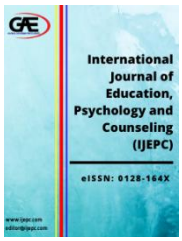
International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051



INTERNATIONAL JOURNAL OF EDUCATION, PSYCHOLOGY AND COUNSELLING (IJEPC)
www.ijepc.com

EXPLORING STUDENTS' EXPERIENCES OF STUDIO PEDAGOGY, COLLABORATION, AND STUDIO ENVIRONMENT IN SHAPING LEARNING OUTCOMES: A QUALITATIVE INQUIRY USING THE INPUT-PROCESS-OUTPUT MODEL

Lyu Xiaohui[1], Hazri Jamil [1*]

[1] School of Educational Studies, Universiti Sains Malaysia, 11800 USM Pulau Pinang, Malaysia
Email: lyuxiaohui@student.usm.my, hazri@usm.my
[*] Corresponding Author

Article Info:

Article history:
Received date: 30.07.2025
Revised date: 25.08.2025
Accepted date: 30.09.2025
Published date: 27.10.2025

To cite this document:

Lyu, X., & Jamil. H. (2025). Exploring Students' Experiences of Studio Pedagogy, Collaboration, And Studio Environment in Shaping Learning Outcomes: A Qualitative Inquiry Using the Input-Process-Output Model. *International Journal of Education, Psychology and Counseling, 10* (60), 701-718.

DOI: 10.35631/IJEPC.1060051

Abstract:

This study adopted the Input–Process–Output (IPO) model to explore how studio pedagogy, collaboration, and the studio environment influence student learning outcomes in textile and apparel education. Using a qualitative approach, semi-structured interviews were conducted with eight undergraduate students from two universities in Tianjin, China. Reflexive thematic analysis revealed that key pedagogical elements, including case-based instruction, iterative design processes, critical reflection, and formative assessment, significantly influenced student learning. Collaboration and the studio environment functioned as core processes, fostering interaction and creativity while also presenting challenges related to workload and feedback culture. The perceived outcomes extended beyond technical skills, encompassing creativity, critical thinking, communication, and cooperation. The findings highlight the value of IPO as an analytical lens and underscore the importance of process-oriented studio practices in cultivating higher-order competencies in design education. Future research could further investigate how studio pedagogy, collaborative practices, and studio environments influence various dimensions of learning outcomes, and how these outcomes may vary across different stages of learning.

Keywords:

Studio Pedagogy, Collaboration, Studio Environment, Learning Outcomes, Input–Process–Output (IPO) Model

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Introduction

Studio pedagogy has long occupied a central position in design education, particularly in disciplines such as architecture, fashion design, and graphic design. This pedagogical model emphasizes experiential and project-based learning, promoting deep student engagement through iterative critique, reflective inquiry, and hands-on interaction with materials and ideas. Existing research has confirmed the substantial educational value of studio-based learning in architecture, where students actively construct knowledge through exploratory and practice-oriented processes (Kararmaz, 2024; Ku Hassan et al., 2019). In the context of textile and apparel education, recent studies have similarly supported the view that studio exercises incorporating design thinking methodologies can effectively engage fashion students, enhance their creativity, problem-solving skills, and individualized design approaches, and stimulate their imagination and aesthetic judgment during the early stages of the design process (Ban, 2023; Hameed & Mimirinis, 2023).

However, beyond its technical and cognitive merits, the studio model is also deeply social. Collaboration among peers, whether through group projects, critique sessions, or informal discussions, plays a critical role in shaping learning outcomes. The physical and social environment of the studio, including its openness, resources, and spatial layout, further mediates these interactions and influences students' motivation, sense of belonging, and creative output. Despite growing recognition of these dimensions, there remains a limited body of qualitative research. For example, existing scholarship often privileges the perspectives of educators and curriculum designers. For example, Hameed, Umer, and Hameed (2021) examined studio pedagogy in textile design through interviews with teachers and practitioners, while Schmidt and Zarestky (2021) provided a conceptual overview of fashion design pedagogy focused on instructor and student roles. These works highlight valuable insights but fall short of revealing how students themselves experience collaboration, feedback culture, and the studio environment in shaping their learning.

To address this gap, the present study adopts the Input–Process–Output (IPO) model as an analytical framework. Originally developed in organizational psychology (Ilgen et al., 2005), the IPO model conceptualizes how educational inputs, internal processes, and outputs are dynamically interconnected. In the context of design education, this model offers a structured and theory-informed lens through which to examine the complex interactions that shape learning experiences.

This study aims to explore the subjective experiences of university students in textile and apparel higher education within studio-based learning settings. Specifically, it focuses on how students perceive instructional design, collaborative practices, and the studio environment, as well as how these elements collectively shape their learning processes and outcomes.

To guide this inquiry, the study addresses the following qualitative research questions:

1. How do students perceive the key elements of studio pedagogy?
2. How do students describe the role of collaboration and the studio environment in shaping their learning experiences?
3. How do students perceive the learning outcomes developed through studio-based learning experiences?

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Literature Review

The IPO Framework in Educational Research

The Input–Process–Output (IPO) model has become a widely adopted analytical framework in educational research, offering a systematic perspective for understanding how various forms of educational input are transformed into observable learning outcomes through structured processes (Sidik, 2022; Gozan et al., 2024; Chua, 2004; Goi et al., 2024; Galais et al., 2021; Chen et al., 2022). Originating from systems theory, the IPO framework has demonstrated high adaptability across different levels of analysis, ranging from institutional evaluation to classroom-level instruction. This section outlines the application of the IPO model at two primary levels: macro-level institutional performance assessment and micro-level instructional process analysis.

At the macro level, the IPO model has been employed to evaluate the performance and effectiveness of entire education systems and higher education institutions. For example, Chua (2004) used the model to analyze how different stakeholders (students, parents, teachers, and employers) perceive educational quality across input, process, and output dimensions. Gozan et al. (2024) applied the IPO model to accreditation evaluation in Indonesian engineering education, exploring how educational inputs and processes influence graduate employment outcomes. Similarly, Goi et al. (2024) developed a customer value co-creation model in higher education, examining how resource allocation and instructional processes jointly shape students' perceptions of service quality and satisfaction.

At the micro level, the IPO framework has demonstrated growing applicability for instructional design and classroom analysis. It provides a clear structure for examining how teaching inputs—such as curriculum design, instructional methods, and learning environments—are transformed into student outcomes through the learning process. Sidik (2022) highlighted its utility in clarifying causal relationships between stages of education, showing how teachers plan inputs (goals, methods, materials), organize processes (teaching activities), and assess outputs (student performance). Galais et al. (2021) further emphasized the central role of the process phase, noting that high-quality, participatory teaching processes are critical for meaningful learning. Supporting this view, Chen et al. (2022) empirically confirmed the mediating role of educational processes in shaping outputs within IPO-based evaluations of undergraduate teaching.

While the IPO model has broad applicability, its practical use varies with research level and purpose. This study focuses on the micro level, where studio pedagogy functions as the primary input, collaboration and the studio environment operate as essential processes, and learning outcomes such as creativity, critical thinking, communication, and cooperation represent the outputs. Unlike macro-level institutional evaluations that emphasize systemic efficiency, this research highlights the interactional mechanisms within the studio and the ways in which they foster individual growth in design education.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Studio Pedagogy in Design Education

Studio pedagogy is an instructional model rooted in the Bauhaus tradition, emphasizing experiential, iterative, and collaborative learning. Since its emergence in early 20th-century Europe and its subsequent development in the United States, this approach has laid the foundation for design education worldwide (Phelan, 2006). Moving beyond didactic instruction, it engages students in hands-on, problem-solving activities supported by continuous dialogue, critique, and reflection (Galton et al., 2009; Lucas et al., 2012). Students are encouraged to navigate between conceptual thinking and practical execution through cycles of experimentation, feedback, and refinement. While this literature affirms the value of studio pedagogy, much of it remains largely descriptive—documenting instructional features and intended benefits rather than critically examining how students themselves experience these practices. This raises important questions about whether such iterative and reflective methods always empower students, or if they sometimes constrain learning through excessive reliance on feedback cultures or hierarchical teacher–student relations.

In contemporary design education, including fields such as architecture, product design, and textile and apparel, studio pedagogy is widely recognized for cultivating both creative and technical competencies through collaborative and practice-based settings. It is typically implemented using two main models: the master studio, which follows a mentorship-based structure emphasizing individualized development, and the professional studio, which focuses on interdisciplinary, project-oriented learning (Zhao, 2014; Agusita & Naudin, 2023). Yet, both models carry inherent tensions. The master studio risks reproducing hierarchical dynamics between instructors and students, while the professional studio, although promoting interdisciplinarity, often creates coordination difficulties and unequal participation. Furthermore, although core instructional components—such as instructional activities, design processes, critical learning, and work assessment—have been identified as foundational (Shaffer, 1998; Morales, 2017), few studies have investigated how these elements are actually perceived by students in practice. The literature therefore provides an account of what studio pedagogy should achieve but offers limited insight into the contradictions and challenges that arise in real studio contexts, particularly in textile and apparel design where collaboration, creativity, and technical precision must be balanced.

Collaborative Learning Processes in Studio Pedagogy

As Vygotsky emphasized, knowledge is co-constructed through peer interaction (Vygotsky, 1978). In studio pedagogy, collaboration typically takes place within studio environments, often in group-based or task-specific formats. It involves activities such as joint problem-solving, peer critique, and collective ideation, playing a vital role in enhancing both students' intellectual engagement and practical skills (Roschelle & Teasley, 1995; Dillenbourg, 1999). Unlike simple task delegation, collaboration emphasizes conceptual development through sustained joint effort (Baker, 2015). In addition, research has shown that collaboration also plays an important role in fostering core learning outcomes in design education, including communication, creativity, and teamwork (Tiwana, 2000).

These foundational studies provide a strong theoretical basis, more recent scholarship has shifted the discussion toward competency-based and higher-order outcomes. For example, Bloom's taxonomy is frequently cited as a historical benchmark for classifying learning outcomes, yet contemporary debates highlight the need to reconceptualize competencies in relation to 21st-century skills and collaborative creativity (Anderson & Krathwohl, 2001;

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Voogt & Roblin, 2012). In design education, this means that collaboration is not only a vehicle for knowledge sharing but also a key mechanism for cultivating transferable skills such as adaptability, digital fluency, and interdisciplinary teamwork (Kumar 2024). However, empirical evidence remains limited on how students perceive these collaborative processes and whether they experience them as supportive or problematic in practice.

Thus, although collaboration is widely acknowledged as central to studio pedagogy—mirroring real-world design industry practices and fostering communication, creativity, and teamwork—existing studies often assume its benefits rather than interrogating its challenges. Unequal participation, conflict management, and feedback culture are frequently reported issues, but they remain underexplored in the literature from a student-centered perspective. This highlights the need for research that critically examines not only the intended benefits but also the lived realities and tensions of collaboration in design education.

Studio Environment as a Pedagogical Process Space

Under the framework of the Input–Process–Output (IPO) model, the educational process is viewed as a systematic structure in which input conditions are transformed into concrete learning outcomes through instructional activities (Chen et al., 2022; Sidik, 2022; Gozan et al., 2024). Within this framework, the learning environment, as a key component of the "process" stage, has a profound impact on instructional implementation and educational effectiveness. In the context of studio pedagogy in design education, the studio environment plays a crucial role. Although some scholars define the studio environment as a physical space (Lamar et al., 2022), it is not only a place where students acquire practical knowledge but also an important setting where learning outcomes are promoted through interaction and collaboration. Shaffer (1998) describes the structure of the studio in terms of two dimensions: surface structure and instructional methods, and argues that only the integration of both can constitute an effective studio teaching environment.

Learning Outcomes in Design Education

In the 1950s, Benjamin Bloom described the development of the concept of learning outcomes as a linear process that began with the objectives movement, continued through the application of learning theories, and culminated in today's outcome-based education movement (Proitz, 2010). During the 1960s and early 1970s, as higher education expanded in the United States, competency-based curricula and learning outcome frameworks were gradually developed and refined. Narrative transcripts began to replace traditional grades or scores, offering periodic demonstrations of student performance assessed against predefined standards linked to each desired level of competence. This process was typically realized through the use of "portfolios" that organized evidence of achievement according to a structured framework of learning outcomes (Ewell, 2007a; Proitz, 2010).

In the field of design education, learning outcomes are widely recognized as multidimensional constructs encompassing both cognitive and non-cognitive domains. Recent scholarship has shifted from an exclusive focus on final design products to a growing emphasis on understanding and engaging with the creative process itself. As noted by Miranda et al. (2021), critical thinking, communication, collaboration, creativity, and innovation have emerged as essential soft-skill indicators and are increasingly integrated into learning outcome frameworks within design-related disciplines. Yet, while this recognition reflects a broader transition toward Education 4.0, much of the existing research still adopts a normative stance—

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051
identifying which competencies should be cultivated—without sufficiently examining how students actually experience the development of these outcomes within studio-based contexts. This leaves unresolved tensions between idealized frameworks and the realities of student learning, where the attainment of soft skills may be uneven, contested, or constrained by institutional and pedagogical conditions.

Sawyer's (2018) work further underscores the significance of process-oriented learning, arguing that meaningful creativity is seldom the result of a single idea but rather emerges through continuous iteration and reflective refinement. Neglecting this process risks overlooking crucial dimensions of student development in design education. However, while process-oriented creativity is frequently theorized, empirical studies rarely capture how students themselves perceive this iterative journey or how collaborative dynamics and feedback cultures shape it in practice. Consequently, although scholars emphasize creativity, critical thinking, communication, and cooperation as key outcomes, the mechanisms by which these outcomes emerge remain underexplored.

To explore how students experience and perceive the development of these dimensions within design education, this study focuses on the interplay between studio pedagogy, collaborative learning processes, and the studio environment. Employing the Input–Process–Output (IPO) model as an organizing framework, the research aims to understand how students interpret and navigate the relationships between instructional inputs, interactive learning processes, and their perceived learning outcomes. This approach offers a structured lens to examine students' lived experiences in studio-based learning contexts, with attention to how educational design influences personal and collaborative development.

Gaps in Student-Centered and Process-Oriented Research on Studio Pedagogy

Although a variety of theoretical perspectives have been proposed in previous studies, researchers in the field of design education have primarily employed established frameworks to examine teaching and learning processes. Among these, experiential learning theory (Kolb, 2014) has been widely applied, emphasizing learning through concrete experience, reflective observation, abstract conceptualization, and active experimentation, which is particularly relevant to creative disciplines. Similarly, social constructivist theory, derived from the work of Vygotsky (1978), has informed collaborative studio-based learning by highlighting the importance of interaction, scaffolding, and the sociocultural environment in shaping learning processes.

While these theories have provided a solid foundation for the field, there remains a lack of research that systematically integrates them into a structured Input–Process–Output (IPO) model. This omission is problematic because it leaves unexplored the causal pathways that connect teaching strategies (inputs), collaborative and environmental dynamics (processes), and student learning outcomes (outputs). Without such integration, existing work often remains fragmented, making it difficult to understand how and why particular pedagogical practices succeed or fail in cultivating higher-order competencies. For example, McInerney et al. (2023) found that creativity in product design education is often taught implicitly and that the social environment has mixed effects, but they did not map how the full input–process–output chain functions from the student perspective. By adopting the IPO framework, the present study directly addresses this gap, offering a structured lens for tracing how pedagogical design and collaborative mechanisms translate into student-perceived outcomes.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Moreover, although learning outcomes are frequently emphasized in design education, most existing studies focus on curriculum design, teaching strategies, or institutional performance, often privileging the perspectives of instructors or administrators. This narrow focus risks overlooking the lived experiences of students—the very individuals whose competencies and professional preparation are at stake. For instance, Rosa and Ferreira (2023) explored design students' preferences for in-person versus remote studio formats but primarily reported descriptive preferences rather than deep insights into how collaboration, critique, and feedback are experienced in practice. Without student-centered accounts, the field risks producing pedagogical recommendations that are misaligned with learners' realities. To respond to this omission, the present study employs qualitative interviews to foreground students' voices, capturing their personal interpretations and meaning-making processes in studio contexts.

Finally, research that explicitly investigates how learning unfolds within collaborative design processes, especially through interaction, feedback, and group work, remains limited. Yet these micro-level mechanisms are critical for understanding how creativity, critical thinking, and teamwork actually develop in practice. Overlooking them reduces collaboration to a presumed benefit rather than a dynamic process that can both enable and constrain learning. Kelter et al. (2021), for instance, argued that design curricula often claim to support collaboration and creativity but provide insufficient empirical detail on how those skills are developed in actual studio settings. By examining students' detailed accounts of collaboration and studio engagement, this study seeks to illuminate these underexplored mechanisms and provide richer insights into the challenges and opportunities of process-oriented studio learning.

This study responds to three interrelated gaps: (1) the lack of systematic integration of established theories into a coherent IPO model, (2) the limited focus on student-centered perspectives, and (3) the underexplored of micro-level collaborative processes. Addressing these gaps is essential for advancing design education research from descriptive accounts of pedagogy toward explanatory, student-driven insights that can inform more effective teaching practices in textile and apparel design.

Theoretical Framework

The Input–Process–Output (IPO) model is a foundational theoretical framework used to explain how systems transform various types of input into measurable outcomes through structured processes. Rooted in systems theory and extensively applied in organizational studies (Ilgen et al., 2005), the model has since been adapted across disciplines, including education. The IPO framework conceptualizes inputs such as resources, strategies and contextual conditions as elements that are transformed through internal processes to generate specific outputs, including performance, competencies and learning outcomes. In education, this model provides a structured lens for examining how instructional design and learning environments affect student development.

Previous research has confirmed that the IPO model can be feasibly applied as a core logic for coordinating and integrating tasks in virtual studio environments. As Meng (2021) highlights, by structuring each design task as a self-contained unit with clearly defined inputs, processes, and outputs, the IPO model was effectively implemented in a Virtual Design Studio (VDS), enabling traceable workflows, modular task management, and interdisciplinary collaboration. This framework illustrates how the IPO model can be embedded into the micro-level operations

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

of design education, offering both theoretical support and practical reference for the structured development of studio pedagogy and task-based feedback mechanisms.

Building on this theoretical foundation, the present study proposes an adapted conceptual framework to explore the role of studio pedagogy in shaping student learning outcomes in textile and apparel education. As shown in Figure 1, the framework aligns with the IPO structure, where the input includes four dimensions of studio pedagogy: instructional activities, design processes, critical learning, and work assessment. These elements operate through the process stage, which consists of collaborative learning and the studio environment, both of which are essential for fostering engagement and design thinking. Finally, the output focuses on learning outcomes expressed across four key elements: creativity, critical thinking, communication, and cooperation. This adapted framework provides a structured lens to examine how studio pedagogy and collaborative learning processes interact to influence educational outcomes in a design-oriented learning context.

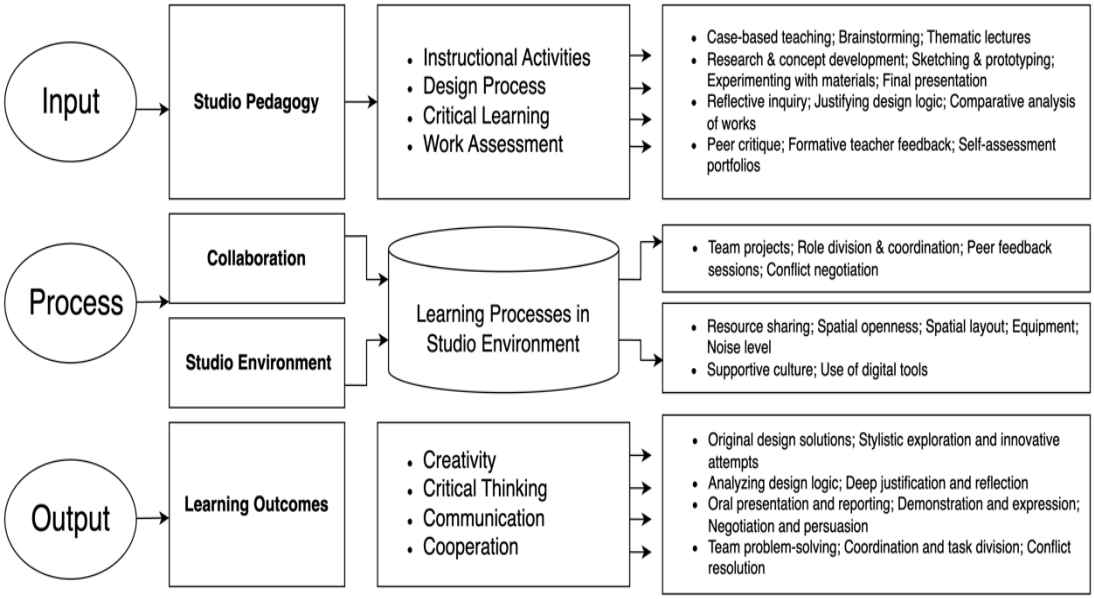


Figure 1: Adapted IPO-Based Framework of Studio Pedagogy and Learning Outcomes

Methodology

Research Design

This study adopts a qualitative research design to gain an in-depth understanding of textile and apparel students' lived experiences and perceptions within studio-based learning environments. Guided by the IPO framework, the research explores how pedagogical components, collaborative practices, and the physical studio context jointly influence students' learning outcomes. Drawing upon three guiding research questions, semi-structured interviews were conducted to capture participants' reflective insights and detailed narratives of their learning processes. This approach enables a nuanced examination of how studio pedagogy, collaboration, and environmental factors interact in shaping educational experiences. The IPO model serves as both the conceptual foundation for the research design and a structured analytical lens for interpreting the qualitative data.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Participants and Sampling

Participants were undergraduate students from design-related programs at universities in Tianjin who had prior experience with studio-based learning and collaborative projects. A purposive sampling strategy was employed to select individuals who could provide rich and diverse perspectives on studio-based learning. Participants were required to be undergraduate students enrolled in textile and apparel design programs at universities in Tianjin and to have prior experience with studio-based courses or collaborative design projects, ensuring familiarity with the learning model under investigation. Additional criteria included year of study (students from both junior and senior levels were invited to capture developmental variation), gender balance (4 female, 4 male), and the ability to articulate and reflect on their experiences in interviews. These criteria were intended to ensure variation in perspectives while maintaining relevance to the study's focus on studio pedagogy, collaboration, and learning outcomes.

Data Collection

Data were collected through semi-structured interviews conducted either face-to-face or via video calls, depending on participants' availability and preference. Each interview lasted approximately 45 to 60 minutes and was conducted in Chinese. The interview guide was structured around the IPO model and included three thematic areas:

1. Perceptions of studio pedagogy and the studio environment (Input)
2. Collaborative learning processes and challenges (Process)
3. Reflections on perceived learning outcomes (Output)

All interviews were audio-recorded with consent and transcribed verbatim.

Data Analysis

This study employed reflexive thematic analysis, guided by the framework proposed by Braun and Clarke (2019), to explore how students perceive the influence of studio pedagogy, collaboration, and studio environments on their learning experiences and outcomes. This method was chosen for its flexibility and emphasis on the interpretive role of the researcher, enabling nuanced insights from rich qualitative data.

The Input–Process–Output (IPO) model (Ilgen et al., 2005) provided the theoretical structure for organizing findings. While initial codes were generated inductively from the interview transcripts, the IPO framework was used deductively to categorize the data into three core components:

- Input, representing studio pedagogy (instructional activities, design processes, critical learning, and work assessment);
- Process, encompassing collaborative learning and the studio environment; and
- Output, referring to perceived learning outcomes such as creativity, critical thinking, communication, and cooperation.

This hybrid coding approach involved iterative readings of transcripts, identifying recurring patterns, and grouping them into themes aligned with the IPO structure. Throughout the process, the researcher maintained critical reflexivity, acknowledging positionality and prior assumptions while striving to center students' voices and authentic experiences. The following

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051
sections present findings in response to each of the study's three research questions, supported by verbatim excerpts from participants.

Results

The findings of this study are presented in alignment with the three guiding research questions:(A) What elements of studio pedagogy shape students' learning most significantly? (B) How do collaboration and the studio environment affect students' learning experiences? (C) How do students perceive the learning outcomes developed through studio-based learning experiences? To ensure clarity and consistency in reporting, student quotations are identified using anonymized codes ranging from "Student 1" to "Student 8," each representing one of the eight undergraduate participants from two universities in Tianjin, China. This approach protects participant anonymity while providing a coherent framework for presenting and interpreting the qualitative data. The results are organized thematically under each research question, reflecting the key patterns and insights that emerged through reflexive thematic analysis.

Section A (RQ1)

Q1. What Elements Of Studio Pedagogy Shape Students' Learning Most Significantly?

The interview data revealed that several components of studio pedagogy exerted a strong influence on students' learning experiences. Four themes emerged most prominently: case-based instruction, project-driven processes, formative feedback, and critical reflection.

Case-based and inquiry-driven instruction encouraged students to construct knowledge actively rather than passively receive it. As Student 2 explained, "The teacher doesn't usually give you direct answers but instead guides you to think and find your own way." This illustrates a shift toward a constructivist pedagogy that positions learners as active agents. Within the IPO model, such instructional practices represent inputs that stimulate deeper engagement in the process of inquiry and meaning-making.

Project-driven design processes served as crucial scaffolds for applied learning. Student 6 described completing a blind box IP design project "from concept development, sketching, modeling, testing, to final presentation." These end-to-end cycles mirrored authentic professional practice and reinforced iterative, process-oriented development. From an IPO perspective, these activities demonstrate how structured inputs (sequenced design tasks) generate transformative processes (experimentation and refinement), ultimately strengthening outputs such as problem-solving capacity and applied creativity.

Formative feedback and assessment also emerged as central mechanisms. Students valued peer and instructor critique as tools for improvement, with Student 7 noting, "After each presentation, we receive feedback from both teachers and peers. This helps us see what needs to be improved." Such feedback practices go beyond evaluation by fostering metacognitive awareness, a key process that mediates between instructional input and the development of higher-order outcomes. This aligns with reflective practice traditions in design education while also resonating with broader Chinese educational culture, where formative assessment is gradually being emphasized alongside traditional summative evaluation.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Finally, critical reflection was perceived as essential for deep learning. Student 4 highlighted the expectation that "You must be able to explain your design logic and the thinking behind it." This insistence on rational justification reflects the growing demand in higher education for students to articulate not just what they design, but why. Within the IPO framework, critical reflection functions as a process that bridges technical input with cognitive and communicative outputs such as analytical reasoning and persuasive articulation.

Taken together, these findings indicate that studio pedagogy elements such as inquiry-based teaching, open-ended tasks, iterative design processes, and formative evaluation not only build technical competencies but also nurture broader cultural expectations for autonomy, critical reasoning, and professional readiness. By situating these practices within the IPO model, it becomes clear that carefully designed instructional inputs—when coupled with reflective and collaborative processes—contribute to outputs that extend beyond creativity and aesthetics, encompassing self-directed learning, metacognitive growth, and communication skills relevant to both local and global design industries.

Section B (RQ2)

Q2. How Do Collaboration and The Studio Environment Affect Students' Learning Experiences?

Analysis of the interview data revealed two interconnected themes: collaborative learning as a social and cognitive process and the studio environment as an immersive learning space. Together, these elements shaped students' learning processes within the IPO framework, functioning as key mechanisms that transform instructional inputs into meaningful outputs.

Collaboration as mutual support and challenge. Students consistently described collaboration as a powerful driver of idea generation, motivation, and collective problem-solving. As Student 5 noted, "Many hands are better than one," while Student 3 emphasized that group discussions often sparked new ideas. These reflections illustrate the process dimension of the IPO model, where interaction mediates the link between pedagogical input and cognitive development. They resonate with social constructivist perspectives (Vygotsky, 1978), highlighting that learning is socially situated and knowledge is co-constructed. Importantly, collaboration was not portrayed as uniformly positive. Student 6 reflected on unequal division of labor—"Sometimes the division of labor isn't clear, and a few people end up doing all the work." Such accounts reveal how collaborative learning also generates tensions around fairness and accountability. Rather than diminishing its value, these tensions underscore collaboration as a context for developing conflict-resolution and project management skills, competencies increasingly emphasized in 21st-century higher education.

The studio environment as an authentic learning space. Students frequently likened the studio to a laboratory or workshop that fosters experimentation and authenticity. As Student 4 described, "The studio is like a lab where we experiment and explore. It feels authentic." Similarly, Student 7 highlighted its role in stimulating creativity and innovation. These insights point to the processual role of the environment in the IPO framework: spatial and material conditions mediate how inputs (tasks, teaching strategies) are enacted and how outputs (creativity, innovation) are realized. The finding aligns with Vygotsky's concept of the zone of proximal development, as students perceive the studio as a space that scaffolds exploration and extends learning beyond traditional classroom boundaries.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Emotional and psychological dimensions of process. While most students valued the studio environment, several expressed discomfort linked to feedback and technical unfamiliarity. Student 3 recalled that "some comments were a bit harsh," initially lowering confidence before adaptation occurred, while Student 4 admitted frustration with unfamiliar equipment. These narratives highlight that collaborative and spatial processes not only support but also challenge learners, shaping their self-efficacy (Bandura, 1997) and sense of relatedness (Deci & Ryan, 2000). In the IPO model, such emotional experiences are crucial process variables that influence whether pedagogical inputs ultimately result in positive or negative outputs.

Absence of physical environment concerns. Interestingly, no participants identified lighting, noise, or space constraints as barriers. For this cohort, cultural adaptation to resource-limited environments or emphasis on perseverance may explain why physical discomforts were not foregrounded. This absence illustrates how broader cultural contexts mediate which aspects of the environment are perceived as significant in shaping learning outcomes.

In summary, collaboration and the studio environment emerge as central process factors in the IPO framework, enabling students to co-construct knowledge, build creativity, and develop soft skills, while also exposing them to interpersonal and technical challenges. These findings suggest that studio pedagogy's effectiveness lies not only in structured tasks but also in how students navigate the relational and emotional complexities of collaborative, practice-based learning in a culturally situated studio context.

Section C(RQ3)

Q3. How Do Students Perceive the Learning Outcomes Developed Through Studio-Based Learning Experiences?

Analysis of the interviews revealed four interconnected learning outcomes: creativity, critical thinking, communication, and collaboration. These outcomes reflect the output stage of the IPO framework, demonstrating how pedagogical inputs and collaborative processes culminate in multidimensional competencies that extend beyond technical proficiency.

Creativity as risk-taking and stylistic exploration. Students described the studio as a safe yet challenging space that encouraged experimentation. Student 2 reflected, "I used to be afraid of doing weird designs, but now the teachers encourage us to try new styles," while Student 6 emphasized that the studio "pushes you to experiment." These accounts show that pedagogical inputs such as open-ended projects and teacher encouragement produced a process environment that legitimized creative risk-taking. In the IPO model, this translated into outputs of enhanced creative confidence and stylistic innovation. Culturally, this resonates with shifts in Chinese higher education where creativity is increasingly valued as a graduate attribute alongside traditional emphasis on mastery and diligence.

Critical thinking as justification and intellectual depth. Students also highlighted the expectation to rationalize design choices, as Student 4 noted: "We always have to explain our design logic—why we did something—not just rely on intuition." Student 7 added that persistent questioning from teachers "forces us to think more deeply." These reflections suggest that studio pedagogy embedded in iterative critique functions as a process mechanism that bridges input (instructional prompts) and output (analytical reasoning). This aligns with

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

broader educational reforms in China emphasizing inquiry-based learning as a counterbalance to rote memorization.

Communication as articulation and professional expression. Repeated opportunities to present, critique, and defend ideas enhanced students' communication competencies. Student 3 explained, "When we present, we have to explain all the details. It really helps improve our articulation." Here, the studio's social dynamics functioned as process conditions that reinforced verbal fluency and professional discourse, preparing students for industry contexts where persuasive communication is critical. Within the IPO framework, these processes represent the transformation of classroom interaction into tangible communicative outputs.

Collaboration as socio-emotional growth. Finally, students identified collaboration as both beneficial and challenging. As Student 5 reflected, "We often have different opinions, but that's exactly when we learn how to communicate." This highlights how conflict and negotiation in group work contributed to socio-emotional competencies such as empathy, adaptability, and teamwork. While collaboration has been widely assumed to yield positive outcomes in design education, these narratives suggest that its value lies precisely in navigating differences—a finding that underscores the cultural importance of harmony and collective achievement in Chinese learning environments.

Synthesis. Taken together, these four themes illustrate how studio pedagogy generates outputs that are cognitive (critical thinking), creative (innovation), interpersonal (communication), and socio-emotional (collaboration). Within the IPO framework, they demonstrate that well-structured inputs (instructional design, open-ended tasks) and enabling processes (collaborative practices, reflective critique) foster learning outcomes that align with global 21st-century competencies while also responding to local cultural expectations for student development.

Discussion

The findings from this study provide valuable insights into the mechanisms through which studio-based learning influences students' development in textile and apparel design education. The IPO model proved useful for tracing how pedagogical inputs, collaborative processes, and the studio context interact to shape multidimensional learning outcomes. While the results align with existing literature emphasizing constructivist and experiential learning principles—where active participation, peer interaction, and reflective engagement are central to skill development (Kolb, 1984; Vygotsky, 1978)—they also reveal important nuances that extend and complicate these frameworks.

First, the data suggest that the balance between autonomy and structure in studio pedagogy is more complex than constructivist accounts typically acknowledge. Students valued open-ended tasks and creative freedom, but they also indicated a need for scaffolding and clearer guidance during collaborative projects. This tension highlights a potential limitation of purely constructivist approaches, suggesting that constructivism in design education must be adapted to include structured facilitation to avoid unequal workload distribution and confusion in group work. In this sense, the IPO framework could be refined to account for the interplay between guided structure and student autonomy as coexisting process variables.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

Second, the findings complicate assumptions about collaboration as uniformly beneficial. While students reported that peer interaction stimulated idea exchange and motivation, they also experienced emotional discomfort, conflict, and performance pressure. These challenges illustrate that collaboration functions not only as a supportive process but also as a site of tension and negotiation. This observation extends social constructivist perspectives by demonstrating that co-construction of knowledge may entail both enabling and constraining dynamics, depending on how feedback and group interactions are managed. For the IPO framework, this suggests that the process stage should be conceptualized as multidimensional, incorporating both positive and negative mechanisms that shape outputs.

Third, the study points to the importance of emotional and psychological dimensions of studio learning, which are often underexplored in experiential and process-oriented models. Reports of anxiety around critique, frustration with technical tools, and gradual growth in self-efficacy indicate that affective experiences are central to how students engage with studio pedagogy. These findings extend the IPO framework by foregrounding affect as a mediating factor that shapes whether inputs and processes translate into productive outputs.

Finally, the outcomes reported by students—creativity, critical thinking, communication, and cooperation—align with global 21st-century competency frameworks. Yet, the way these competencies emerged in practice reflects the specific cultural context of Chinese higher education, where collectivism, perseverance, and respect for authority intersect with emerging demands for innovation and self-expression. This suggests that while the IPO framework offers a transferable structure, its application in design education must remain sensitive to cultural values and institutional contexts.

Taken together, these findings indicate that the present study does not simply confirm prior theories but contributes by refining and extending them. Specifically, the study calls for a more nuanced view of constructivism that recognizes the simultaneous need for autonomy and structure, highlights collaboration as a site of both growth and conflict, and integrates affective dimensions into IPO-based models of studio pedagogy.

Implications and Recommendations

The findings of this study carry several important implications for enhancing studio-based design education. In terms of curriculum design and course planning, the results indicate that students particularly valued end-to-end project cycles that mirrored authentic professional practices. Embedding such comprehensive projects into textile and apparel design courses can foster deeper learning and better prepare students for industry expectations. Regarding the role of teachers, while students appreciated the autonomy granted by studio pedagogy, they also expressed difficulties in managing ambiguity and uneven workload distribution within group projects.

This suggests that instructors should adopt facilitative roles that balance guided autonomy with structured scaffolding, for example, through rotating role assignments that ensure workload equity while preserving creative freedom. Feedback culture also emerged as a critical area of concern. Although students recognized the developmental value of critique, they reported initial emotional discomfort when receiving harsh comments, which they only overcame gradually. Consequently, the integration of feedback literacy training and resilience-building

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

practices within the studio curriculum is recommended to help students navigate critique constructively.

Moreover, while physical studio conditions such as lighting or space were not perceived as barriers, students did highlight frustrations with unfamiliar technical tools. This finding suggests that policies on studio space should prioritize digital integration and early technical orientation rather than focusing solely on physical improvements. Finally, the study underscores the importance of supporting collaboration through explicit training in teamwork, communication strategies, and conflict resolution, thereby equipping students to address the recurring challenge of unequal participation in group projects.

Conclusion

This study offers an empirically grounded contribution to the discourse on studio pedagogy by exploring how students in textile and apparel design programs perceive its influence on their learning through the lens of the Input–Process–Output (IPO) model. By centering on students' lived experiences, the research highlights how instructional practices, collaborative processes, and immersive studio environments collectively shape multidimensional outcomes that extend beyond technical proficiency to include creativity, critical thinking, communication, and cooperation. The findings demonstrate that studio pedagogy nurtures student autonomy and inquiry but also reveals tensions between freedom and structure, indicating the necessity of guided facilitation to balance creative independence with equitable workload distribution. Similarly, while collaborative engagement enhanced interpersonal skills and design thinking, it also generated emotional stress and managerial difficulties, suggesting that collaboration should be understood as both a site of opportunity and of challenge. The studio environment itself was perceived as an authentic and stimulating context for experiential learning, though its effectiveness depended more on students' affective and technical experiences than on physical conditions.

The theoretical contribution of this study lies in demonstrating the added value of applying the IPO framework to design education. Unlike experiential learning or constructivist theories, which focus primarily on individual cognition or social interaction, the IPO model illuminates the causal pathways connecting pedagogical inputs, collaborative and environmental processes, and multidimensional outputs. This study therefore extends existing frameworks by integrating emotional, structural, and cultural dimensions into the process stage of the IPO model. Moreover, while the results align with previous research affirming the benefits of active and collaborative learning, they diverge in highlighting the difficulties students experienced with critique, workload equity, and technical unfamiliarity—challenges that have been underexplored in earlier literature. Such insights underscore the importance of contextual and cultural considerations in evaluating studio pedagogy. Although the small, context-specific sample limits generalizability, this study contributes to theory-building by refining the IPO framework for application in studio-based learning and points to future directions for multi-institutional and longitudinal research.

Acknowledgement

I would like to express my gratitude to everyone who supported me in the completion of this research. In addition, no potential conflict of interest was reported by the author(s).

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051

References

Agusita, E., & Naudin, A. (2023). Editorial: Special Issue on Creative Higher Education Curriculum and Pedagogy. MAKINGS, 4(1).

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

Baker, M. (2015) 'Collaboration in collaborative learning', *Interaction Studies*, 16(3), pp. 451–473.

Ban, L. (2023). *Inspired: Exploring creative pedagogies at the early stage of the fashion design process*. *Art, Design & Communication in Higher Education, 22*(1), 69–87. https://doi.org/10.1386/adch_00070_1

Chen, Z., Bao, Y. & Zhu, T. (2022) 'An empirical study on IPO model construction of undergraduate education quality evaluation in China from the statistical pattern recognition approach in NLP', *ACM Transactions on Asian and Low-Resource Language Information Processing*, 21(6), pp. 1–18.

Chua, C. (2004). Perception of quality in higher education. In Proceedings of the Australian universities quality forum (pp. 1-7). Melbourne, Australia: AUQA occasional publication.

Dillenbourg, P. (1999) *What do you mean by collaborative learning?* Oxford: Elsevier.

Ewell, P. (2007). *Applying Learning Outcomes Concepts to Higher Education: An Overview*.

Galais, C., Fernández-Martínez, J.L., Font, J. and Smith, G., 2021. Testing the input-process-output model of public participation. European Journal of Political Research, 60(4), pp.807-828.

Galton, M., Hargreaves, L., & Pell, T. (2009). Group work and whole-class teaching with 11-to 14-year-olds compared. Cambridge Journal of Education, 39(1), 119–140. https://doi.org/10.1080/03057640802701994

Goi, M.T., Kalidas, V. and Yunus, N. (2024) 'Developing and testing a customer value co-creation model of higher education institutions', *Journal of Marketing for Higher Education*, *34*(2), pp. 777–801. https://doi.org/10.1080/08841241.2022.2076275

Gozan, M., Renanto, D., Nurcahyo, R., Abdurrahman, M.A. & Misran, E. (2024) 'Input Process Output (IPO) Framework for Engineering Higher Education Accreditation in Indonesia', *International Journal of Engineering Education*, 40(2), pp. 344–357.

Hameed, U., & Mimirinis, M. (2023). *How does digital reflective practice in textile design education relate to creativity?* Reflective Practice, 24(3), 1–14. https://doi.org/10.1080/14623943.2023.2194623

Hameed, U., Umer, S., & Hameed, U. (2021). Studio Pedagogy as a Method in Textile and Textile Design Education. Himalayan Journal of Education and Literature, 2(3), 24-34.

Ilgen, D.R., Hollenbeck, J.R., Johnson, M. and Jundt, D., 2005. *Teams in organizations: From input–process–output models to IMOI models*. *Annual Review of Psychology*, 56, pp.517–543. Available at: https://doi.org/10.1146/annurev.psych.56.091103.070250

Kararmaz, Ö. (2024). An investigation of the self-construction experience in architect's education. Megaron, 526–538. https://doi.org/10.14744/megaron.2024.86658

Kelter, J., Peel, A., Bain, C., Anton, G., Dabholkar, S., Horn, M. S., & Wilensky, U. (2021). Constructionist co-design: A dual approach to curriculum and professional development. British Journal of Educational Technology, 52(3), 1043-1059.

Kolb, D. A. (2014). Experiential learning: Experience as the source of learning and development. FT press.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051
Ku Hassan, K. A., Abdul Samad, M. H., Nordin, J., & Nik Bahari Shah, N. S. B. (2019). Impact Of Architectural Design Studio Provision On Students' Creativity: An Initial Findings. https://doi.org/10.15405/EPMS.2019.12.57

Kumar, A. (2024). Knowledge transfer in the digital age: investigating the mechanisms and challenges. A., Knowledge Transfer in The Digital Age: Investigating the Mechanisms and Challenges (April 27, 2024).

Lamar, T.A., Nartker, K. & Woodbridge, J. (2022) 'The impact of emergency remote learning on a studio curriculum analyzed via case studies', *Journal of Textile Design Research and Practice*.

Lucas, B., Claxton, G., & Spencer, E. (2012). Making It: Studio teaching and its impact on teachers and learners.

McInerney, D. (2023). Insights into product design students' perception of, and engagement with, creativity in design education. International Journal of Technology and Design Education, 33(3), 1199-1219.

Meng, Z., 2021. *An Intelligent Virtual Design Studio (vds) For Integrative Design Of Green Buildings* (Doctoral dissertation, Syracuse University).

Miranda, J., Navarrete, C., Noguez, J., Molina-Espinosa, J. M., Ramírez-Montoya, M. S., Navarro-Tuch, S. A., Bustamante-Bello, M. R., Rosas-Fernández, J. B., & Molina, A. (2021). The core components of education 4.0 in higher education: Three case studies in engineering education. *Computers and Electrical Engineering*, *93*. https://doi.org/10.1016/j.compeleceng.2021.107278

Morales, M. M. (2017). Creating the Transdisciplinary Individual: Guiding Principles Rooted in Studio Pedagogy. In JISE (Vol. 6, Issue 1).

Phelan, A. (2006). Studio Art Education Today: the Impact of Digital Media and Technology on the Pedagogical Structure. The International Journal of Arts Education.

Prøitz, T. S. (2010). Learning outcomes: What are they? Who defines them? When and where are they defined? *Educational Assessment, Evaluation and Accountability*, *22*(2), 119–137. https://doi.org/10.1007/s11092-010-9097-8

Rosa, C., & Ferreira, J. (2023). The distant studio: a survey of design students' experience with distance educational formats. International Journal of Technology and Design Education, 33(5), 2019-2043.

Roschelle, J. and Teasley, S.D. (1995) 'The construction of shared knowledge in collaborative problem solving', in *Computer Supported Collaborative Learning*. Berlin: Springer, pp. 69–97.

Sawyer, R. K. (2018). Teaching and Learning How to Create in Schools of Art and Design. *Journal of the Learning Sciences*, *27*(1), 137–181. https://doi.org/10.1080/10508406.2017.1381963

Schmidt, K., & Zarestky, J. (2021, October). The state of fashion design pedagogy: The roles of students and instructors. In Proceedings of the 14th International Conference of the European Academy of Design, Safe Harbours for Design Research, online (pp. 12-15).

Shaffer, D. Williamson. (1998). Expressive Mathematics: Learning by Design.

Shaffer, D.W. (1998) *Expressive mathematics: Learning by design*. PhD dissertation, MIT.

Sidik, F. (2022) 'Input, process and output system theory approach in educational institutions', Irfani: Jurnal Pendidikan Islam, 18(1), pp. 34–40. https://doi.org/10.30603/ir.v18i1.2658

Tiwana, A. (2000) *The knowledge management toolkit: Practical techniques for building a knowledge management system*. Prentice Hall PTR.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 60 (October 2025) PP. 701-718
DOI 10.35631/IJEPC.1060051
Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st century competences: Implications for national curriculum policies. Journal of curriculum studies, 44(3), 299-321.

Vygotsky, L.S. (1978) *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Zhao, F. (2014). Research on Human Resources Management of Supervisor Studio System in Art Schools.