

# Effects of 3DS MAX Software on Creative Development and Skills in Art Education at Guizhou University, China

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## Abstract

This study investigates the impact of 3DS MAX 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 practical pedagogical approaches. The research objectives were to (1) explore the role of 3DS MAX in enhancing students' creative abilities, 2) evaluate the implementation of 3DS MAX in art curricula, and (3) analyze student feedback on software usage. The study employed a quantitative approach with pretest 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 utilized descriptive statistics and paired t-tests. Results showed 1) significant improvements in student performance, with mean scores increasing from 75 to 79 and standard deviation decreasing from 6 to 5, and 2) the results indicate that students' mean scores after learning were significantly higher. 3) Student feedback revealed moderate to positive responses (overall mean 2.99, SD=1.42), with the most significant improvements in problem-solving (M=3.09) and elaboration (M=3.26), while artistic expression showed room for enhancement (M=2.83).

**Keywords:** 3DS MAX software, art education, creative development, digital media, technical skills, higher education, student performance, curriculum development

## 1. Introduction

In recent years, animation software, particularly 3DS MAX software, has emerged as a powerful tool for enhancing creative endeavors across various fields. This study explores how 3DS MAX software influences and supports creative processes in college art education, building upon its demonstrated impact in advertising, filmmaking, and video game development (Wu, 2023).

Its capabilities in realistic image rendering, virtual environment manipulation, and simulation of complex phenomena have revolutionized creative practices (Hinterwaldner, 2023).

3DS MAX software serves as a versatile tool across industries, enhancing storytelling in VFX (Cutting, 2021), driving creativity in advertising (Sung et al., 2022), and fostering digital literacy and problem-solving in education (Wei et al., 2022). Its role in gaming continues to grow, creating immersive experiences for diverse players (Pajkovic, 2022). Online resources democratize access, empowering individuals and fostering innovation (Ghedini, 2021). Despite its potential in art education, gaps remain in integrating 3DS MAX into college curricula. This study explores the impact of curriculum exposure, faculty support, and project integration on students' creative activity, highlighting 3DS MAX's ability to nurture critical thinking and technical skills (Ketelhut et al., 2020; Matossian, 2004; Tamsah & Yusriadi, 2022).

This study investigates how curriculum exposure, project integration, and faculty training influence college art

students' creative activity through 3DS MAX software, emphasizing integrating 3D tools into education. Findings on 3D CAD in STEM suggest similar benefits for art education (Lv et al., 2021). Faculty training is pivotal as instructors shape learning experiences and facilitate technology integration (Chien & Chu, 2018). The study's dependent variable, enhanced creative activity (Trolan & Jach, 2020), underscores the need for effective curriculum design and professional development.

This research addresses gaps in the literature and identifies best practices for integrating 3DS MAX into art curricula, enhancing teaching strategies, and fostering students' creativity.

### *1.1 Research Questions*

1. How does the 3DS MAX software enhance the creative activity of college students in college art education at GUIZHOU UNIVERSITY, China?
2. How does implementing 3DS MAX software Enhance Creative Activity in College Art Education?
3. What is the student's feedback about using 3DS MAX software Enhance Creative Activity in College Art Education?

### *1.2 Research Objectives*

- (1) To explore the role of 3DS MAX in enhancing students' creative abilities,
- (2) To evaluate the implementation of 3DS MAX in art curricula,
- (3) To analyze student feedback on software usage.

### *1.3 Theoretical Significance*

This study advances the theoretical understanding of technology integration in art education, focusing on the role of 3D animation software like 3DS MAX. Exploring the relationship between curriculum exposure and creative activity bridges a key gap in the literature on the potential of digital tools to enhance artistic education. Grounded in the TPACK model and Csikszentmihalyi's Systems Model of Creativity, the research provides a robust framework to examine the interplay of technology, pedagogy, and creativity. Additionally, it uncovers the cognitive and practical pathways through which 3DS MAX fosters artistic expression and problem-solving. By situating the study in the Chinese higher education context, it contributes cross-cultural insights, revealing culturally specific patterns in adopting and leveraging 3D animation tools for art education.

### *1.4 Practical Significance*

This research offers actionable insights for enhancing art education practices by integrating 3DS MAX software. It informs educators on optimizing digital tools to improve creativity dimensions like flexibility, fluency, elaboration, problem-solving, and artistic expression. The findings guide professional development programs for art educators, equipping them with strategies randomly selected to examine how curriculum exposure to 3DS MAX software influences their creative activity and effectively implement 3D animation tools in their teaching. Policymakers can leverage these insights to shape technology investments and curriculum reforms in art education. For students, the study highlights 3DS MAX's potential to enhance creativity, employability, and innovative expression, motivating deeper engagement with the software for future career advancement.

This study investigates the integration of 3DS MAX software into the College Art Education program at Guizhou University, China. A sample of 341 first-year digital media art design students was professional skill development.

### *1.5 Research Limitations*

**Sample Representativeness:** The findings are constrained by focusing on a single institution, Guizhou University. Factors such as institutional policies, faculty expertise, and resources may not reflect conditions in other art colleges across China, limiting the study's generalizability.

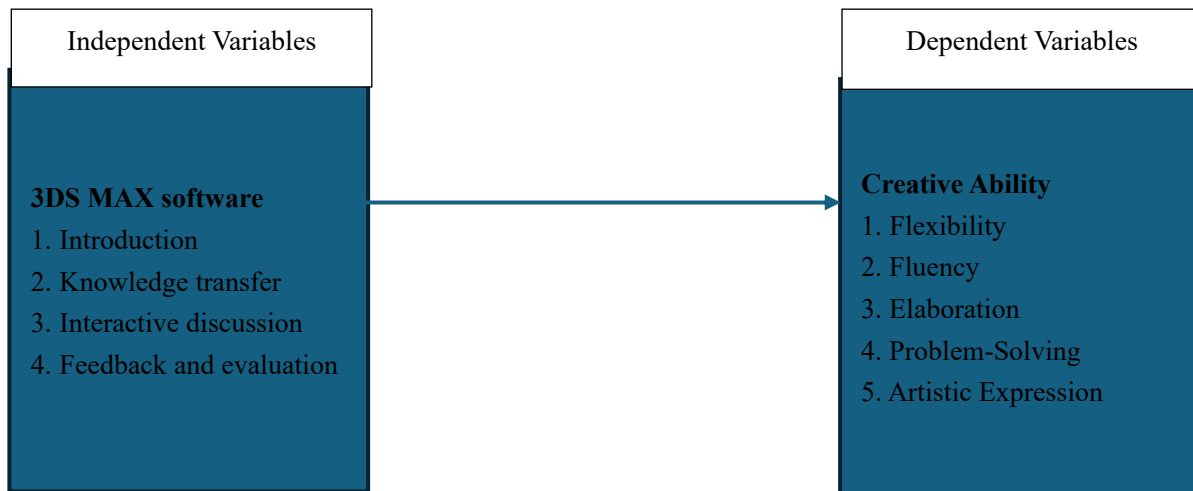
**Methodological Constraints:** The reliance on questionnaires and pre-posttests introduces limitations inherent to self-reported data and controlled testing environments, which may not capture the full spectrum of creative activity or practical application of skills.

**Short Study Duration:** The study's timeframe may only reflect initial changes in creativity and professional skills, potentially overlooking the long-term effects of 3DS MAX software exposure, including skill retention and the more profound development of creativity.

**The complexity of Creativity Assessment:** Creativity is a multifaceted construct, and the standardized tools used may not adequately capture the nuanced growth in students' creative and technical abilities. This limitation could lead to an

incomplete understanding of the software's impact on their overall development.

### 1.6 Research Framework



The initial learning phase focuses on familiarizing students with the 3DS MAX interface, tools, and operations, including layout, navigation, and fundamental functionalities for creating 3D content.

Interactive discussions between instructors and students foster two-way communication, clarify concepts, address queries, and encourage collaborative learning. This approach emphasizes the exploration of techniques and ideas related to 3DS MAX.

Adaptability reflects students' ability to adjust to new challenges and situations, ensuring they can produce creative concepts, designs, and animations without technical or creative hindrances.

Artistic expression encompasses conveying ideas, emotions, and narratives through visual media. It uses color, composition, form, and movement to create impactful and meaningful art reflecting the creator's vision and style.

Located in Shenzhen, China, Guizhou University's art program integrates traditional art with modern technology, offering a holistic curriculum. The program is recognized for nurturing creativity, technical skills, and artistic expression, preparing students for innovation in the digital arts.

## 2. Literature Review

Technology, pedagogy, and content knowledge (TPACK) are the three pillars upon which successful technology integration rests, according to TPACK (Wang, 2022). By integrating students' technical skill development with their creative pursuits, faculty members with a strong command of CK can successfully connect Animation: 3DS MAX software activities with the larger objectives of the art education curriculum (Wei et al., 2022). Using Csikszentmihalyi's Systems Model of Creativity framework, we can examine how art education can foster creativity (Csikszentmihalyi, 1988). Theoretically, this framework states that domain, field, and individual interaction drive creative output (Xiao et al., 2020). The development of autonomy, resilience, and a growth mindset are crucial attributes for cultivating creativity and invention throughout a student's life. Students develop these qualities by participating in self-directed learning activities (Bhandari et al., 2020). Through this recurrent cycle of discovery and refining, students can increase their creative fluency and originality, laying the groundwork for future creative activities (Ciriello et al., 2024). In addition, Animation: 3DS MAX software is 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 to accomplish shared objectives through working together on group projects. Through participation in these collaborative activities, students improve their creative activity and develop fundamental interpersonal skills that are beneficial in various contexts, including academic, professional, and personal settings (Mann et al., 2022).

Students can release their creativity, express themselves, and build vital skills for success in the 21st century using

Animation: 3DS MAX software. This is accomplished by giving opportunities for hands-on exploration, learning across disciplines, and collaborative problem-solving. Animation: 3DS MAX software continues to be a powerful instrument 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 continually emerging (Javaid et al., 2023).

The application of 3DS MAX software in educational settings has been diverse and impactful. This statement is in line with Margulies (2024), who, in his paper, advocates for a holistic approach to societal issues and calls for a broader understanding of technology and innovation as tools for creating a more equitable society, as well as developing skills for transformation. The article further highlights the need for practitioners to develop technological skills that facilitate social change. Also, as Selfa-Sastre et al. (2022) note, 3DS MAX 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.

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

The current status of 3DS MAX 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 role of software in developing 21st-century skills and its adaptation to emerging technologies.

Li and Zhang (2023) conducted a comprehensive survey of 3D animation software used in Chinese universities, finding that 3DS MAX 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 3DS MAX 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 3DS MAX 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 cemented 3DS MAX software's educational role. A recent meta-analysis by Garcia and Thompson (2023) of 50 studies on project-based learning with 3D animation software found that 3DS MAX software-based projects consistently led to higher levels of student motivation, better learning outcomes, and enhanced creativity compared to traditional instructional methods.

By all means, 3DS MAX 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.

### 3. Research Methodology

This study adopted a quantitative approach to evaluate the impact of 3DS MAX software integration on creative activity among art students in Chinese higher education. A pretest/post-test design measured changes in students' skills and creative abilities before and after exposure to 3DS MAX instruction. The approach systematically assessed the software's influence on key creativity dimensions, including flexibility, fluency, elaboration, problem-solving, and artistic expression within the framework of college art education.

The population for this study consisted of college art students in China who have taken Animation: 3DS MAX software courses. The choice of GUIZHOU UNIVERSITY was strategic, as it was located in one of China's most technologically advanced cities, providing a unique environment where art and technology intersect.

The study involved a sample of 175 first-year undergraduate students aged 19-22, majoring in environmental design with a focus on digital media and art. These students, who have completed introductory art foundation courses and possess fundamental computer skills, exhibit varying experience with 3D modeling software. Participants were required to maintain a minimum GPA of 2.5 and demonstrate proficiency in basic design principles. The group comprised approximately 60% female and 40% male students representing urban and rural backgrounds.

The total population for the program was 3,000 students, and the sample size aligns with recommendations for ensuring statistical power while maintaining practicality. To ensure diversity and representativeness, cluster random sampling was employed. From four classrooms (Classroom 1: 45 students, Classroom 2: 42 students, Classroom 3: 43 students, Classroom 4: 45 students), Classroom 1 was randomly selected as the final sample group. This sampling approach ensures meaningful analysis while reflecting the demographic and academic diversity of the target population. The process of selecting participants follows purposive sampling.

The first lesson introduces students to 3DS MAX software, focusing on developing flexibility, fluency, elaboration, problem-solving, and artistic expression. It aimed to familiarize students with the software's interface and essential tools, enabling them to navigate and execute basic commands while beginning to explore creative possibilities and technical challenges.

Students studied the core elements of 3DS MAX, including interface navigation, toolbars, menus, and basic object creation, such as cubes and spheres. They also gain insight into organizing and saving project files, laying the groundwork for structured and efficient workflows.

The lesson began with an introduction to the course objectives and real-world applications of 3DS MAX, followed by a demonstration of its core functionalities. Students engaged in interactive discussions to explore the software's potential, supported by examples from professional projects, fostering an inquiry and collaborative learning environment.

Students completed a simple task, such as creating a 3D object, to apply their learning. Formative feedback highlighted strengths and areas for improvement, while summative assessment evaluated their creativity, technical accuracy, and ability to navigate the software effectively.

A 30-question multiple-choice test administered as a pretest and post-test, covering five key areas:

Lesson 1: Introduction to 3DS MAX (6 questions)

Lesson 2: Modeling Techniques (6 questions)

Lesson 3: Texturing and Shading (6 questions)

Lesson 4: Lighting and Rendering (6 questions)

Lesson 5: Character Rigging and Animation (6 questions)

A practical component was also assessed for students' creative application of 3DS MAX skills, graded using a standardized rubric.

### *3.1 Test Development Process*

Develop Content: Create straightforward, concise questions and tasks aligned with objectives.

Pilot Testing: Test with a small group to identify issues.

Finalize: Refine the test based on pilot feedback.

Administer: Ensure a suitable environment and necessary resources.

Evaluate: Grade using consistent criteria and provide constructive feedback.

### *3.2 Data Collection*

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

Data collection involved an online survey, pre-and post-tests, and detailed lesson plan implementation. Pre- and post-tests assessed theoretical and practical knowledge of 3DS MAX software and creative application, conducted in sample group settings for consistency. Instructors monitored and documented lesson plans, recording student engagement and deviations. The quantitative results from tests and surveys complemented this qualitative data. Additionally, focus group discussions were held with a subset of students to gather insights into their experiences and challenges using 3DS MAX.3.4.2. Part 2

Post-test, students completed an online questionnaire to provide feedback on their experience with 3DS MAX software. The questionnaire assessed the following areas:

Professional knowledge (5 questions)、 Practical experience (5 questions)、 Innovation ability (5 questions)

The survey was distributed via email, social media, and academic forums, with a set response deadline.

### 3.3 Reliability and Validity Tests

This study ensured the reliability and validity of the research tools by evaluating the Index of Item-Objective Congruence (IOC) for each scale. The IOC values, which reflect the alignment between each item and the study's objectives, were as follows:

**Table 1.** IOC Value of the Test Items

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

Table 1 revealed that these IOC values indicated how each item aligns with the research objectives, ensuring the test effectively measures the targeted knowledge and skills related to 3DS MAX software.

### 3.4 Development and Evaluation of Lesson Plan Effectiveness and Questionnaire Validity

To ensure the effectiveness of the lesson plan for art education at Guizhou University, it underwent a thorough review by a team of educational research experts. The evaluation was focused on the Item Objective Consistency (IOC), ensuring that each component aligns with the educational goals. For the plan to be deemed suitable for research, the IOC must be  $\geq 0.50$ . The IOC analysis of a similar program at Fuzhou Software Vocational and Technical College returned a perfect score of 1.00, setting a benchmark for this study.

Additionally, the expert team reviewed the student questionnaire on the impact of 3DS MAX software Technology in improving vocational skills for content validity. The process will involve assessing the questionnaire's IOC, with a standard index of  $\geq 0.50$ , to confirm its suitability for research. This approach aims to ensure the reliability of the data collected, providing a robust foundation for evaluating the effectiveness of 3DS MAX software in the curriculum.

### 3.5 Statistical Data Analysis Plan

This study employed descriptive and inferential statistical methods to comprehensively analyze the collected data, aiming to explore the impact of 3DS MAX software on students' creative activity.

Quantitative analysis was conducted on student test scores using paired sample t-tests to compare pretest and post-test results. Descriptive statistics such as the mean, median, mode (measures of central tendency), standard deviation, and range (measures of variability) were calculated to summarize the performance and score distribution. Descriptive statistics were computed for the questionnaire, including frequency, percentage, mean, and standard deviation. Inferential statistics, mainly one-way ANOVA tests, identified significant response differences based on demographic factors (e.g., gender, prior experience with 3D software). Correlation analyses will examine relationships between different aspects of the questionnaire and test performance. Thematic analysis will be applied to responses to open-ended questions. The responses are coded, categorized, and analyzed for common themes, and the frequency of each theme will be quantified. Key quotes will be selected to enrich the quantitative findings with qualitative insights. All analyses were conducted using SPSS software, with statistical significance at  $p < 0.05$ .

## 4. Result

- (1) To answer research objective 1: To explore the role of 3DS MAX in enhancing students' creative abilities.

The Table 2 presented the pretest and post-test scores for a 3DS MAX training program across five topics. The average pretest score was 75, while the post-test score improved to 79, indicating overall performance enhancement. The standard deviation decreased from 1.25 to 0.55, suggesting more consistent results after training. The highest improvement was seen in Modeling Techniques (from 73 to 79).

**Table 2.** The Pretest and Post-Test Scoring

No.	Item	Pretest	Post-test
1.	Introduction to 3DS MAX 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
<i>Mean</i>		75.00	79.00
<i>Standard Deviation</i>		1.25	0.55

To answer research objective 2: To evaluate the implementation of 3DS MAX in art curricula. A comprehensive test of 30 multiple-choice questions was administered during the pre-and post-test of the 3DS MAX software instruction period. This test is designed to assess student's knowledge and understanding across five key areas:

Critical value:  $t_{.05,44} = 1.68$

Computed value:  $t_{compute} = 3.18 > t_{.05,44} = 1.68$

Rejection/Conclusion: "Mean score after learning more than mean score before learning."

This statistical analysis shows that we reject the null hypothesis 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. The results indicate that students' mean scores after learning were significantly higher.

Table 3 This test is designed to assess student's knowledge and understanding across five key areas:

**Table 3.** Mean Ccore of Pretest and Post-test

Items	n	Mean	S	Df	t
<b>Post-test (After Learning)</b>	45	78.96	25.27		
<b>Pretest (Before Learning)</b>	45	74.6	42.61	44	3.18

Table 3 reported that the mean score improved from 74.6 (Pretest) to 78.96 (Post-test), indicating an increase in performance after learning. The standard deviation (S) decreased from 42.61 (Pretest) to 25.27 (Post-test), suggesting more consistent scores after training.

The t-value for the paired sample test is 3.18, with 44 degrees of freedom (Df), indicating a statistically significant improvement in performance.

To answer research objective 3: To analyze student feedback on software usage.

Table 4 Analyze student feedback on software usage

**Table 4.** Student Feedback Analysis

Research Objective	M	SD
Analyze students feedback on software usage	2.99	1.42

Table 4 presented the student feedback analysis revealed moderate to positive responses across all five creative dimensions, with an overall mean score of 2.99 (SD = 1.42).

### 5. Discussion

RO1: To explore the role of 3DS MAX in enhancing students' creative abilities.

Explain the testing results and why 3DS MAX 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 3DS MAX Software and Lighting and Rendering sections received slightly lower scores of 0.67, suggesting room for improvement.

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 more apparent 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 curriculum structure is sound, specific components are strengthened to better support students' creative development. Thus, effective lesson plans can enhance the creative activity of year one university students in art education at GUIZHOU UNIVERSITY, China. The researcher agrees that good planning affects the students' creative ability because they studied after-school programs, workshops, and online tutorials utilizing 3DS MAX software, fostered self-directed learning, leading to the development of crucial attributes such as autonomy, resilience, and a growth mindset (Bhandari et al., 2020). Furthermore, students master the intricacies of the arts and find their voice as creators by using Animation: 3DS MAX software as a springboard for imaginative play (Saputra et al., 2021)

RO2: To evaluate the implementation of 3DS MAX in the art curriculum.

Based on the pretest and post-test scores for the 45 students in Classroom 1, there is clear evidence of improvement in student performance after exposure to 3DS MAX software instruction. The mean score increased from 75 to 79, and notably, the standard deviation decreased from 6 to 5, indicating higher but more consistent performance across the class. Individual student progress varied, with pretest 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, like #27 and #43, showed slight decreases in their pretest scores (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 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. Thus, 3DS MAX software has been integrated into curricula in formal education settings to enhance students' technical skills in 3D design and animation while fostering artistic expression and problem-solving abilities. Anantrasirichai and Bull (2022) reported that hands-on projects involving 3DS MAX software improved student engagement, motivation, and self-efficacy, resulting in more profound learning experiences and creative accomplishments. Beyond formal education, 3DS MAX software has found significant application in informal learning environments. Bhandari et al. (2020) explored how after-school programs, workshops, and online tutorials utilizing 3DS MAX software fostered self-directed learning, developing crucial attributes such as autonomy, resilience, and a growth mindset.

RO3: To analyze student feedback on software usage.

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. Thus, The increasing focus on project-based learning has further cemented 3DS MAX software's role in education. A recent meta-analysis by Garcia and Wu (2023) of 50 studies on project-based learning with 3D animation software found that 3DS MAX software-based projects consistently led to higher levels of student motivation, better learning outcomes, and enhanced creativity compared to traditional instructional methods. By all means, 3DS MAX 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).



## 6. Conclusion and Recommendation

The analysis of the role of 3DS MAX software in art education at GUIZHOU UNIVERSITY reveals several key points that underscore its essential role in fostering students' creative development and skill enhancement. 3DS MAX (3D Studio MAX) is more than just an advanced 3D modeling, animation, and rendering tool; it is a comprehensive creative platform that stimulates students' imagination and thinking. Students can tackle complex visual design challenges through its practical applications, enhancing their design thinking and visual performance abilities. This is especially evident in fields such as advertising design, film and television effects, and game production, where 3DS MAX plays a crucial role in bridging creative concepts with real-world technical execution. The software improves students' technical proficiency and cultivates a deeper understanding of visual communication, problem-solving, and innovative design practices.

The IOC evaluation of the lesson plan showed strong content validity, with Modeling Techniques, Texturing and Shading, and Character Rigging and Animation receiving perfect scores (1.00). The Introduction to 3DS MAX Software and Lighting and Rendering sections scored slightly lower (0.67), suggesting room for improvement. Pretest and post-test data showed improved student performance, with the mean score increasing from 75 to 79 and the standard deviation decreasing from 6 to 5. Although individual progress varied, overall results indicate that 3DS MAX instruction effectively standardized and enhanced student skills.

Student feedback revealed positive responses, particularly in problem-solving ( $M = 3.09$ ) and elaboration ( $M = 3.26$ ). However, artistic expression ( $M = 2.83$ ) received lower ratings, suggesting the software is more effective for technical tasks than for fostering individual artistic creativity.

This study on implementing 3DS MAX software in art education at GUIZHOU UNIVERSITY has significantly improved technical and creative development. Student performance saw a notable increase, with mean scores rising from 75.63 to 79.15 and standard deviation dropping from 1.25 to 0.55, indicating more consistent results. Key areas such as Character Rigging and Animation and Modeling Techniques showed the most significant advancements, with scores rising to 79.66 and 79.58, respectively. The curriculum's effectiveness was validated by expert evaluations, with IOC scores ranging from 0.67 to 1.00 and perfect scores (1.00) in Modeling Techniques, Texturing and Shading, and Character Rigging and Animation. Feedback from students reinforced these findings, with positive responses in Problem Solving ( $M = 3.09$ ) and Elaboration ( $M = 3.26$ ), though Artistic Expression ( $M = 2.83$ ) indicated potential areas for improvement. Integrating 3DS MAX software improved technical and creative skills, particularly problem-solving and conceptual expansion. While improvements were evident, opportunities remain to refine the curriculum, especially in fostering artistic expression and improving the introductory phase. This research supports the continued development of 3D animation software integration in art education.

## 7. Recommendation

Based on the research findings, it has been recommended that GUIZHOU UNIVERSITY strengthen the integration of 3DS MAX software into its art education curriculum by addressing areas identified for improvement. Specifically, the curriculum should be more structured, with additional focus on the introductory components and lighting/rendering sections, which received lower IOC scores. A balanced approach that enhances technical competency and creative expression is crucial, as student feedback indicated higher satisfaction in technical areas than in artistic expression. A dual-track curriculum structure is suggested, combining technical skill development with creative exploration and integrated projects that foster both aspects. To further enhance effectiveness, teacher training programs should focus on blending technical and innovative instruction, and a "creative studio" environment was created to allow for hands-on, real-world project applications. Lastly, using validated evaluation methods to establish a systematic assessment framework for technical proficiency and creative development will help ensure ongoing improvement. Character Rigging Animation and Modeling Techniques, which showed notable improvements, should serve as models to refine other curriculum areas.

## 8. Further Study

Based on the research findings, several areas require further investigation to deepen our understanding of the impact of 3DS MAX software in art education. Despite significant improvements in test scores (from a mean of 75.63 to 79.15), the varying effectiveness across different curriculum components highlights the need for longitudinal studies to assess the long-term effects of software integration on students' technical and creative skills. Specifically, future research should explore the relationship between technical proficiency and creative development, particularly how advanced

technical skills, such as those in Character Rigging and Animation and Modeling Techniques, can support artistic expression. The findings also indicate a need for focused research on pedagogical approaches that better integrate technical and creative skill development, as some areas (e.g., Problem-Solving) showed more substantial improvement than others. Future studies should investigate the balance between structured technical training and creative exploration, especially in light of feedback that indicates the need for more structured learning objectives in certain curriculum sections like Introduction and Lighting/Rendering. Further research should address curriculum gaps, particularly in sections with lower IOC scores, such as the Introduction and Lighting/Rendering, to create more effective introductory approaches and integrate theoretical knowledge with practical application. The reduction in standard deviation (from 1.25 to 0.55) in post-test scores indicates successful standardization of learning outcomes, but additional studies are needed to ensure this does not hinder creative development. Finally, integrating project-based learning should be explored to strengthen technical and creative skills, focusing on curriculum models that foster long-term growth in both areas. Longitudinal studies tracking students' progress over multiple semesters could offer valuable insights into how curriculum structures impact immediate learning outcomes and long-term creative development.

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