High Tech, Low Touch: The Interaction Paradox in Post-Pandemic Hybrid Pedagogy

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ABSTRACT

The post-pandemic era cemented hybrid learning as a key curriculum innovation. While offering flexibility, its success in higher education hinges on effective digital pedagogy and student perception. This study addresses this by providing a comprehensive evaluation of student perceptions within an Educational Technology program, offering a holistic view of the current hybrid model's effectiveness. This research holistically analyzes perceptions of active students across all cohorts regarding digital pedagogy in the hybrid environment. It examines key dimensions (content delivery, interaction, collaboration, flexibility) to identify overarching challenges and advantages, ultimately providing evidence-based recommendations for curriculum innovation. This descriptive survey used a quantitative approach. The sample consisted of 88 active students from the Educational Technology Program. Data was collected via a validated questionnaire and analyzed using descriptive statistics (percentage) to map overall perceptual trends. The descriptive analysis reveals a critical pedagogical disconnect. Despite students perceiving 'student readiness' (81.8%) and 'lecturer competence' (80.7%) as the top factors supporting success, the single greatest obstacle identified was 'lack of student interaction' (83.0%). This was followed by technical barriers, with 'internet quality' (79.5%) also cited as a major hindrance. This suggests that while individual components (students, faculty) are strong, the current hybrid model struggles to facilitate the pedagogical-social connections essential for learning. Understanding this holistic student perspective is essential for refining digital pedagogy. The findings provide actionable insights for faculty and curriculum designers to create a hybrid environment that is not only flexible but also truly meaningful and supportive, contributing to sustainable curriculum transformation.

Keywords: *Curriculum Innovation, Digital Pedagogy, Hybrid Learning, Student Interaction, Student Perception.*

1. INTRODUCTION

After more than four years since the COVID-19 pandemic, hybrid learning has become the new standard in global education systems, including in Indonesia. This model combines the advantages of face-to-face interaction with the flexibility of online learning, allowing students and educators to adjust their time, place, and learning styles. Studies have shown that hybrid learning has been effectively implemented, with students successfully achieving instructional goals (Rusyada & Nasir, 2022) and showing increased learning motivation (Hardanti et al., 2022).

However, flexibility does not solely equate to effectiveness. Effective learning demands deep interaction and student engagement. While much research has focused on infrastructure, the socio-pedagogical aspect is often overlooked. This leads to a phenomenon known as the "interaction paradox": a condition where the increased use

of technology paradoxically decreases the depth of human interaction in the learning process.

Despite efficient digital communication, studies report that interpersonal relationships become shallower, emotional engagement declines, and students feel awkward and unable to interact optimally (Rahmawati et al., 2023). This "low touch" phenomenon is not merely anecdotal; it is a documented challenge in high-tech pedagogy. Recent studies explicitly identify the "lack of social interaction" and the "possible loss of human connection" as significant negative impacts of technology-driven learning (Mim et al., 2025).

A systematic review by Otto et al. (2025) confirms this, cautioning that Generative AI (GenAI) may "reduce human-to-human interaction" and negatively impact the "critical social-emotional aspects of learning". The same review noted that GenAI applications predominantly focus on "individual usage," with "collaborative applications being notably rare", further exacerbating the "low touch" problem.

This issue becomes particularly critical within an Educational Technology program. On one hand, these students are expected to be the most adaptive to digital learning. On the other hand, they also require meaningful social interaction. While studies show students are generally positive about the flexibility of hybrid models, they also face significant challenges related to pedagogy and technology use (Raes et al., 2020).

Therefore, this research holistically analyzes the perceptions of active Educational Technology students regarding this paradox. This study aims to (1) analyze student perceptions of digital pedagogy, (2) identify key challenges in interaction and collaboration, and (3) specifically highlight the gap between high-tech readiness and the perceived "low-touch" or failure of pedagogical-social connections. The findings are essential for refining a hybrid environment that is not only flexible but also truly meaningful and supportive.

2. METHODOLOGY

2.1. Research Design

This study utilized a descriptive quantitative approach. The research design employed was a descriptive survey. This methodology was chosen as it is the most suitable for the study's objective: to provide a systematic and measurable overview of student perceptions regarding the implementation of hybrid learning and its impact on social interaction and pedagogical aspects. Instead of seeking causal relationships, this descriptive research focuses on mapping trends and identifying the actual conditions in the field, specifically to measure the "high tech" and "low touch" variables within post-pandemic hybrid pedagogy.

2.2. Participants of the Study

The population for this study comprised active students from the Educational Technology Program at Universitas Pendidikan Indonesia. The research sample consisted of 88 active students selected from various cohorts. The selection of participants from the Educational Technology program was purposive, based on the assumption that this group is the most adaptive to technology. Therefore, their perceptions of the "interaction paradox" are highly relevant and crucial to investigate.

2.3. Instruments

The primary data collection instrument was a validated questionnaire designed by the researchers. The questionnaire was distributed online using the Google Forms platform. The instrument was specifically designed to measure three key dimensions: (1) the level of technology utilization (high tech); (2) the frequency and quality of social interaction (low touch), including both faculty-student and student-student interactions; and (3) student perceptions of the application of pedagogical principles within the hybrid system. The questionnaire utilized a combination of a 1-5 Likert scale and multiple-choice questions to identify the most dominant supporting and hindering factors.

2.4. Data Analysis Techniques

All data collected from the 88 respondents were analyzed using descriptive statistics. This technique was used to process the quantitative data into concise and clear information. The data analysis focused on calculating frequencies and percentages to map overall perceptual trends. This analysis was used to identify the factors most dominantly perceived as supporters (e.g., 'lecturer competence', 'student readiness') and hindrances (e.g., 'lack of student interaction', 'internet quality') in the implementation of post-pandemic hybrid pedagogy.

3. RESULT AND DISCUSSION

This study analyzed the perceptions of 88 active students from the Educational Technology Program. The descriptive statistical analysis mapped the primary supporting factors and the main hindrances perceived by students in the post-pandemic hybrid learning environment.

The results show a clear consensus on the human components of the system. As shown in Table 1, the two most significant factors identified by students as supporting the success of hybrid learning were 'Student Readiness' (81.8%) and 'Lecturer Competence' (80.7%). This indicates a high level of confidence in the 'high tech' capabilities, the technical and pedagogical readiness, of both educators and learners within the program.

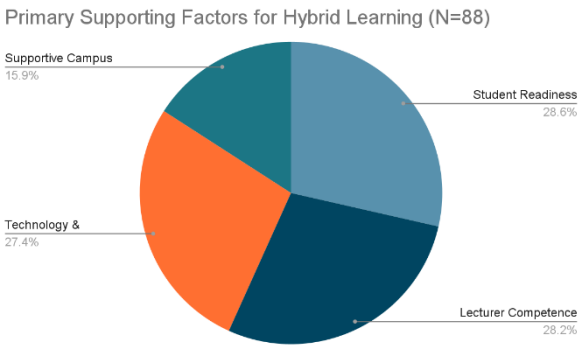

Figure 1. Primary Supporting Factors for Hybrid Learning

Conversely, when asked to identify the greatest hindrances, respondents pointed to both social and technical issues. As detailed in Table 2, the most significant obstacle identified was 'Lack of Student Interaction' (83.0%). This was followed by technical barriers, with 'Internet Quality' (79.5%) also cited as a major hindrance.

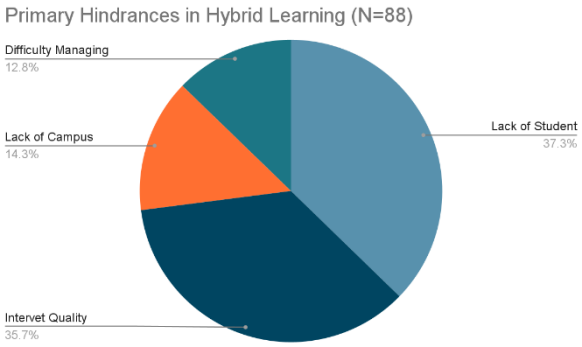

Figure 2. Primary Hindrances in Hybrid Learning

The findings of this study reveal a critical pedagogical disconnect, which we term the "High Tech, Low Touch" paradox. The data presents a stark contradiction: students report a very high level of readiness and competence from both themselves and their lecturers (81.8% and 80.7%, respectively), indicating that the High Tech components (human capability) are largely in place. However, they simultaneously report that the single greatest obstacle to their learning is a Low Touch component: 'Lack of Student Interaction' (83.0%).

This paradox, where technological readiness is high but human connection is failing, is a documented challenge in modern digital pedagogy. This finding strongly aligns with recent literature. For instance, a systematic review by Otto et al. (2025) on Generative AI in STEM education cautioned that such technologies may "reduce human-to-human interaction" and negatively impact the "critical social-emotional aspects of learning". The same review noted that GenAI applications predominantly focus on "individual usage," with "collaborative applications being notably rare", which mirrors

the "low touch" environment our participants are experiencing. Similarly, Mim et al. (2025) explicitly identified the "lack of social interaction" and the "possible loss of human connection" as significant negative impacts of technology-driven learning.

This paradox is particularly striking given the study's population: Educational Technology students. This is a cohort that, by definition, should be the most skilled and prepared to thrive in a high-tech learning environment. Their perception that the system is failing on a social level, despite their own technical readiness, suggests that the current hybrid model has prioritized logistical flexibility over pedagogical-social connection. The findings imply that while individual components (students and faculty) are strong, the curriculum design of the hybrid model struggles to facilitate the meaningful, collaborative interactions essential for deep learning.

4. CONCLUSION

This study concludes that the "High Tech, Low Touch" paradox is a significant and measurable phenomenon within the post-pandemic hybrid learning model. The findings confirm that while individual "high tech" components, such as student readiness (81.8%) and lecturer competence (80.7%), are perceived as strong, the current model is failing in the "low touch" dimension. The fact that 'lack of student interaction' (83.0%) is cited as the single greatest hindrance, surpassing even technical issues like internet quality (79.5%), demonstrates a critical pedagogical disconnect. The current implementation prioritizes logistical flexibility at the expense of essential pedagogical-social connections. Based on these findings, this study provides actionable insights for curriculum designers and faculty. It is recommended that the Educational Technology program shifts its focus from mere technological deployment to the intentional design of interaction. Curriculum innovation should not only be flexible but also truly meaningful and supportive. Practical suggestions include implementing structured collaborative projects, redesigning hybrid activities to mandate peer-to-peer engagement (Otto et al., 2025), and leveraging technology to facilitate, rather than replace, human connection (Mim et al., 2025) . This study contributes to sustainable curriculum transformation by emphasizing that a successful hybrid model must be both high tech and high touch.

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