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Original Paper

Construction Model of "Project-Based Learning (PBL) + Five-Dimensional Collaboration" for User Experience Design Course Group

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Abstract

In the digital age, the demand for interdisciplinary talents in user experience (UX) design has driven reforms in university course clusters. However, traditional course clusters suffer from issues such as fragmented objectives, disconnected content, and a gap between industry and education. Based on the concept of Project-Based Learning (PBL), this study proposes a "goal-content-teaching-practice-evaluation" five-dimensional collaborative construction model, which addresses the fragmentation dilemma by reconstructing the collaborative mechanism of course clusters. Taking the user experience design course cluster of a university as the practical object, through over one year of reform verification, the results show that this model can significantly enhance students' user insight, interdisciplinary collaboration, and full-link design capabilities, and cultivate and deliver "user-centered + practice-oriented" high-quality UX talents to enterprises. The research offers theoretical references and practical paradigms for the development of curriculum clusters in similar institutions.

Keywords

User Experience Design, Curriculum Cluster, PBL, Five-in-One Collaboration, Educational Model

1. Reform Background

With the popularization of digital products (such as APPs and smart hardware), enterprises' demand for User Experience Design (UX Design) has shifted from "interface beautification" to "user behavior insight + full-link optimization", requiring practitioners to possess comprehensive capabilities of "user-centered thinking + interdisciplinary collaboration + iterative verification".

The main learning objective of the User Experience Design course in our school is to simulate the completion of an APP design project, which mainly includes four courses: “User Needs and Experience Research”, “Interface Prototype Design”, “Mobile Media Interface Design”, and “UI Motion Design”. After extensive research, there are currently three major problems: (1) Discrete objectives: the course positioning is disconnected from industry needs, lacking a systematic orientation of “full-link design”; (2) Fragmented content: knowledge modules are either duplicated (e.g., overlap between “prototype design” and “interface design”) or disconnected (e.g., insufficient connection between “prototype design” and “user testing”); (3) Disconnection between industry and education: practical teaching mostly relies on simulated tasks, lacking the drive of real enterprise projects, making it difficult for students to access users’ real needs and business constraints. Interviews with enterprise mentors in the early stage show that enterprises generally believe that fresh graduates lack practical collaborative capabilities. Existing studies indicate that the core competencies of user experience design include four modules: “user research (needs insight), interaction design (process optimization), visual design (experience communication), and service design (full-scenario coverage)”. However, in the current educational practice of user experience design courses in our university, there is a tendency of “emphasizing skills over thinking” and “emphasizing individual courses over collaboration”.

PBL is widely applied in the field of design education (such as project-based courses in institutions like IDEA and Parsons). Its characteristics of “real problem-driven”, “interdisciplinary collaboration”, and “outcome orientation” are highly consistent with the “user-centered” essence of UX design. However, existing studies mostly focus on PBL practice in single courses, and rarely combine PBL with the collaborative mechanism of course clusters, especially lacking the construction of systematic models in the field of user experience design. PBL (Project-Based Learning) emphasizes “driven by real problems, student-centered, and learning promoted through collaboration”, which highly aligns with the essence of UX design of “user-centered and interdisciplinary collaboration”. The key to curriculum group construction lies in “synergy”. Existing studies have proposed strategies such as “goal synergy”, “content synergy”, and “resource sharing”, but there is a lack of specific paths for the interdisciplinary field of user experience design, and there is no in-depth integration with teaching methods such as PBL. However, “five-dimensional synergy” can solve the fragmentation problem in curriculum group construction, and the combination of the two provides a new path for curriculum group reform.

This study focuses on “five-dimensional synergy of curriculum group driven by PBL”, aiming to make up for some deficiencies in this research direction. Construct the theoretical framework for curriculum cluster development based on “PBL + Five-Party Collaboration”, enrich the practical theories in the field of user experience design education, and provide a new perspective for interdisciplinary curriculum integration. Provide replicable operational guidelines for the optimization of user experience design curriculum clusters in colleges and universities, assist students in transforming from “single-skill executors” to “full-link design leaders”, and enhance their professional competitiveness.

Starting from 2024, the user experience design course team has integrated four courses, namely “User Needs and Experience Research”, “Interface Prototyping Design”, “Mobile Media Interface Design”, and “UI Motion Design”, as a whole for teaching and evaluation. They have also collaborated with teachers from the School of Big Data to teach interdisciplinary software development knowledge, explored the construction model of user experience design curriculum clusters, and formed the “PBL + Five-Party Collaboration” curriculum cluster construction model.

2. Main Content of the User Experience Design Course Group

The user experience design course group of this major mainly includes 4 courses, as shown in Figure 1. It is dominated by project-based teaching, and in these four courses, students are required to complete the design work of an App. Teachers teach through a combination of theoretical explanation and practical guidance, and guide students to complete the tasks of each course according to the task objectives of each course. The “User Needs and Experience Research” course has a total of 32 class hours. In this course, students need to complete 5 tasks: market research, competitive product analysis, user research, needs experience, and function design, and finally complete 1 phased task: the product requirements analysis report). The “Interface Prototyping Design” course has a total of 32 class hours. Students need to complete 3 tasks: UI interface prototype design, interaction method design, and interaction logic design, and finally complete 1 phased task: the interaction design specification document. The “Mobile Media Interface Design” course totals 48 class hours. In this course, students are required to complete high-fidelity UI interface design, visual design specification documents, product display board design, and ultimately output a product concept design report. The “UI Motion Design” course totals 32 class hours. In this course, students are required to complete the presentation and explanation of the APP’s product positioning, user requirements, core pages, and main functions, create interactive motion effects for core pages, and complete the page display of all interfaces of the App.

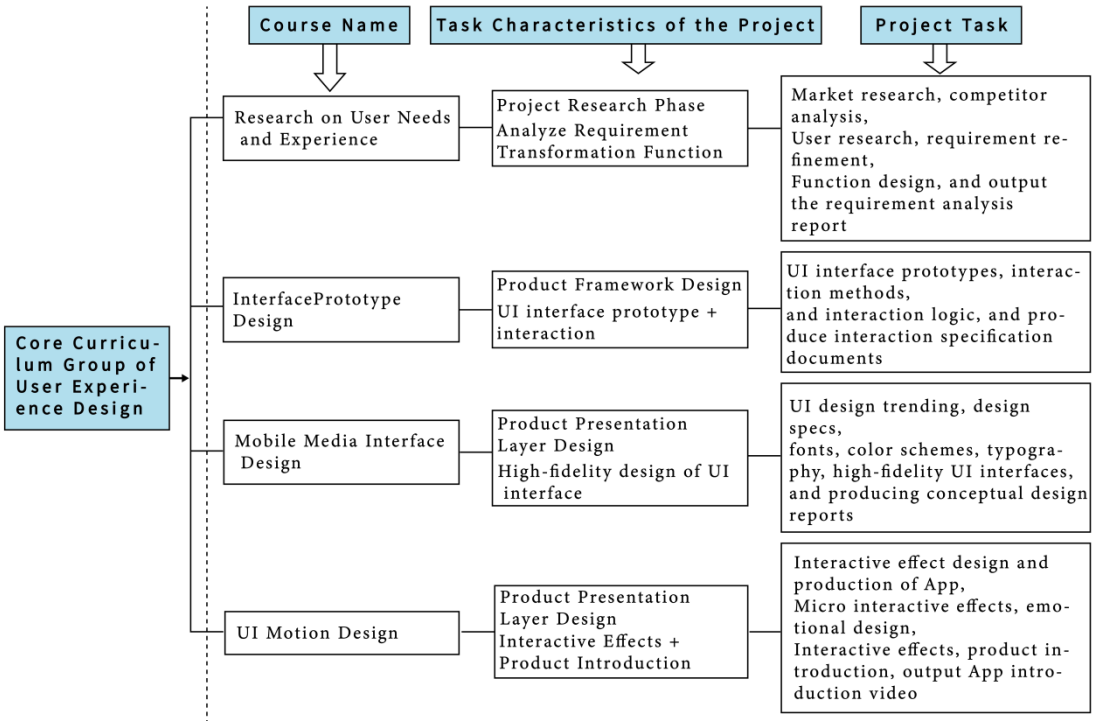

Figure 1. Content of the User Experience Design Course Group

3. Current Situation and Pain Point Analysis of User Experience Design Course Cluster

3.1 Research Design and Data Sources

This study follows the logical sequence of "Why collaboration is needed—How to collaborate—What are the outcomes of collaboration," specifically encompassing: (1) analysis of the current status and pain points of user experience design course clusters; (2) construction of the theoretical framework for the "Five-Dimensional Collaboration" model; (3) design and practical validation of a PBL-based collaboration mechanism; (4) suggestions for model optimization and promotion pathways. The research was primarily conducted using the following methods:

Literature review: A comprehensive review of literature related to PBL educational theory, UX design education, and course cluster collaboration to establish the theoretical foundation.

Semi-structured teacher interviews: Focused on curriculum goal setting, teaching challenges, and collaboration needs (15 participants interviewed, with each interview lasting 30-60 minutes). Student Questionnaire (Anonymous): 80 questionnaires were distributed, with 72 valid responses collected (a 90% validity rate), covering learning experiences, skill gaps, and collaborative needs.

Course Materials Analysis: Syllabuses, project cases, and evaluation forms from both the courses within the course cluster and related courses were collected to analyze the coherence of knowledge modules and the authenticity of practical scenarios.

Case Study Method: The "User Experience Design" course cluster of the Digital Media Art program at the School of Design and Fine Arts of our university was selected as the practical subject, and the effectiveness of the model was verified through a one-year reform experiment.

Action Research Method: The model was iteratively refined in practice, and the feasibility of the solution was enhanced through the "plan-action-observation-reflection" cycle.

3.2 Summary of Existing Pain Points

Goal Level: The course cluster goals are misaligned with industry needs (78% of enterprise mentors report that "students lack full-link design thinking"), and there is an absence of systematic "user-centered + business implementation" orientation.

Content Level: There is knowledge overlap between courses (e.g., both "User Research" and "Service Design" cover user interviews but lack sufficient depth) or disconnects (e.g., the "Prototype Design" course fails to connect with the "User Testing" course), with weak interdisciplinary content integration (only 30% of courses involve multidisciplinary knowledge integration).

Teaching Level: Instruction is primarily lecture-based (classroom lectures account for 65%), and project practices are mostly "simulated tasks" (e.g., "design a virtual APP") lacking the impetus of real enterprise scenarios. Practice level: Student collaboration remains at the level of "task division" (e.g., "one person handles user research, another takes charge of prototype design"), lacking in-depth interaction for "joint problem-solving"; there is a lack of effective school-enterprise cooperation.

Evaluation level: A singular outcome-based evaluation that neglects the assessment of process-oriented capabilities (such as user insight, teamwork, and iterative optimization) (students have feedback that "efforts made in the process are not fully recognized"), with insufficient emphasis placed on evaluating students' presentation skills and summarization abilities during the reporting of phased and final outcomes.

4. Construction of "Five-in-One Collaboration" Curriculum Group Construction Model Based on PBL

4.1 Core Framework of "Five-in-One Collaboration"

This study puts forward a five-in-one collaborative model of "objective-content-teaching-practice-evaluation" (as shown in Table 1). The specific connotations of each dimension are as follows:

Table 1. Framework of the Five-way Collaborative Model of "Goal - Content - Teaching - Practice - Evaluation"

Dimension	Core Connotation
Target Coordination	Centered on "cultivating interdisciplinary UX professionals with user-centric thinking and end-to-end design capabilities", we align industry demands with the positioning of course clusters.
Content Coordination	Based on the five-layer UX design model (from strategy to presentation layer), we restructure course content to achieve organic cohesion and interdisciplinary integration of knowledge modules.
Teaching Coordination	Driven by PBL, we design a teaching process of "problem introduction - independent exploration - collaborative practice - iterative optimization" to facilitate cross-course collaboration among teachers.
practice Coordination	We establish a three-tiered practical platform consisting of "on-campus workshops + real-world corporate projects + interdisciplinary competitions" to enhance students' interaction with users, teams, and the industry.
Evaluation Coordination	We develop a diversified evaluation system encompassing "process-oriented (participation, collaborative contribution) + outcome-oriented (work quality) + development-oriented (ability enhancement)".

4.2 Integration Mechanism of PBL and "Five-Party Collaboration"

PBL drives goal collaboration: Real-world enterprise projects (e.g., "Medical APP User Experience Optimization") are used to define shared objectives for course clusters, ensuring each course content (such as "User Research" focusing on patient needs and "Interaction Design" optimizing operational workflows) aligns with project requirements.

PBL promotes content collaboration: Project requirements guide the breakdown of knowledge modules (e.g., "User Research → Requirements Documentation → Low-Fidelity Prototyping → User Testing → High-Fidelity Design"), facilitating dynamic adjustments to course content (e.g., incorporating a "Medical Scenario User Interview Techniques" module into the "User Research" course).

PBL supports teaching collaboration: The "driving questions" and "continuous inquiry" features of PBL necessitate cross-course collaborative lesson planning among teachers (e.g., interaction design and visual design instructors jointly developing the "Interface Usability Testing" task), thereby achieving the integration of teaching resources. PBL Enhancing Practical Collaboration: Team collaboration in project practice, where students are grouped into roles such as "user researcher", "interaction designer", and "visual designer", naturally fosters cross-curricular and interdisciplinary practical collaboration.

PBL Empowering Evaluation Collaboration: Project outcomes, including user research reports, high-fidelity prototypes, and user testing data, serve as evaluation vehicles. By integrating student self-assessment (participation), team peer review (collaborative contribution), enterprise mentor evaluation (implementation feasibility), and teacher assessment (knowledge application), multi-dimensional evaluation is achieved.

5. Practical Verification and Effect Analysis of the Model

5.1 Practical Background and Implementation Subjects

Implementing Institution: Digital Media Art Program, School of Design and Fine Arts, Qingdao Huanghai University. Implementation Target: 3 undergraduate classes of Digital Media Art (2022 intake), totaling 90 students. Implementation Period: September 2022 - July 2023 (1 academic year), push in 3 phases.

5.2 Description of Implementation Process

Phase 1: Alignment of Goals and Content (Months 1-2).

Enterprise Demand Research: Collaborated with 3 internet enterprises to investigate the capability requirements for UX talents, identifying core enterprise needs (user insight, interdisciplinary collaboration, iterative optimization).

Establishment of Course Cluster Goals: “Master the entire process of user research, interaction design, and visual design; independently complete UX optimization for small and medium-sized products; possess interdisciplinary team collaboration capabilities”.

Decomposition of Goals into Sub-tasks: User research (quantitative + qualitative analysis) → Requirement Document (user personas, pain point list) → Low-fidelity Prototype (Axure/Figma) → User Testing (usability metrics) → High-fidelity Design (visual specifications, interaction logic).Revise curriculum content: Add the “User Interviews in Medical Scenarios” module to the “User Research” course; incorporate case studies on “Balancing Business Goals and User Experience” into the “Interaction Design” course; and enhance training on “User Test Feedback-Driven Interface Optimization” in the “Visual Design” course.

Phase 2: Integration of Teaching and Practice (Months 3-6).

Launch the PBL project: “User Experience Optimization for Campus Second-hand Trading Platform” (with enterprise mentors providing real requirement Document). The teaching process is as follows:

Driving question (Month 3): “How to improve platform user retention through UX design?” (Instructors guide students to analyze the problem from both user and business perspectives). Independent Exploration (Month 4): Conduct group-based user interviews (8-10 target users) and competitor analysis (8-15 similar platforms), and output user personas and requirement lists.

Collaborative Design (Month 5): Complete low-fidelity prototypes (interaction design) → user testing (service design) → high-fidelity design (visual design) through group collaboration, with joint

guidance from teachers across courses (e.g., interaction design teachers instruct on prototyping tool usage, and visual design teachers provide guidance on interface aesthetics).

Iterative Optimization (Month 6): Optimize the solution based on user testing feedback (e.g., "the search function entrance is not obvious"), and output the final design report and interactive prototype.

Phase 3: Collaborative Evaluation and Feedback (Months 7-8).

Evaluation Subjects: Student self-evaluation (project engagement, collaborative contributions), team peer review (project innovation, execution efficiency), enterprise mentor evaluation (project implementability, user value), and instructor evaluation (knowledge application ability).

Evaluation Indicators: Process-based (40%, including completeness of user interview records, team collaboration logs), outcome-based (40%, including prototype and interaction design integrity, user experience quality), and developmental (20%, including iteration depth from initial to final version).

Feedback and Improvement: Based on evaluation results, optimize project design for subsequent phases (e.g., adding a training module on "user persona construction").

5.3 Analysis of Implementation Effect

Table 2. Quantitative Data

Indicators	Object of reform
Project Achievement Quality (Full Score 100)	89.2±5.1
Course Satisfaction	92.1%
Enterprise Mentor Evaluation (Feasibility)	8.7/10

Qualitative Data:

Student Interviews: "Through cross-curricular collaboration, I learned to approach visual presentation from an interaction design perspective, moving beyond a single skill set"; "Real-world enterprise projects made me realize that user research isn't just 'theoretical speculation on paper' but directly impacts a product's success or failure", etc.

Teacher Reflections: "The 'Five-Party Collaboration' model requires teachers to break down course barriers. While initial lesson preparation was stressful, students' comprehensive abilities improved significantly, making it well worth promoting", etc.

Conclusion: The "Five-Party Collaboration" model has effectively enhanced students' comprehensive UX capabilities and the synergy among course clusters, verifying the model's effectiveness.

6. Optimization Suggestions and Future Outlook

6.1 Model Optimization Suggestions

Dynamically adjust the weights of the "five components": Flexibly adjust the collaborative focus of "target-content-teaching-practice-evaluation" in response to industry developments (such as the impact

of AIGC on UX design) and evolving enterprise needs, for instance, by adding content modules on "AI tool applications".

Strengthen teacher collaboration mechanisms: Establish cross-curricular teaching and research teams, conduct regular "project-based teaching" training (including inviting corporate mentors to share practical project experience), and enhance teachers' capabilities in PBL design and collaborative guidance.

6.2 Research Limitations and Future Outlook

Research limitations: The sample size is small (only one university case study), necessitating an expanded scope of validation; the quantitative indicator system for "five-component collaboration" requires further refinement (such as incorporating "student career development tracking" data).Future Outlook: Explore the adaptability of the "Five-Party Collaboration" model across different types of universities, such as art colleges and comprehensive universities; optimize the PBL process by integrating AI tools like the design assistance software Midjourney and user research platform UserTesting to enhance teaching efficiency.

7. Conclusion

To address the fragmentation issue in user experience design course clusters, this study proposes a PBL-based "Five-Dimensional Collaboration" development model. Through systematic synergy across target, content, teaching, practice, and evaluation, it resolves the collaboration challenges faced by traditional course clusters. Practical validation demonstrates that this model significantly enhances students' user insight, interdisciplinary collaboration, and full-link design capabilities, providing enterprises with high-caliber UX talents characterized by "user-centricity and practice orientation." This research offers theoretical references and practical paradigms for course cluster reforms in similar institutions, and future efforts can further expand the model's applicability and explore technology-enabled pathways.

Project

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References

Liu, M. et al. (2023). "Five-in-One" Construction Mode of Core Curriculum Group for Landscape Architecture Planning and Design. *Modern Horticulture*, *46*(23), 194-197.

Huang, Y. Q., Xiang, Z. X., & Li, J. T. (2021). Construction and Exploration of Project-Based Curriculum Group for Industrial Design[J]. Industrial Design, *10*, 32-33.

Yang, Y. B., & Qin, Y. M. (2025). Research on the Construction of Artificial Intelligence Curriculum Group for Automation Major under the Background of New Engineering. *Journal of Higher Education*, *11*(10), 19-22.

Bao, Y. H. et al. (n.d.). *Construction and Effect Evaluation of Processing Curriculum Group for High-End Manufacturing in Polymer Industry*[J/OL]. Polymer Bulletin, 1-7[2025-08-11].