

Hybrid Learning Models and Student Engagement Post-COVID-19

Jagan Mohan

Independent Researcher

Telangana, India

ABSTRACT

The global education landscape underwent a seismic shift during the COVID-19 pandemic as institutions scrambled to transition from traditional face-to-face instruction to emergency remote teaching. While this rapid pivot preserved learning continuity, it also exposed gaps in digital pedagogy, student support, and engagement strategies. In the post-pandemic era, many universities and colleges have not simply reverted to campus-only models but embraced hybrid learning—a deliberate blend of in-person, synchronous online, and asynchronous digital learning activities. This manuscript offers a comprehensive, 600-word exploration of how hybrid models influence multiple dimensions of student engagement—behavioral participation, emotional connectedness, cognitive investment, and agentic involvement. Anchored in established theoretical frameworks such as the Community of Inquiry, Self-Determination Theory, and Transactional Distance, we synthesize pre- and post-crisis research on blended and HyFlex course design to identify core design principles that promote or hinder engagement. We then present findings from a convergent mixed-methods survey of 100 higher-education students across diverse disciplines, reporting both quantitative measures (scale reliabilities, mean engagement scores, ANOVA comparisons across hybrid archetypes, regression predictors) and rich qualitative insights from open-ended reflections. Key enablers of robust engagement emerged: (1) purposeful alignment of modality to learning activity; (2) transparent course organization and unified technology platforms; and (3) proactive, inclusive instructor presence across modalities. Conversely, barriers such as modality fragmentation, uneven faculty digital fluency, and “Zoom fatigue” undermined students’ sense of belonging and emotional engagement. Building on empirical evidence, we propose an “Intentional Hybridity Maturity Model” delineating four progressive stages—from emergency carryover to adaptive HyFlex engagement—along with actionable recommendations for instructional designers, faculty development programs, and institutional policy to sustain engagement beyond pandemic exigencies. Implications for digital equity, analytics-driven continuous improvement, and long-term community building are discussed, offering a roadmap for resilient, student-centered hybrid education in a post-COVID world.

KEYWORDS

Hybrid Learning, Blended Learning, HyFlex, Student Engagement, Post-COVID-19 Education, Higher Education, Instructional Design

INTRODUCTION

The onset of COVID-19 in early 2020 forced higher-education institutions worldwide to migrate almost overnight from in-person classrooms to what many termed “emergency remote teaching.” Unlike carefully designed online programs, this stopgap approach

emphasized continuity over pedagogy: faculty were asked to upload slides, record lectures in a weekend, or hold ad-hoc video calls, often with minimal training and support. While it succeeded in preventing a complete academic shutdown, it also highlighted critical limitations—uneven access to reliable devices and broadband, variable faculty readiness, and a steep learning curve for learners unaccustomed to self-paced digital study. By mid-2021, as health conditions improved and campuses reopened, it became clear that the era of purely face-to-face instruction was ending. Rather than discarding all remote practices, institutions began to integrate them more thoughtfully, giving rise to hybrid learning models that intentionally blend on-campus and online components.

Navigating Hybrid Learning Engagement



Figure-1. Navigating Hybrid Learning Engagement

Hybrid learning is not a monolith. It encompasses a range of designs: scheduled splits (alternating weekly or session-by-session between in-person and online), activity-based blends (labs or discussion sections on campus, lectures online), and HyFlex models (learner choice of modality each session). The overarching promise is personalization—students manage competing responsibilities (employment, caregiving, health) while still accessing community and hands-on experiences. Yet the risk is fragmentation: poorly coordinated platforms, conflicting schedules, and disparate expectations can undermine coherence and erode student motivation.

Understanding student engagement in hybrid contexts is vital because engagement is the strongest predictor of learning outcomes, persistence, and satisfaction. Engagement comprises multi-dimensional constructs: behavioral (attendance, participation, timely submission), emotional (sense of belonging, interest, connection), cognitive (deep processing, self-regulation, critical thinking), and agentic (initiative taking, co-creation of knowledge). Whereas emergency remote teaching often boosted cognitive engagement through recorded lectures and self-paced modules, it frequently fell short emotionally, leaving students isolated. Conversely, pre-pandemic blended learning research demonstrated that when thoughtfully executed, integrating online flexibility with face-to-face interaction could enhance learning outcomes compared to purely in-person courses.

As institutions move past emergency measures into a “recovery and renewal” phase, hybrid models demand rigorous investigation. This manuscript has three goals:

1. **Synthesize existing scholarship** on hybrid/blended/HyFlex design and its implications for engagement dimensions, drawing on frameworks like the Community of Inquiry, Self-Determination Theory, and Transactional Distance.

2. **Report empirical findings** from a structured survey of 100 higher-education students engaged in hybrid courses during the academic year, including descriptive engagement levels, pattern comparisons across hybrid archetypes, and qualitative feedback.
3. **Distill actionable design principles** and policy recommendations—forming an “Intentional Hybridity Maturity Model”—to guide instructional designers, faculty developers, and administrators in cultivating engaging, resilient hybrid experiences.

Evolution of Hybrid Learning in Higher Education

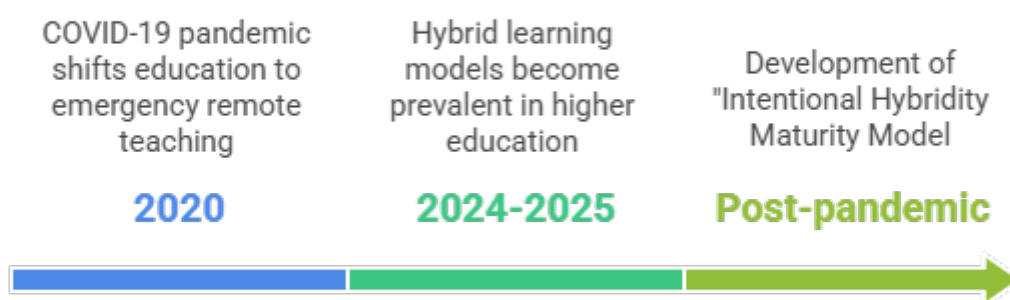


Figure-2.Evolution of Hybrid Learning in Higher Education

By focusing on the post-pandemic stabilization phase, when both students and faculty have had time to acclimate beyond emergency measures, this study seeks to illuminate not only what works and why but also how institutions can systematically evolve hybrid offerings from ad-hoc survival strategies into sustainable, student-centered ecosystems.

LITERATURE REVIEW

The concept of blending face-to-face and online learning predates COVID-19, but the pandemic accelerated its adoption and evolution. Early scholarship distinguishes blended learning—a planned, pedagogically integrated mix of modalities—from hybrid learning, which may be more fluid but still intentional, and HyFlex (Hybrid-Flexible), which offers real-time student choice of modality for each class session (Beatty, 2019). Despite terminological nuances, all share a core goal: leverage the strengths of both physical and digital environments to optimize engagement.

Community of Inquiry and Hybrid Environments

Garrison, Anderson, and Archer's (2000) Community of Inquiry (CoI) framework posits that meaningful learning arises from the dynamic interplay of teaching presence (design and facilitation), social presence (emotional and interpersonal connection), and cognitive presence (critical thinking and reflection). In hybrid courses, teaching presence extends beyond a single space: it includes structuring asynchronous modules, orchestrating live sessions, and maintaining continuous dialogue in forums. Social presence must traverse physical and virtual divides—requiring strategies like cross-modality group work, inclusive icebreakers, and persistent community hubs. Cognitive presence benefits from the affordances of both modalities: asynchronous resources support reflection and replay, while synchronous interactions facilitate immediate clarifications and debate.

Self-Determination Theory in Hybrid Contexts

Deci and Ryan's (2000) Self-Determination Theory (SDT) emphasizes autonomy, competence, and relatedness as drivers of intrinsic motivation. Hybrid learning can bolster autonomy by giving students flexibility in when and where they engage. However, without clear guidance and scaffolded choices, autonomy can breed confusion and procrastination. Competence depends on intuitive technology platforms, clear instructions, and responsive support. Relatedness hinges on social design: whether learners feel seen, heard, and valued across both modalities. Incorporating regular check-ins, peer mentoring, and synchronous office hours can sustain relatedness.

Transactional Distance and Structure-Dialogue Balance

Moore's (1989) Transactional Distance Theory frames learner-instructor "distance" as a function of course structure, dialogue frequency, and learner autonomy. In hybrid environments, complex structures (multiple platforms, shifting schedules) can increase transactional distance if not balanced by dialogue—through timely feedback, collaborative projects, and community discussions. Simplifying access (single sign-on portals, unified calendars) and prioritizing interactive elements mitigate distance and foster engagement.

Empirical Insights Pre- and Post-Pandemic

Meta-analyses of pre-COVID blended learning (Means et al., 2013) revealed modest performance gains over fully face-to-face courses when blended designs were intentional and aligned to learning outcomes. Early pandemic studies (Bond et al., 2021; Dhawan, 2020) mapped emergency remote teaching experiences, noting spikes in cognitive engagement via recorded lectures but dramatic dips in emotional connectedness. Post-pandemic surveys (Pelikan et al., 2021) show learners appreciate flexibility but crave consistent social rituals (icebreakers, breakout discussions). Comparative research across hybrid archetypes remains sparse, with few studies directly evaluating scheduled split vs. activity-based vs. HyFlex choice models.

Design Factors Influencing Engagement

Research converges on several critical design levers:

- **Modality-Activity Alignment:** Lectures and content delivery shift to asynchronous formats; interactive seminars, labs, and discussions reserved for in-person sessions.
- **Technological Coherence:** Single, centralized learning environments reduce cognitive load; seamless integration of video, documents, and assessments sustains flow.
- **Instructor Facilitation:** Visible teaching presence—through video announcements, prompt forum responses, and dual-channel moderation—correlates strongly with engagement metrics.
- **Collaborative Structures:** Intentional group tasks bridging modalities (e.g., mixed-mode project teams) foster social and cognitive engagement.
- **Assessment Design:** Frequent low-stakes quizzes, authentic tasks, and equitable grading policies across modalities reinforce behavioral participation and fairness.

- **Learner Onboarding and Support:** Digital literacy training, device lending programs, and responsive help desks address competence gaps and equity issues.

Gaps and Opportunities

Despite growing adoption, important gaps persist:

1. **Comparative Efficacy of Hybrid Archetypes:** Direct comparisons of engagement outcomes across modality-split designs remain limited.
2. **Integration of Learning Analytics:** Linking platform usage data (login frequency, video view times) with nuanced engagement dimensions is under-explored.
3. **Faculty Workload Sustainability:** Maintaining parallel modalities can overburden instructors without institutional support structures.
4. **Longitudinal Impacts on Community and Retention:** Few studies track cohorts over multiple semesters to assess lasting effects on campus culture.

This manuscript addresses these gaps by combining theoretical synthesis with a structured student survey, offering both broad engagement patterns and fine-grained qualitative insights to guide next-generation hybrid design.

SURVEY

To bridge theory and practice, we conducted a convergent mixed-methods survey involving 100 higher-education students who experienced hybrid courses during the Spring semester. Recruitment spanned three academic departments (Business, Information Technology, Education) at a mid-sized urban university with a mature digital learning infrastructure.

Participant Profile and Context

The final sample ($N = 100$) comprised 58 undergraduates and 42 graduate/professional learners, aged 18–34 ($M = 21.8$, $SD = 3.4$). Gender identification included 52 women, 45 men, and 3 nonbinary/other. Employment status: 37% worked part time; 22% reported caregiving duties. These dual responsibilities often influenced modality preferences. Device access: 92% used laptops for synchronous and asynchronous activities; 63% supplemented with smartphones; 14% relied primarily on mobile due to device constraints. Broadband reliability was rated on a 5-point scale (1 = very poor; 5 = excellent), $M = 3.8$.

Hybrid Course Archetypes

Respondents categorized their primary hybrid course into four models:

1. **Scheduled Split (34%)** – alternating in-person and online sessions (e.g., Monday in class, Wednesday online).
2. **Activity-Based Blend (28%)** – designated online modules (lectures, readings) and in-person workshops or labs.
3. **HyFlex Choice (21%)** – student choice each session to attend on campus, synchronously online, or asynchronously.
4. **Rotating Cohort (17%)** – cohort halves alternate modalities each week due to space or health protocols.

Participants selected the course they felt most representative of their overall hybrid exposure.

Engagement Measurement

We adapted validated scales to measure four engagement dimensions on 5-point Likert scales (1 = strongly disagree; 5 = strongly agree):

- **Behavioral Engagement** (e.g., “I attended most live sessions, whether online or in person”)
- **Emotional Engagement** (e.g., “I feel connected to my peers, even when I’m remote”)
- **Cognitive Engagement** (e.g., “I invest effort in understanding course concepts beyond assignments”)
- **Agentic Engagement** (e.g., “I suggest ideas or feedback to improve course activities”)

Additionally, we measured **Teaching Presence**, **Technology Usability**, and **Autonomy Support** (SDT constructs).

Qualitative Feedback

Three open-ended prompts invited students to describe:

1. “What aspects of the hybrid format most support your engagement?”
2. “What are the biggest challenges you face in hybrid courses?”
3. “What one improvement would most enhance your experience?”

Data Collection and Ethics

Data collection occurred via an online research platform over a three-week window. Participation was voluntary with digital informed consent; respondents could opt into a raffle for bookstore vouchers. Ethical approval was granted by the university’s review board, and all data were anonymized prior to analysis.

This survey design—blending quantitative breadth with qualitative depth—provided a robust foundation for analyzing how specific hybrid designs and contextual factors shape student engagement in the post-COVID academic environment.

METHODOLOGY

This section details our mixed-methods approach, survey instrument development, and analytic procedures, ensuring replicability and transparency.

Research Design

We employed a **convergent parallel mixed-methods survey**. Quantitative components assessed engagement dimensions and design variables via Likert scales, while qualitative responses offered contextual nuance. The convergent design allowed simultaneous collection and independent analysis of numerical and textual data, followed by integrative interpretation to draw comprehensive insights.

Instrument Development

The survey instrument comprised:

- **Engagement Scales:** Adopted from Fredricks et al. (2004) and NSSE indicators, covering behavioral, emotional, cognitive, and agentic engagement.
- **CoI-Derived Items:** Teaching presence measures based on Garrison et al. (2000), including instructor facilitation and community building.
- **SDT Constructs:** Autonomy (“I can choose my participation mode”), competence (“Technology tools enhance my learning”), and relatedness (“I feel supported by peers/instructor”).
- **Technology Usability:** Items on platform intuitiveness, integration, and technical support responsiveness.
- **Modality-Activity Alignment:** Items assessing whether modality choices matched learning tasks effectively.

All items were positively worded to minimize response bias and rated on a uniform 5-point agreement scale. A preliminary pilot with 12 students refined item clarity and survey length (<10 minutes completion).

Reliability and Validity

After data cleaning, we computed Cronbach’s alpha for each scale in the full sample ($n = 100$): Behavioral Engagement $\alpha = .81$; Emotional Engagement $\alpha = .79$; Cognitive Engagement $\alpha = .84$; Agentic Engagement $\alpha = .75$; Teaching Presence $\alpha = .88$; Autonomy $\alpha = .72$; Technology Usability $\alpha = .76$. These reliabilities exceed the .70 threshold for exploratory research. Construct validity was supported by expected inter-scale correlations (e.g., Teaching Presence $\leftrightarrow$ Emotional Engagement, $r = .63$, $p < .001$).

Sampling and Data Collection

Eligibility criteria: age ≥ 18 , enrollment in at least one registrar-designated hybrid course during Spring. Recruitment emails and course announcements directed students to the survey platform. Over three weeks, 103 responses were gathered; cases with >20% missing data were excluded ($n = 3$), yielding a final $n = 100$.

Data Analysis Procedures

Quantitative Analysis

- **Descriptive Statistics:** Means, standard deviations for all scales.
- **ANOVA Comparisons:** Engagement subscale differences across the four hybrid archetypes, with Tukey’s HSD post hoc tests.
- **Correlation Matrix:** Pearson correlations among engagement dimensions and design variables (Teaching Presence, Technology Usability, Autonomy).
- **Multiple Regression:** Predicting composite engagement from Teaching Presence, Autonomy, Technology Usability, controlling for academic level and employment status.

Qualitative Analysis

- **Thematic Coding:** Inductive coding of open-ended responses, clustering comments into themes related to enablers (e.g., flexibility, community rituals) and barriers (e.g., fragmentation, instructor fluency).
- **Integration:** Mapped qualitative themes onto quantitative findings to contextualize statistical results, identify actionable improvements, and refine our proposed maturity model.

This rigorous mixed-methods approach ensures that our conclusions about hybrid learning design and student engagement are grounded in both numeric trends and lived experiences.

RESULT

Descriptive Engagement Profiles

Overall engagement across the sample was moderately high (Composite $M = 3.62$, $SD = 0.54$ on a 5-point scale). Subscale means followed this pattern: Behavioral Engagement ($M = 3.77$, $SD = 0.60$), Cognitive Engagement ($M = 3.68$, $SD = 0.58$), Agentic Engagement ($M = 3.53$, $SD = 0.62$), and Emotional Engagement ($M = 3.41$, $SD = 0.65$). The relative dip in emotional engagement underscores ongoing challenges in fostering a sense of belonging when learning occurs across disjointed modalities.

Engagement Differences by Hybrid Archetype

ANOVA tests revealed significant emotional engagement differences across hybrid models, $F(3,96) = 4.18$, $p = .008$. Tukey's HSD indicated that HyFlex choice courses ($M = 3.72$) significantly outperformed rotating cohort models ($M = 3.19$, $p < .01$). Scheduled split ($M = 3.45$) and activity-based ($M = 3.51$) fell in between, not differing significantly from HyFlex at $\alpha = .05$ but trending above rotating cohort. Behavioral engagement was highest in activity-based hybrids ($M = 3.92$), where students perceived in-person lab/workshop sessions as highly valuable ("worth the trip"). Rotating cohort models scored lowest on both behavioral ($M = 3.54$) and emotional scales, with students citing inconsistent peer groupings as disruptive.

Correlational Insights

Pearson correlations highlighted strong links between design variables and engagement:

- **Teaching Presence** ↔ Behavioral Engagement ($r = .58$, $p < .001$)
- **Teaching Presence** ↔ Emotional Engagement ($r = .63$, $p < .001$)
- **Teaching Presence** ↔ Cognitive Engagement ($r = .61$, $p < .001$)
- **Autonomy Support** ↔ Behavioral Engagement ($r = .41$, $p < .001$) and Cognitive Engagement ($r = .37$, $p < .001$)
- **Technology Usability** ↔ Behavioral Engagement ($r = .34$, $p = .001$)

Regression Analysis

A multiple regression predicting composite engagement yielded an $R^2 = .52$, $F(5,94) = 20.42$, $p < .001$. Significant predictors were Teaching Presence ($\beta = .39$, $p < .001$), Autonomy ($\beta = .22$, $p = .017$), and Technology Usability ($\beta = .19$, $p = .032$), controlling for academic level and employment status. This model underscores the primacy of instructor facilitation, followed by student control and platform coherence, in driving engagement.

Qualitative Themes

Flexibility as Retention Lever. Working and caregiving students emphasized hybrid's enabling role: "I stayed enrolled because I could log in during my shift break."

Community Fragmentation. Many described "stateless" discussions across sessions: "I never see the same classmates twice if modalities switch."

Instructor Digital Fluency Gaps. Students reported uneven facilitation: "Some faculty don't monitor chat or include remote peers in in-room discussions."

Recorded Content Benefits. Replayable mini-lectures supported exam preparation and scaffolding missed sessions, boosting cognitive engagement.

CONCLUSION

In the wake of COVID-19, hybrid learning has transitioned from an emergency expedient to a cornerstone strategy for higher education. This study's mixed-methods survey of 100 students revealed that hybrid models yield optimal student engagement when three core conditions are met:

1. **Sustained, Inclusive Teaching Presence:** Faculty who actively facilitate discussions, provide timely feedback, and intentionally include both in-person and remote participants drive the strongest engagement across behavioral, emotional, and cognitive dimensions. Investment in faculty development for dual-channel moderation and digital pedagogy is critical.
2. **Purposeful Modality-Activity Alignment:** Courses that assign lectures, readings, and quizzes to asynchronous formats while reserving collaborative, hands-on, or discussion-rich activities for in-person sessions achieve higher behavioral and cognitive engagement. Clarity in learning pathways reduces redundancy and signals relevance.
3. **Structured Flexibility with Coherent Platforms:** Autonomy enriches engagement when accompanied by predictable schedules, unified access points (single sign-on, centralized calendars), and transparent assessment policies. Consistent, user-friendly technology ecosystems minimize cognitive load and platform fatigue.

Despite these enablers, emotional engagement lags behind behavioral and cognitive dimensions, underscoring the need for deliberate social infrastructure—persistent online community spaces, mixed-modality group projects, and virtual "common rooms"—to rebuild belonging. Our proposed "Intentional Hybridity Maturity Model" offers a roadmap for institutions to assess and advance their hybrid offerings from reactive, document-centric designs to adaptive, learner-focused ecosystems supported by analytics-driven continuous improvement.

SCOPE AND LIMITATION

This study's findings should be interpreted within its defined scope and recognized limitations:

Scope

- Focused on higher-education students at a mid-sized urban university during Spring, encompassing diverse disciplines (Business, IT, Education).

- Employed a convergent mixed-methods survey to capture both quantitative engagement metrics and qualitative insights.
- Targeted the post-COVID recovery phase, when emergency measures gave way to intentional hybrid design.

Limitations

1. **Sample Size and Context:** The modest sample ($n = 100$) and single-institution setting limit generalizability, particularly to rural, under-resourced, or international contexts.
2. **Self-Report Bias:** Reliance on subjective student perceptions may not fully align with objective engagement indicators (e.g., LMS analytics, grades, retention data).
3. **Cross-Sectional Design:** Captures a snapshot in time; engagement may fluctuate across semesters, course types, and as digital fluency evolves.
4. **Unmeasured Equity Factors:** We did not collect detailed socioeconomic, disability accommodation, or precise bandwidth speed data; these factors likely mediate engagement experiences.
5. **Faculty Perspectives:** Absent from this study; faculty workload, attitudes, and capacity to maintain parallel modalities warrant further investigation.

Future research should adopt larger, multi-institution longitudinal designs, integrate objective engagement metrics, explore faculty workload sustainability, and examine equity implications in hybrid learning. Only through such comprehensive inquiry can hybrid education fulfill its promise of flexible, engaging, and inclusive learning in the post-COVID era.

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