



# Reconceptualizing Technology and Learner Autonomy in EFL Blended Learning: Pathways, Barriers, and an Analytic Roadmap

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**ABSTRACT:** In tertiary EFL blended learning, technology does not shape learner autonomy through isolated tools, but through the interaction structures it reorganizes. This paper conceptualizes technology as an ecosystem of features embedded in course design and views autonomy as enacted practice rather than a static trait. Drawing on the Community of Inquiry framework, it explains how changes in teaching, social, and cognitive presence mediate the relationship between technological features and observable autonomy. It further identifies key breakpoints—cognitive load, pedagogical misalignment, and system opacity—that account for divergent learning outcomes across similar technology-rich contexts. The study offers a mechanism-oriented framework for analyzing autonomy in blended EFL settings and for guiding more coherent design and evaluation.

**KEYWORDS:** Blended EFL Learning, Learner Autonomy, Interaction Structures, Community of Inquiry, Educational Technology.

## I. INTRODUCTION

Technology is now the backbone of blended learning in tertiary EFL classrooms. Learning platforms, mobile tools, analytics dashboards, and AI-powered feedback are no longer optional add-ons; they shape what counts as participation, how learning is paced, and which forms of progress become visible (Park & Doo, 2024). Yet discussions still slip into sweeping verdicts—tools “help” by adding flexibility and speeding feedback, or “harm” by distracting learners and inviting dependence. This tension is real, but it hardly constitutes an explanation.

In blended settings, technology seldom acts as a single factor that directly “produces” learner autonomy. Instead, it reshapes the conditions under which autonomy is enacted: influencing how

learners plan, monitor, adjust, and reflect, while also shifting what teachers can scaffold, what peers can observe, and what tasks qualify as legitimate engagement. The same feature might lower the cost of self-regulation for one learner yet raise the coordination burden for another, depending on task design, learner histories, and institutional routines. The question, then, is not whether technology supports autonomy in general, but how particular features and routines make autonomy easier to enact—or harder to sustain. Generative AI has made this double-edged character impossible to overlook. Recent higher-education studies suggest that over-reliance may be linked to cognitive fatigue and weaker critical thinking, while information literacy can cushion some of those risks (Tian et al., 2025).

Conversely, research on AI-assisted blended learning reports more positive outcomes when AI tools are woven into guided teaching practices rather than treated as effortless shortcuts. What matters is how tools reshape guidance, participation, and cognitive engagement—an autonomy lens thus needs a clear account of mechanisms, not mere praise or alarm. What the blended EFL literature often lacks is not awareness of pros and cons, but a shared framework for connecting experience to explanation—and a clearer sense of what qualifies as evidence. Too many accounts move from tool adoption to evaluation without making the underlying process legible: how technology alters patterns of guidance, participation, and inquiry, and how those shifts shape learners’ autonomous action. When mechanisms remain implicit, results are hard to compare across contexts and prone to over-generalization. This paper adopts a mechanism-and-evidence stance.

Technology is framed as an ecosystem of features and routines rather than a one-size-fits-all intervention. Learner autonomy, meanwhile, is treated as enacted practice: setting goals and plans,



monitoring and adjusting strategies, seeking help and contributing actively, sustaining engagement across online and offline spaces, and transferring learning reflectively to new tasks and contexts. These actions can be enabled, distorted, or suppressed by the interaction structures that technology helps to build. To keep these structures in view, the analysis uses the Community of Inquiry (CoI) framework (Garrison et al., 2000) as a bridge between tools and outcomes. Here, CoI is not a passive label but a map of where mechanisms operate: technology reshapes teaching presence through design, facilitation, and feedback; reconfigures social presence through visibility, belonging, and participation norms; and conditions cognitive presence through supports for inquiry, reflection, and meaning-making. Technology matters because it alters the architecture of interaction—and that architecture defines what autonomy can plausibly look like in practice. Against this background, the paper offers three core contributions. First, it develops a pathway model linking technology features to shifts in teaching, social, and cognitive presences, and then to observable signs of autonomous learning. Second, it proposes a barrier typology that frames constraints as predictable breakdown points, distinguishing learner-side barriers (e.g., literacy gaps, workload management struggles, fluctuating motivation, dependency risks), pedagogy and assessment barriers (e.g., inadequate supervision, misaligned feedback, compliance pressures), and system or AI-related barriers (e.g., usability friction, fragmented tool ecologies, operational opacity, over-reliance). Third, it provides an analytic roadmap that clarifies the minimum evidence needed for each pathway and barrier, while strengthening claims through triangulating data from interviews, classroom and online observations, course materials, learner work, and platform traces. The scope is deliberately focused on blended EFL learning in higher education, where language development spans classroom and online spaces, and participation is shaped by institutional accountability and learners' uneven digital experiences. With this framing in place, subsequent sections refine key constructs and the theoretical lens, then present the pathway model, barrier typology, and analytic roadmap in forms that stay close to what researchers can realistically observe and document. Moving beyond judgments of whether technology helps or harms, this section focuses on what technology reorganizes in blended EFL learning, anchoring the discussion in working definitions of technology and learner autonomy as observable practice.

## **II. Conceptual Anchoring: Technology and Autonomy as Enacted Practice**

In blended EFL courses, technology is often spoken about as if it were a single add-on to an otherwise stable pedagogy. That habit obscures what actually matters for autonomy. Autonomy rises or falls less with the presence of tools than with the features that organize attention, interaction, and accountability (Alfredo et al., 2024). A learning management system does more than store materials: it sequences work, sets deadlines, decides what is visible to whom, and leaves traces that can later be read as effort, compliance, or engagement. A discussion space is more than a channel for talk: it shapes norms of participation, makes some voices easier to hear, and makes other forms of contribution feel risky. An AI-enabled feedback function is not simply “faster feedback”: it can change when revision happens, where evaluation sits, and how learners understand responsibility for judgment. Seen in this light, technology is best treated as an ecosystem of affordances and routines embedded in course design, not a discrete intervention (Khodabandelou, 2025). This ecological view also helps avoid a familiar analytical shortcut—equating access or adoption with explanation. In many tertiary settings, access is a threshold condition, not an account of learning. Adoption tells us little, too, because “using the platform” can mean very different things. Two learners may log in daily and still follow opposite paths: one builds a steady rhythm of practice and revision; the other grazes resources, completes micro-tasks near deadlines, and quietly transfers evaluation to external tools. The difference is not the tool itself but how specific affordances are taken up in self-regulatory routines—whether reminders support planning or merely trigger last-minute compliance, whether dashboards guide monitoring or simply display anxiety, whether rubrics invite principled choices or reduce work to box-ticking, whether visibility encourages peer support or prompts withdrawal, whether AI suggestions become scaffolds for thinking or substitutes for it. For the purposes of this paper, technology refers to the platform-, tool-, and data-mediated features that shape participation, pacing, feedback, and traceability in blended courses, including AI-enabled feedback and learning analytics when they function as part of the learning ecology.

Learner autonomy, in turn, needs to be defined in a way that fits this ecology. If autonomy is framed mainly as attitude—confidence, preference for independence, a general willingness to “take charge”—the analysis drifts away from what



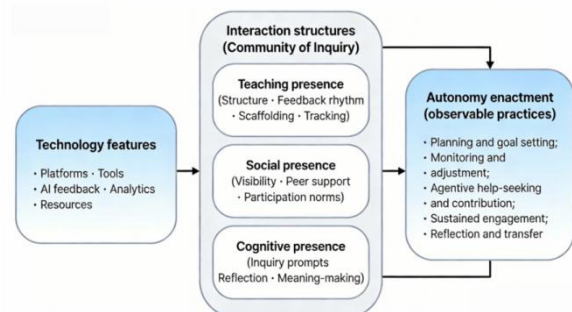
blended learning asks learners to do every week. Blended courses distribute work across spaces and time, and that distribution makes autonomy a repeated accomplishment: deciding when to engage, what to prioritize, which resources to trust, and how to respond to feedback and setbacks. In this paper, autonomy is treated as enacted practice: goal setting and planning, monitoring and adjustment, evaluation and reflection, alongside agentic participation such as help-seeking, contributing to peers, and negotiating meaning in interaction. The attraction of an enactment lens is not rhetorical; it is methodological. Enacted autonomy leaves traces. Plans can be articulated, revisions can be tracked, help-seeking can be observed, and reflection can leave a footprint in talk, writing, or platform activity.

This lens also clarifies a quiet tension in the autonomy literature. Autonomy is often celebrated as freedom, but the freedom that matters pedagogically is rarely the absence of structure. In language learning, structure can be what makes agency workable: clear purposes, intelligible criteria, timely feedback, and predictable opportunities to participate. The threat to autonomy is not structure as such, but structure that is misaligned, opaque, or enforced in ways that narrow learners' options to compliance. Autonomy is enacted within interaction structures—patterns of guidance, social connection, and cognitive work—that a course makes possible (Richardson et al., 2025). If those structures are fragile, learners may appear “unmotivated” when they are simply overburdened, uncertain, or pushed toward shortcut strategies that keep them afloat.

The Community of Inquiry framework (Garrison et al., 2000) is adopted here because it keeps those interaction structures in view without turning the analysis into a blunt causal story. For present purposes, CoI works as an organizing lens that makes mechanism talk more precise. Teaching presence names how design and facilitation create a workable rhythm of guidance, feedback, and scaffolding. Social presence captures whether participation feels safe, worthwhile, and reciprocated, and whether learners can take interpersonal risks without penalty. Cognitive presence focuses on whether learners are supported to inquire, integrate ideas, and reflect in ways that build meaning rather than merely complete tasks. These presences are not decorative labels. In blended EFL settings they show up in concrete patterns: how criteria are communicated and revisited, how feedback is timed and acted upon, how discussions are acknowledged and extended,

how inquiry is prompted, and whether reflection is treated as part of learning rather than an afterthought. CoI therefore provides a principled middle layer between tool features and autonomy enactment (Changet al., 2025). Figure 1 summarizes this conceptual anchoring by situating technology, interaction structures, and autonomy enactment within a single analytic frame.

**Figure 1. Conceptual anchoring of technology features, interaction structures, and autonomy enactment in EFL blended learning**



*Note.* This figure is developed by the authors to illustrate the conceptual anchoring adopted in this study. It depicts technology as reshaping interaction structures, within which learner autonomy is enacted as observable practices.

Anchoring the paper in CoI also keeps the later argument from slipping into technological determinism. The pathways proposed later do not run directly from “AI feedback” to “more autonomy.” They run through interactional conditions. AI feedback can strengthen autonomy when it supports a manageable cycle of planning, action, and revision while leaving evaluative responsibility with the learner; it can weaken autonomy when it displaces judgment, encourages surface completion, or erodes the learner’s sense of ownership. Analytics dashboards can support autonomy when they help learners notice patterns in their own work and make informed adjustments; they can constrain autonomy when they are experienced mainly as surveillance, or when metrics reward narrow forms of engagement at the expense of deeper learning. The point is not to praise or blame tools, but to specify the mechanisms by which affordances become enabling or constraining.

Any conceptual anchoring meant to guide later analysis also needs to be explicit about boundary conditions. Task type is consequential. Tightly specified micro-tasks can cultivate accuracy and routine, but they can also reduce autonomy to



“staying on schedule” and discourage purposeful choice. Open-ended projects can invite goal setting and resource selection, yet they can also amplify overload when support is thin and expectations are unclear. Assessment regimes matter, too. When grades privilege measurable outputs in rigid ways, learners may rationally orient toward performative compliance, and platform traces can start to resemble gaming rather than learning. Learner differences are equally central: digital literacy, language proficiency, and motivational stability can determine whether the same feature reduces the burden of self-regulation or adds to it. These boundaries do not weaken the framework; they

make its claims more honest and more testable across contexts.

Taken together, these anchors clarify the stance of this paper. It does not treat technology as a monolithic cause, nor autonomy as a stable trait. It treats technology as a set of features that reshape interaction structures, and it treats autonomy as practice enacted within those structures. With these definitions in place, the next section can move from concepts to propositions, mapping plausible enabling pathways and identifying predictable breakpoints where constraints interrupt autonomy in blended EFL learning.

**Table1. Working definitions of key constructs in the study**

<b>Construct</b>	<b>Working definition in this study</b>
Technology features	Platform-, tool-, and data-mediated features and routines that shape participation, pacing, feedback, and traceability in blended EFL courses.
Interaction structures (CoI)	Patterns of teaching, social, and cognitive presence through which guidance, participation, and inquiry are organized across learning spaces.
Learner autonomy	Enacted practice involving planning, monitoring, evaluation, and agentic participation observable in learners’ engagement and learning activity.

*Note.* The table is developed by the authors to clarify working definitions for analytic purposes rather than for measurement.

### **III. Pathways and Analytic Roadmap: Mechanisms and Minimal Evidence**

Section II argued that technology matters for autonomy in blended EFL less as a “tool” than as an arrangement of features that quietly reorganizes guidance, participation, and inquiry. What follows takes that claim one step further. Instead of treating autonomy as something learners either have or lack, this section describes the interactional pathways through which autonomy is enacted—and the kinds of empirical traces that would make those pathways persuasive rather than merely plausible.

#### **3.1 Mechanism pathways through interaction structures**

The same platform can produce opposite outcomes because the mechanism is not “platform use” but the way design choices shape an ongoing rhythm of work. In many blended courses, learners do not struggle with a shortage of resources; they struggle with the timing of attention: when to begin, what to prioritize, and how to tell whether a move was worthwhile. Technology features intervene here by making some actions easier, some more visible, and some more accountable—and by doing so, they

thicken or thin the interaction structures in which autonomy must operate.

A teaching-presence pathway becomes legible when the course architecture distributes regulation across the semester rather than compressing it into deadline-driven bursts (Li & Wang, 2024). Checkpoints, revision windows, staged submissions, and feedback that arrives while revision is still possible can turn self-monitoring from an aspiration into a routine. The mechanism is practical: learners are prompted to compare current work against criteria, decide what to fix first, and justify the direction of change. In this pathway, autonomy enactment is not “independence”; it is the ability to revise with reasons. One sees it when a learner returns to the same text or recording, makes targeted changes, and can explain why those changes mattered—sometimes by referencing a rubric, sometimes by pointing to a communication goal, sometimes by recognizing a recurring weakness.

A social-presence pathway is activated when technology changes the social cost of participation. Visibility can work as a bridge or a barrier. When participation norms are clear and the environment feels safe, discussion threads, peer review functions, and shared works-paces can



normalize help-seeking and reciprocal contribution (Kajan, 2025). Autonomy enactment then appears as agentive interaction: a learner asks a precise question rather than waiting for correction; another offers an example or a reformulation that is taken up; a group negotiates meaning and adjusts a plan because someone’s feedback makes a problem visible. When those conditions are absent, the very same visibility can produce silence, strategic minimalism, or private workarounds. The mechanism is not “peer support exists” but whether the course makes support usable.

A cognitive-presence pathway becomes visible when tools are used to sustain inquiry rather than merely to complete tasks (Van Dorresteijn et al., 2024). Prompts that ask learners to compare alternatives, articulate a rationale, or connect a new performance to prior attempts can pull reflection into the workflow instead of leaving it as an afterthought. In blended EFL learning, this is often where autonomy either matures or stalls. Mature enactment looks like a learner naming a strategy shift (“I slowed down to check stress placement because my recording showed...”) or transferring a move from one task to another (“I used the same paraphrase technique in the seminar discussion”). Stalled enactment looks like surface completion with no record of sense-making. The mechanism is simple but demanding: the course must make meaning-making worth the time.

These pathways do not run in parallel lanes. A revision routine supported by teaching presence often depends on social conditions that make feedback credible and on cognitive conditions that make reflection intelligible. Conversely, a fragile link in any one presence can flatten the whole experience into compliance: learners keep clicking, submitting, and “participating,” yet the work does not accumulate into self-directed competence. This is why the paper treats pathways as interactional arrangements rather than as properties of tools.

### 3.2 Minimal evidence units and triangulation logic

Pathway language is cheap unless it is tethered to evidence. The aim here is not to convert autonomy into a rigid measurement instrument, but to specify what would count as a minimally convincing unit of evidence for each pathway. In practice, the most informative materials are rarely single indicators. They are short sequences that connect action to rationale: a change made, a reason given, an interaction taken up, a reflection that reshapes a next step (Valle Torre et al., 2024).

Triangulation strengthens these units by forcing each interpretation to survive contact with alternative readings. Interview accounts provide access to intention and experience, but they can drift toward post-hoc rationalization; observation and platform traces counterbalance that by showing timing, sequencing, and uptake. Course documents and assessment cues clarify what learners were responding to, preventing analysts from attributing agency where the design left no room for choice. Learner artefacts—drafts, recordings, reflections—are crucial because they carry the visible residue of regulation: what changed, what persisted, and whether the learner can account for the change in a way that aligns with the interactional conditions.

Two practical safeguards keep this roadmap from becoming a confirmation exercise. First, negative cases are treated as diagnostic: a learner may show high platform activity with weak enactment, or low visibility with strong private regulation. Second, competing explanations are actively tested. A “revision” may reflect genuine monitoring, or it may reflect copying; a burst of discussion may signal co-regulation, or it may be grade-driven performance. Mechanism claims should therefore be framed conditionally and supported by converging traces rather than by single, flattering examples.

With pathways specified and minimal evidence units made explicit, the paper can now turn to interruption points. The next section treats constraints not as a loose catalogue of problems but as predictable breakpoints—moments where the interaction structures needed for autonomy thin out, and enacted practice becomes difficult to sustain.

**Table 2** Compact evidence map for mechanism tracing

Pathway focus	Mechanism	Minimal evidence unit (illustrative)
Teaching presence	Guidance rhythm and feedback timing make revision actionable.	A revision chain (draft → feedback → targeted changes) plus a brief learner rationale for the changes.
Social presence	Participation norms and visibility make help-seeking and contribution usable.	A help-seeking episode and uptake (question → response → applied change or acknowledged learning).



Pathway focus	Mechanism	Minimal evidence unit (illustrative)
Cognitive presence	Inquiry prompts and reflection loops support meaning-making and transfer.	A reflective trace that links performance to strategy, and shows transfer to a later task.

*Note.* The table is developed by the authors to clarify minimal evidence units for analytic purposes rather than for measurement.

#### IV. Barriers as Breakpoints: Where Pathways Fail

If the pathways above describe how autonomy can be enacted when interaction structures hold, barriers describe the moments when those structures thin out. The point is not to compile every complaint associated with educational technology, but to name predictable breakpoints where the work of planning, monitoring, and reflective adjustment becomes difficult to sustain. Constraints are analytically useful when they are specified as interruptions on a pathway, rather than as generic “challenges” (Saqr, 2023).

Some breakpoints originate on the learner side, but they are rarely reducible to attitude. Digital and academic literacy gaps often act as hidden multipliers of self-management load, making routine platform tasks consume attention that would otherwise support language learning. In such conditions, planning collapses into reactive task completion, and monitoring becomes a check for deadlines rather than a check for learning. Motivation volatility follows not because learners are indifferent, but because the cost of staying oriented is high. A further break-point arises when external supports become substitutes for judgment. Dependency risk is most visible when learners outsource evaluation—accepting suggestions without being able to account for them—and then struggle to transfer performance when the support is absent (Zhai et al., 2024).

Other breakpoints are produced by pedagogy and assessment regimes. Autonomy enactment requires room for choice, yet that room can quietly disappear when assessment cues reward narrow compliance. When grades disproportionately privilege measurable outputs, platform traces can be reinterpreted as performance signals rather than learning resources, and learners adapt accordingly. Supervision gaps can amplify this drift: if feedback arrives too late to be used, or if criteria are opaque, revision becomes cosmetic. Task fragmentation is another common interruption. A course can be “active” online while still failing to accumulate coherence; learners click and submit, but do not build a storyline of growth. The clearest clue is the absence of continuity: work products do not refer

back to prior attempts, and reflection reads as generic rather than consequential.

System and AI-related constraints often appear mundane, yet they can decisively shape interaction structures. Usability friction—slow interfaces, confusing navigation, unreliable uploads—drains attention and encourages surface strategies. Fragmented tool ecologies can also splinter participation norms: learners are asked to perform different identities across platforms, with little clarity about what counts where. Opacity becomes a break-point when learners cannot tell why a recommendation, score, or dashboard signal was produced, making it hard to learn from it. Equally, when analytics are experienced as surveillance, they may suppress the risk-taking that language learning needs (Hatala & Nazeri, 2024). These constraints do not negate the pathways; they specify the conditions under which the same features shift from supportive to constraining.

Taken together, these breakpoints clarify why “technology helps” and “technology harms” are both too blunt. Autonomy is interrupted when guidance loses timeliness, participation loses safety, or inquiry loses meaning—often in combination (Johansen et al., 2023). This diagnostic framing also sets up the concluding task of the paper: to state what this re-conceptualization contributes, where it travels, and what a plausible next research agenda looks like.

#### V. Discussion and Conclusion: Contribution, Boundaries, and an Agenda

This paper has argued for a shift from verdicts to mechanisms. Technology should be analysed as an ecosystem of features that reorganizes interaction structures, and learner autonomy should be treated as enacted practice that leaves observable traces (Mesenhöller, 2025). The analytic gain is not merely terminological. It makes it possible to explain why the same tool can support autonomy in one blended EFL course and undermine it in another, without resorting to either optimism or alarm. By linking features to teaching, social, and cognitive presence, the framework also offers a common language for comparing studies that otherwise talk past one another.



At the same time, the framework travels only under stated conditions. Task type matters because it sets the space for choice: tightly specified tasks can stabilize routines yet compress agency, while open-ended tasks can invite ownership yet amplify overload. Assessment regimes matter because they shape what learners rationally optimize. Learner differences matter because they determine whether a feature reduces or increases the burden of self-regulation. The framework therefore invites conditional claims—about when particular interaction structures are likely to support autonomy enactment—rather than universal promises.

A practical agenda follows from this stance. Future empirical work can test mechanism claims by asking, for instance, whether a paced feedback rhythm is associated with revision chains that include learner rationales; whether specific participation norms lower the threshold for help-seeking and increase uptake; whether inquiry prompts produce transferable strategy talk rather than generic reflection; whether analytics are experienced as self-monitoring supports or as surveillance; whether apparent “AI-assisted improvement” persists when support is removed; whether low-visibility learners nonetheless show strong private regulation; and whether different task types shift which pathway dominates. These prompts are deliberately framed as testable mechanism questions, not as effect statements.

In closing, the paper offers a conceptual anchoring, a set of pathways, a diagnostic view of barriers, and a lightweight roadmap for evidence. Its central claim is modest but consequential: to understand autonomy in technology-mediated blended EFL learning, we need to document how interaction structures are built, how they thin out, and how learners enact regulation within them. Those are empirical questions, and they are answerable—provided researchers treat evidence not as an afterthought, but as part of the mechanism story from the start.

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