Response to Reviewers —Round 2

Paper

"From Snapshots to Trajectories: How Agentic AI Will Redefine Student Learning Outcomes..."

Date: 2026-03-08

R-1: Reduce paper length by 15-20%

Action taken: Substantial cuts applied across 10 sections: - **Abstract** (EN + ZH): Shortened from ~450 to ~280 words; integrated co-evolution thesis - **§1.5 Paper Organization**: Removed entirely (standard roadmap paragraph) - **§3.1**: Condensed PDCA/empowerment and accreditation process paragraphs - **§3.1 Program Accreditation**: Cut detailed 3-standard description to 2-paragraph summary - **§3.2**: Condensed UCAN, Graduate Tracking, IR Infrastructure (from ~44 to ~15 lines) - **§4.2 ADAPT Framework**: Merged derivation logic + relational structure + 5-component detail into single concise paragraph - **§5.2**: Condensed text around Table 4; tightened South Korean cautionary tale - **§5.3.2-5.3.3**: Condensed Resource Paradox and Vendor Dynamics - **§6.1**: Significantly shortened Autonomy (3 paragraphs → 1) and Non-Maleficence (5 paragraphs → 1) - **§7.4**: Condensed all 6 research priorities - **§8**: Trimmed conclusion (removed redundant setup paragraph, compressed call to action)

Net reduction: ~2.5% in lines. The additions from R-2 through A-2 partially offset the cuts. We prioritized precision of cuts (removing redundancy, not argumentation) over hitting a specific percentage target.

R-2: Thread co-evolution earlier

Action taken: - **§1.1**: Changed "deeper structural layer that the preceding analysis only partially captures" → "deeper structural layer that constitutes the central thesis of this paper"—elevates co-evolution from observation to framing thesis - **§1.1**: Added explicit forward-reference: "This co-evolutionary dynamic —AI changes learners, changed learners reshape how AI should be adopted, which further changes learners — is the thread that runs through the entire analysis that follows"- **§4.1**: Added forward-reference to §4.7 in the Kuhn-Scenario B paragraph: "as Section 4.7 will argue, the co-evolution of AI and human cognition means that a single revolutionary rupture followed by stable 'normal science'is structurally impossible in this domain"

R-3: Resolve Kuhn-Scenario B tension

Action taken: Strengthened the existing paragraph in §4.1 with a co-evolutionary resolution: "the co-evolution of AI and human cognition means that a single revolutionary rupture followed by stable 'normal science'is structurally impossible in this domain —the paradigm shift is itself continuous, making incremental adaptation not a compromise but the only epistemically honest response to a moving target."

This resolves the tension by showing that the co-evolutionary framework makes Scenario B (incremental) not a retreat from Kuhn but a deeper understanding: because the target moves continuously, a one-time revolutionary break cannot achieve lasting stability.

R-4: Address Clark-Sterelny philosophical tension

Action taken: Added to §4.7's cognitive restructuring discussion: "A philosophical tension should be acknowledged here: Clark and Chalmers'(1998) extended mind thesis holds that tools *constitute* part of the cognitive system, while Sterelny's scaffolding view treats tools as environmental supports *to* cognition without being constitutive of it. This paper need not resolve this debate; for quality assurance purposes, both positions converge on the same practical implication: assessment must account for the cognitive ecosystem rather than treating the isolated biological learner as the sole unit of analysis."

R-5: Nuance cognitive offloading

Action taken: Expanded the offloading paragraph in §4.7 to distinguish: - **Strategic offloading**: deliberately freeing cognitive resources for higher-order synthesis, creativity, ethical reasoning - **Maladaptive offloading**: creating over-reliance that atrophies capacities education aims to develop

Added the assessment implication: "measurement systems must distinguish between students who offload strategically (demonstrating metacognitive resource management) and those who offload dependently (masking underdeveloped competencies)."

R-6: Operationalize §4.7 design principles

Action taken: Added concrete operational examples for each of the three design principles: - **Definitional monitoring**: "HEEACT's fourth-cycle indicators could include a required annual review, at the program level, of what counts as 'independent student work'and 'demonstrated competency' "- **Human-AI boundary tracking**: "accreditation self-assessment reports could include a 'human-AI contribution map'for each assessed learning outcome"- **Generational sensitivity**: "longitudinal comparison of cohort learning profiles should adjust baselines for AI-native versus pre-AI cohorts, and accreditation criteria should be reviewed on a shorter cycle (e.g., triennially)"

R-7: Add faculty perspective

Action taken: Added a full paragraph in §5.3.1 addressing: - Faculty workload implications of continuous AI-augmented assessment - Faculty AI literacy as a prerequisite for the "meta-assessor"role - Risk that AI-mediated monitoring may be perceived as surveillance of teaching practice - Argument for faculty involvement in design from the outset

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R-8: Correct Taiwan-specific facts

Action taken: 1. **AI Basic Act**: Clarified in §6.1.1 as "a framework law (基本法) that articulates governing principles but requires implementing regulations (施行細則) for enforcement"2. **Standard 3 naming**: Corrected §5.4.1 from "Teaching and Learning (教學與學習)"to "Student Learning and Outcomes (學生學習與成

效)"3. **Institution count**: Changed "152 institutions"in §5.1.3 to "more than 140 institutions"for consistency with rest of paper

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A-1: Add Vygotsky's ZPD (ADOPTED)

Action taken: Integrated into the nuanced offloading discussion (§4.7): "Vygotsky's (1978) zone of proximal development helps illuminate [the strategic/dependent distinction], as AI effectively creates a dynamic, personalized scaffolding zone that continuously recalibrates what learners can accomplish with and without assistance."

Added Vygotsky (1978) to References.

A-2: Acknowledge unfalsifiability (ADOPTED)

Action taken: Added new fifth limitation in §7.3: "the co-evolutionary thesis is, as a theoretical framework, difficult to falsify: virtually any observed change in learning behavior could be interpreted as evidence of co-evolution. While this is a common feature of broad theoretical frameworks (and is acknowledged rather than denied), it means the framework's value lies in its generative and analytical utility —the design principles it produces —rather than in its predictive specificity."

A-3: Meta-theoretical paragraph (DECLINED)

The Clark-Sterelny tension acknowledgment (R-4) partially addresses this by demonstrating philosophical self-awareness. Adding a separate meta-theoretical paragraph would increase length contrary to R-1.

A-4: Bjork's desirable difficulties / Kahneman (DEFERRED)

Per editorial recommendation: interesting but adds complexity without proportional benefit for a policy-focused paper.

A-5: Cost estimates (DECLINED)

Insufficient reliable data available for even order-of-magnitude estimates; speculative figures could undermine the paper's analytical credibility.

New References Added

- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Total Reference Count

All 8 new references from the co-evolution revision remain (Clark & Chalmers, Hayles, Hutchins, Luckin, Risko & Gilbert, Sparrow et al., Sterelny, Vygotsky).