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Integrating Interdisciplinary Knowledge in Interior Design Studio Courses: A Comparative Analysis of Single-Teacher and Multi-Teacher Instructional Methods

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Abstract: *This study explores integrating interdisciplinary knowledge in studio practice courses within higher education's interior design programs, focusing on comparing the effectiveness of single-teacher and multi-teacher educational models to assess their application in the field. As educational environments evolve, interdisciplinary integration becomes increasingly evident, requiring a systematic comparison of different teaching models to determine which promotes student learning and creativity development more effectively. The study sets three objectives: to evaluate the effectiveness of single-teacher versus multi-teacher education in interdisciplinary integration, to analyze students' learning experiences under different teaching models, and to investigate the impact of teachers' professional backgrounds and experiences on teaching performance. The hypothesis suggests that the multi-teacher model is more effective in promoting interdisciplinary knowledge integration, with students experiencing more positive learning outcomes and enhanced creativity, and teachers' performance significantly influenced by their professional backgrounds and experiences. The research employs an experimental design with 120 interior design students, divided into an experimental group taught by four teachers and a control group taught by one teacher, ensuring consistent learning content. Data collection includes surveys, observations, interviews, and assessments, using quantitative and qualitative analysis to ensure reliable conclusions. The results will provide empirical evidence for course design, teacher training, and interdisciplinary teaching, supporting educational reform and development.*

Keywords: interdisciplinary knowledge integration, single-teacher education, multiple-teacher education

1. Introduction

In recent years, interior design in China has been significantly influenced by rapid urbanization and economic growth, placing higher demands on university studio courses in interior design, particularly in developing designers' comprehensive skills and creativity. The studio art practice courses in Chinese universities offer a unique perspective. This study analyzes both single-teacher and multi-teacher instructional methods, comparing their advantages and disadvantages to explore effective improvement paths for students and industry development. Modern studio courses emphasize technical skills, innovative problem-solving abilities, and conceptual development, with their effectiveness relying on teachers' diverse instructional methods. Understanding these differences can facilitate innovation in best practices (Wong, 2023).

With the globalization of interior design, Chinese higher education institutions need to integrate international standards, combining sustainable practices and new technologies. Multi-teacher courses better reflect a comprehensive educational approach. This study evaluates teaching methods based on current needs and trends, providing effective practices and recommendations, thus contributing important insights to Chinese interior design education and academic discussions (Ubuz & Aydınyer, 2019).

Furthermore, this study offers guidance for interdisciplinary development in interior design. Integrating architecture, psychology, and art design strengths promotes interdisciplinary collaboration. Designing globally sustainable, user-centered spaces requires multidisciplinary cooperation. In international competition, graduates with innovation, collaboration, and problem-solving abilities are more advantageous and successful in the global design industry (Afacan, 2021; Chinoski et al., 2006; Molly & Jameel, 2020). Therefore, studying the integration of interdisciplinary knowledge under single-teacher and multi-teacher instructional methods is particularly important.

Research Scope

This study compares single-teacher and multi-teacher instructional methods, aiming to assess the impact of collaborative multi-teacher instruction on students' comprehensive professional skills in interior design studio art practice. The research focuses on how multi-teacher collaboration, compared to single-teacher methods, enhances students' technical skills, creativity, critical thinking, problem-solving abilities, and professional competence. These skills are measured and analyzed through students' academic performance and actual design outcomes.

Research Objectives

SO1: Evaluate the effectiveness of single-teacher versus multi-teacher education in interdisciplinary knowledge integration, identify influencing factors, and provide improvement suggestions. (Interdisciplinary Dimension)

SO2: Analyze student learning experiences under different teaching models and identify key factors affecting creativity and initiative. (Student Dimension)

SO3: Investigate the impact of teachers' professional backgrounds and experiences on interdisciplinary teaching performance and propose recommendations for teacher training and support. (Teacher Dimension)

Research Questions

RQ1: How do the effects of single-teacher education differ from multi-teacher education in promoting interdisciplinary knowledge integration? In what specific aspects are these differences observed? (Interdisciplinary Dimension)

RQ2: What are the differences in students' learning experiences between single-teacher and multi-teacher education? Which mode is more effective in stimulating students' creativity and initiative? (Student Dimension)

RQ3: How do teachers' professional backgrounds and experiences influence their performance in interdisciplinary teaching, especially under single-teacher and multi-teacher educational models? (Teacher Dimension)

Research Hypotheses

H1: The multi-teacher educational model is more effective than the single-teacher model in promoting interdisciplinary knowledge integration, specifically reflected in students' enhanced ability to relate and apply content from different disciplines.

H2: Students' learning experiences are more positive in the multi-teacher educational model, significantly stimulating their creativity and initiative, particularly regarding project engagement, willingness to collaborate in teams, and innovative outputs.

H3: Teachers' interdisciplinary teaching performance in a multi-teacher model is significantly influenced by their professional backgrounds and experiences. Teachers with multidisciplinary experience can facilitate students' interdisciplinary understanding and collaboration more effectively.

2. Literature Review

Constructivism Learning Theory -CLT

The Constructivist Learning Theory (CLT) posits that learning is constructing knowledge through experience. Learners understand the world through interaction with their environment, communication with others, and personal experiences rather than passively receiving information. This theory originated in the 20th century within educational psychology and was influenced by several psychologists, most notably Jean Piaget and Lev Vygotsky. Although the concept of constructivism has been discussed in numerous academic articles, there is no single "original" journal for its publication. Important literature on this theory can be found in the Journal of Constructivist Theory and Practice.

Constructivist learning encourages creativity, independent thinking, practical skills, and adaptability in the competitive design industry (Morley & Jamil, 2020). In a multi-teacher educational model, the interaction between teachers and students and the collaboration of multidisciplinary teachers provides students with diverse learning opportunities. This helps them independently construct and integrate knowledge, especially in interdisciplinary projects.

Interdisciplinary Education Theory -IET

The Interdisciplinary Education Theory (IET) emphasizes integrating knowledge and methods from multiple disciplines to solve complex problems, fostering connections between different fields of knowledge for students. The development of this theory was influenced by educational reforms in the 1970s and 1980s, particularly advocating interdisciplinary collaboration and research among the sciences, social sciences, and humanities. Research related to this theory is often published in the Journal of Interdisciplinary Studies.

This interdisciplinary approach enhances students' interior design knowledge and problem-solving abilities by encouraging them to examine design issues from multiple perspectives (Kurt Cavus & Kaptan, 2022).

Project-Based Learning Theory -PBL

Project-Based Learning Theory (PBL) emphasizes engaging students in learning through real-world problems and projects. Students acquire knowledge through collaboration and research, demonstrating what they have learned while solving practical problems. This theory was proposed as early as the early 20th century, with later research and implementation enriched

by John Dewey's educational philosophy. Research in this field is commonly found in the International Journal of Project-Based Learning.

Interdisciplinary teaching between departments that coordinate different resources and priorities also faces challenges. Additionally, group dynamics may affect collaborative learning, as students' contributions to group projects may vary. Despite these obstacles, these approaches remain highly valuable, highlighting the importance of curriculum support and resource integration (Kurt Cavus & Kaptan, 2022).

Multiple Intelligences Theory - MI

The Multiple Intelligences Theory (MI), proposed by Howard Gardner, argues that traditional intelligence assessments are too narrow and that humans possess various types of intelligence, including linguistic, logical-mathematical, and spatial intelligence. This theory aims to recognize and apply diverse learning methods. It was first introduced in the book "Frames of Mind," published in 1983.

Teachers can stimulate innovative design solutions by encouraging the integration of multiple intelligences (Chung et al., 2022; Felek & Gul, 2019; Orer Sogut & Gosterici, 2024). Therefore, a multi-teacher educational model can offer diverse learning method options, enabling teachers from different disciplinary backgrounds to collectively meet students' intelligence needs, enhancing students' development in collaborative projects, and increasing classroom engagement.

Conceptual framework

The framework elucidates how these theories enhance instructional design quality (IDQ) and collaboration and interdisciplinary integration (CII), thereby promoting academic success (AS), skill acquisition (SA), and positive student perception (SP), showcasing an integrated approach to interior design education. These theories shape learning experiences through practical application, collaboration, cognitive management, and skill development. Their combination effectively teaches students technical skills, critical thinking, creativity, and adaptability.

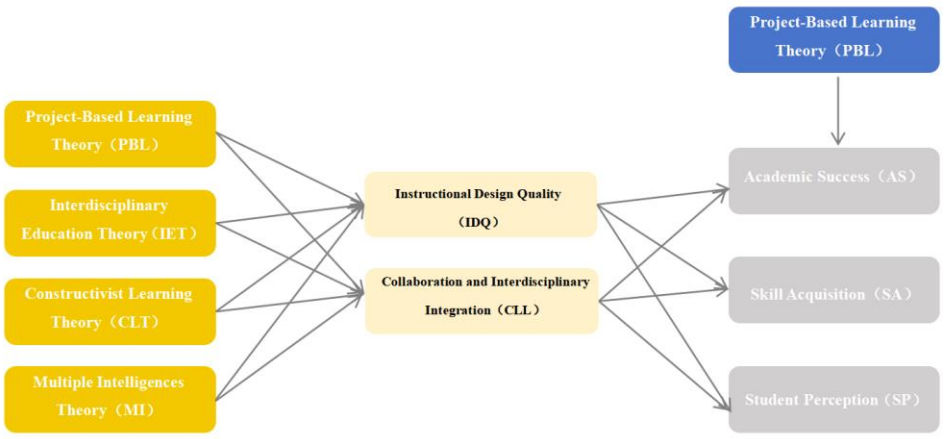

Figure 1: Conceptual Framework

3. Methodology

This study employs a mixed-methods approach to explore multiple research questions deeply. By integrating the numerical precision of quantitative data with the profound insights of

qualitative data, mixed methods effectively capture the depth and complexity of educational phenomena (Creswell, 2012). Quantitative methods provide comparative data on student performance and learning outcomes through statistical analysis, while these results can be interpreted with qualitative data, including interviews and observations, revealing the perspectives of students and educators (Tashakkori & Teddlie, 2010). In China, the shift from traditional lecture-based teaching to collaborative and interdisciplinary teaching methods highlights the importance of such integration (Creswell, 2003). When investigating the teaching of interior design studio practice courses, the inseparability of student engagement, teaching quality, and interdisciplinary collaboration is evident. This study uses quantitative surveys and qualitative interviews to identify patterns and correlations, comprehensively examining educational impacts (Johnson et al., 2007; Teddlie & Sammons, 2010). Triangulation of multiple data sources enhances the reliability and validity of mixed-methods research (Creswell & Plano Clark, 2011).

Study design
Type: Experimental study

Groups: randomly assign two groups

Experimental group: 60 students, taught by 4 teachers from different subject backgrounds (multi-teacher education model)

Sample selection
Participants: Select 120-grade students in interior design to ensure similarities in their academic background and basic skills.

Random allocation: 120 students were divided into experimental and control groups by random sampling to eliminate selection bias.

Teaching implementation
Course structure: Design a consistent course syllabus and projects, including interdisciplinary topics, to ensure that the two groups have the same learning content, mainly focusing on design thinking, cooperative projects and comprehensive application tasks.

Teachers choice: The four teachers in the experimental group should come from different subject fields (architecture, art design, psychology, and engineering) to promote the integration of interdisciplinary knowledge.

Teachers in the control group should have rich expertise in interior design.

Data collection
Questionnaire survey: Pre-questionnaires on interdisciplinary knowledge integration, self-efficacy, and learning motivation were issued before the course.

Post-test: Follow-up questionnaires will be issued after the course, including:
- Knowledge integration capability (RQ 1, H1)
- Satisfaction, creativity, and initiative of the learning experience (RQ 2, H2)

Interview

Teacher Interview: Participating teachers were interviewed to understand the impact of their professional background, teaching experience and teaching methods on interdisciplinary teaching (RQ 3, H3).

Project evaluation: Students' performance in each project is assessed in a standardized scoring manner, focusing on their performance in interdisciplinary knowledge application and creativity performance.

Data analysis

Quantitative analysis: Using statistical software (such as SPSS or R), descriptive statistics, and independent sample t-test or ANOVA) were used to analyze interdisciplinary knowledge integration and learning experience (RQ 1, RQ 2).

Qualitative analysis: The content analysis method was used to code and extract thematic data between student and teacher interviews, analyzing students' learning experiences and teachers' teaching performance in different teaching modes (RQ 3).

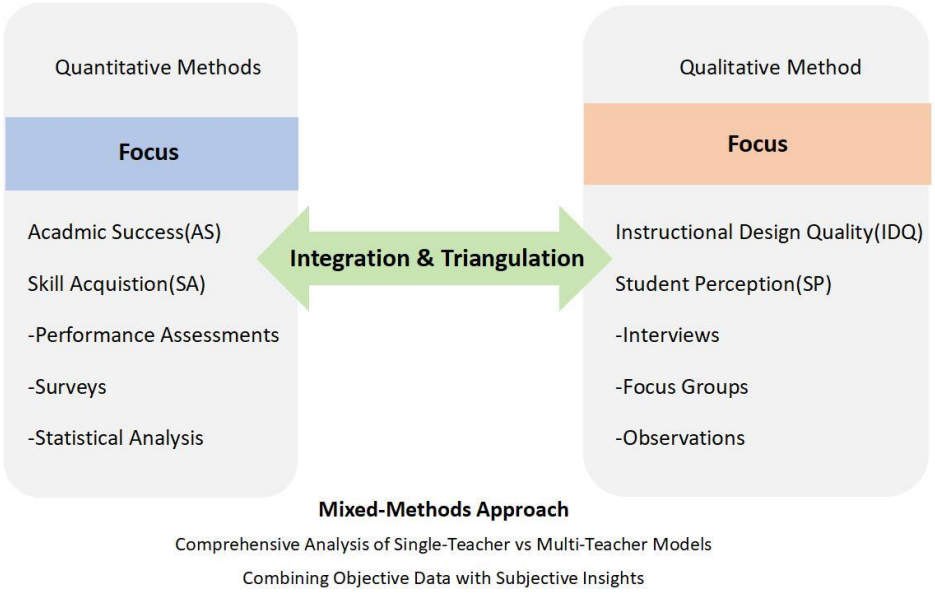

Figure 1: Example of Figure

Research ethics

The study strictly adheres to ethical guidelines, ensuring informed consent from students and teachers before commencing the research and protecting participants' privacy. Participants can withdraw from the study anytime, and all data will be processed anonymously. The study aims to evaluate the effects of single-teacher and multi-teacher education in interior design studio practice courses through a systematic experimental research approach. It provides an in-depth analysis of interdisciplinary knowledge integration, student learning experiences, and teacher impact, thereby offering empirical evidence for future teaching improvements.

4. Conclusion

In summary, we examined the impact of the multi-teacher collaborative teaching model on studio practice courses and found that, although students prefer this model, some teaching

remains single-teacher focused, which contradicts theoretical expectations. The study indicates a lack of coordination in this model within higher education, suggesting further research to enhance the quality of interdisciplinary knowledge integration.

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