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Integrating Digital Sketching Through Project-Based Learning: Indonesian and European Students' Point of View

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ABSTRACT

This study investigates students' perceptions of the implementation of Project-Based Learning (PjBL) in an international joint digital sketching class involving Indonesian and European higher education institutions. Grounded in constructivist learning theory and supported by Koyan's perception framework, the research aims to examine the pedagogical effectiveness of PjBL in fostering cognitive, pedagogical, affective, and creative learning outcomes within a cross-cultural digital design context. Employing a mixed-methods research design, the study integrates a systematic literature review, perception surveys administered to 39 purposively selected respondents, direct observations, and document analysis. Quantitative data were analyzed descriptively using Koyan's perception criteria, while qualitative data strengthened contextual interpretation through triangulation. The findings reveal consistently very high mean scores across all evaluated dimensions, including knowledge, teaching methods, ability to answer questions, creativity, and students' care, with an overall average score of 4.33. The highest-rated dimension was students' care, highlighting the crucial role of instructor support and affective engagement in project-based and studio-oriented learning environments. Although creativity obtained the lowest mean score among the indicators, it remained within the very high category, indicating that PjBL combined with digital sketching provides substantial opportunities for creative exploration. The study concludes that PjBL is an effective and holistic pedagogical approach for digital sketching education, particularly within international and cross-cultural learning settings, and underscores the importance of instructional competence, supportive learning climates, and institutional support in maximizing its educational impact.

Keywords: Project-Based Learning; Digital Sketching; Cross-Cultural Design Education; Design Pedagogy; Higher Education; Student Perception

INTRODUCTION

Project-Based Learning (PjBL) has increasingly been recognized as an effective pedagogical approach for fostering higher-order thinking skills, collaboration, and active student engagement. Through authentic project tasks, learners are encouraged to engage in investigative processes, planning activities, and product creation as concrete representations of their conceptual understanding. Recent studies indicate that the implementation of PjBL significantly enhances students' collaborative skills and active participation, particularly within the framework of the Merdeka Curriculum, which emphasizes learner-centered instruction (Fazhari et al., 2023). These findings are consistent with research by Lestari et al. (2023), who reported that well-structured, collaborative, and meaningful project activities contribute substantially to increased student motivation.

Beyond motivational outcomes, studies conducted between 2024 and 2025 demonstrate that PjBL also has a positive impact on the development of students' critical thinking and creativity. Andini and Muhammad (2024) found that PjBL implementation in primary education promotes students' analytical and evaluative skills, as learners are required to process information, assess alternative solutions, and generate creative ideas throughout the project completion process. In science education, PjBL has been shown to strengthen conceptual understanding and environmental awareness through contextual, experience-based projects (Pebriana & Aini, 2024). The effectiveness of PjBL is further enhanced when supported by appropriate instructional materials, such as project-based student worksheets, which have been found to stimulate creativity and other twenty-first-century competencies (Marlina et al., 2025). Moreover, the integration of PjBL with technology and interactive media broadens its instructional potential. Yulisnawati et al. (2025) reported that incorporating educational games within a PjBL framework significantly improves students' mathematical problem-solving abilities by facilitating active interaction and strategic thinking. At the tertiary level, Juanta et al. (2025) similarly demonstrated that PjBL effectively develops university students' problem-solving skills through application development projects requiring systematic needs analysis, solution design, and prototype evaluation.

Despite its considerable potential, the implementation of PjBL in the Indonesian educational context remains suboptimal, particularly in fostering student creativity. One of the primary contributing factors is teachers' limited readiness and pedagogical competence in designing and managing project-based instruction. Several studies indicate that teachers often experience difficulties in developing contextual projects that are well aligned with learning objectives, resulting in PjBL being reduced to project assignments rather than a comprehensive learning process (Syahdia et al., 2024). In addition, time constraints within the curriculum pose a significant challenge, as PjBL requires extended periods for planning, implementation, and evaluation. Consequently, essential stages of the PjBL process are frequently shortened or omitted.

Another factor influencing the limited effectiveness of PjBL is the inadequacy of supporting facilities and infrastructure, particularly about access to technology, learning resources, and collaborative workspaces. These limitations often hinder the quality of students' project outcomes. Furthermore, the complexity of project assessment presents additional challenges for teachers. Many educators struggle to implement authentic assessment strategies, such as rubric-based evaluation, portfolios, and process-oriented assessment, leading to evaluations that do not fully capture students' competency development. Student diversity in terms of ability, motivation (da Costa et al., 2019), and

learning autonomy also affects the success of PjBL implementation. Without appropriate differentiation strategies, some learners tend to remain passive or less engaged during project activities.

Beyond classroom-level factors, assessment systems that remain predominantly test-oriented further constrain the effective implementation of PjBL. The pressure to complete curricular content and prepare students for standardized examinations often leads teachers to prioritize short-term cognitive achievement over the development of creativity and higher order thinking skills (Costa et al., 2019). This situation is compounded by long-standing reliance on conventional teaching methods, which makes pedagogical transformation toward PjBL a gradual process requiring sustained institutional support and continuous professional development for teachers. While Project-Based Learning offers substantial potential for enhancing creativity, critical thinking, and twenty-first-century competencies. Its effectiveness is highly dependent on teacher preparedness, adequate infrastructure, sufficient instructional time, and alignment between pedagogical approaches and assessment systems. Without comprehensive support across these dimensions, the implementation of PjBL is unlikely to achieve its intended outcomes, particularly in terms of fostering student creativity. Because of that, conducting PjBL on international joint digital sketching class is interesting to follow.

METHOD

This research adopts a mixed-methods design that integrates both qualitative and quantitative approaches. Data collection primarily relies on a comprehensive literature review, conducted through a systematic analysis of academic books, peer-reviewed journal articles, and pertinent policy documents to construct a robust theoretical and empirical framework (Wicaksana, Suprihatin, & Mar'an, 2024; Wicaksana, Cahyono, Sudrajat, & Suprihatin, 2025). This process was carried out over a four-month period. To support the qualitative analysis, a perception survey was administered to 39 purposively selected respondents who possessed relevant expertise and experience related to the research focus. Additionally, direct observations and document analysis were undertaken to capture contextual and empirical insights from real-world environments. The research instruments consisted of a structured perception questionnaire, observation protocols, and document analysis checklists.

Instrument validity was established through content validity assessed by expert judgment, while data triangulation across the literature review, survey findings, observations, and document analysis strengthened the study's credibility. Moreover, cross-validation across multiple data sources was employed to enhance the reliability and trustworthiness of the findings (Wicaksana et al., 2025). Cross-validation entails systematically comparing data obtained from different sources to identify convergences and inconsistencies, thereby reducing potential bias and reinforcing the evidence base for the conclusions (Diadi, Nurdin, & Gunawan, 2023).

By positioning the literature review as the central methodological component, the study draws upon established scholarly knowledge within the field. Academic texts contribute foundational theories and conceptual frameworks, while previous empirical studies provide evidence that either supports or challenges existing perspectives. Furthermore, the perception survey utilized a five-point Likert scale, and relevant documents such as institutional reports, policy papers, and official records were analyzed to enrich contextual understanding and support well-substantiated conclusions.To

comprehend the result, the analysis of perception is implemented by using Koyan (2012) perception table here

Table 1 Koyan's Perception Theory

Score	Category
Mi + 1,5 SDi M < Mi + 3,0 SDi	Very high
Mi + 0,5 SDi M < Mi + 1,5 SDi	High
Mi – 0,5 SDi M < Mi + 0,5 SDi	Average
Mi – 1,5 SDi M < Mi – 0,5 SDi	Low
Mi – 3,0 SDi M < Mi – 1,5 SDi	Very Low

Mi is Ideal mean calculated using the formula 1/2 (ideal maximum score - ideal minimum score) which means Mi is ½ (5 – 1) and the score of Mi is 2. Meanwhile, SDi is Ideal standard deviation calculated using the formula: 1/6 (ideal maximum score - ideal minimum score) which means SDi is 1/6 (5 – 1) and the score of SDi is 0.67.

RESULTS AND DISCUSSIONS

Table 2. Results of Questionnaire

Criteria	Average Score
Knowledge	4.282051282
Teaching Method	4.333333333
Answering Question Ability	4.435897436
Creativity	4.153846154
Students' Care	4.487179487
Average	**4.338461538**

The descriptive statistical results demonstrate consistently high levels of teacher performance across all evaluated dimensions. The Students' Care criterion obtained the highest average score (M = 4.487179487), indicating a strong level of careness among the teachers. This is followed by Ability in Answering Question (M = 4.435897436) and Knowledge (M = 4.282051282), suggesting that teachers are able to deliver instructional content in varied and engaging ways while effectively addressing students' inquiries. Collectively, the overall mean score of 4.33 reflects a very high and relatively uniform distribution of performance across all indicators based on Koyan's perception table (2012), demonstrating minimal variability and indicating that the teachers exhibit consistently strong competencies in cognitive, pedagogical, and affective domains.

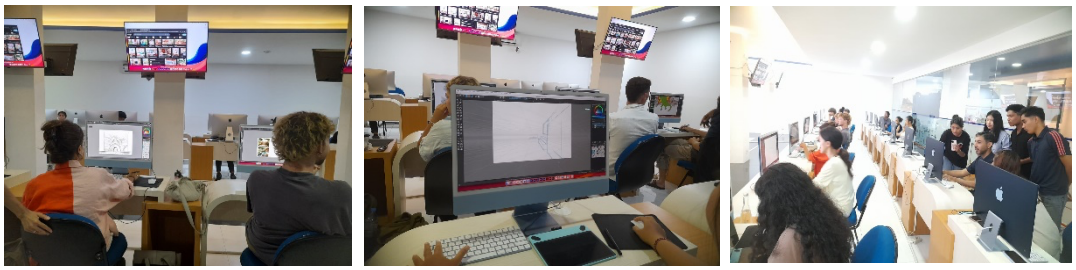

Figure 1. PjBL in Digital Sketching

This study set out to examine students' perceptions of the implementation of Project-Based Learning (PjBL) in an international joint digital sketching class, with particular attention to pedagogical effectiveness, instructional competence, and the learning climate fostered through project-based activities. Anchored in the theoretical framework of PjBL and supported by Koyan's perception theory (2012), the findings provide strong empirical evidence that the integration of PjBL within a digital sketching context result in a highly effective and holistic learning experience. The overall mean score of 4.34, categorized as *very high*, indicates that students perceive the learning process as successful across cognitive, pedagogical, affective, and creative dimensions.

From a theoretical perspective, PjBL is grounded in constructivist learning theory, which emphasizes active knowledge construction through authentic tasks, collaboration, and reflection. As articulated in the literature, PjBL encourages learners to engage in inquiry, problem-solving, and product creation as representations of conceptual understanding. The consistently high scores obtained in this study suggest that these theoretical principles were effectively operationalized in the digital sketching class. Rather than positioning students as passive recipients of information, the learning design enabled them to actively construct meaning through iterative sketching, project development, and continuous feedback, which aligns with the core assumptions of constructivist and experiential learning theories.

The highest-rated dimension, *Students' Care* (M = 4.49), highlights the central role of the affective domain in project-based and studio-based learning environments. PjBL theory emphasizes the importance of teacher facilitation, mentoring, and scaffolding, particularly when learners engage with complex, open-ended tasks. In digital sketching projects, students are often required to navigate uncertainty, revise ideas repeatedly, and respond to critique. The very high perception of students' care indicates that instructors successfully created a supportive learning climate in which students felt guided and valued throughout the project process. This finding reinforces prior research suggesting that effective PjBL implementation depends not only on task design but also on the quality of teacher–student interaction and emotional support.

Closely related to this affective dimension is the *Ability in Answering Questions* criterion (M = 4.44), which reflects instructors' responsiveness and conceptual clarity during the learning process. Within PjBL theory, dialogue and questioning are essential mechanisms for deep learning, as they promote reflection, conceptual clarification, and higher-order thinking. The high score in this dimension suggests that instructors functioned effectively as facilitators rather than sole knowledge transmitters. By responding to students' technical, conceptual, and design-related questions, instructors supported cognitive apprenticeship, allowing students to gradually internalize professional ways of thinking and problem-solving. This finding aligns with studies emphasizing that PjBL enhances critical thinking when teachers actively guide inquiry and provide timely feedback.

The *Teaching Method* dimension (M = 4.33) further confirms the pedagogical effectiveness of PjBL in the digital sketching context. According to PjBL theory, learning activities should be organized around meaningful projects that integrate multiple skills and knowledge domains. The high student perception of teaching methods indicates that the instructional design successfully combined project tasks, collaborative activities, and reflective discussions. In contrast to traditional lecture-based approaches, this method allowed students to engage directly with real-world design problems, thereby increasing relevance and authenticity. This finding supports previous empirical studies

demonstrating that PjBL enhances student motivation and engagement, particularly when projects are well structured and aligned with learning objectives.

The *Knowledge* dimension (M = 4.28) reflects students' perceptions of instructors' subject-matter mastery and theoretical competence. Within the framework of PjBL, strong content knowledge is essential, as instructors must be able to integrate theory with practice and guide students in applying conceptual principles to project outcomes. In the context of digital sketching and design education, this involves linking design theory, visual principles, and digital tools within project activities. The high score in this dimension suggests that theoretical concepts were not treated as isolated or abstract knowledge but were embedded within the project workflow. This finding is consistent with the theoretical argument that PjBL supports deeper learning by situating knowledge within authentic contexts, thereby strengthening students' conceptual understanding and professional identity.

Although still categorized as *very high*, the *Creativity* dimension recorded the lowest mean score (M = 4.15). From a theoretical standpoint, creativity is a central outcome of PjBL, as learners are encouraged to generate original ideas, explore alternative solutions, and experiment with diverse approaches. The slightly lower score may indicate that creativity is influenced by multiple factors beyond instructional design, including students' prior experience, confidence, and cultural background. In international and cross-cultural learning environments, differences in educational traditions and attitudes toward risk-taking may also shape students' perceptions of creative freedom. Nevertheless, the high score suggests that PjBL provided adequate opportunities for creative exploration, even though further refinement of project scaffolding and assessment criteria could enhance creative outcomes more explicitly.

When interpreted collectively, the minimal variation among the five dimensions indicates a balanced implementation of PjBL that addresses multiple domains of learning. According to Koyan's perception theory, such consistency reflects a stable and effective educational experience. This balance is particularly important in design education, where cognitive knowledge, technical skills, creativity, and affective engagement must develop in parallel. The findings demonstrate that PjBL serves as an integrative pedagogical model capable of harmonizing these domains within a digital learning environment.

In relation to the broader challenges of PjBL implementation in Indonesia, the findings of this study offer an important counterpoint to previous research highlighting obstacles such as limited teacher readiness, inadequate infrastructure, and assessment difficulties. The very high perceptions reported by students suggest that these challenges can be mitigated through careful instructional planning, strong teacher competence, and institutional support. The international joint nature of the digital sketching class may also contribute to enhanced motivation and engagement, as students are exposed to diverse perspectives and professional practices. This supports theoretical claims that authentic, collaborative, and context-rich projects are more likely to yield positive learning outcomes.

CONCLUSIONS

This study demonstrates that the implementation of Project-Based Learning (PjBL) within an international joint digital sketching class is pedagogically effective in supporting high-quality teaching and learning processes. The findings from the perception survey reveal consistently high mean scores across all evaluated dimensions, knowledge, teaching method, ability in answering questions, creativity, and students' care with an overall average score of 4.33. According to Koyan's (2012) perception

criteria, these results fall within the *very high* category, indicating that the instructional practices applied in the digital sketching context are perceived very positively by participants.

The highest score obtained in the Students' Care dimension suggests that the PjBL approach fosters a learning environment characterized by strong teacher engagement, responsiveness, and supportive interaction. This affective dimension is crucial in project-based and cross-cultural learning settings, where continuous guidance and feedback significantly influence student motivation and participation. Furthermore, the high scores in teaching methods and ability to answer questions indicate that instructors are able to manage project-based digital sketching activities effectively, facilitate inquiry-based discussions, and respond to students' learning needs in a timely and meaningful manner.

In addition, the relatively high creativity score reflects the potential of PjBL combined with digital sketching to stimulate students' creative thinking and problem-solving skills. By engaging students in authentic design projects, the learning process moves beyond procedural software use toward deeper conceptual understanding and creative exploration. These findings align with previous studies highlighting the role of PjBL in enhancing higher-order thinking skills, collaboration, and creativity, particularly when supported by appropriate pedagogical strategies and learning resources.

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