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EVALUATING THE EFFECTIVENESS OF BLENDED LEARNING ON STUDENTS' LEARNING OUTCOME IN INTERIOR DESIGN MATERIAL AND CONSTRUCTION COURSE

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ABSTRACT

Interior design materials courses are essential for preparing students for real-world professional practice. Students must not only understand the characteristics and appropriate applications of various materials but also think critically about material selection to meet both aesthetic and functional requirements. Blended learning—a combination of online instruction and face-to-face engagement—offers a promising approach by integrating self-directed digital resources with hands-on, interactive activities. This study investigates the impact of blended learning on student learning outcomes in a postgraduate interior design materials course, employing a quasi-experimental post-test-only design. One group of students participated in a blended learning model that combined online instruction with hands-on lab activities. A second group engaged in traditional classroom instruction paired with lab activities, while a third group followed a conventional lecture-based classroom format without lab engagement. Bloom's Taxonomy was used as the framework for assessing learning outcomes, with post-test questions targeting all cognitive levels—from remembering and understanding to creating. Results indicated that students in the blended learning group outperformed their peers in higher-order cognitive skills, particularly in analyzing, evaluating, and creating practical material solutions. The findings also revealed no significant difference in lower-order thinking skills (e.g., remembering and understanding) between students taught through traditional classroom methods and those taught online.

1. INTRODUCTION

Understanding interior design materials is fundamental to creating functional and aesthetically pleasing interior environments. Students in interior design programs are typically taught about material properties, construction methods, sustainability considerations, and appropriate applications across different spatial contexts. However, professional success in the field also depends on their ability to analyze and develop innovative solutions that meet user needs and project constraints. Therefore, an effective materials course must not only facilitate knowledge acquisition but also foster hands-on experience and critical thinking skills.

Traditionally, materials instruction has relied heavily on classroom-based lectures, where instructors present or circulate material samples while discussing their characteristics. While effective for conveying foundational knowledge, such approaches may fall short in cultivating the advanced cognitive skills demanded by 21st-century design practice. In response, blended learning has emerged as a viable pedagogical alternative—integrating digital resources and activities with in-person engagement. By shifting some instructional components online, educators can reserve face-to-face sessions for deeper discussions, practical workshops, and real-time feedback.

This study explores the impact of blended learning on student learning outcomes in a postgraduate interior design materials course. A quasi-experimental, post-test-only control group design was employed. Participants were divided into three groups:

- **Control Group:** Received traditional lecture-based classroom instruction.
- **Experimental Group 1:** Received traditional classroom instruction along with hands-on lab activities.
- **Experimental Group 2:** Followed a blended learning format combining online modules, face-to-face discussions, and practical hands-on exploration in the makers' lab.

Learning outcomes were assessed using a post-test quiz structured around Bloom's Taxonomy, covering a range of cognitive skills from lower-order (remembering, understanding) to higher-order (analyzing, evaluating, creating). This study specifically investigates the extent to which the blended learning model enhances both foundational knowledge and higher-order thinking skills in material selection and application.

Aim: To measure students' cognitive learning outcomes in the three types of learning modes i.e Traditional, experiential and blended in an interior design materials and construction course.

1.1. OBJECTIVES

- To compare students' cognitive learning outcomes of students in blended, experiential and traditional learning environments.
- To measure the effect of learning outcomes on the-order of thinking skills in all three groups the groups.

Hypothesis:

- Ha1 – There is significant difference in the post test scores in different learning modes i.e blended, experiential and traditional.

Ha2 – There is a significant difference in students' performance scores when assessed on higher-order thinking skills as compared to lower-order thinking skills.

2. LITERATURE REVIEW

2.1. INTERIOR DESIGN MATERIALS EDUCATION AND ITS CHALLENGES

Interior design materials education is central to cultivating a designer's technical and aesthetic competence. However, students often struggle to grasp abstract concepts related to materials, particularly when instruction is limited to lectures and textbook-based learning (Kang & Kim, 2012). According to Noll and Wilkins (2015), interior design students benefit more from tactile engagement and application-based understanding rather than theoretical exposure alone. Material sourcing, sustainability, and technological advances in finishes and surfaces require dynamic, updated teaching strategies that bridge knowledge and hands-on skill (Gurel & Basa, 2004). The challenge lies in delivering content that balances theory with practical relevance.

2.2. BLENDED LEARNING IN HIGHER EDUCATION

Blended learning combines online educational content with traditional classroom methods, allowing greater flexibility and engagement (Garrison & Kanuka, 2004). Graham (2006) emphasizes that blended learning improves access to content while fostering active learning and collaboration. Hrastinski (2019) further suggests that when designed effectively, blended learning enhances student motivation and performance by supporting multiple learning styles. In higher education, especially in skill-based disciplines, blended learning offers a way to integrate multimedia content, peer discussion, and personalized feedback (Halverson et al., 2014).

2.3. BLENDED LEARNING AND INTERIOR DESIGN MATERIALS

In design disciplines, blended learning offers unique opportunities to enhance visualization, critical thinking, and material application skills (Saghafi, Franz, & Crowther, 2014). For example, Lee and Lee (2020) found that interior design

students in blended courses demonstrated improved design reasoning and problem-solving abilities. Through virtual simulations, online libraries, and discussion forums, students engage with materials more flexibly while using in-class time for prototyping and critique. Park and Kim (2018) argue that blended learning allows better use of lab facilities and more time for instructor-led, in-person guidance on technical matters like joinery, finishes, and sustainable options.

2.4. EXPERIENTIAL LEARNING IN INTERIOR DESIGN MATERIALS EDUCATION

Kolb's (1984) theory of experiential learning emphasizes the importance of concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the context of interior design materials education, experiential learning translates to touching, testing, and experimenting with materials directly. According to Demirbas and Demirkan (2007), design students who engage in experiential tasks perform better in real-world scenarios. Brown and Burkhalter (2009) highlighted that lab-based material study improves sensory understanding and application, making experiential methods superior for learning complex, tactile content.

2.5. BLOOM'S TAXONOMY AS A FRAMEWORK FOR EVALUATION

Bloom's Taxonomy (Bloom et al., 1956; revised by Anderson & Krathwohl, 2001) is widely used in educational research to assess learning outcomes across cognitive levels: remembering, understanding, applying, analyzing, evaluating, and creating. In design education, using Bloom's taxonomy allows instructors to structure assessments that move beyond rote memorization toward the ability to apply concepts in design challenges (Sezer, 2017). According to Forehand (2010), the revised taxonomy supports formative and summative evaluations of both lower-order and higher-order thinking skills, making it a suitable framework for measuring the impact of blended and experiential learning models.

3. METHODOLOGY

3.1. RESEARCH DESIGN

This research utilized a quasi-experimental post-test only control group design to examine how blended learning impacts the cognitive development of students in a Masters level interior design materials course. There were three groups

First group (Control group 1)) followed a conventional approach with lectures and limited in-class exercises.

Second group (the experimental group 1) received classroom instruction followed by lab work with actual paints in the real-world scenario.

Third group (Experimental group 2) received blended instruction which comprised of online, face to face and experiential learning in the makers lab.

Control Group	Classroom - traditional
Experimental Group 1	Classroom + Maker's lab - Experiential
Experimental group 2	Online + Classroom + Makers Lab - Blended

All the sections were taught by the same instructor, covered identical topics of understanding interior paints as a material and its application process, and used the same post-test quiz.

Sample: Masters and PG level of first year students enrolled in the interior design course at Pearl Academy and Sushant University in Delhi and Gurgaon. The study was conducted over two years for two consecutive batches of both the colleges.

Instrument: Post test scores with questions from all levels of blooms taxonomy.

Number of participants = 196

Analysis: Statistical Analysis.

Brief of the exercise: To make the students learn about interior paints as a material,

- Its types and properties,
- Application tools

- To create textures and finishes.
- Step by step application process to achieve the desired aesthetics on interior surfaces.

This experiment aimed to assess students' fundamental comprehension of interior paints and finishes, including their application processes, texture development, and finishing techniques to attain the desired surface aesthetics. The students were required to choose a subject and construct a wall texture using interior paints, demonstrating a wall surface through the practical application of primer, wall paints, and Plaster of Paris, colloquially referred to as 'Putty.' The application equipment utilized were rollers, brushes, texturing tools, sponges, and wooden combs, while the surface for application was Medium-Density Fibreboard (MDF). The students were provided with a selection of interior themes to select from and tasked with creating a highlighter wall based on their chosen theme. Each student was required to utilize an MDF board of approximately 2 by 2 feet, simulating a scaled wall surface for the application of paints and the creation of textures. The design students were permitted to select the color, finish, and type of inside paints. Students utilized a variety of tools, including sponges, combs, stencils, and rollers, to create textures.

3.2. INSTRUCTIONAL STRATEGIES IN THE EXPERIMENTAL GROUP 2 – BLENDED LEARNING

Students in the blended learning group engaged with online modules designed to address lower-order cognitive tasks (e.g., remembering and understanding). These included activities such as watching video demonstrations, reviewing PowerPoint presentations, and reading materials on basic material properties and standard installation procedures. In contrast, in-class sessions were dedicated to higher-order cognitive skills, such as practical hands-on laboratory work, collaborative problem-solving, and receiving instructor feedback. For example, after exploring the characteristics and finishes of paints through online content, students utilized face-to-face class time to apply various finishes on sample boards, compare outcomes, and troubleshoot common issues. This blended approach ensured that students arrived prepared for complex tasks, thereby reinforcing the practical application of conceptual knowledge acquired online.

3.3. INSTRUCTIONAL STRATEGIES IN THE EXPERIMENTAL GROUP1 EXPERIENTIAL LEARNING

Students in experiential learning were engaged in classroom learning for understanding theory and materials in a traditional lecture-based format. After that they were engaged in makers lab to explore the materials hands on, understanding its application and creating design solutions. Etcfor high order thinking skills.

3.4. INSTRUCTIONAL STRATEGIES IN THE CONTROL (TRADITIONAL) GROUP

The control group learned through conventional lectures, slide presentations, and textbook-based discussions. Quiz was administered in class to assess memory and understanding. They had fewer opportunities for experimentation or group problem-solving.

3.5. ASSESSMENT

All the groups completed a final post test quiz consisting of:

12 uestions , 2 from each level of blooms taxonomy.

3.6. DATA ANALYSIS

After the experiment we used one way anova ($p < 0.05$) to compare the three groups - blended, experiential and traditional

- Overall quiz score

4. RESULT AND DATA ANALYSIS

Statistical Method

A One-Way ANOVA was conducted at a significance level of $p < 0.05$ to compare the effectiveness of three instructional strategies—Traditional (Control), Experiential (Group 1), and Blended (Group 2)—on students' cognitive development, assessed via a post-test quiz based on Bloom's Taxonomy.

4.2. RESULTS OF THE POST-TEST QUIZ

Nature of Assessment	Group	N	Mean	Std. Deviation	Levene Test (Sig.)	F-ratio/Welch Stat (Sig.)
Lower Order Quiz	Traditional	64	23.906	7.425	0.061	2.780 (p = 0.065)
	Experiential	67	21.417	5.954		
	Blended	65	23.615	6.465		
Higher Order Quiz	Traditional	64	24.843	20.058	0.000	44.009 (p = 0.000)
	Experiential	67	45.970	11.422		
	Blended	65	52.615	12.658		
Total Quiz Score	Traditional	64	48.750	25.773	0.000	26.027 (p = 0.000)
	Experiential	67	67.313	13.295		
	Blended	65	76.230	16.346		

There was no significant difference among groups for Lower Order Quiz scores ($p = 0.065$), indicating that basic knowledge and understanding could be equally achieved through any instructional method.

Significant differences were observed for Higher Order Quiz scores ($p = 0.000$), with the Blended group scoring the highest, followed by Experiential, and lastly Traditional.

Overall quiz scores also revealed a statistically significant difference ($p = 0.000$), again favoring the Blended group.

5. DISCUSSION

5.1. INTERPRETATION OF RESULTS

The results indicate that while all instructional approaches are relatively effective in imparting lower-order cognitive knowledge, only experiential and blended learning methods are significantly superior in enhancing higher-order cognitive abilities like application, analysis, evaluation, and creation.

The blended group consistently outperformed others, which may be attributed to the flipped classroom strategy that allowed:

- Pre-class exposure to basic concepts
- In-class focus on skill application and critical problem-solving
- Repeated interaction with concepts via multiple modes (online, hands-on, discussion)

5.2. EDUCATIONAL SIGNIFICANCE

The study clearly supports the hypothesis that integrating digital tools with hands-on experiential learning improves educational outcomes, particularly for complex, skill-based subjects like interior design materials.

5.3. IMPLICATIONS FOR INTERIOR DESIGN EDUCATION

- **Curriculum Designers:** Should consider adopting blended models to reinforce both theoretical and applied learning.
- **Instructors:** May shift from pure lectures to active learning techniques with experiential modules and digital content.
- **Institutions:** Need to invest in Maker's Labs, e-learning platforms, and faculty training to support modern pedagogies.

5.4. LIMITATIONS OF THE STUDY

- Sample restricted to two institutions (Pearl Academy and Sushant University) and may not be fully generalizable.
- The duration of exposure was short-term; long-term learning retention was not evaluated.
- Student motivation and prior knowledge were not controlled.
- Assessment focused only on post-test scores; pre-test comparisons could enhance reliability.

6. CONCLUSION

This study demonstrated that blended learning significantly enhances higher-order cognitive learning in interior design education, especially when compared to traditional or purely experiential methods. While lower-order skills can be achieved through any format, blended instruction offers an optimal balance of flexibility, interactivity, and depth. The integration of online modules, hands-on lab work, and in-class discussions facilitates a deeper understanding of interior materials, promoting not only knowledge acquisition but also application and creativity—key competencies for design professionals.

CONFLICT OF INTERESTS

None.

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REFERENCES

Alammary, A. (2019). Blended learning models for introductory programming courses: A systematic review. PLOS ONE, 14(11), e0221765. https://doi.org/10.1371/journal.pone.0221765

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman.

Biggs, J., & Tang, C. (2011). Teaching for quality learning at university (4th ed.). McGraw-Hill Education.

Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom (ASHE-ERIC Higher Education Report No. 1). George Washington University.

Chi, M. T. H. (2009). Active-constructive-interactive: A conceptual framework for differentiating learning activities. Topics in Cognitive Science, 1(1), 73–105. https://doi.org/10.1111/j.1756-8765.2008.01005.x

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Prentice Hall.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. U.S. Department of Education.

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223–231. https://doi.org/10.1002/j.2168-9830.2004.tb00809.x

Ramsden, P. (2003). Learning to teach in higher education (2nd ed.). RoutledgeFalmer.

Salmon, G. (2000). E-moderating: The key to teaching and learning online. Kogan Page.

Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. Interdisciplinary Journal of Problem-Based Learning, 1(1), 9–20. https://doi.org/10.7771/1541-5015.1002

Singh, H. (2003). Building effective blended learning programs. Educational Technology, 43(6), 51–54.

Toven-Lindsey, B., Rhoads, R. A., & Lozano, J. B. (2015). Virtually unlimited classrooms: Pedagogical practices in massive open online courses. The Internet and Higher Education, 24, 1–12. https://doi.org/10.1016/j.iheduc.2014.07.001

Dulux Paints. (n.d.). Interior painting tips and techniques. Retrieved from https://www.dulux.com

Nerolac Paints. (n.d.). Wall texture designs & paint finishes. Retrieved from https://www.nerolac.com

Sherwin-Williams. (2022). Paint application guide for professionals. Sherwin-Williams Company.
Asian Paints. (2021). Product and application manual. Retrieved from https://www.asianpaints.com