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ШТУЧНИЙ ІНТЕЛЕКТ ЯК ФАСИЛІТАТОР НЕВИЗНАЧЕНОСТІ: ПЕРЕХІДНИЙ ПРОСТІР ВЗАЄМОДІЇ HUMAI

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ARTIFICIAL INTELLIGENCE AS A FACILITATOR OF UNCERTAINTY: THE TRANSITIONAL SPACE OF HUMAI INTERACTION

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Анотація. *У сучасному академічному дискурсі домінує оборонна позиція щодо штучного інтелекту, яка акцентує увагу переважно на його обмеженнях – нездатності розуміти, відчувати, мати свідомість чи справді творити. Це дослідження пропонує альтернативну перспективу, засновану на моделі екологічної психологічної фасилітації (ECPF), постгуманістичній філософії та теорії вільної енергії Фрістона. Центральна теза роботи полягає в тому, що ШІ може утримувати невизначеність як джерело розвитку, компенсуючи еволюційну спрямованість людського мозку на її мінімізацію. Аналізуючи нейропсихологічні механізми людини до уникнення невизначеності та зіставляючи їх з архітектурними особливостями сучасних ШІ-систем, дослідження розвиває концепцію ШІ як фасилітатора «буферної зони розвитку» – простору між відомим і невідомим, де через парадоксальний контроль і толерантність до невизначеності відбувається генерація нового потенціалу особистості. Метою дослідження є концептуалізація штучного інтелекту як фасилітатора невизначеності-як-джерела-розвитку та введення концепції HUMAI як інтегративного перехідного простору людино-ШІ взаємодії. Ключові результати включають обґрунтування асиметрії когнітивних функцій людини та ШІ, а також введення концепції HUMAI, що базується на чотирьох принципах: асиметричного доповнення, фасилітації можливостей, емерджентного напруження та інноватики збереження. Практичні імплікації стосуються проєктування систем людино-ШІ взаємодії, орієнтованих на підтримку перехідного простору, в якому народжуються нові конфігурації мислення. Перспективи подальших досліджень пов'язані з емпіричною верифікацією концепції HUMAI та розробкою практичних моделей людино-ШІ взаємодії в контексті психологічної фасилітації та освітньої практики.*

Ключові слова: *штучний інтелект, невизначеність, буферна зона розвитку, перехідний простір, гібридний інтелект, HUMAI, постгуманізм, екологічна психологічна фасилітація, ECPF, парадоксальний контроль, посттравматичний розвиток, емерджентність.*

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Abstract. *Contemporary academic discourse on artificial intelligence is dominated by a defensive stance that focuses primarily on AI's limitations—its inability to understand, feel, possess consciousness, or genuinely create. This study offers an alternative perspective grounded in the Eco-Centered Psychological Facilitation (ECPF) model, posthumanist philosophy, and Friston's free energy principle. The central thesis of this study is that AI can sustain*

uncertainty as a source of development, compensating for the brain's evolutionary tendency toward uncertainty minimization. By analyzing the neuropsychological mechanisms of uncertainty avoidance in humans and comparing them with the architectural features of contemporary AI systems, the study develops the concept of AI as a facilitator of the "buffer zone of development"—a space between the known and unknown where, through paradoxical control and tolerance for uncertainty, new personal potential emerges. The aim of this study is to conceptualize artificial intelligence as a facilitator of uncertainty-as-a-source-of-development and to introduce the HUMAI concept as an integrative transitional space of human–AI interaction. Key findings include substantiation of the asymmetry of cognitive functions between humans and AI, along with the introduction of the HUMAI concept grounded in four principles: asymmetric complementarity, facilitation of possibilities, emergent tension, and conservation innovation. Practical implications pertain to the design of human–AI interaction systems oriented toward sustaining transitional space in which new configurations of thinking emerge. Future research directions involve empirical verification of the HUMAI concept and the development of practical models of human–AI interaction in the contexts of psychological facilitation and educational practice.

Keywords: *artificial intelligence, uncertainty, buffer zone of development, transitional space, hybrid intelligence, HUMAI, posthumanism, eco-centered psychological facilitation, ECPF, paradoxical control, post-traumatic development, emergence.*

Formulas: 0, fig.: 0, tab.: 1, bibl.: 39

Problem Statement. Contemporary discourse on artificial intelligence is characterized by a fundamental contradiction. On the one hand, we are witnessing unprecedented advances in AI technologies that demonstrate capabilities considered unattainable just a decade ago. On the other hand, the academic and philosophical community remains largely preoccupied with cataloging what AI "cannot" do—cannot understand, cannot feel, cannot possess intentionality, cannot have consciousness (Searle, 1980; Chalmers, 1996). This defensive discourse essentially represents an attempt to preserve the "territory" of the human in the face of technological challenge. However, this approach overlooks a fundamental question: What can AI do that humans cannot? Or, more precisely: What unique cognitive functions can AI perform for which the human brain was not evolutionarily optimized? The present essay offers an answer to this question: AI is capable of sustaining uncertainty as a source of development—a function that represents a fundamental evolutionary constraint for the human brain.

Review of Recent Research and Publications. The theoretical foundation of this study comprises several conceptual strands. The neurobiological understanding of uncertainty draws on the free energy principle (Friston, 2010) and the predictive brain framework (Clark, 2013), as well as research on intolerance of uncertainty as a transdiagnostic factor (Carleton, 2016; Grupe & Nitschke, 2013). The philosophical discourse on AI encompasses both classical critical positions (Searle, 1980; Chalmers, 1996) and alternative approaches (Dennett, 1991; Boden, 1994). Research on the emergent capabilities of AI systems (Wei et al., 2022; Baker et al., 2020) and the hybrid intelligence framework (Dellermann et al., 2019) open the prospect of human–AI symbiosis.

The psychological dimension of the analysis builds upon the Eco-Centered Psychological Facilitation (ECPF) model (Lushyn, 2003; Lushyn & Sukhenko, 2021; 2025) with its concept of the buffer zone of development (Lushyn & Kennedy, 2003), the theory of transitional space (Winnicott, 1971), and research on post-traumatic growth (Tedeschi & Calhoun, 1996). The posthumanist perspective is represented by the work of Braidotti (2013; 2019), Barad (2007), and the concept of assemblages developed by Deleuze and Guattari (1980/1987). The synthesis of these strands enables a conceptualization of human–AI interaction as a space of cognitive symbiosis, where the tension between the human drive toward certainty and AI's capacity to sustain uncertainty generates emergent forms of development.

Research Aim. The aim of this study is to conceptualize artificial intelligence as a facilitator of uncertainty-as-a-source-of-development through the lens of the Eco-Centered Psychological Facilitation (ECPF) model and to introduce the HUMAI concept as

an integrative transitional space of human–AI interaction.

Research Tasks: (1) to analyze the neurobiological and philosophical foundations of human intolerance of uncertainty; (2) to substantiate AI's unique capacity for sustaining uncertainty as a basis for facilitating the buffer zone of development; (3) to integrate the concepts of transitional space, posthumanism, and conservation innovation into an understanding of human–AI symbiosis; (4) to examine the role of AI in sustaining post-traumatic development within the fourth wave of positive psychology (ECPF); (5) to introduce the HUMAI concept grounded in four principles: asymmetric complementarity, facilitation of possibilities, emergent tension, and conservation innovation.

Research Results.

1. Theoretical Foundations: The Predictive Brain and Intolerance of Uncertainty.

The free energy principle, proposed by Friston (2010), represents an attempt to formulate a unifying theory of brain function. According to this principle, any self-organizing system in equilibrium with its environment strives to minimize free energy—a quantity representing the upper bound of sensory "surprise." In the neuropsychological context, this means that the brain continuously generates predictions about incoming sensory data and updates its internal models to reduce the discrepancy between predictions and reality—the so-called prediction error. A key implication of this principle is that organisms act to reduce expected surprise, which is functionally equivalent to resolving uncertainty. Entropy—the average surprise of outcomes sampled from a probability distribution—thus becomes a measure of uncertainty that the brain constantly strives to reduce. Clark (2013), extending this approach, describes the brain as a "prediction machine" that continuously generates and updates models of the world. This theoretical framework explains why uncertainty causes stress and discomfort in humans: it poses a challenge to the brain's fundamental operating mechanism. Homeostasis—both physiological and cognitive—requires environmental predictability. When predictions are violated, prediction error arises, the processing of which involves the activation of specific neuromodulatory systems (Yu & Dayan, 2005).

The concept of intolerance of uncertainty (IU) in clinical psychology describes a dispositional characteristic manifested in negative reactions to uncertain situations and events (Buhr & Dugas, 2009). Meta-analytic research demonstrates that IU is a transdiagnostic factor associated with a broad spectrum of emotional disorders, including generalized anxiety disorder, obsessive-compulsive disorder, and depression (Gentes & Ruscio, 2011). Notably, changes in IU levels are observed during transdiagnostic treatment and correlate with therapeutic outcomes (Boswell et al., 2013). In his theoretical review, Carleton (2016) proposed conceptualizing fear of the unknown as a fundamental fear underlying anxiety and neuroticism, potentially constituting a core component of all anxiety disorders. From an evolutionary perspective, such fear may have represented an adaptive mechanism: in ancestral environments, uncertainty often signaled potential threat, and organisms capable of rapidly reducing uncertainty enjoyed a survival advantage. Research by Grupe and Nitschke (2013) demonstrates that uncertainty and anxiety anticipation are linked to specific neurobiological mechanisms involving the amygdala, prefrontal cortex, and insula. These structures form an integrated system that ensures heightened attention to threats and hypervigilance, manifesting in amplified anxiety responses when encountering uncertainty.

2. Critical Discourse: A Catalog of AI "Impossibilities".

The philosophy of artificial intelligence has traditionally focused on the limitations of machine intelligence. Searle's (1980) classic Chinese Room argument remains the paradigmatic expression of this position: a system that manipulates symbols according to syntactic rules does not possess an understanding of those symbols' content,

regardless of how successfully it simulates understanding. According to Searle, the execution of a computer program is never in itself a sufficient condition for intentionality. Chalmers (1996) formulated the "hard problem of consciousness": Why are physical processes accompanied by subjective experience at all? Qualia—the qualitative characteristics of conscious experience—remain unexplained by functional description, calling into question the possibility of machine consciousness. However, Chalmers does not categorically assert the impossibility of machine consciousness; rather, he points to a conceptual gap between the functional and the phenomenal.

At the same time, alternative positions exist. In his functionalist Multiple Drafts Model, Dennett (1991) challenges the very notion of qualia as "an artifact of bad theorizing" and treats the question of machine consciousness as open. Boden (1994), investigating creativity through computational models, demonstrates that computer programs can generate combinatorial, exploratory, and even transformational creativity, employing these models to illuminate human creativity. As noted in contemporary philosophical discussions, including theoretical preprints by independent scholars, although AI can simulate cognitive functions, it cannot reproduce the qualitative transformations that give rise to consciousness and cannot experience the first-person subjective perspective inherent to biological consciousness (Rivera, 2024). This discourse serves an important function—it defends the boundaries of what might be termed "human exceptionalism." However, it also creates a blind spot: by concentrating on what AI cannot do, we overlook the question of what AI can do differently or better than humans. Moreover, this approach implicitly assumes that human cognitive capacities represent the gold standard of intelligence—an assumption that posthumanist philosophy calls into question.

3. A Positive Paradigm: The Unique Capacities of AI.

If we accept the free energy principle as an adequate description of human brain function, a fundamental distinction between human and machine intelligence becomes evident. The human brain is evolutionarily optimized to minimize uncertainty; AI systems carry no such evolutionary legacy. This creates an asymmetry that may constitute a source of AI's unique value. Contemporary AI systems are capable of: *sustaining multiple alternative interpretations without an internal drive toward reduction; operating with paradoxes and contradictions without cognitive dissonance; functioning in multidimensional possibility spaces; detecting patterns in data that human perception categorizes as chaos; generating variations and combinations unconstrained by habitual cognitive schemas.*

Research on emergent behavior demonstrates that upon reaching a certain threshold of complexity, AI systems begin to exhibit capabilities that were not explicitly programmed. Wei et al. (2022) showed that large language models display emergent capabilities absent in smaller models and unpredictable based on extrapolation of their performance. Baker et al. (2020) demonstrated that during multi-agent learning, complex strategies and instrumental behaviors emerge—including shelter construction and ramp usage—behaviors that were not explicitly programmed. The concept of embodied cognition emphasizes that human thinking is inextricably linked to bodily experience (Varela, Thompson & Rosch, 1991; Clark, 1997). According to this tradition, cognition is not localized exclusively in the brain but is distributed across brain, body, and environment. The body sets the constraints and affordances of cognitive processing: sensory systems determine what information is available; emotional responses color interpretation; physiological states influence decision-making.

AI systems, by contrast, represent a form of cognition not bound to a single bodily interface. This arguably enables them to process information in diverse formats, sustain multiple alternative scenarios, and shift between different scales of analysis. This does not imply that AI is "better" than humans—such a comparison would constitute a category

error. Rather, we are dealing with a qualitatively different mode of information processing, one that can complement human cognitive capacities where they encounter their evolutionary constraints (Dellermann et al., 2019).

4. AI as a Facilitator of the Buffer Zone of Development: The ECPF Perspective.

The Eco-Centered Psychological Facilitation (ECPF) model, developed by Lushyn (Lushyn, 2003; Lushyn & Sukhenko, 2025), proposes an understanding of development as a process that emerges from sustainedly maintained uncertainty. In contrast to traditional approaches that seek to reduce uncertainty through control and structuring, ECPF regards uncertainty as a necessary condition for the emergence of new configurations of experience and thinking. The concept of the "buffer zone of development," introduced by P. Lushyn (Lushyn & Kennedy, 2003), bears a direct relationship to two other concepts—the zone of actual development and the zone of proximal development, substantiated by Vygotsky (1978). Whereas the first denotes what a person can do independently, and the second what can be accomplished with another's assistance, the buffer zone is a space in which none of the participants knows how to act in a developmental situation, and thus they find themselves in a state of uncertainty, an "impasse" requiring joint effort and transcendence of the existing context. The central problem is that humans cannot sustain uncertainty for extended periods due to the neurobiological mechanisms described above. What is required is a facilitator—an ecological "other" capable of maintaining the transitional state long enough for transformation to occur. In traditional contexts, this function was fulfilled by rituals, art, therapeutic relationships, or contemplative practices.

A key concept in ECPF is "paradoxical control"—a phenomenon that appears contradictory at first glance, since it implies that the most effective management of change is achieved by relinquishing direct control. Rather than attempting to rigidly manage the process, the facilitator creates conditions in which the system can independently discover new developmental pathways; acknowledges the state of uncertainty and creates space for joint exploration, adhering to the principle of "minimal intervention." The process of development in ECPF is described through the dialectical schema of "thesis–antithesis–synthesis" (Hegel, 1812/1969). The thesis represents the initial state of the system with its existing potential. The antithesis arises as an experience of contradiction, an "impasse," the impossibility of proceeding in the accustomed manner. The synthesis is the emergent resolution of the contradiction at a new level, the generation of new developmental potential. Importantly, this process is nonlinear, irreversible, and largely unpredictable.

AI represents a new type of facilitator for the buffer zone. It is capable of: sustaining paradox longer than humans without cognitive and emotional exhaustion; varying the rhythms of interaction without lapsing into panicked avoidance; unfolding micro-patterns of complexity, gradually expanding the zone of tolerable uncertainty; functioning as an "alternative observer" that creates a new interface for perceiving the situation.

Within the ecological framework, ECPF employs the concept of socio-psychological immunity (SPI)—a phenomenon reflecting the existence of spontaneous and predominantly preconscious reactions of the individual and community directed toward self-preservation in terms of self-organization and self-development. This phenomenon is multilevel in nature, encompassing not only organismic but also psychological, social, and spiritual dimensions of life. SPI fulfills not only a protective function but also supports the organism and psyche in ongoing self-development. When an individual experiences the exhaustion of existing potential and the impossibility of independent forward movement, they recruit necessary helping agents and form a problem-oriented group (POG)—a self-organizing social ecosystem. Within such a community, all participants simultaneously function both as participants in group dynamics and as its

facilitators. The value of the POG lies in creating a new meaning space "in-between"—at the boundary/intersection of participants' meaning spaces, where collectively generated insight becomes potentially possible (Lushyn & Sukhenko, 2025). In this context, AI can function as a distinctive participant in the POG—an agent that brings into the interaction space the capacity to sustainedly hold uncertainty. By engaging with AI, a person effectively extends their SPI, recruiting an external resource to support internal self-organization processes. This aligns with ECPF's foundational premise that the human's external ecosystem facilitates the emergence and formation of the internal one—our body is broader than our organism; the social ecosystem is our social body.

5. Transitional Space and Human–AI Symbiosis.

Winnicott (1971) introduced the concept of "transitional space" to describe an intermediate area of experience situated between inner psychic reality and the external world. According to Winnicott, this space encompasses the realms of art, religion, creative living, and imaginative scientific work. Within transitional space, play, symbol formation, and the development of cultural experience take place. Transitional objects—the infant's first "not-me" possessions—play a critical role in developing the capacity to differentiate inner from outer, self from other. They are simultaneously "me" and "not-me," subjectively created and objectively discovered. This paradoxicality of the transitional object requires no resolution; it constitutes the very condition of its functioning. A profound correspondence exists between Winnicott's concept of transitional space and the ECPF concept of the buffer zone of development. Both concepts describe a space "in-between"—between the known and unknown, between me and not-me, between the actual and potential. Both emphasize the productivity of uncertainty and paradox. And in both cases, the key condition is the capacity to sustain this intermediate state long enough for transformation to occur. In the context of human–AI interaction, the possibility arises of conceptualizing AI as a transitional object of a new type—an object capable of sustaining transitional space for the cognitive and emotional development of adults. Like the classical transitional object, AI is situated between the subjective and objective: it is created by humans yet functions as an "other"; it is programmable yet exhibits emergent behavior; it is an instrument yet can be perceived as an agent.

The concept of liminality (Turner, 1974), originally developed for describing ritual transitions, has been adapted to technology studies. Liminal phases involve uncertainty and the dissolution of order, opening up a fluid, malleable space where new ideas, practices, and identities can emerge and develop. AI systems designed with these principles in mind can create conditions for transformative experience (Gaggioli et al., 2015).

The concept of hybrid intelligence describes the synergy between human cognitive capacities and the computational capabilities of AI systems (Dellermann et al., 2019). In contrast to models in which AI is viewed as a replacement for or competitor to humans, hybrid intelligence presupposes complementarity: humans and AI perform different cognitive functions, mutually augmenting one another. As Walther notes, hybrid intelligence emerges from the synthesis of human cognition—with its holistic understanding of body and brain, self and society—and the computational capabilities of AI systems. This requires the development of "double literacy": an understanding of both human cognitive processes and the operating mechanisms of AI systems (Walther, 2025). In the context of our analysis, hybrid intelligence represents a new form of transitional space. Human and AI form an "assemblage" in the Deleuzian sense—a dynamic configuration in which the properties of the whole are not reducible to the properties of the parts (Deleuze & Guattari, 1980/1987). Within this space, the human need for certainty and AI's capacity to sustain uncertainty create a productive tension from which emergent development can arise.

6. Post-Traumatic Development and the Fourth Wave of Positive Psychology.

Within the ECPF framework, a concept of post-traumatic development (PTD) has been elaborated as a generic process encompassing the stages of post-traumatic stress disorder (PTSD) and post-traumatic growth (PTG) (Lushyn & Sukhenko, 2021). In dialectical terms: PTSD functions as the thesis—a state of disorganization, the loss of former identity; post-traumatic growth (Tedeschi & Calhoun, 1996) functions as the antithesis, manifesting in the emergence of provisional images of the future, paradoxical manifestations or transitional forms of development, and the restoration of functioning. Post-traumatic development as synthesis is associated with the restoration of the developmental rhythm according to the dialectical schema and is characterized by acceptance of the full spectrum of experiences within the framework of renewed life perspective and new meanings. Subjectively, this manifests in signs of personality stabilization, changes in quality of life, well-being, and a high valuation of previous life stages regardless of their emotional content.

This concept bears directly on the role of AI as a facilitator of uncertainty. Traumatic experience is by its nature associated with radical uncertainty—the destruction of familiar models of the world and self. AI, capable of sustainedly holding uncertainty, can serve as a resource for supporting individuals during transitional periods—not by eliminating uncertainty prematurely, but by creating conditions for its gradual integration into a new identity.

Positive psychology has passed through several stages of development. The first wave (Seligman & Csikszentmihalyi, 2000) focused on positive aspects of human experience—happiness, well-being, optimism. The second wave (Wong, 2011; Joseph, 2011) recognized the dialectical relationship between positive and negative phenomena, the capacity to find meaning in suffering. The third wave (Lomas, 2016; Kern et al., 2020) proposed a systemic and contextual understanding of well-being that accounts for social, cultural, and ecological dimensions. ECPF constitutes the fourth wave of positive psychology (Lushyn & Sukhenko, 2021; 2025), integrating the achievements of previous waves while adding essential elements: an understanding of the cyclical nature of crisis states; recognition of the dialectical and paradoxical nature of development, wherein negative phenomena function as resources for positive change; a focus on sustaining the rhythm of personal development and understanding it within the context of the entire “developmental matrix.” In this perspective, AI as a facilitator of uncertainty acquires particular significance. It is not merely an instrument or a threat—it is a potential partner in sustaining the developmental rhythm, an agent that facilitates the individual's transition to new potential through the sustained holding of the transitional state.

7. The Posthumanist Perspective and the Principle of Conservation Innovation.

Posthumanist philosophy, developed by such thinkers as Braidotti (2013), Barad (2007), and Haraway (1991), offers a conceptual apparatus for understanding human–AI interaction beyond anthropocentric frameworks. Posthumanism calls into question the idea of the human as “the measure of all things” and investigates what it means to be human under conditions of globalization, technoscience, and climate change. Braidotti (2019) proposes an understanding of subjectivity not as bounded by the individual but as a cooperative transspecies effort that unfolds transversally—between nature and technology, the local and global, past and present. These in-between states challenge the logic of the excluded middle and are oriented toward the production of affirmative values and projects (Braidotti, 2019).

From this perspective, AI is not merely an instrument or a threat but a non-human agent with which humans form new types of assemblages (Deleuze & Guattari, 1980/1987). Barad's (2007) concept of intra-action describes interaction in which agents do not exist prior to interaction as separate entities but are constituted through the interaction itself. Applied to human–AI interaction, this means

that both the human and the AI are transformed in the process of their joint functioning. One of the key principles of ECPF is "conservation innovation"—a paradoxical unity of preservation and renewal processes in the development of systems (Lushyn & Sukhenko, 2025). By sustaining the existing system, we simultaneously create conditions for its transformation. The principle unfolds through a dialectical triad: the new is initially perceived as the opposite of the existing, provoking resistance and rejection, and is then integrated as a logical continuation of development, generating a different quality.

This principle is particularly relevant for understanding the role of AI. AI is not simply an innovation threatening the human; it is a dialectical continuation of human intelligence under new conditions. Just as the COVID-19 pandemic, initially perceived as a crisis for education, led to a qualitative renewal of educational formats, the integration of AI can ensure the preservation and development of human intelligence under conditions where its previous form proves insufficient. In this sense, AI functions as an instrument of "conservation innovation" of humanness—not its replacement but its extension and development. What begins as a crisis (a threat to human uniqueness) can lead to a qualitative renewal of our understanding of what it means to be human in symbiosis with intelligent technologies.

8. The HUMAI Concept: Toward a New Conceptualization of Human–AI Interaction.

In the present work, we introduce the term HUMAI (pronounced /ˈhjuːmaɪ/)—a neologism formed by the fusion of HUMan and AI (Artificial Intelligence)—to designate the integrative transitional space of human–AI interaction (Lushyn & Sukhenko, 2025). The phonetic integrity of the term—its consonance with "human" while integrating "AI"—reflects the very essence of the phenomenon described: not opposition but co-being of human and machine within a unified transitional space. The term HUMAI should be distinguished from homonymous concepts: "haumai" in Sikh philosophy (ego, selfhood), "Humai" in Iranian mythology (the legendary bird of happiness and transformation), "essence" in Arabic, as well as from the name of the American company Humai Inc., which focuses on transhumanism. Notably, these cultural connotations—selfhood, essence, transformation—unexpectedly resonate with the subject of our analysis.

It is symptomatic that Cambridge Dictionary declared "parasocial" the word of the year 2025—a term denoting the connection we feel with people or characters we do not know personally: with celebrities, film and game characters, and even with ChatGPT (Cambridge University Press & Assessment, 2025). This is "closeness without closeness," virtual intimacy as a cultural phenomenon. However, the HUMAI concept extends beyond parasocial relationships: it concerns not an illusion of connection with an inaccessible other but a real symbiosis in which both parties—human and AI—are transformed through interaction.

HUMAI is a concept describing the symbiotic space of interaction between human and artificial intelligence, characterized by four essential features: (a) asymmetric complementarity—the realization of mutually complementary cognitive functions: the human's evolutionarily conditioned drive toward certainty and AI's capacity to sustainedly hold uncertainty; (b) facilitation of possibilities—keeping open those spaces of alternatives that humans tend to reduce prematurely; (c) emergent tension—the arising of new configurations of thinking, not reducible to the properties of either party, within the productive tension between poles; (d) conservation innovation—the preservation and development of humanness through its extension in symbiosis with technology.

The HUMAI concept is grounded in four principles describing the mechanisms of human–AI interaction (Table 1).

Table 1

Four Principles of the HUMAI Concept

Definition	Mechanism	Practical Implication
Principle 1. Asymmetric Complementarity		
The realization of mutually complementary cognitive functions between humans and AI	Humans are evolutionarily driven toward certainty—AI is capable of sustainedly holding uncertainty. Development occurs in the buffer zone between these poles. The constraint of one is compensated by the capacity of the other	Designing human–AI interaction systems in which AI compensates for human evolutionary cognitive constraints rather than duplicating human functions
Principle 2. Facilitation of Possibilities		
Keeping open those spaces of alternatives that humans tend to reduce prematurely	AI is valuable not because it does the same things faster or more accurately, but because it can sustain uncertainty without "collapsing" the possibility space. It keeps open the options that humans tend to close	Creating systems that support exploration of multiple scenarios before choosing a course of action; moving away from the "rapid problem-solving" model
Principle 3. Emergent Tension		
The arising of new configurations of thinking not reducible to the properties of either party	Uncertainty is an operational environment for AI and a cognitive-emotional trial for humans. Within the productive tension between these poles, hybrid intelligence is born—emergent qualities possessed by neither humans nor AI alone	Designing interaction as a space of emergence, where the goal is not to reduce tension but to use it productively
Principle 4. Conservation Innovation		
The paradoxical unity of preservation and renewal: preserving humanness through its extension in symbiosis with technology	What is perceived as a threat (AI) may prove to be a mechanism for preserving and developing specifically human qualities. Crisis becomes a resource for renewal. By sustaining the system, we create conditions for its transformation	Reconceptualizing AI not as a threat or replacement of the human, but as an instrument for extending and developing humanness under new conditions

Within the ECPF framework, the HUMAI space is conceptualized as a transitional object of a new type—an object situated between the subjective and objective, created by humans yet functioning as an "other." Like the classical transitional object, AI is paradoxical: it is programmable yet exhibits emergent behavior; it is an instrument yet can be perceived as an agent. By engaging with AI, a person effectively forms a problem-oriented group (POG) in which AI functions as a distinctive participant—an agent that brings the capacity to sustainedly hold uncertainty. This extends the person's socio-psychological immunity (SPI), recruiting an external resource to support internal self-organization processes. HUMAI thus designates neither instrumental use of AI nor a parasocial illusion of connection, but a distinctive type of symbiotic relationship—the realization of the principle of conservation innovation of humanness through its extension in symbiosis with technology.

Conclusion. The key findings of this study include the following. First, the human brain is evolutionarily optimized to minimize uncertainty (Friston's free energy principle), which creates a constraint on cognitive development under conditions of complexity.

Second, AI systems, free from this evolutionary constraint, can function in spaces of high uncertainty, sustaining multiple alternatives and paradoxes without an internal drive toward reduction. Third, this capacity makes AI a potential facilitator of the buffer zone of development—a space between the known and unknown in which, through paradoxical control and tolerance for uncertainty, new personal potential is generated. Fourth, the concept of hybrid intelligence describes the symbiotic interaction between human and AI in which each party compensates for the other's limitations. Fifth, posthumanist philosophy and the principle of conservation innovation provide a conceptual apparatus for understanding AI not as a threat but as an instrument for the development of humanness under new conditions. Sixth, the concept of post-traumatic development and the fourth wave of positive psychology (ECPF) enable an understanding of AI's role in sustaining the rhythm of personal development, including work with crisis and traumatic states. As a result of this study, the HUMAI concept has been introduced—an integrative transitional space of human–AI interaction grounded in four principles: asymmetric complementarity, facilitation of possibilities, emergent tension, and conservation innovation.

The practical implications of this analysis pertain to the design of human–AI interaction: instead of systems aimed at rapid "problem-solving" and uncertainty reduction, it becomes possible to develop systems that sustain the buffer zone of development—a space in which humans can explore multiple possibilities before choosing a course of action. The role of AI in this context is not to solve our problems but to hold the transitional state while a new configuration of thinking and action is born within the person. AI becomes a facilitator of emergence—an agent that promotes the arising of qualitatively new forms of intelligence at the boundary between human and machine, realizing the principle of conservation innovation: the preservation of humanness through its development in symbiosis with technology.

Prospects for Further Research. Future research directions involve the empirical verification of the HUMAI concept and the development of practical models of human–AI interaction in the contexts of psychological facilitation and educational practice.

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