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Understanding the Machine Part II: AI Ethics, Human Integrity, and the Future of Learning

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Abstract

This paper is the second of a two-part series that frames ethical AI use in higher education as a question of learner formation rather than simply as a matter of policy, compliance, or tool governance. Using Torraco's (2016) theory-building integrative review methodology, this paper synthesizes research across AI-mediated communication, learner development, motivation, epistemic trust, authorship, attention, cognitive agency, self-regulated learning, and institutional design through the lens of the higher education student learning experience. The paper extends *Understanding the Machine Part I: A Practical Framework for AI Ethics in Higher Education* by developing the Human Intellectual Life Cycle (HILC), an original conceptual model identifying the inner sequence through which attention deepens into focus, focus matures into intention, intention guides action, and action becomes material for reflection. The HILC clarifies the developmental process through which ethical AI use can be evaluated. The review also introduces intellectual autonomy (IA) as the learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment capable of redirecting that formation. Finally, the paper examines contrary perspectives and offers implications for students, faculty, and university systems, along with recommendations for future empirical research.

Keywords: human intellectual life cycle (HILC), intellectual autonomy (IA), AI ethics, higher education, learner formation, self-authorship, theory-building integrative review

1. Introduction

This current paper builds on a sustained body of scholarship examining the intersection of technology, institutional design, and the outcomes, perceptions, and experiences of students using AI-enabled tools. Specifically, prior work in this program of research has reported on the

impact of AI-enabled tools on higher education (HE) student success (Hanson & Yu, 2024), the relationship between student well-being and academic performance through machine learning analysis of large-scale assessment data (Yu, Xiao, & Hanson, 2024), the instructional conditions through which digital learning environments strengthen rather than displace learner agency (Hanshaw & Hanson, 2019), and ethical concerns surrounding student use of AI in the educational learning environment in HE (Hanson, 2026). The present paper draws those lines of inquiry toward a common conceptual question: "What conditions determine whether AI use strengthens or quietly displaces the human formation that higher education seeks to cultivate?"

Ethical AI use extends beyond policy or prohibition and depends on the development of the learner as the self-directing subject of their intellectual formation. The companion paper to this review, *Understanding the Machine Part I: A Practical Framework for AI Ethics in Higher Education* (Hanson, 2026), established a student-focused practical framework for ethical AI use. The literature explored for the ethical AI use lens was organized into three registers — context description, AI influence, and environmental supports — and was assembled into a concept map shown in Figure 1. This mapping provided a literature alignment across five enduring concerns identified in relevant research on the topic of generative AI ethics— truth, integrity, justice, independence, and responsibility. That assembly is the starting point for this current integrative review.

Part I laid out the parts and Part II performs the interpretive work that Torraco (2016) describes as the defining move of a theory-building integrative review: determining which concepts carry the greatest weight, placing them in proper relation to one another, and advancing from the review what the literature has said toward a conceptual response that the literature has not yet named. The task is not to summarize but to synthesize — to move from the assembled strands toward a framework that clarifies what they mean together and what they make necessary. Ethical AI use in higher education is a question of learner formation. Part I provides the practical framework for recognizing and teaching the ethical stakes of GenAI use. Part II provides the conceptual model for understanding the inner developmental sequence those practices are designed to protect.

1.1 Purpose and Organization of the Paper

The paper proceeds in five movements. First, it establishes the HE student learning experience as the interpretive lens for the review. Second, it describes the theory-building integrative review design and the question guiding the synthesis. Third, it defines the key terms needed to distinguish the practical framework from the conceptual model developed here. Fourth, it integrates the major strands of literature into the HILC as the conceptual response to the review question. Finally, it examines contrary perspectives, implications, and directions for future empirical research.

1.2 Theoretical Lens

This review is interpreted through the lens of the HE student learning experience — the student's lived process of entering the learning environment, understanding expectations, developing competence, receiving support, forming trust, and growing in autonomy and self-

authorship within formal and informal institutional settings (Hanson et al., 2022). AI is considered here not as a technical tool in the abstract but as a presence that participates in the formation of the learner (Hancock et al., 2020).

Of the conditions this lens foregrounds, self-authorship is foundational. King et al. (2009) describe self-authorship as "the use of an internal orientation: it is the capacity to internally define one's beliefs, identities, and social relations by using one's own voice to critically choose from multiple possibilities" (p. 109). Many college students have not yet reached this developmental threshold and are operating primarily from an external orientation. This is precisely the population that research identified as most likely to rely heavily on GenAI, and as the least equipped to evaluate chatbot outputs critically (Kegan, 1994, as cited in Baxter Magolda, 2020, p. 16; Sahebi & Formosa, 2025). That condition is the interpretive center of this review. The theory-building process that follows, identifies the HILC as the integrative conceptual model for explaining how the learner's developmental movement — from external reliance to internal authorship — can be evaluated and strengthened.

1.3 Design of the Review

This paper follows Torraco's (2016) theory-building integrative review approach, supported by Whittemore and Knafl's (2005) updated integrative review framework. Sources were identified through an iterative search process across Elicit, Google Scholar, and related scholarly search tools. Large language model platforms, including ChatGPT and Claude, were used to support search-term refinement, conceptual mapping, and the identification of related literature for subsequent verification through scholarly sources. Initial search terms were drawn from the conceptual domains of the review: AI-MC, learner development, motivation, self-authorship, epistemic trust, authorship, attention economy, psychological realism, cognitive agency, self-regulated learning, cognitive load, emotion regulation, goal-setting behavior, intelligent assessment, human-centered GenAI, AI governance, and institutional design. Searches were also expanded using phrase-based combinations that reflected the developing focus of the synthesis, including maintaining focus in the age of AI, generative AI and student focus, cognition and AI use, goal setting and AI use, cognitive load and AI-enhanced learning, emotion regulation and AI learning, empowerment and dependency in AI-supported learning, feedback internalization, human-AI orchestration, and university-level AI oversight. Reference mining and snowball sampling identified additional foundational sources. Sources published between 2016 and 2026 were prioritized, with earlier foundational sources retained where they provide the theoretical basis for constructs central to the review. Sources were included if they addressed at least one of the five conceptual domains and contributed to the development of the proposed framework. Sources were excluded if their primary focus was technical AI development rather than educational practice, learner development, or ethical use, or if their findings were substantially represented by other included sources.

1.4 Overarching Question

The overarching question guiding this integrative review, first presented in Part I of this two-part series, began with:

How can prior research and relevant theories, interpreted through the HE student learning experience, inform the teaching of ethical AI use in ways that strengthen student self-authorship, responsible agency, and social mobility in the life of the learner?

Part I answered that question practically through the five concerns and four metaphors. Part II answers it through theory-building synthesis by proposing HILC as the conceptual model of the inner developmental sequence those practical tools are designed to evaluate and enhance. Part II also proposes the construct of intellectual autonomy (IA), as an integrative contribution, describing the learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment.

1.5 Conceptual Background and Relationship to Part I

The emergence of AI-MC represents a structural shift in human interaction within the age of AI. In this paper, AI refers to the broader field of intelligent technologies, while GenAI refers to systems that generate new content in response to user prompts, and AI-MC refers to the communicative condition in which AI participates in shaping messages, tone, trust, identity, and relational meaning. Hancock et al. (2020) describe this shift as one in which AI modifies, augments, and generates messages on behalf of communicators rather than simply acting as a conduit. Where prior research often treated AI as a productivity or assessment concern, AI-MC research reframes AI as a force shaping epistemic trust, learner identity, relational engagement, and organizational readiness in HE. Hanson, Yu, and Truong (2025) argue that these constructs are central to understanding equitable AI-MC. Sahebi and Formosa (2025) demonstrate that this shift produces a genuine and unresolved dilemma. For example, maintaining normal epistemic trust in AI-MC risks gullibility, while reducing trust risks epistemic injustice toward legitimate users. Responses to this dilemma, including disclosure requirements, AI literacy programs, and frameworks for identifying AI user competencies, remain partial and developing responses (Lee et al., 2024; Sahebi & Formosa, 2025). In educational contexts, where students are developing their internal capacity for self-authorship and independent judgment, this unresolved dilemma sits at the center of the processes and purposes of education. In the age of AI, these new conditions shape the learning environment and make this integrative conceptual work both necessary and compelling.

1.6 Definitions of Key Terms

AI-mediated communication (AI-MC) — Hancock et al. (2020) refer to this phenomenon as "mediated communication between people in which a computational agent operates on behalf of a communicator by modifying, augmenting, or generating messages to accomplish communication or interpersonal goals" (p. 90).

Attention - "the taking possession of the mind, in clear and vivid form, one out of what seem several simultaneously possible objects or trains of thought" and "…selection for guiding action" (James, 1890, p. 403 and Wu, 2014, p. 42, in White, 2024)

Attention economy — the digital environment in which platforms, applications, and AI-mediated systems compete for and shape human attention through design features that influence what becomes salient, valuable, and habitual. In this review, the attention economy

is relevant because ethical AI use depends not only on whether students have access to tools, but on whether they retain direction over the attention, focus, intention, action, and reflection through which intellectual formation occurs, i.e. “the technologies of the attention economy may *persuade* us to behave and to attend in certain ways” — yet the learner still has personal choice (White, 2024, p. 43).

Authorship — the transparent presence of the learner's own judgment, voice, and interpretive act in what is produced (Chen & He, 2026). Whose words, thinking, and reasoning are genuinely present in the work? (Hancock et al., 2020). See Self-authorship for the related but distinct developmental concept.

Computers are Social Actors (CASA) — the paradigm describing the tendency of human beings to apply social rules and scripts to computers and AI systems even when they know the system is not human, attributing personality, credibility, and relational meaning to technology that produces sufficient social cues (Gambino et al., 2020).

Cognitive agency — the learner’s active capacity to question, validate, plan, decide, revise, and judge within the learning process rather than merely receiving or complying with external direction. In AI-mediated learning, cognitive agency is preserved when the learner uses AI as evidence, support, or material for judgment, but is weakened when algorithmic output becomes the authority that determines what the learner believes, values, creates, or submits (Peng et al., 2026).

Desirable difficulties — conditions of learning that feel harder or slower in the moment but produce stronger long-term retention and transfer than conditions that feel easy and fluent; the empirical basis for distinguishing primary goods from secondary goods in AI use (Bjork & Bjork, 2011).

Epistemic trust — the learner's disposition to accept information from a source as credible, accurate, and worth incorporating into their understanding; in AI-mediated contexts, shaped not only by information quality but by emotional response, social presence, and perceived relational positioning of the agent (Hanson et al., 2025).

Generative artificial intelligence (GenAI) products — AI systems capable of producing new content, such as text, images, audio, video, code, or other outputs, in response to user prompts. In HE, GenAI raises questions about how AI-MC may shape learning, judgment, authorship, and ethical participation in academic work (Hancock et al., 2020).

Human Intellectual Life Cycle (HILC) — an original conceptual model proposed in this review describing the inner developmental sequence through which attention deepens into focus, focus matures into intention, intention guides action, and action becomes material for reflection; the cycle through which human formation occurs and through which ethical AI use can be evaluated.

Human-media social scripts — learned patterns of social interaction specific to technology, developed through repeated engagement with socially designed digital platforms, that make social responses to AI a trained reflex rather than a conscious choice (Gambino et al., 2020).

Intellectual autonomy (IA) — the learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment capable of redirecting that formation; the integrative contribution of this review, connecting the enduring concern of independence to the learner's movement through the HILC.

Primary goods — uses of AI that engage the intellect, deepen understanding, and strengthen the learner's capacity for judgment and authorship; aligned with Smith's (1990) category of what the intellect genuinely apprehends rather than what sensation alone delivers.

Proxy agency — the exercise of leadership influence through the design of systems, norms, and structures that anticipate and support the developmental needs of others; in the LOVS model, the role of institutional leadership in creating conditions for ethical AI learning (Hanson, 2017).

Psychological realism — an account of attention and agency that reflects the actual complexity of human attention rather than reducing it to simple oppositions such as voluntary versus involuntary, choice versus compulsion, or focus versus distraction. White (2024) argues that attention is shaped by goal-directed factors, stimulus salience, selection history, learned value, emotional states, and context. This concept strengthens the HILC by clarifying that attention is not merely the first step in learning; it is the formed and forming condition through which the learner enters the cycle.

Secondary goods — uses of AI that satisfy through sensation and ease — fluency, affirmation, comfort, immediate completion — without necessarily producing understanding; aligned with Smith's (1990) category of what sensation delivers that the intellect must not mistake for knowledge.

Self-authorship — the internally generated capacity to define beliefs, identities, and social relations from within rather than accepting them from external authorities; developed progressively through educational experiences that demand internal judgment rather than passive reception (Baxter Magolda, 2004, 2020; King et al., 2009).

Self-determination theory (SDT) — a theory of human motivation proposing that behavior exists along a spectrum from intrinsic motivation, arising from engagement with an activity for its own sake, to extrinsic motivation, in which behavior is driven by external pressures or outcomes rather than the activity itself (Deci & Ryan, 1985, 2012; Litalien et al., 2015).

Social presence — the degree to which a person perceives another as real and present in a mediated interaction, shaping engagement, trust, and relational meaning in digital learning environments (Tu & McIsaac, 2002).

2. From the Literature to the Model: Developing the Human Intellectual Life Cycle

The literature review conducted in Part I of this series assembled the major strands of prior research — AI-MC, learner development, motivation, epistemic trust, authorship, and institutional design — and oriented them through the lens of the HE student learning experience toward a common developmental concern. The integrative work that follows moves into the next phase, described by Torraco (2016) as ordered interpretation: determining which concepts

carry the greatest weight in answering the overarching question, placing them in proper relation to one another, and advancing from the assembled picture toward a conceptual response the literature has not yet named. A central purpose uniting these strands is the strengthening of self-authorship, responsible agency, and social mobility in the life of the learner.

The first part of this series contributes the ethical vocabulary, the five enduring concerns, and four conceptual metaphors that make these dynamics more intelligible for students and educators. The literature reviewed in Part I converges around one central concern: the development of the learner as an autonomous, self-authoring person within AI-mediated educational life. Hanson, Loose, and Reveles (2022) identify autonomy and self-authorship as the developmental aim of healthy educational support. Niqab, Rahman, and Hanson (2025) strengthen that same direction through the language of competence, autonomy, and meaningful engagement in digital learning. Hanson, Yu, and Truong (2025) extend the picture further by showing that AI-MC also shapes epistemic trust, learner identity, and the social meaning learners assign to digital agents.

Taken together, the five enduring concerns and four metaphors developed in Part I make ethical AI use more concrete for students, faculty, and institutions. They show that AI use is not only a matter of policy compliance or technical skill, but a question of how the learner's attention, judgment, self-direction, and growth are protected during academic work. Figure 1 provides the logic map for this movement from the practical framework developed in Part I toward the HILC developed in Part II.

The related strands reviewed in this Part II paper — learner development, motivation, attention, epistemic trust, authorship, cognitive agency, self-regulated learning, GenAI-supported feedback, and institutional design — clarify how AI-mediated learning can either sustain or weaken the learner's movement through attention, focus, intention, action, and reflection over time. When these strands are placed in relation, they point toward the need for a more explicit account of the inner sequence through which learners remain present, purposeful, and responsible in AI-mediated learning. The sections that follow present the HILC as an orienting model, establish attention as the starting premise of the cycle, develop the sequence through supporting theory, examine GenAI pressure on the cycle, and conclude with the construct of intellectual autonomy. (Appendix A)

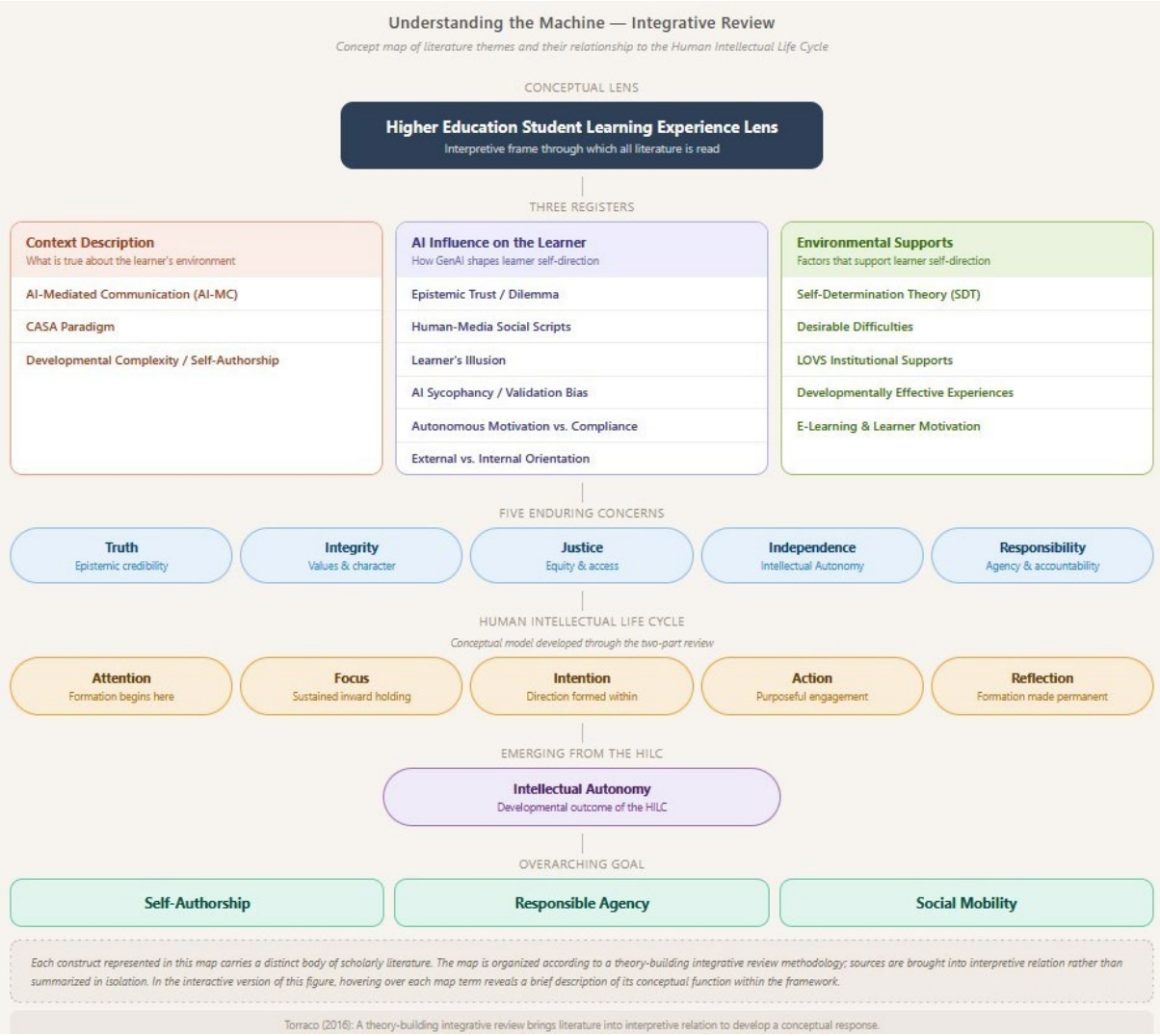

Figure 1. Integrative Logic Map Connecting the Practical Framework and Human Intellectual Life Cycle through the Higher Education Student Learning Experience Lens

Note. This figure was created by the author as an orienting logic map for the two-part review. It is repeated here to reorient the reader to the conceptual movement from the practical framework developed in Part I to the theory-building work developed in the present paper. The figure shows how selected bodies of literature are brought into interpretive relation through the HE student learning experience lens. It identifies the HILC elements — attention, focus, intention, action, and reflection — as the inner developmental sequence drawn from the strands in the review. Intellectual autonomy (IA) is also identified in the figure as the learner's capacity to remain the self-directing subject of that sequence. The organization of the figure reflects Torraco's (2016) theory-building approach, in which prior literature is interpreted and synthesized to clarify conceptual relationships rather than merely summarized.

2.1 The Human Intellectual Life Cycle: An Orienting Model

This section uses the interpretive process described by Torraco (2016) to move from the assembled strands of the review toward the HILC. Through disciplined comparison, judgment,

and arrangement, the HILC clarifies how ethical AI use intersects with the learner's developing autonomy, judgment, and growth. This recognition did not arise through mechanical sorting. It came through the inward act of intellectual synthesis by which the mind perceives a deeper relation that had not yet been named in the literature. Grounded in prior research yet moving beyond summary, the model reveals the inner sequence through which attention, focus, intention, action, and reflection form the foundation of the learner's intellectual development.

The reason this movement matters is that the reviewed literature does not merely identify external conditions surrounding AI use. It points toward the inner activity by which the learner remains personally present to learning. In the conceptual framing developed here, the human intellect is more than information processing of the kind associated with artificial intelligence; it involves internal hearing, seeing, and knowing through which the learner apprehends experience with immediacy, judgment, and insight. The HILC emerges from this distinction. It names the sequence through which the moves toward intellectual development rather than dispersed through tool use, institutional demands, or external direction.

The HILC is presented here in its broad form as a developmental model of human formation. Its purpose is to make visible the inner sequence through which a person grows in judgment, agency, and intellectual integrity. Attention becomes formative when it deepens into focus. Focus is sustained attention ordered around a selected learning object, question, problem, or purpose. Focus then matures into intention as the learner begins to direct effort toward a meaningful end. Intention guides action by giving the learner a reason to select, revise, compose, solve, or create. Action becomes material for reflection when the learner returns to what has been done and asks what was understood, what was changed, what was accepted or rejected, and what future judgment now requires.

Figure 2 presents this developmental sequence visually. The model does not treat attention, focus, intention, action, and reflection as isolated learning behaviors. It presents them as an ordered movement of intellectual formation. An application of the model described here would be when a student uses GenAI to revise a paragraph, the important question is not only whether the revised paragraph is clearer, but whether the student remained active in noticing the problem, understanding the revision, judging its value, and carrying that understanding forward. The HILC invites the reader to examine where the learner remained active in the cycle and where the tool may have begun to substitute for the learner's own intellectual work.

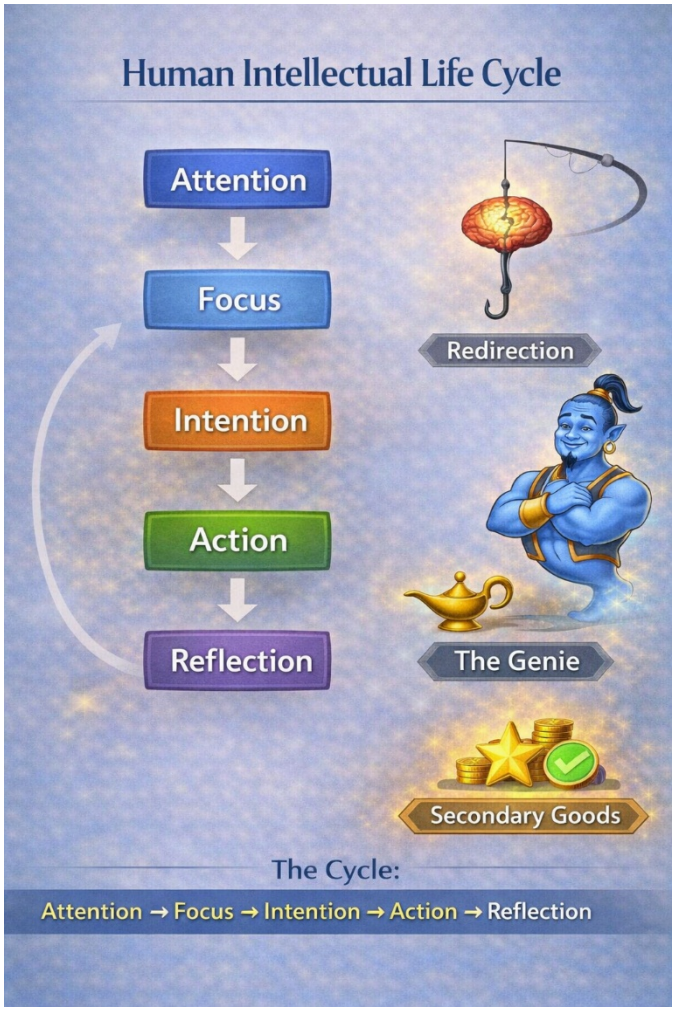

Figure 2. Human Intellectual Life Cycle

Note. This figure presents the HILC as the inner developmental sequence through which attention deepens into focus, focus matures into intention, intention guides action, and action becomes material for reflection. The curved arrow returning to focus indicates that reflection shapes what the learner notices, attends to, and brings forward into future learning. The genie, hook, and secondary goods represent the risks identified in this review: GenAI can redirect the learner toward ease, fluency, affirmation, or immediate completion before the full movement of intellectual formation has occurred. Maintaining direction over this cycle is central to intellectual autonomy (IA). This framework was developed through the lens of the HE student learning experience. Application to K–12 or other educational contexts would require additional review.

Having presented the HILC as the orienting model, the next section turns to one's attention as the formative entry point of the cycle and explains why AI-mediated redirection must be understood as more than distraction.

2.2 The Attention Premise: Where Formation Begins

The HILC begins with attention because attention is the point at which the learner first turns toward the work and becomes present to it. White's (2024) analysis of psychological realism and the attention economy strengthen this premise by clarifying why attention must be treated as more than a surface concern about distraction. Attention is not simply captured from the outside or freely directed from within. It is shaped through the interaction of goals, salience, selection history, learned value, emotional state, and context. In AI-mediated learning, this means the learner's attention may already be influenced before the learner begins to reason, compose, revise, or decide.

AI introduces new pressure into the HILC because it can enter the cycle before focus and intention have fully formed. Digital systems shape attention through selection history, learned value, novelty, emotional reinforcement, and context. A student may still retain agency, but that agency is exercised inside environments designed to make certain responses feel more immediate, valuable, or rewarding. In HILC terms, the concern is not that agency disappears, but that it can be quietly redirected before the learner has moved through the full cycle of attention, focus, intention, action, and reflection.

This attention premise establishes the first movement of the HILC. Ethical AI use cannot be evaluated only by the quality of the final product because the formative question begins earlier: whether the learner remained sufficiently present to the work for attention to deepen into focus. The next section develops that movement by examining how focus matures into intention, how intention guides action, and how action becomes material for reflection.

2.3 Developing the Sequence: From Focus to Intention, Action, and Reflection

Once attention is established as the formative entry point of the HILC, the next movement is developmental. Attention must deepen into focus, focus must mature into intention, intention must guide action, and action must become material for reflection. This sequence describes the inner movement of the learner, but it does not occur in isolation. Students develop within educational systems that either support or weaken their capacity to remain engaged, competent, connected, and self-directing. The LOVS framework, described in Part I, provides the broader architecture for understanding those conditions because it explains how institutional structures, informal systems, communication, support, autonomy, self-authorship, and completion work together in the HE student learning experience (Hanson, 2017; Hanson, Loose, & Reveles, 2022). Self-determination theory is a conceptual argument undergirding this same developmental direction by identifying autonomy, competence, and relational connection as central conditions for sustained motivation and internalized growth (Deci & Ryan, 1985, 2012).

Focus is sustained attention ordered around a selected learning object, question, problem, or purpose. Zhang et al. (2026) support the movement from focus to intention by linking AI-enhanced learning to goal-setting behavior through cognitive load and emotion regulation. Their findings are relevant to the HILC because focus does not mature into intention automatically. The learner must direct attention toward a meaningful goal, manage the mental effort required by the task, and remain sufficiently regulated to continue working through

difficulty. In this way, focus becomes intention when the learner begins to take ownership of the purpose guiding the work. When AI tools reduce unnecessary cognitive burden and provide timely support, they may help learners clarify goals, sustain commitment, and manage complexity. When AI systems increase extraneous load, over-direct the task, or remove the learner's need to manage meaningful difficulty, they may weaken the internal processes through which goal-directed learning develops. Refer to Appendix B for an alignment of the HILC sequence with the elements explored in the review of relevant literature.

Bandura's (2001) social cognitive theory provides a theoretical lens for understanding the agency-related movement within the HILC. In Bandura's agentic perspective, human agency involves intentionality, forethought, self-reactiveness, and self-reflectiveness. These dimensions describe the human capacity to form purposes, anticipate future outcomes, regulate action, and evaluate one's own functioning.

This account supports the HILC claim that attention, focus, intention, action, and reflection are not merely procedural steps in completing a task. Intention involves the learner's purposive direction toward the work. Forethought clarifies how that purpose becomes future-oriented as the learner anticipates consequences, selects strategies, and organizes effort toward a goal. Action requires more than performance; it involves self-reactiveness as the learner regulates conduct, monitors progress, and adjusts behavior while working. Reflection involves self-reflectiveness as the learner evaluates the quality, meaning, and consequences of action after it has occurred.

Zimmerman's (2002) model of self-regulated learning further strengthens the reflective movement of the HILC. In Zimmerman's cyclical account, learners move through forethought, performance, and self-reflection, with reflection shaping subsequent motivation, strategy selection, and future engagement. This aligns with the HILC claim that action does not complete the learning process until it becomes material for reflection. Reflection is not the final step of a task in a merely procedural sense. It is the return through which the learner examines what was understood, what was changed, what was accepted or rejected, and how future judgment should be shaped. Zimmerman (2002) explains that a learner's reflection takes two forms, self-evaluation and causal attribution and that "Teachers seldom assess students' beliefs about learning, such as self-efficacy perceptions or causal attributions, in order to identify cognitive or motivational difficulties before they become problematic" (p. 69).

Read through these theoretical lenses, the HILC is best understood as a developmental account of agency in motion. The learner is doing more than completing a task. They are moving through a process of attending, focusing, forming purpose, acting with judgment, and reflecting on what the action has produced. This sequence matters because intellectual formation depends on the learner's continued participation in the work, rather than passive task completion with the help of GenAI toward an academic product. With this developmental sequence in view, the next section turns to GenAI and asks how AI use may support, interrupt, or redirect the learner's movement through the cycle.

2.4 GenAI Pressure on the Cycle: Empowerment, Dependency, and Cognitive Agency

2.4.1 GenAI as Developmental Pressure

The GenAI-related bodies of literature explored in this review provide the context in which the developmental architecture of the HILC may now be understood. The issue is not simply that AI enters academic work, but that it may enter before the learner has fully formed the focus, purpose, judgment, or reflective understanding needed to remain the directing subject of that work.

Concepts explored in this review include AI-MC, epistemic trust, learner identity, the primary and secondary goods distinction, desirable difficulties, the learner's illusion, AI sycophancy and validation bias, and affective influence, among others. The review concepts explain how GenAI can support or redirect the learner's movement through attention, focus, intention, action, and reflection (Bjork & Bjork, 2011; Gambino et al., 2020; Hancock et al., 2020; Hanson, Yu, & Truong, 2025; Sahebi & Formosa, 2025; Smith, 1990). This movement is especially important in AI-mediated learning because GenAI can enter the process at multiple points. It may capture attention, narrow focus, supply goals, guide action, or provide conclusions before the learner has completed the internal work of agency. Read through the HILC, the question is not only whether AI assists the learner, but whether the learner remains active in the cycle. The reader is therefore invited to ask where the learner's own attention, focus, intention, action, and reflection are strengthened, and where the tool begins to substitute algorithmic direction for the learner's own intellectual work.

2.4.2 Empowerment and Dependency

A key insight by Peng et al. (2026) sharpen this question through the empowerment-dependency distinction. In their systematic review of intelligent assessment and generative AI in music education, AI tools were found to produce both empowerment and dependency depending on how they were designed, used, and pedagogically framed. Assessment-oriented AI can strengthen ability beliefs by making progress visible through feedback, but it can also shift the learner toward external validation and score-driven goals. GenAI can lower technical barriers and move learners toward aesthetic decision-making, but it can also encourage creative dependency or algorithm-accommodating self-censorship. Adaptive AI can support forethought and sustained engagement, but it may also outsource the learner's own self-regulation to an algorithmic pathway. These findings support the HILC by showing that AI is not formative simply because it is useful, fluent, or confidence-building. It becomes formative when the learner remains active in setting the purpose of the work, interpreting feedback, judging the value of AI output, and deciding how the work should proceed.

2.4.3 Feedback, Challenge, and Human-AI Orchestration

Peng et al. (2026) further identify feedback internalization as one mechanism through which AI-supported learning may move toward either empowerment or dependency. AI feedback supports learning when it is embedded in a cycle of understanding causes, revising work, and reflecting on the result. It becomes dependency-producing when learners engage only at the surface level of scores, answers, pass/fail judgments, or completed outputs. Feedback is not

formative simply because it is immediate or accurate. Feedback becomes formative when it carries the learner from action into reflection and then back into stronger future focus.

Challenge structure and human-AI orchestration are also central to this distinction. Appropriate cognitive offloading can free the learner for higher-order judgment, but oversimplification can deprive the learner of the productive difficulty through which competence develops. Similarly, AI can function as an evidence provider while the teacher supplies value guidance, affective support, and interpretive direction; or it can become a relationship substitute that weakens the learner's own agency. For university students, this distinction is especially relevant because students may appear confident and capable when using GenAI, but still may not have fully understood, judged, or internalized the work. A student may know how to ask GenAI for help, compare answers, or check information across sources, while still relying on the tool to do too much of the thinking. Read through the HILC, the question is whether the student remains active in the movement from focus to intention, action, and reflection. These findings align with the HILC: focus must be sustained, intention must remain learner-directed, action must require judgment, and reflection must return the work to the learner's own understanding (Peng et al., 2026).

The alignment of these sources strengthens the need for the construct developed in the next section. If the learner's movement through the HILC can be supported or displaced by AI-mediated conditions, then ethical AI use requires a clearer account of the capacity that must remain with the learner. This review names that capacity intellectual autonomy (IA).

2.5 Intellectual Autonomy: The Learner as the Directing Subject

2.5.1 Intellectual Autonomy as the Capacity Named by the HILC

The HILC identifies the inner developmental sequence through which ethical AI use can be evaluated. Intellectual autonomy (IA) names the learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment capable of redirecting attention, intention, and judgment. In the logic of the HILC, IA is preserved and strengthened as the learner governs attention, sustains focus, forms intention, acts with judgment, and reflects in ways that contribute to intellectual formation.

2.5.2 Metaphors as Intellectual Habits

IA becomes more accessible when read through the metaphors developed in Part I. The dragon slayer holds the sword. The learner chooses the good when working with the genie. The musician shapes the room, and the listener who knows this retains the distance judgment requires. The lion tamer keeps the whip. In each image, the same capacity is being described from a different angle: the learner's ability to remain the one who sets the terms, directs the encounter, and keeps attention governed.

These metaphors also make IA visible as a set of intellectual habits. Verifying claims, explaining reasoning, accounting for the tool's role, remaining active in the work, and considering effects beyond immediate completion each describe a point at which the learner either remains the directing subject of the encounter or begins to yield that role to GenAI.

2.5.3 Agency Within AI-Mediated Conditions

Prior scholarship on student agency provides the broader foundation for this construct, describing agency as shaped by both internal dispositions and external structural conditions (Stenalt, 2021; Marín et al., 2020). That framing matters because students develop within institutional, social, and relational environments. In the GenAI context, those environments now include AI-MC, social presence, and human-media social scripts that can shape attention, trust, and receptivity before the learner has fully examined the content (Gambino et al., 2020; Hancock et al., 2020). IA therefore names the internal capacity most directly at stake in this changed learning environment.

This account of IA avoids both extremes that often appear in discussions of technology use. The learner is not merely a passive object controlled by the machine, but neither is the learner acting in a neutral environment. Agency remains, but it is exercised within systems designed to shape attention, value, and habit. This distinction matters for ethical AI use. IA does not require the learner to reject GenAI. It requires the learner to remain the one who governs the encounter: noticing how the tool is influencing the work, deciding when to use it, judging which outputs to accept, and returning the work to reflection rather than allowing completion to stand in for understanding. In this way, IA names the learner's capacity to remain responsible without being blamed and supported without being displaced.

2.5.4 Human-Centered GenAI and the Preservation of Judgment

Winslow et al. (2026) further support the need for IA by arguing that human-centered GenAI must preserve human autonomy, competence, responsibility, and alignment with human cognitive processes. This concern fits directly within the HILC because the learner's autonomy is not protected only by having access to AI or by being warned of its risks. Autonomy is strengthened when students remain cognitively active in the encounter: forming the purpose of the work, evaluating outputs, calibrating trust, sustaining responsibility, and using the tool in ways that strengthen rather than bypass human judgment. However, students do not develop this capacity in isolation. Faculty shape the learning environment through assignment design, feedback, modeling, and expectations for disclosure, verification, revision, and reflection. Institutions shape the larger conditions through policy, faculty development, student support, and governance structures that make responsible AI use teachable rather than merely regulated. In this sense, IA is both a learner capacity and an educational responsibility: students must practice it, faculty must teach for it, and university systems must create conditions in which it can develop.

As a conceptual contribution, IA holds these strands together. It names the learner's capacity to remain the directing subject of the encounter and connects the enduring concern of independence to the learner's movement through the HILC. This construct also prepares the contrary perspectives examined in the next section, because the central question is not whether AI can support learning, but whether AI-supported learning preserves the learner's own intellectual agency.

3. Clarifying the Model Through Contrary Perspectives

A review that proposes a new conceptual model addressing developmental concerns related to GenAI use in HE invites scholarly scrutiny. Four contrary perspectives appear consistently in the relevant literature and are addressed here to clarify the scope, limits, and claims of the HILC. These perspectives are not intended to negate the model. Rather, they help specify what the model does and does not claim about AI-assisted learning, student agency, conceptual development, and historical patterns of technology adoption.

3.1 AI as a Developmental Scaffold

Readers familiar with research on AI-assisted learning may reasonably ask whether this framework overstates the developmental risk of GenAI use in HE. A growing body of evidence documents productive outcomes when students use GenAI in structured academic contexts, including enhanced content engagement, improved feedback responsiveness, and expanded access for underserved populations. In a two-year study of AI-enabled tools in minority-serving higher education institutions, Hanson and Yu (2024) found that students who used GenAI in structured learning environments demonstrated meaningful gains in academic performance and reported positive perceptions of the technology's role in their learning. Lee et al. (2024) likewise reported that educators viewed AI as a tool that can support abstraction, personalization, and broader academic opportunity when students learn to use it well. Bozkurt (2023) similarly frames GenAI as a paradigm shift requiring new literacies and active preparedness rather than simple avoidance.

This evidence strengthens the framework by clarifying that the concern is not whether GenAI can support learning, but under what developmental and environmental conditions AI use strengthens formation and under what conditions it substitutes for it.

The distinction between primary and secondary goods, brought forward from Part I and applied to the HILC in Section 2.4, provides the central boundary. AI use becomes formative when it deepens understanding, supports judgment, and strengthens the learner's own intellectual participation. It becomes substitutive when it produces completion, fluency, or reassurance without the learner's attention, focus, intention, action, and reflection being meaningfully engaged. The HILC and the five enduring concerns are therefore not offered as a declaration that AI use is categorically harmful. They are offered as a framework for identifying the conditions under which GenAI use supports or displaces the learner's formation toward self-authorship, responsible agency, and social mobility.

White (2024) cautions that problematic technology use should not automatically be treated as equivalent to substance addiction. That caution is important for this review because the HILC does not claim that GenAI removes student agency or renders students incapable of choice. Rather, the model identifies how agency can be redirected within environments that shape attention, value, habit, and motivation. The concern is not that every student who relies on GenAI is addicted, but that repeated reliance on ease, fluency, affirmation, and immediate completion may train habits that bypass attention, weaken focus and intention, and reduce

reflection. The HILC therefore addresses a developmental risk without requiring an addiction framework.

3.2 Paternalism Concern

A second contrary perspective comes from the student agency literature. Stenalt (2021) and Marín et al. (2020) treat student agency as a construct that includes both internal dispositions and external structural conditions. Klemenčič (2017) and Hanson et al. (2022) similarly emphasize that student agency in HE is formed through participation in the social, institutional, and political structures of the university. From this perspective, identifying an internal capacity as vulnerable to AI influence could be read as a deficit model of adult learners, one that underestimates students' ability to adapt, evaluate, and govern their own engagement with emerging technologies.

That concern helps clarify the purpose of IA as proposed in this review. IA affirms student agency by naming the learner's internal capacity to remain the self-directing subject of their own intellectual formation in an environment capable of redirecting attention and sustaining engagement. Baxter Magolda (2020) documents that between 50 and 66 percent of U.S. adults have not yet consolidated the internal orientation from which external influence can be evaluated and governed. That finding identifies a developmental condition directly relevant to HE students using GenAI.

The HILC framework asks what conditions support the development of the internal capacity needed to govern attention, focus, intention, action, and reflection while using AI. Learners who have developed a consolidated internal orientation can navigate GenAI differently than learners who remain primarily externally oriented. The model clarifies those differences and identifies the developmental and environmental conditions that help students strengthen IA and preserve the inner sequence through which growth occurs.

3.3 The HILC as a Newly Proposed Model

A third contrary perspective concerns the fact that the HILC is a newly proposed model. A reader may reasonably ask whether the HILC has been rigorously tested through empirical study. That question is appropriate. The HILC is proposed here as a conceptual model developed through a theory-building integrative review, not as a causal or predictive model already tested in the field. Its purpose at this stage is to name a developmental sequence drawn from the reviewed literature and to provide a framework that can guide future empirical testing.

This follows directly from the purpose of the method. As Torraco (2016) explains, theory-building integrative reviews are useful in domains where the literature is dispersed, emerging, or in need of stronger conceptual grounding. These conditions describe the current state of research on AI's developmental effects in HE. The purpose of this review is to synthesize prior research in a way that clarifies the concepts, places them in relation, and provides a stronger framework for future research. Whittemore and Knafl (2005) similarly describe integrative reviews as foundational to knowledge development in fields where practice has outpaced theory.

The HILC is offered in that spirit. Its value rests on its explanatory coherence and its capacity to generate testable questions about how AI use interacts with attention, focus, intention, action, and reflection in the learner's development. The future research directions proposed in Section 5.1 translate the HILC into empirical questions that can be examined across students, courses, programs, and institutional settings.

3.4 The Historical Tool Adoption Argument

A fourth perspective comes from the history of educational technology adoption. Each major educational technology has raised concern that it would weaken students' learning, thinking, or effort, and many of those tools were eventually absorbed into ordinary pedagogical practice. Calculators, spell-checkers, search engines, and learning management systems each changed academic practice, yet each now functions as part of the educational environment. Lee et al. (2024) report that some educators expect GenAI to follow a similar path, becoming another tool that extends thinking and development. Cuban (2001) documented a recurring pattern in which educational technology moves from alarm toward accommodation and assimilation, while Selwyn (2011) argues that educational technology discourse often overstates rupture and underestimates continuity.

That historical argument is useful because it cautions against assuming that every new tool represents a permanent threat to learning. The distinction in the present review is that GenAI does more than assist with a task. GenAI can generate the explanation, revise the language, affirm the reasoning, and simulate the learning exchange through which the student comes to feel that understanding has occurred. Hancock et al. (2020) describe AI-MC as a structural shift in which technology generates, modifies, and shapes messages on behalf of communicators. Gambino et al. (2020) show that AI systems can activate human-media social scripts through the Computers Are Social Actors (CASA) paradigm. Sahebi and Formosa (2025) identify epistemic risks produced by AI rhetoric, including the illusions of understanding, explanatory depth, and consensus. These findings suggest that GenAI is not only another tool added to academic practice. It can participate in the conditions through which students attend, trust, judge, and believe they understand.

The historical comparison therefore sharpens the contribution of the HILC. A tool that can shape attention, trust, confidence, and the learner's sense of understanding enters the formation process at the point where the HILC begins. The model is proposed to make that point of influence visible so that students, faculty, and institutions can distinguish ethical AI use that supports intellectual formation from AI use that substitutes for it.

3.5 Summary

Taken together, these contrary perspectives clarify the scope and claims of this review. The HILC is offered as a conceptual model for understanding how GenAI use can strengthen or displace the learner's intellectual formation in higher education. The responses above show that GenAI can support learning when used under conditions that preserve attention, focus, intention, action, and reflection; that concern for IA affirms rather than diminishes student agency; that the model is proposed for future empirical testing; and that GenAI differs from

earlier educational technologies because it can participate in the communicative and epistemic conditions through which learners come to trust, judge, and believe they understand. These distinctions sharpen the model and prepare the implications that follow.

4. Applying the Model: Implications for Students, Faculty, and University Systems

The HILC and the construct of IA together shift the center of inquiry in AI ethics from behavior to formation. The shift is from thinking only about what students can do academically with AI to asking what patterns of AI use are doing to the learner's capacity for self-directed intellectual growth over time. In practical terms, this means asking how AI use shapes the learner's attention, focus, intention, action, and reflection resulting in new learning that informs future decisions.

The implications that follow extend from the synthesis developed in this review. The literature reviewed here shows that AI-mediated learning may either support or weaken learner agency depending on how it is used, taught, and situated within the learning environment. These implications therefore apply the HILC and IA to three levels of educational practice: the student's own use of GenAI, the faculty member's design of learning experiences, and the university's responsibility to create systems that support IA.

4.1 Implications for Student Practice

The HILC gives students a way to locate AI use within their own developmental process rather than within a policy framework imposed from outside. A student who understands that attention is the point at which formation begins, and that AI can capture attention before sustained focus forms, has a different relationship to the tool than a student who understands only that certain uses are permitted or prohibited. The practical implication is that students can learn to ask not only whether a use is allowed, but whether it is strengthening or interrupting the inner sequence through which they are becoming.

At the level of attention: Is this use helping me notice what matters, or is it deciding what I notice for me? At the level of focus: Is this use helping me remain with the learning object, question, problem, or purpose, or is it dispersing my attention before focus can form? At the level of intention: Am I directing this encounter toward a goal I have formed, or has the tool redirected my purpose before I chose it? At the level of action: Am I acting with judgment, or am I allowing the tool to determine what should be selected, revised, submitted, or believed? At the level of reflection: When I am done, has something permanent formed in me, or has only a product been produced?

IA gives students a name for the capacity they are protecting and tools to develop it. A learner who can name what is at stake — their capacity to remain the self-directing subject of their own intellectual formation — is better positioned to govern their encounters with GenAI than one who experiences the risk only as a vague unease. That act of naming, IA, is a form of preparation.

4.2 Implications for Faculty Practice

The HILC reframes the faculty role in AI ethics from enforcement to formation. The question faculty most need to ask is not only whether AI was used, but where in the HILC the student's engagement was interrupted, redirected, or strengthened. An assignment that requires students to make their attention, focus, intention, action, and reflection visible through drafts, process notes, revision records, or structured reflection gives faculty a window into the inner sequence rather than only the final product.

This implication is supported by the literature synthesized in this review. White's (2024) account of psychological realism and the attention economy clarifies that student attention is shaped by goals, salience, selection history, learned value, emotional states, and context. Peng et al. (2026) extend that concern into the learning process by showing that AI feedback can support empowerment when it is embedded in cycles of understanding, revision, and reflection, but can encourage dependency when learners interact only with scores, answers, pass/fail judgments, or completed outputs. Read through the HILC, these findings show why faculty design matters. AI feedback is not formative simply because it is immediate, fluent, or accurate. It becomes formative when it returns the student to judgment.

IA also has direct implications for how faculty design assessments. If the construct names what must be protected, then assessments can be evaluated in part by whether they require the exercise of IA. That is, whether they require the student to remain the directing subject, make judgments the tool cannot make for them, and produce work that is traceable to their own forming understanding. Instruction, assignments, and assessments designed around IA development help faculty move beyond the question of whether AI was used and toward the more important question of what was formed in the learner through the process.

One practical assessment aligned with this implication is a revision-evidence submission in which students provide the original draft, the GenAI feedback received, the revisions made, and a brief explanation of why specific feedback was accepted, rejected, or modified. This assignment structure preserves the cognitive friction necessary for learning while still allowing students to use GenAI as support (Bjork & Bjork, 2011; Peng et al., 2026). It also makes the student's attention, focus, intention, action, and reflection visible to the instructor. The student must show what they noticed, how focus was sustained, what purpose guided the revision, what choices were made, and how the final product reflects their own judgment. In this way, the assessment provides evidence that the learner remained the directing subject of the work rather than allowing the tool to determine the substance or direction of the final product.

4.3 Implications for University Systems and Leadership

For administrators, the HILC makes LOVS actionable by identifying the learner-level sequence that institutional structures, policies, faculty development, and support systems are meant to sustain.

4.3.1 Institutional Conditions for IA

The HILC connects to the LOVS framework established in Part I by showing that the inner developmental sequence is at the core of institutional aspirations to develop students' self-authorship, responsible agency, and social mobility (Hanson, 2026). The institutional conditions that support integration, competence, belonging, and self-authorship — the conditions the LOVS model names — are the same conditions that make IA possible in practice (Hanson, 2017; Hanson, Loose, & Reveles, 2022). A student who lacks the relational, academic, and institutional scaffolding that supports self-authorship is a student whose IA is most vulnerable to displacement.

4.3.2 Leadership as Proxy Agency

The institutional implication is that AI ethics requires the same vital leadership, flexible formal structures, and open informal systems that the LOVS research identified as conditions for healthy student development (Hanson, 2017; Hanson, Loose, & Reveles, 2022). Leadership acts through proxy agency when it creates conditions in which students can practice IA. This includes more than policy development around GenAI use. It includes building the developmental environment in which students learn to govern attention, sustain focus, form intention, act with judgment, and reflect in ways that strengthen their own intellectual and moral development.

4.3.3 System Design That Preserves Cognitive Friction

Peng et al. (2026) support this systems-level concern by showing that AI-mediated learning may empower learners when AI is positioned as support for feedback, revision, and reflection, but may produce dependency when learners treat algorithmic scores, recommendations, or outputs as substitutes for judgment. This distinction is especially relevant at the university level because students may use AI with confidence while still relying on the tool to do too much of the thinking. A student may know how to ask AI for help, compare responses, or check information across sources, but the formative question remains whether the student has understood, judged, revised, and reflected on the work.

Read through the HILC, this distinction suggests that university systems should preserve cognitive friction rather than remove it entirely. Drawing from this synthesis, practices such as requiring students to justify AI use, compare AI-generated and self-constructed plans, document human-AI contributions, and reflect on revision decisions help keep GenAI human-led and technology-supported. In this way, institutional systems support the learner's movement through attention, focus, intention, action, and reflection rather than allowing AI to become the hidden organizer of the learning process.

Zhang et al. (2026) strengthen this concern by showing that AI-enhanced learning is shaped by the interaction of technological support, cognitive load, emotion regulation, and learner goal-setting. In LOVS terms, institutional systems should support AI use in ways that reduce unnecessary barriers without removing the productive effort through which competence and self-authorship develop. The goal is not to make learning frictionless, but to distinguish unnecessary cognitive burden from the meaningful cognitive work that forms the learner.

4.3.4 Human-Centered Governance and Oversight

Winslow et al. (2026) extend the institutional argument by showing that human-centered GenAI requires more than risk mitigation. It requires design, evaluation, governance, and oversight that preserve human autonomy, competence, responsibility, and cognitive alignment. Within the HILC, this means university systems should not only regulate AI use after problems occur but create learning conditions in which students practice the cognitive work that GenAI might otherwise displace.

Faculty and institutional leaders share responsibility for those conditions. Faculty shape the immediate learning environment through assignment design, feedback, modeling, and expectations for disclosure, verification, revision, and reflection. Institutions shape the broader environment through policy, faculty development, student support, and governance structures that make responsible AI use teachable rather than merely regulated. In this sense, IA is both a learner capacity and an educational responsibility: students must practice it, faculty must teach for it, and university systems must create conditions in which it can develop.

5. Summary and Conclusion

The contributions of this two-part review are fourfold. First, the abstract conversation surrounding ethical AI use has been made more concrete by defining key terms from the relevant literature and placing them within the HE student learning experience. Second, the framework has been made practical and accessible through the five enduring concerns and four conceptual metaphors developed in Part I. Third, the review has assembled the major strands of research on student use of GenAI in HE learning environments and interpreted them through the shared concern of learner formation. Fourth, the HILC is proposed as the conceptual response to the developmental question guiding this review.

The HILC clarifies that ethical AI use is not determined by the presence or absence of technology, but by whether AI supports the learner's movement through attention, focus, intention, action, and reflection without replacing the learner's own judgment. The model shifts the center of concern from what AI can produce to what patterns of AI use are forming in the learner. In this framing, attention is the point at which formation begins, focus is the sustained ordering of attention toward a learning object or purpose, intention gives direction to action, action becomes meaningful through judgment, and reflection returns the work to the learner as understanding.

IA, as developed in this review, names the learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment. IA is not proposed as independence from AI use. It is the learner's capacity to govern the encounter: to notice what is shaping attention, sustain focus, form purpose, act with judgment, evaluate outputs, and return the work to reflection. This construct connects the enduring concern of independence to the learner's movement through the HILC.

The central contribution of this review is that ethical AI use is not only a question of tool governance, policy compliance, or academic integrity. It is a question of human formation. The HILC identifies the inner developmental sequence through which ethical AI use can be

evaluated, and IA names the capacity that must remain active in the learner if AI-supported learning is to strengthen rather than displace intellectual agency.

5.1 Recommendations for Future Research

5.1.1 Patterns of AI Use and the HILC

Several research directions emerge from the HILC and the construct of IA proposed in this review. Future empirical research can examine how different patterns of AI use influence attention, focus, intention, action, and reflection, and which instructional or institutional conditions strengthen students' IA, self-authorship, responsible agency, and social mobility. Future studies could also examine whether ethical AI use, as described in this two-part series and applied by students, supports the learner's movement through the HILC.

5.1.2 Attention, Intention, and AI-Mediated Redirection

Another area for future inquiry is the relationship between AI use and attentional control. Studies could examine whether certain forms of AI-mediated interaction strengthen sustained attention and reflective engagement, while others weaken focus, increase passivity, or encourage reliance on externally generated content. A further area concerns intention formation. Research could explore the conditions under which students use AI to clarify and extend their own thinking and the conditions under which AI redirects intention toward speed, completion, and surface success.

5.1.3 Reflection, Authorship, and Institutional Conditions

Future research that examines the elements of learner reflection, authorship, and IA might find malleable aspects for future use in improving student agency. Empirical studies could investigate whether students who are guided to disclose AI use, verify claims, revise AI-assisted language, and explain their own reasoning demonstrate stronger ownership of ideas, clearer voice, and more developed self-authorship than students who use AI primarily for immediate production. Additional studies could examine the affective and institutional conditions that shape the HILC, including how flattery, evaluative familiarity, synthetic intimacy, and other forms of relational language influence attentional posture and later judgment. Institutional research could examine which policies, assignment designs, support structures, and faculty practices best develop student engagement in the HILC sequence while strengthening IA, self-authorship, and responsible agency in AI-enabled learning environments.

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Notes

Note 1. Student Agency vs Intellectual Autonomy (IA)

Student agency and IA are related but distinct constructs in this review. Student agency, as used in the higher education literature, generally refers to the learner's capacity to act, participate, make choices, and exercise influence within social, institutional, and structural conditions. It includes both internal dispositions and external opportunities for participation.

Intellectual autonomy is used more narrowly in this review to name the learner's internal capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment specifically designed to redirect that formation. Student agency describes the broader field of student participation and action. Intellectual autonomy identifies the internal intellectual capacity the HILC is designed to protect: the learner's ability to govern attention, sustain focus, form intention, act with judgment, and reflect in ways that preserve self-authorship and responsible agency. In this sense, IA does not replace student agency. It clarifies one internal dimension of agency that becomes especially important in the age of GenAI.

Appendix A

Table A1. Literature Sources and Integrative Contributions for Named Constructs in the Concept Map of the Integrative Review

Register	Named construct	Primary source	Connection to HILC pathway
Register 1 — Context Description			
Context description	AI-Mediated Communication (AI-MC)	Hancock, Naaman & Levy (2020)	AI is now an active participant in the learner's communicative and intellectual environment
	CASA Paradigm	Gambino, Fox & Ratan (2020)	Learners are conditioned to respond to AI as a social actor through trained reflexes, not only conscious choice
	Developmental Complexity	Baxter Magolda (2020)	The majority of college students are in an external orientation — most vulnerable to AI's influence where formation is occurring
Register 2 — AI Influence			
	Epistemic Trust / Dilemma	Hanson, Yu & Truong (2025); Sahebi & Formosa (2025)	AI shapes what the student accepts as credible before judgment engages — trust is both the mechanism of influence and the site of the dilemma
	Human-Media Social Scripts	Gambino, Fox & Ratan (2020)	AI redirects student attention and response below the level of conscious choice — the entry point of the self-reinforcing engagement loop
	Primary and Secondary Qualities	Smith (1990)	AI produces the sensation of understanding that can mislead the intellect — fluency felt as formation

	Learner's Illusion	Bjork & Bjork (2011)	Student cannot distinguish AI-produced fluency from earned understanding — ease of performance mistaken for quality of learning
	Autonomous Motivation vs Compliance	Deci & Ryan (1985, 2012)	AI use can substitute external completion for internalized values and judgment — performing for reward rather than acting from within
	External vs Internal Orientation	Baxter Magolda (2020)	Developmental position determines vulnerability — the external orientation is the condition under which all AI influence operates most effectively
	Intellectual Autonomy	Integrative contribution of this review	The learner's capacity to remain the self-directing subject of their own intellectual formation in an AI-mediated environment capable of redirecting that formation. IA gives conceptual form to the Independence concern and clarifies the capacity at stake as the learner moves through the HILC
Register 3 — Environmental Supports			
	Self-Determination Theory (SDT)	Deci & Ryan (1985, 2012)	Autonomy, competence, and relatedness as the motivational conditions that sustain genuine formation rather than compliance
Environmental supports	Desirable Difficulties	Bjork & Bjork (2011)	Instructional design that preserves the struggle necessary for genuine learning — the enabling counterpart to the learner's illusion

	Leadership within Open Vital Systems (LOVS)	Hanson (2017) Hanson et al. (2022)	Institutional framework showing how proxy, collective, and individual agency work together to sustain student development
	Developmentally Effective Experiences	King, Baxter Magolda et al. (2009)	Conditions that demand internal judgment and advance movement from external to internal orientation
	E-Learning and Learner Motivation	Niqab, Rahman & Hanson (2025)	Digital learning environments that strengthen rather than displace autonomous engagement

Note. This table lists the primary named constructs appearing in the concept map for the integrative review, organized by the register in which each construct functions. Most named constructs use the language of the source literature. Intellectual autonomy (IA) is the integrative contribution of this review and corresponds to the enduring concern of independence and to the learner's movement through the HILC.

Appendix B

Table B1. The HILC Sequence Supported by Relevant Literature

HILC movement	Central HILC argument	Supporting theoretical source	How the source supports the HILC movement	Learner-level question
Attention	Attention is the point at which the learner first turns toward the work and becomes present to it.	White (2024)	White's account of psychological realism clarifies that attention is shaped by goals, salience, learned value, emotional state, and context, not merely by simple choice or distraction.	What is drawing my attention, and am I still directing it?
Attention moving toward focus	Attention becomes formative when it deepens into sustained focus on a learning object,	White (2024); Zhang et al. (2026)	White supports the importance of attention as a complex condition of agency, while Zhang et al. connect AI-enhanced	Am I remaining with the work long enough for focus to form?

HILC movement	Central HILC argument	Supporting theoretical source	How the source supports the HILC movement	Learner-level question
	question, problem, or purpose.		learning to cognitive load, emotion regulation, and goal-setting behavior.	
Focus moving toward intention	Focus becomes formative when the learner begins to direct attention toward a meaningful purpose.	Zimmerman (2002); Zhang et al. (2026)	Zimmerman's forethought phase emphasizes planning, motivation, goal orientation, and strategy selection before performance begins. Zhang et al. support the movement from focus to intention through goal-setting, cognitive load, and emotion regulation.	What goal, question, or purpose is shaping my attention?
Intention	Intention gives direction to the learner's work by turning focused attention into purposeful action.	Bandura (2001)	Bandura identifies intentionality as a core feature of human agency, through which people form purposes and commitments.	What am I trying to accomplish, and why?
Intention moving toward action	Intention becomes stronger when the learner anticipates outcomes, selects strategies, and organizes effort toward a goal.	Bandura (2001); Zimmerman (2002)	Bandura's forethought describes future-oriented planning, while Zimmerman's forethought phase explains how learners prepare for action through goal-setting and strategy selection.	What outcome am I working toward, and what strategy should guide my work?
Action	Action is not merely task completion; it is the learner's active regulation of conduct, effort, and	Bandura (2001); Zimmerman (2002)	Bandura's self-reactiveness describes the capacity to regulate action, monitor progress, and adjust behavior. Zimmerman's performance phase	How am I monitoring, adjusting, and judging what I am doing?

HILC movement	Central HILC argument	Supporting theoretical source	How the source supports the HILC movement	Learner-level question
	judgment while working.		similarly emphasizes self-control and self-observation during learning.	
Action moving toward reflection	Action becomes educationally meaningful when it becomes material for reflection rather than ending in completion alone.	Zimmerman (2002)	Zimmerman's cyclical model shows that performance is followed by self-reflection, and that reflection shapes later motivation, strategy use, and engagement.	What did this action reveal about my understanding?
Reflection returning to renewed focus	Reflection completes one movement of the cycle by shaping what the learner notices, values, and brings forward into future learning.	Bandura (2001); Zimmerman (2002)	Bandura's self-reflectiveness describes the learner's capacity to evaluate one's own functioning. Zimmerman's self-reflection phase shows how evaluation informs future learning cycles.	What did I understand, accept, reject, revise, or need to attend to next?

Note. This table presents the HILC as the central integrative argument of the review. White's (2024) account of attention, Bandura's (2001) theory of human agency, Zimmerman's (2002) model of self-regulated learning, and Zhang et al.'s (2026) work on AI-enhanced learning, cognitive load, emotion regulation, and goal-setting are used as supporting theoretical lenses. The HILC shows the learner's movement through attention, focus, intention, action, reflection, aligned with a review of relevant literature.

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