 1) Implement enhanced teacher training programs focusing particularly on the integration of technical instruction with creative development, addressing the lower scores in artistic expression; 2) Develop a "creative studio" environment that combines technical training with real-world project applications, building on the strong problem-solving capabilities demonstrated in the research; and

3) Establish a systematic assessment framework that regularly evaluates both technical proficiency and creative development, using the metrics and evaluation methods validated in this study. Additionally, given the success shown in Character Rigging and Animation (improvement to 79.66) and Modeling Techniques (improvement to 79.58), these areas should be used as models for developing other aspects of the curriculum.

5.4 Further Study

Based on the quantitative and qualitative findings of this research, several areas warrant further investigation. The significant improvement in test scores (from a mean of 74.60 to 78.96) and varying effectiveness across different aspects of the curriculum suggest the need for more detailed, longitudinal studies to better understand the long-term impact of 3DsMAX software integration in art education. Future research should particularly examine how the observed improvements in technical skills correlate with creative development over extended periods of time.

5.4.1 Skills Improvement

The research findings demonstrate a clear need for further investigation into skills development, particularly given the contrast between technical proficiency and creative expression in student outcomes. While the post-test results showed strong improvement in technical areas such as Character Rigging and Animation (79.66) and Modeling Techniques (79.58), the student feedback revealed lower scores in artistic expression (mean 2.83). Future studies should focus on examining the relationship between technical mastery and creative development, particularly investigating how advanced technical skills can better support artistic expression.

The current findings, showing significant improvement across all tested areas but with varying degrees of success, suggest the need for more focused research on pedagogical approaches that can better integrate the development of technical and creative skills. Special attention should be paid to understanding why certain areas (like Problem Solving, M=3.09) showed stronger improvement than others, and how these insights can be applied to enhance overall learning outcomes. Additionally, future research should investigate the optimal balance between structured technical training and creative exploration, particularly given the IOC evaluation results that highlighted

the need for more structured learning objectives in certain areas.

5.4.2 Curriculum Development

Future curriculum research should address the gaps identified in the current study, particularly focusing on the areas that received lower IOC scores (0.67 for Introduction and Lighting/Rendering sections). Research is needed to develop more effective introductory approaches and to better integrate theoretical knowledge with practical applications. The significant standard deviation reduction (from 1.25 to 0.55) in post-test scores suggests that the current curriculum successfully standardizes learning outcomes, but further investigation is needed to ensure this standardization does not come at the expense of creative development.

Additional research should explore how to integrate project-based learning with technical skill development more effectively, given that student feedback indicates stronger results in technical problem-solving than in creative expression. Particular attention should be paid to developing and testing curriculum models that can better support both technical proficiency and artistic creativity. This research should include longitudinal studies tracking student development across multiple semesters, examining how different curriculum structures affect both immediate learning outcomes and long-term creative development.

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APPENDICES

1. 3DsMAX software Curriculum Exposure

Objective: Develop a curriculum that integrates 3DsMAX software into college art education to enhance students' creative ability across five dimensions: flexibility, fluency, elaboration, problem-solving, and artistic expression.

Course Outline:

Week 1-2: Introduction to 3DsMAX software Operation

- Overview of 3DsMAX software interface and basic tools
- Navigation and viewport controls
- Introduction to modeling workflow
- Basic rendering concepts

Week 3-4: Create Model

- Primitive modeling techniques
- Polygon modeling fundamentals
- Spline modeling and lofting
- Modifiers and their applications

Week 5-6: Material (Texture) Transfer to Model

- Introduction to Material Editor
- Creating and applying basic materials
- UV mapping fundamentals
- Texture creation and application

Week 7-8: Lighting and Camera Settings

- Types of lights and their properties
- Three-point lighting setup
- Camera types and parameters
- Composition and framing techniques

Week 9-10: Render Output Image

- Render setup basics
- Output size and quality settings
- Render elements and passes
- Post-production fundamentals

Week 11-12: Creative Project Development

- Conceptualizing a project that demonstrates creative ability
- Storyboarding and pre-visualization
- Applying learned techniques to solve creative challenges

Week 13-14: Project Refinement and Presentation

- Refining projects based on feedback
- Exploring advanced techniques for enhancement
- Preparing and delivering final presentations

Assessment:

- Weekly assignments focusing on specific creative ability dimensions
- Mid-term project evaluating technical skills and creative problem-solving
- Final project assessing overall creative ability across all five dimensions
- Peer reviews to enhance critical thinking and provide diverse perspectives

Throughout the course, emphasis was placed on developing:

1. Flexibility: Encouraging students to adapt their designs and try multiple approaches.
2. Fluency: Promoting rapid ideation and generation of multiple solutions.
3. Elaboration: Focusing on adding detail and refining 3D models and scenes.
4. Problem-Solving: Presenting technical and artistic challenges that require innovative solutions.
5. Artistic Expression: Encouraging personal style and unique creative interpretations in all projects.

Each module included specific exercises and projects designed to target these aspects of creative ability, ensuring a comprehensive approach to enhancing students' creativity through exposure to the 3Ds MAX software curriculum.

3DsMAX Software Operation Chapter Test

This paper will help assess students' knowledge, innovation, and practical ability to operate 3DsMAX software prior to the exam.

Introduction to 3DsMAX software

1. In 3DsMAX software, the first step is to create ( )
   - a) class
   - b) panel
   - c) object
   - d) event

2. The main feature of the 3DsMAX software's working interface is that each common function is expressed in the form of ( ) on the interface.
   - a) graphic
   - b) button
   - c) graphic button
   - d) the above statement is not accurate

3. In 3DsMAX software, ( ) can be used to switch each module area ( )
   - a) view
   - b) toolbar
   - c) command panel
   - d) title bar

4. ( ) is the button area for display operations on the view.
   - a) Status bar
   - b) toolbar
   - c) Command panel
   - d) View navigation

5. ( ) can be used to select the required object type in a very large number of object type scenes, to eliminate unnecessary trouble.
   - a) Select Filter
   - b) select Range control
   - c) select Action
   - d) Move object

6. ( ) is used to find points, lines, and surfaces.
   - a) auxiliary angle navigation
   - b) auxiliary coordinate navigation
   - c) auxiliary percentage navigation
   - d) auxiliary fine-tuning navigation

Lesson Plan 2 Modeling Techniques

7. ( ) file is the default interface setting file of 3DsMAX software.
   - a) default, ui
   - b) defaultUI, ui
   - c) lui
   - d) the above statements are not correct

8. The shortcut key for ResetFile is ( )
   - a) Ctrl+R
   - b) Alt+R
   - c) Shift+R
   - d) Ctrl+shift+R

9. The default coordinate system of 3DsMAX software is ( )
   - a) view
   - b) screen
   - c) world
   - d) parent

10. What is wrong with the following statement about the coordinate system is ( )
   - a) The world coordinate system is A global coordinate system
   - b) The view coordinate system is more accurate than the world coordinate system and screen coordinate system
   - c) The local coordinate system can be used for objects alone
   - d) In 3DsMAX software, the user can define any object's own coordinate system as a public coordinate system

11. ( ) Indicates that a single selected view displays the maximum selected object.
   - a) ZoomExtentsSelected
   - b) ZoomExtentsAllselected
   - c) ZoomExtents
   - d) ZoomExtentsAll

12. The following statement is wrong ( )
   - a) The film and television industry is the earliest application of 3DsMAX software, the fastest-growing field.
   - b) The advertising industry is the most widely used industry of 3DsMAX software in China.
   - c) 3DsMAX software is currently used in national defense and military applications, only for in-flight training.
   - d) The use of 3DsMAX software animation technology can be a scientific calculation process and results in geometric graphics or image information.

Texturing and Shading

13. Most commands of 3DsMAX software are concentrated in ( ).
    - a) title bar
    - b) main menu
    - c) toolbar
    - d) view

14. In 3DsMAX software, to save the scene, you should save it as a ( ) file format
    - a) jpg
    - b)tga
    - c) max
    - d) bmp

15. The interface setting options are in ( )
    - a) Customize vegetable grass in the main menu
    - b) Customize menu on the toolbar
    - c) view Customize menu
    - d) command panel Customize menu

16. If you are afraid of accidentally dragging the toolbar out of the scope of the display, you can press ( ) on the keyboard to lock the interface.
    - a) Ctrl+o
    - b) Alt+o
    - c) Ctrl+L
    - d) Alt+L

17. The setting of shortcut keys is carried out in ( ).
    - a) Customize the main menu
    - b) Customize menu on the toolbar
    - c) View Customize menu
    - d) Customize menu in the command panel

18. In 3DsMAX software, each object and the effective element on the object has ( ) coordinate values.
    - a) 1
    - b) 2
    - c) 3
    - d) 4

Lighting and Rendering

19. In the front view of the world coordinate system, the horizontal direction is the world coordinate system ( ) axis.
- a) T
- b) X
- c) Y
- d) Z

20. In the front view of the world coordinate system, the horizontal ( ) edge is positive.
- a) up
- b) down
- c) left
- d) right

21. "Attenuation" can produce the effect of ( ).
- a) from light to dark
- b) from dark to bright
- c) from large to small
- d) from small to large

22. When the carefully designed object is put into the scene, it is found that the shape is distorted or the boundary between the objects is incompatible, the reason is most likely (B).
- a) 3D modeling error
- b) ignored the lighting design and camera
- c) the material is not very good
- d) the above answers are wrong

23. 3DsMAX software in the system default state provides ( ) a floodlight.
- a) 1
- b) 2
- c) 3
- d) 4

24. The following is not a standard light is ( ).
- a) floodlight
- b) target spotlight
- c) target parallel light
- d) target linear light

Character Rigging and Animation

25. The following does not belong to optical lighting is ( ).
    - a) target point light
    - b) free point light
    - c) skylight
    - d) free line light

26. The highest value of the RGB three primary colors ( ).
    - a) all 63
    - b) all 127
    - c) all 255
    - d) R is 63, G is 127, B is 255

27. The error in the following statement is ( ).
    - a) The shape of the spotlight can be round or rectangular
    - b) the spotlight has more control than the floodlight to project the target
    - c) The direction of the floodlight can be controlled
    - d) The direction of the spotlight can be controlled

28. The UVWMap command is on the ( ) panel.
    - a) modify
    - b) level
    - c) motion command
    - d) multi-function

29. The disadvantage of BoxModeling is ( ).
    - a) too esoteric, beginners find it difficult to dabble
    - b) speed is not ideal
    - c) 3DsMAX software NURBS is not perfect
    - d) The above statements are correct

30. Surface Tools modeling can be divided into ( ) ways.
    - a) 1
    - b) 2
    - c) 3
    - d) 4

Questionnaire

Students' feedback on using 3DsMAX software to enhance creative activity in college art education.

1. Flexibility

Questionnaire Items	1	2	3	4	5
1. 3DsMAX software allows me to try out different ideas easily.					
2. I can quickly adapt my designs in 3DsMAX software when faced with new requirements.					
3. 3DsMAX software helps me explore various artistic styles in my work.					
4. Using 3DsMAX software has made me more open to experimenting with different techniques.					
5. 3DsMAX software enables me to easily modify my work at different stages of the creative process.					

2. Fluency

Questionnaire Items	1	2	3	4	5
6. 3DsMAX software helps me generate a large number of ideas quickly.					
7. I can efficiently produce multiple design variations using 3ds Max software.					
8. 3DsMAX software allows me to prototype different concepts rapidly.					
9. Using 3DsMAX software has increased the quantity of creative ideas I can produce.					
10. I can quickly visualize multiple solutions to a design problem using 3DsMAX software.					

3. Elaboration

Questionnaire Items	1	2	3	4	5
11. 3DsMAX software allows me to add intricate details to my designs.					
12. I can easily refine and expand on my initial ideas using 3DsMAX software.					
13. 3DsMAX software helps me develop complex and sophisticated 3D models.					
14. Using 3DsMAX software has improved my ability to elaborate on basic concepts.					
15. I can create more detailed and rich visual narratives with 3DsMAX software.					

4. Problem-Solving

Questionnaire Items	1	2	3	4	5
16. 3DsMAX software helps me find innovative solutions to design challenges.					
17. I can easily troubleshoot technical issues I encounter in 3DsMAX software.					
18. Using 3DsMAX software has improved my ability to solve complex design problems.					
19. 3DsMAX software allows me to approach problem-solving from multiple perspectives.					
20. I feel more confident in tackling difficult design tasks using 3DsMAX software.					

5. Artistic Expression

Questionnaire Items	1	2	3	4	5
21. 3DsMAX software allows me to express my artistic vision more effectively.					
22. I feel that my artistic style has evolved through using 3DsMAX software.					
23. 3DsMAX software has expanded the range of artistic expressions available to me.					
24. I can create more emotionally impactful work using 3DsMAX software.					
25. Using 3DsMAX software has helped me develop a unique artistic voice.					

Expert IOC

No.	Item	Expert 1	Expert 2	Expert 3	IOC	Recommendation
1.	Introduction to 3DsMAX Software	1	1	0	0.67	Expert 3: The introduction section needs more structured learning objectives and a clearer progression from basic to advanced concepts to guide new users effectively through the software interface.
2	Modeling Techniques	1	1	1	1	-
3	Texturing and Shading	1	1	1	1	-
4	Lighting and Rendering	1	0	1	0.67	Expert 2: The lighting and rendering section would benefit from more hands-on examples and practical demonstrations to help students understand the relationship between lighting setup and final rendered output.
5	Character Rigging and Animation	1	1	1	1	-

BIOGRAPHY

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