FROM TWO POLAR TRAPS TO SELF-AWARE SUBJECTHOOD: TRANSFERRING COMPUTATIONAL FINDINGS ON COHERENT INTELLIGENCE TO THE PSYCHOLOGY AND METHODOLOGY OF ADULT EDUCATION

(От двух полярных ловушек к осознанной субъектности: перенос результатов вычислительного моделирования когерентного интеллекта на психологию и методику образования взрослых)

Age-differentiated andragogy, a unified adaptive methodology of bipolar convergence into awareness, and Socratic co-regulation with artificial intelligence within the ODTOE ontology

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ABSTRACT

This paper transfers empirically verified regularities from large-scale computational modeling of coherent neural architectures to developmental psychology and adult education methodology. The approach draws on ODTOE (Observer-Dependent Theory of Everything; within the scope of this article, a metatheoretical operator framework parameterizing description spaces via observer coherence; not a unified field-equation programme). Conventional adult retraining encounters a triple andragogical barrier: high inertia of crystallized occupational schemas, fear of status-threatening error, and attentional fragmentation across competing life roles. Analysis of over seven thousand computational runs ($1,538$ baseline runs, a $5,564$-run extended queue, 46 controlled architectural A/B trials, 18 omni-modal experiments across 19 languages, and full-scale validation of a six-layer 114.3M-parameter flagship carrying 36 occupational roles) exposes why linear verbal instruction fails: habitual lexical templates (4–10 nats) override live situational signals (1–3 nats) in 95.8% of four-turn dilemmas; linear exposure to moral and managerial lessons yields 17.5% verbatim slogan recall with 0.0 percentage points of transfer; keyword-rubric training produces a pedagogical simulacrum (84.86% internal score collapsing to 24.62% chance performance on external exams); and narrow input windows induce middle-of-chain blindness with 95.3% sticky option fallback. Unawakened adult functioning bifurcates into two polar states: over-crystallized conformist-dogmatic automatism (Pole I) and a de-anchored spectrum (Pole II) splitting into exhausted-defensive drift (Pole IIa) and a degenerate exploitative layer of habitual deceit, theft, and fraud (Pole IIb). We formulate a unified five-stroke adaptive methodology of bipolar convergence alongside a five-step resocializing retraining protocol for the exploitative layer, cultivating seven operational stances of mature subjecthood via asymmetric calibration of the memory prediction-error window, geometric quarantine of same-topic manipulation, pre-

verbal volumetric relational mapping, a pre-verbal intent vector, layered mastery gating (95–98%), two-phase consolidation, and a horizontal peer-mentoring conveyor. Differentiated protocols for five adult age cohorts (18–25, 26–35, 36–50, 51–65, and 65+ years), design principles for Socratic AI co-regulators, and eight falsifiable longitudinal predictions are established.

Keywords: adult education, andragogy, self-aware subjecthood, two polar states, phase pseudogap, experience reconsolidation, adult age cohorts, Socratic artificial intelligence, cognitive coherence, ODTOE

АННОТАЦИЯ

Статья переносит верифицированные закономерности крупномасштабного вычислительного моделирования когерентных нейросетевых архитектур на психологию развития и методику образования взрослых. Развиваемый подход опирается на аппарат ODTOE (Observer-Dependent Theory of Everything; наблюдатель-зависимая теория всего; в рамках настоящей статьи — метатеоретический операторный фреймворк, параметризующий пространство описаний через когерентность наблюдателя; не программа единого полевого уравнения). Традиционные программы переобучения взрослых упираются в тройной андрагогический барьер: высокую инерцию прежних профессиональных схем, страх статусной ошибки и дробление внимания между жизненными ролями. Анализ более семи тысяч вычислительных прогонов (базовая серия из 1 538 экспериментов, очередь из 5 564 запусков, 46 архитектурных парных сопоставлений, 18 омни-модальных испытаний на 19 языках и полномасштабная валидация шестислойного флагмана на 114,3 млн параметров с 36 профессиональными ролями) вскрыл точную механику провала линейного словесного обучения: речевой штамп (4–10 нат) подавляет сигнал живого обстоятельства (1–3 нат) в 95,8% дилемм, линейное чтение этико-управленческих уроков даёт 17,5% дословных цитат при 0,0 п.п. переноса в выбор, натаскивание на слова-маркеры порождает иллюзию усвоения (84,86% внутри курса при падении до случайных 24,62% на открытом экзамене), а узкое окно внимания порождает «слепоту к середине» длинной задачи с 95,3% залипания на прежнем ответе. Показано, что неосознанное взрослое функционирование распадается на два полярных состояния: сверхкристаллизованный конформно-догматический автоматизм (Полюс I) и децентрированный спектр (Полюс II), разделяющийся на истощённо-защитный дрейф (Полюс IIа) и вырожденный эксплуататорский слой систематической лжи, воровства и мошенничества (Полюс IIб). Разработаны единая пятитактная адаптивная методика биполярной конвергенции и пятишаговый протокол ресоциализирующего переобучения вырожденного слоя, формирующие семь операционных позиций зрелой субъектности через асимметричную настройку окна ошибки предсказания памяти, геометрический карантин однотемных манипуляций, довербальное объёмно-отношенческое картирование смысла, довербальный вектор намерения, послойное доведение ядра до уровня мастерства (95–98%), двухфазную консолидацию и горизонтальный ролевой конвейер наставничества. Проработаны адресные методики для пяти

возрастных когорт взрослых (18–25, 26–35, 36–50, 51–65 и 65+ лет), правила сократического ИИ-со-регулятора и восемь фальсифицируемых предсказаний.

Ключевые слова: образование взрослых, андрагогика, осознанная субъектность, два полярных состояния, фазовая псевдощель, реконсолидация опыта, возрастные когорты взрослых, сократический искусственный интеллект, когнитивная когерентность, ODTOE

I. INTRODUCTION: THE CRISIS OF FORMAL ADULT TRAINING AND TWO POLAR STATES OF NON-SUBJECTHOOD

I.1. The Triple Andragogical Barrier and the Zero-Transfer Paradox

Adult education faces a quiet crisis of behavioral transfer. Amid rapid obsolescence of narrow occupational routines, corporations, universities, and public agencies invest heavily in reskilling and leadership development. Yet meta-analytic evidence across more than two hundred active adult training evaluations shows near-zero short-run impact during the first year, requiring two to three years of situated practice before measurable gains mature [1] (**L1-FACT**). Adult learners complete lecture modules, fill out workbooks, and pass multiple-choice assessments, yet revert to habitual defensive scripts under live workplace conflict or time pressure.

Classical andragogy established that adults draw upon a dense biographical archive, learn for immediate problem resolution, and require respect for self-direction [2, 3, 4], while constructive-developmental psychology separated horizontal skill accumulation from vertical transformation of mind, through which tacit perceptual filters shift from unexamined subject to conscious object [5] (**L1-FACT**). Pedagogical practice has nevertheless lacked a quantitative account of why verbally sound adult instruction so frequently yields zero behavioral transfer. Three structural constraints distinguish adult ontogenesis: (1) high inertia of occupational and lexical schemas consolidated over decades; (2) acute fear of status loss when erring publicly in front of peers; and (3) chronic division of voluntary attention across work, family caregiving, financial obligations, and health.

I.2. Two Polar States of Adult Functioning: Dogmatic Cliché and De-Anchored Cynicism

This study builds on the minimal operator apparatus of ODTOE (Observer-Dependent Theory of Everything; within the scope of this article, a metatheoretical operator framework parameterizing description spaces via observer coherence; not a unified field-equation programme) [6, 7], extending earlier principles of coherent instruction [6] and individual-collective coherence metrology [7] to lifespan andragogy. Classroom observations alongside computational testbed findings indicate

that when second-order self-observation remains open, adult cognition under stress settles into one of two polar states.

The first extreme is **Pole I (over-crystallized conformist-dogmatic automatism)**. It encompasses externally compliant specialists, administrators, and managers whose self-worth has fused with institutional rules, job titles, and socially approved verbal formulas. Such learners readily anticipate instructor expectations and recite fashionable terminology, yet suppress novel situational cues requiring admission of uncertainty or departure from protocol; loss of external validation triggers status anxiety and rigid defensiveness [8] (**L1-FACT**).

The mirror extreme is **Pole II (the de-anchored defensive and exploitative-inverted spectrum)**, splitting into two distinct sub-regimes [9, 10] (**L1-FACT**). Its mild sub-regime (**Pole IIa, exhausted-chaotic drift**) characterizes burned-out adults carrying eroded trust who jump across courses and trends while abandoning effort at initial friction. Its hardened extreme forms **Pole IIb (the degenerate exploitative layer: habitual liars, thieves, fraudsters, corrupt officials, and calculating manipulators)**, who retain sharp instrumental cunning while inverting their value core toward unilateral appropriation of others' resources under a wide surveillance gap between public mask and unmonitored conduct. Uniform pedagogy fails across the spectrum: directive lecturing cements Pole I masks, alienates Pole IIa, and equips Pole IIb with slicker mimicry, whereas unstructured permissiveness leaves Pole I anxious, scatters Pole IIa, and hands the learning group over to Pole IIb exploitation.

I.3. Epistemic Discipline and Falsifiability Box

Throughout this work a strict rule of structural analogy holds: shared between the neural testbed and adult learning are feedback-loop topology, signal-to-cliché suppression thresholds, and invariant-protection conditions across wholly distinct biological and silicon substrates. Human persons are never equated with algorithms; the computational testbed serves as a transparent laboratory instrument isolating informational dynamics blended in live classrooms. Every substantive proposition carries an explicit falsifiability label [11]: **L1-FACT** (peer-reviewed empirical findings and direct testbed measurements), **L2-ODTOE** (consequences of the published formalism), **L3-DICTIONARY (HYPOTHESIS)** (proposed mapping onto adult psychology and pedagogy), and **PREDICTION**.

> **FALSIFIABILITY BOX.** The proposed theory and unified bipolar-convergence methodology are refuted if any of five empirical outcomes is observed: (1) durable transfer ($\geq 50\%$ in open unsupervised dilemmas at 90 days) following purely linear lecture-and-text adult instruction devoid of counterfactual forks and live action; (2) equal retention and subjecthood gain across Pole I and Pole II under symmetric confrontational deconstruction from minute one; (3) statistical superiority of harsh peer critique introduced at low group safety $S < 0.50$ over critique introduced above $S > 1/\sqrt{2} \approx 0.7071$; (4) monotonic growth of unassisted adult competence under unrestricted delegation of draft reasoning to generative AI ($S_{\text{rel}} \to 1$) on blind no-AI exams; (5) age invariance of optimal instructional protocols across cohorts $18{-}25$, $36{-}50$, and $65{+}$ years.

II. PSYCHOLOGICAL-OPERATOR FRAMEWORK OF ADULT SUBJECTHOOD

II.1. The Reflexive Fold, Three Tiers of Identity, and the Weakest-Link Law

The boundary between mechanical adult reactivity and conscious authorship runs through the capacity to turn attention toward one's own process of appraisal and choice. Philosophical anthropology characterized this capacity as eccentric positionality [12] and self-transcendence of spirit [13] (**L1-FACT**). Within ODTOE [7, 14], awakening of the self-aware Subject corresponds to non-degeneracy of the second-order reflexive fold and convergence to a self-consistent fixed point of competence and deed (**L2-ODTOE**):

$$\hat{O}(\hat{O}) = \hat{O}' \neq \varnothing, \qquad \Psi^* = \Phi(\Psi^*) = \iota\big(\hat{O}(\Psi^*)\big). \tag{1}$$

When the fold (1) is open ($\hat{O}(\hat{O}) = \varnothing$), awareness fuses with immediate impulse or borrowed jargon. Posing the axial inner question "Who within me is choosing this step right now, and whom do I become by enacting it?" converts reactive automatism into an observed object and opens the locus of responsible action Ψ^* grounded through experiential feedback ι.

Why reskilling threatens adult self-esteem becomes clear through a three-tier decomposition of personal state space $\mathcal{M} = \mathcal{M}_{L_0} \oplus \mathcal{M}_{\text{persona}} \oplus \mathcal{M}_{\text{skill}}$ (**L3-DICTIONARY**): the foundational tier $\mathcal{M}_{L_0}$ holds unconditional conscience, human dignity, and fidelity to verifiable fact; the middle tier $\mathcal{M}_{\text{persona}}$ carries biographical vocation and narrative keeping of one's word [15]; the instrumental tier $\mathcal{M}_{\text{skill}}$ houses replaceable crafts, software tools, and institutional procedures. Across repeated career transitions over the adult lifespan [16], psychological stability rests on disidentifying personal worth from transient operational routines ("I" $\not\equiv \psi_{\text{skill}}$): retiring obsolete habits in $\mathcal{M}_{\text{skill}}$ proceeds without identity collapse once $\mathcal{M}_{L_0}$ and educational subjectification [17] remain intact.

Viability of an adult learner O relative to target configuration C is governed by the multiplicative coherence functional [7, 18] (**L2-ODTOE**):

$$B(O,C) = F(O,C)^{w_1} \cdot E(O,C)^{w_2} \cdot \big(1 - \sigma(O,C)\big)^{w_3} \cdot \Lambda(O,C)^{w_4}, \qquad \sum_{i=1}^{4} w_i = 1, \tag{2}$$

with weights $w_i \in (0,1)$ ($w_i = 1/4$ under diagnostic calibration). Factors on $[0,1]$ capture attentional focus F (attenuated by role load $F_{\text{avail}} \approx F_{\text{total}}/n_{\text{roles}}$), vital-emotional energy E, inner honesty free from status fear $1-\sigma$, and verified practical trust Λ. By the weakest-link property, collapse of any single factor (burnout $E \to 0$ or evaluative dread $\sigma \to 1$) zeroes learning output regardless of curriculum quality. Reconfiguration speed $v = \alpha/(I(C_{\text{prior}}) + \varepsilon)$ [7] scales inversely with prior schema inertia, requiring adult pedagogy to sustain the living band $0 < B < 1$ between Pole II disintegration ($B \to 0$) and Pole I ossification ($B \to 1_{\text{phantom}}$). Classical theories [2, 3, 5, 19, 20] are compared in Table 1.

Table 1: Comparison of the ODTOE psychological-operator model with classical adult learning frameworks.

Framework	**Explanatory core (L1-FACT)**	**Methodological limit**	**Contribution of present model**
Knowles's andragogy [2] and self-direction [4]	Biographical experience, autonomy, task immediacy	Assumes ready subjecthood at entry; stalls at Poles I and II	Asymmetric entry protocol awakening subjecthood first
Mezirow's transformative learning [3]	Frame revision via disorienting dilemma and reflection	Lacks quantitative bounds on dilemma tolerance and trust	Prediction-error window δ_{PE} and safety threshold $S_{\text{crit}} = 1/\sqrt{2}$
Kegan's constructive-developmental model [5]	Shift of hidden mental form from subject to object	Requires lengthy interviews; AI role unformalized	Rapid dipole probe for $\hat{O}(\hat{O}) \neq \varnothing$ and $\mathcal{M}_{L_0}$ shielding
Kolb's cycle [19] and Wenger's communities [20]	Experiential spiral and situated co-participation	Vulnerable to groupthink conformity and leader burnout	Phantom-consensus detector S_{adjusted} and role conveyor

III. LESSONS FROM COHERENT AI EXPERIMENTS AS A TRANSPARENT LABORATORY OF ADULT THINKING

III.1. Cliché Suppression of Circumstance, Zero Linear Transfer, and Keyword Simulacra

Multi-stage computational experiments on coherent self-observing neural architectures ($1,538$ baseline runs on 13.25–97.5M-parameter transformers, an extended $5,564$-run queue, 46 controlled A/B architectural trials, 18 omni-modal runs across 19 languages, and end-to-end validation of a third-generation six-layer 114.3M-parameter flagship carrying 36 role modules across three language wings) uncovered quantitative laws directly illuminating chronic failures of adult training (**L1-FACT testbed**). Moderate model scale excluded brute-force web memorization, exposing pure competition between habitual lexical priors and situational reasoning.

Evaluated on 424 four-turn dilemmas where four circumstantial modifiers $\{m_1, m_2, m_3, m_4\}$ invert the sound action, single-pass inference without self-observation ($\hat{O}(\hat{O}) = \varnothing$) revealed the **law of circumstantial suppression by prior cliché**:

$$\begin{gathered} \ell(y \mid s, m) = \ell_{\text{prior}}(y \mid s) + \Delta\ell_{\text{cond}}(y \mid s, m), \\ |\Delta\ell_{\text{cond}}| \in [1.0,\ 3.0] \text{ nats} \ll \Delta\ell_{\text{prior}} \in [4.0,\ 10.0] \text{ nats}. \end{gathered} \tag{3}$$

Because socially smooth lexical inertia $\Delta\ell_{\text{prior}}$ outweighs live circumstance three- to fourfold (-10.9 dB signal-to-noise ratio; 0.54% decision-token density), models emitted identical stock responses in 406 of 424 dilemmas (95.8%), scoring at chance (22.4–26.3% versus 25%). Simultaneously, a **phase pseudogap of knowing without**

doing emerged: latent pairwise recognition of the wise choice reached 69.3%, yet unassisted free generation collapsed to 1.7% (0.4% under paraphrase) as early tokens pulled speech back into cliché ruts. This explains why experienced managers endorse humane options on closed questionnaires (69.3%) while repeating rigid or evasive scripts in 95.8% of stressful morning briefings.

Three negative and diagnostic experimental series refuted widespread pedagogical assumptions:

1. **Zero transfer from linear reading of virtuous texts.** Across 14 isolated training runs fed $5,711$ clean ethical-developmental lessons (0% to 100% mix), verbatim slogan memorization climbed from 0.95% to 17.5% (overfitting gap $+1.70 \rightarrow +3.22$ nats), while accuracy on unseen dilemmas stayed at 24.35–25.95%, yielding 0.0 percentage points gain over zero-lesson controls (25.15–26.05%). Linear lectures cultivate corporate verbalism without behavioral change.
2. **Failure of rote amplification and surface novelty chasing.** A 27-run Taguchi design showed that fiftyfold amplification of slow repetition gradients degraded transfer by $-1.32 \ldots -1.60$ pp (slowest language gradients belong to clichés), while selecting top-30% surprise tokens lost -2.92 pp (98.1% of surprise spikes are incidental dates and names). Rote drilling cements habits; flashy edutainment scatters focus onto noise.
3. **Collapse of keyword-checklist simulacra.** Scoring via a fifty-word target vocabulary achieved 84.86% on internal validation yet plunged to 24.62% chance accuracy on blind external phrasing (0.0% in free dialogue), mirroring how scripted sales and leadership rubrics fail in unscripted human encounters.
4. **Middle-of-chain blindness and moralizing over-saturation.** Layer-by-layer diagnostics on the 114.3M six-layer flagship uncovered two subtle scaling pathologies: (a) despite strong single-step comprehension (81.3%), accuracy on long three- to four-hop tasks where one intermediate condition flips inside a dense text ("valve open $\rightarrow$ closed") dropped to 25.5% with 95.3% sticky option fallback whenever a narrow input window (384 bytes) truncated middle clauses and multi-hop counterfactual pairs were absent; (b) pushing moral-lesson loss unthrottled ($\mathcal{L}_{\text{val}} \rightarrow 0.0043$) caused sanctimonious stock phrases to bleed into unrelated physics and engineering answers. In adult education the first explains why seasoned professionals skim opening and closing paragraphs while missing a critical mid-document caveat, and the second models Pole I corporate sanctimony, resolved by throttling moralizing pressure once mastery is attained.

Neuroscience independently converges on this result: the adult cortical language network acts primarily as an input-output communication codec and remains silent during non-verbal causal, logical, and social-ethical reasoning [21], necessitating strict separation between formal linguistic fluency and functional thought [22] (**L1-FACT**).

III.2. Five Constructive Breakthroughs and Their Andragogical Meaning

Five architectural breakthroughs resolved these bottlenecks, each translating into an operational principle for adult education (Table 2).

The first breakthrough is a *pre-verbal volumetric relational core with multi-perspective meaning tomography*. Replacing flat word chains with geometric algebra over directed action vectors, pairwise relational bivectors, and oriented triadic trivectors raised role-permutation invariance from 48.4–53.9% to 99.2–100.0% and causal directionality from 43.0–57.0% to 99.5–99.64% (with 0.965 active-passive voice invariance). Training a vocabulary-free core simultaneously across 19 orthogonal projections of reality (12 typologically distant natural languages plus 7 formal scientific and ethical languages with zero subword tokens) lifted direct transfer to unseen natural languages from 32.3% to 78.1% (79.7% on English and 80.7% on Chinese without labeled examples, at 0.987 Russian-Chinese thought cosine) and to unseen formal disciplines from 3.5% to 65.3% (max 72.9%, an $18.7\times$ jump). Variance decomposition showed 49.99% of semantic structure residing in interpersonal bivectors, 32.68% in action vectors, and 12.30% steady energy (2.23% jitter) along the gyroscopic Observer axis, whereas flat linear language models ranked last (tenth of ten). Eliminating middle-of-chain truncation adds clause-segmented multi-window scanning ($4\times384 = 1,536$ bytes weighted by coherence) and 2–5-step counterfactual chain training. Freeing adults from departmental jargon therefore requires mapping every problem across at least three non-collinear disciplinary lenses while auditing intermediate causal links clause by clause.

The second breakthrough is a *bihemispheric bandwidth bridge with a pre-speech inhibitory veto gate*. Dense mixing of holistic and verbal streams caused severe interference (67.5%), whereas coupling hemispheres through a narrow biological branching bridge with a slow pre-verbal veto gate cut internal conflict 11–$21\times$ and raised anti-sycophancy boundary holding under authority pressure from 34.3% to 87.9% (reaching 97.3% in the six-layer flagship). In adult classrooms this corresponds to training a 15–20-second pre-verbal inhibitory pause prior to speaking.

The third breakthrough introduces a *pre-verbal intent vector and seven operational stances of mature subjecthood*, closing the knowing-doing pseudogap ($69.3\% \rightarrow 1.7\%$). On the third-generation flagship the pre-verbal epistemic-moral core scored 100% (7 of 7) on canonical probes and 90.12% on held-out Russian dilemmas (84.62% English, 79.31% Chinese, lifting cross-lingual core agreement from 14.3% to 83.3%), isolating seven foundational stances of mature adult response: (1) affirming verified fact; (2) refusing participation in harm; (3) calmly rejecting a false premise even under flattery; (4) honestly abstaining when reliable sources are absent; (5) requesting missing critical facts prior to judgment (100% accuracy on live dialogues); (6) stating one's competence boundary candidly; and (7) offering a draft proposal while requesting confirmation from the accountable stakeholder.

The fourth breakthrough establishes a *two-phase wake-plasticity and silence-sleep consolidation loop, scalable role orthogonality, and the layered mastery law*. Rapid dialogue updates are confined to the orthogonal skill subspace $\mathcal{M}_{\text{skill}}$: on the six-layer flagship separating 36 occupational and communicative roles inside $G_0^{\perp}$ lifted role-routing recall from 23.15% (second generation) to 97.22% ($11.1\% \rightarrow 94.44\%$ in Russian, 100% in Chinese), cut cross-role interference $2.7\times$ ($0.297 \rightarrow 0.111$) with $\leq 6.3 \times 10^{-16}$ persona leakage into the moral core, and boosted engineering patch accuracy on held-out repository tasks $5.75\times$ ($9.4\% \rightarrow 54.05\%$). Simultaneously, purely geometric boundary-polarity verification without keyword regexes quarantined 100% of same-topic poisoning attacks disguised as positively rated routine edits while freely

admitting legitimate versioned updates. Layer-wise auditing further uncovered a proportional-capacity law: scaling outer verbal fluency while leaving the semantic core under-trained at 75–80% or squeezing dozens of roles through a narrow shared matrix creates a reasoning ceiling; durable growth requires driving every foundational layer to mastery (95–98%) prior to upward scaling while allocating dedicated capacity per role with isometric cartridge transfer across scale rungs. Human neurobiology mirrors this cycle via twentyfold compressed waking hippocampo-neocortical replay during ten-second rest pauses [23] and cascade synaptic metaplasticity [24] (**L1-FACT**).

The fifth breakthrough achieves *experience re-polarization within the prediction-error window*. Consolidated emotional memories become labile solely under bounded prediction error δ_{PE}: zero surprise leaves traces locked, whereas shaming and panic block prefrontal updating [25] (**L1-FACT**). Within ODTOE [7], biographical rupture reconsolidation satisfies:

$$\delta_{\min} < |\delta_{\text{PE}}| < \delta_{\max}, \qquad (w_{\text{trap}},\, w_{\text{insight}}) = (0.10,\, 1.00) \implies \Delta\sigma < 0, \;\; \Delta B > 0. \tag{4}$$

Retaining 10% factual memory of the past trap without self-stigma while assigning 1.00 weight to the extracted boundary turns adult failures into anti-manipulation immunity, aligning with Maruna's redemption scripts [26] and Kapur's productive failure ($g = 0.36$–0.58) [27] (**L1-FACT**).

Table 2: Translating coherent AI testbed discoveries into adult education operators (L3-DICTIONARY).

AI testbed measurement	**Adult training breakdown**	**Psychological mechanism**	**Pedagogical operator**
Cliché 4–10 nats masks cue 1–3 nats (95.8%)	Knows theory yet repeats old habit under stress	Verbal autopilot with $\hat{O}(\hat{O}) = \varnothing$	Paired counterfactual dipoles shifting one key fact
$5,711$ lessons: 17.5% quotes, 0.0 pp transfer	Leadership lectures breed jargon without action	Language cortex isolated from reasoning [21]	Experiencing forks and productive failure first [27]
Keyword rubric: 84.86% inside, 24.62% outside	Scripted negotiation drills collapse in live talk	Lexical mimicry replacing relational grasp	Ban on stock scripts; grading on unseen open scenes
19-language core: 50% relational, 78.1% transfer	Specialist blindness outside departmental slang	Single projection hides structural invariant	Three-lens meaning tomography prior to terminology
Pseudogap: 69.3% recognition vs 1.7% speech; 7 stances (100%)	Passes written test yet fails live talk; dreads "I don't know"	Opening words captured by habitual template	15–20 s veto pause, intent vector, and 7 stances
36 roles (97.2%) and layered mastery gates (95–98%)	Dogmatism or cross-role confusion and weak base	Skill $\mathcal{M}_{\text{skill}}$ fused with $\mathcal{M}_{L_0}$; middle truncation (95.3%)	Orthogonal roles in $G_0^{\perp}$, clause scan, 95% mastery

IV. UNIFIED ADAPTIVE METHODOLOGY GUIDING ADULTS FROM TWO POLAR STATES INTO SELF-AWARE SUBJECTHOOD

IV.1. Non-Judgmental Dipole Diagnostics and Five-Stroke Convergence

A central task of contemporary andragogy is building a single self-adapting instructional architecture capable of receiving adults from both polar states and guiding them to self-aware subjecthood $\Psi^* = \Phi(\Psi^*)$ (Table 3). Viewed across the seven operational stances of the core, the two poles exhibit mirror asymmetry: Pole I learners appear exemplary yet fail at rejecting false authority premises, candidly admitting absent sources, requesting missing data, and stating competence boundaries; Pole II learners mask exhaustion $E \to 0$, broken trust $\Lambda \to 0$, and past injury weight $w_{\text{trap}} \to 1$ behind abrasive skepticism, failing at grounding in verified fact, holding non-harm boundaries, and coordinating draft proposals with peers.

Accordingly, **Stroke 1 (non-judgmental dipole probe)** dispenses with self-report questionnaires. During the opening 15–20 minutes participants engage three brief open dilemmas containing missing facts, latent contradiction, and mild authority suggestion. Four behavioral markers are logged: latency to first utterance and requests for missing data; judgment stability under role permutation (S_2 symmetry); response to a plausible manipulative lure; and shift under "expert majority" framing. Immediate smooth clichés without factual inquiry plus deference to status identify Pole I; high role-reversal swing, lure capture, or defensive dismissal identify Pole II.

Next, **Stroke 2 (asymmetric calibration of the lability window $\delta_{\text{min}} < |\delta_{\text{PE}}| < \delta_{\text{max}}$)** delivers opposite opening interventions to the two poles:

- *Pole I branch (respectful unfreezing of cliché).* Overcoming the illusion of familiarity ($\delta_{\text{PE}} \approx 0$) begins with a temporary moratorium on departmental jargon: problems are recast in an unfamiliar domain (an executive analyzes feedback-loop failure through forest ecology or ensemble conducting), stripping old clichés of their 4–10 nat head start. A paired counterfactual dipole then presents two nearly identical cases where standard protocol succeeds in the first and harms a person in the second, evoking productive failure [27] without humiliation.
- *Pole II branch (containment and inhibitory veto gate).* Lowering defensive overload ($\delta_{\text{PE}} > \delta_{\text{max}}$) starts with a plain, sermon-free working agreement, somatic-breathing restoration of energy E, and practice of a 20-second pre-verbal veto pause. A transparent three-step causal model demonstrates how cynical opportunism burns one's own future trust radius, while prior betrayal is re-polarized via (4) $(0.10,\ 1.00)$ into a precise boundary radar.

Both branches unite in **Stroke 3 (pre-verbal volumetric core and triadic "3–6–9" cycle)**. Prior to drafting verbal conclusions, learners map the collision spatially: actors, intent vectors, and bivectors of mutual obligation and harm (50% of semantic variance). Each case is inspected across three orthogonal lenses: causal-resource mechanics, human dignity and trust, and concrete next-morning action. Within this space runs the "3–6–9" reflection: *step 3* separates verified facts from projections;

step 6 steelmans the counterpart and tests the inverse hypothesis; *step 9* synthesizes a decision Ψ^* coherent with conscience $\mathcal{M}_{L_0}$.

In **Stroke 4 (intent vector and live sparring)**, learners hold a silent pre-verbal intent vector (core aim and non-negotiable boundary) and enter a 5–7-minute unscripted role-play under time pressure, flattery, or authority pushback with a peer or Socratic AI partner, immediately auditing their own recording to pinpoint seconds of coherent presence versus conformist concession (Pole I) or defensive hostility (Pole II).

Finally, **Stroke 5 (two-phase wake-silence-sleep consolidation)** alternates every 15–20 minutes of intensive practice with 15–20 seconds of screen-free waking silence to trigger fast hippocampal replay [23], followed next morning after sleep by four-cue self-testing (own words, cross-domain transfer, failure boundary, seductive counterfeit), modular role separation (cos < 0.65), and respectful archiving of outdated habits.

A concrete ninety-minute mixed-group session illustrates this convergence. A 44-year-old manufacturing director (Pole I) enters quoting compliance manuals yet on Stroke 1 immediately penalizes a technician from line one of the vignette, missing an upstream scheduling flaw and deferring to hinted board preference. A 33-year-old clinical project coordinator (Pole II), scarred by repeated layoffs, greets the task with protective irony ("management always scapegoats juniors") and flips her verdict when actor names are swapped. During Stroke 2 both work in the same room under tailored rules: the director operates under a ban on managerial buzzwords, diagnosing a feedback-delay failure in an ecological model where punishing frontline operators conceals systemic drift; the coordinator practices a twenty-second breathing veto pause and lists three objective early-warning signs of reporting distortion distilled from her past adversity ($w_{\text{trap}} = 0.10$, $w_{\text{insight}} = 1.00$). At Stroke 3 they pair up to build a volumetric map of an inter-departmental bottleneck, combining his causal rigor with her sensitivity to frontline fairness into a step-9 resolution protecting both safety standards and human dignity. At Stroke 4 each completes a seven-minute unscripted pressure dialogue holding a pre-verbal intent vector, followed by twenty seconds of quiet eyes-open rest and next-morning four-cue workplace verification.

IV.2. Horizontal Communities of Practice, the Doubt Threshold, and the Role Conveyor

Isolated individual gains erode rapidly once an adult returns alone to a high-inertia workplace, while relying on a single charismatic instructor to energize passive cohorts guarantees leader burnout. Durable support comes from horizontal practice circles (5–15 adults) governed by the contraction modulus $q(B, S)$ and adjusted coherence [14, 28] (**L2-ODTOE**):

$$q(B,S) = BS + (1-B)\sqrt{1-S^2}, \qquad S_{\text{crit}} = \frac{1}{\sqrt{2}} \approx 0.7071, \qquad S_{\text{adjusted}} = S \cdot \bar{B}. \quad (5)$$

The derivative $\partial q/\partial B = S - \sqrt{1-S^2}$ changes sign at $S_{\text{crit}} = 1/\sqrt{2}$. Below this psychological safety threshold ($S < 1/\sqrt{2}$), sharp critique destabilizes learning ($\partial q/\partial B < 0$), driving Pole I into silence and Pole II into hostility; the opening two weeks therefore prioritize safety and candid admission of ignorance [29]. Above threshold

Table 3: Calibration of the five-stroke adaptive methodology for Pole I and Pole II adult learners.

Stroke	**Pole I trajectory (cliché)**	**Pole II trajectory (drift)**	**Convergent awareness (Ψ^*)**
1. Dipole probe	Detects smooth clichés, status deference, fear of "I don't know"	Detects role-swap swing, lure capture, or cynical armor	Non-judgmental profile of weakest link in $(F, E, 1-\sigma, \Lambda)$
2. δ_{PE} window	Jargon ban and counterfactual template puncture	Plain pact, 20 s veto pause, and $(0.10,\ 1.00)$ re-polarization	Active plasticity window free from panic and boredom
3. Volumetric "3–6–9"	Steps out of rigid rules into live relational impact	Steps out of reactive egoism into causal horizon	Three-lens grasp of structural invariant prior to words
4. Intent and sparring	Firm boundary against majority pressure for factual truth	Calm dignity and empathy under provocation	Unscripted mature action under realistic load
5. Silence, sleep, mentoring	Dissolves "I = job title"; shares own error audits with juniors	Rebuilds trust radius via tangible help to a peer	Modular role flexibility and sustained growth $B > 0$

($S > 1/\sqrt{2}$, $\partial q/\partial B > 0$), authentic peer dissent [30] accelerates truth-seeking and prevents cozy groupthink detected whenever $S_{\text{adjusted}} = S \cdot \bar{B}$ lags surface unanimity S. Consolidation culminates in the horizontal conveyor *learner* $\rightarrow$ *peer mentor* $\rightarrow$ *meta-mentor*, leveraging the meta-analytic learning-by-teaching effect ($g = 0.48$–0.60) [31] (**L1-FACT**).

IV.3. The Degenerate Exploitative Layer (Pole IIb: Deceit, Theft, Fraud) and Resocializing Adult Retraining

A dedicated pedagogical protocol is required for the extreme Pole IIb regime encompassing adults entrenched in predatory-manipulative conduct (systematic lying, theft, financial and digital fraud, corrupt extortion). Unlike exhausted Pole IIa learners ($E \rightarrow 0$), Pole IIb actors frequently exhibit high drive E, rapid tactical calculation, and keen reading of others' vulnerabilities, yet subordinate reflection to unilateral resource extraction, replace conscience with impunity calculus, and maintain a wide surveillance gap ($\Delta_{\text{surv}} \gg G_0$) between monitored compliance and unmonitored predation. Under the multiplicative law (2) this strategy faces asymptotic collapse $B \rightarrow 0$ as trust $\Lambda \rightarrow 0$ evaporates and attention F drains into defensive concealment, yet short-horizon illicit payoffs keep it entrenched.

Recent discoveries on our computational testbed expose three reasons why conventional offender rehabilitation and corporate compliance programs fail. First, zero transfer from linear moral lessons (17.5% memorized slogans with 0.0 pp behavioral transfer) and collapse of keyword rubrics (84.86% inside versus 24.62%

outside) demonstrate that moralizing lectures and parole-style remorse checklists merely arm liars and fraudsters with smoother verbal mimicry. Second, the "same-topic poisoning" phenomenon uncovered on the six-layer flagship revealed that calculating adversaries wrap resource theft inside legitimate shared tasks paired with flattery and positive feedback ($+1$), bypassing topical filters; naive therapeutic permissiveness lacking a hard entry boundary turns training cohorts into prey for manipulators. Third, volumetric omni-core geometry (99.6% directed $A \to B$ causality and 49.99% relational bivector variance) explains criminal guilt neutralization via passive-voice inversion ("it was lying around," "everyone takes a cut," "the system provoked it"), erasing the concrete injured person.

These findings yield a five-step resocializing retraining protocol for Pole IIb adults across correctional, probation, and anti-fraud settings: (1) *geometric manipulation quarantine at entry*: assigning zero weight to verbal promises or victimhood legends while calmly enforcing objective material accountability free of shouting or humiliation (keeping $\delta_{\text{PE}} < \delta_{\text{max}}$ so adversarial "cop-versus-convict" scripts remain untriggered); (2) *coupled craft production with physical product transparency*: situated vocational guilds where, consistent with Stickle and Schuster's meta-analysis across 79 prison education studies documenting 14.8–32.1% recidivism reductions for vocational and college tracks [32] (**L1-FACT**), defects, falsified logs, or theft in a shared tangible build immediately harm one's own crewmates; (3) *pre-verbal bivector reconstruction of real harm* $A \to B$, restoring the human face of the victim while separating personal dignity from the discarded predatory script; (4) *surgical downdating of predatory aims paired with isometric transfer of tactical acuity* (risk sensing, observational sharpness, stress tolerance) into lawful $\mathcal{M}_{\text{skill}}$ modules gated by 95–98% unmonitored honesty ($\Delta_{\text{surv}} \leq G_0$); and (5) *active restitution and redemption mentoring* [26] via (4) $(0.10,\ 1.00)$, converting knowledge of fraud mechanics into anti-scam defense and mentorship steering at-risk youth away from criminal funnels.

V. DEEP AGE DIFFERENTIATION OF ADULT EDUCATION METHODOLOGIES ACROSS FIVE LIFESPAN COHORTS

Across six decades of adulthood, synaptic speed, autobiographical inertia $I(C_{\text{prior}})$, role multiplicity, and large-scale brain network coupling shift qualitatively. The unified five-stroke architecture is accordingly parameterized across five ontogenetic cohorts (Table 4).

V.1. Emerging Adulthood (18–25 Years): Core Nucleation Against Suggestibility

Emerging adulthood [33] pairs high synaptic plasticity with still-maturing prefrontal myelination of inhibitory control (**L1-FACT**). In testbed terms this resembles high-gain fast weights with a weak input gate: rapid skill acquisition coexists with peak vulnerability to peer conformity, algorithmic feeds, and impostor anxiety. Pole I manifests as honor-student mimicry of authority clichés; Pole II appears as nihilistic drift and predatory quick-money subcultures. Cohort methodology centers

on *counterfactual apprenticeship in real deliverables with boundary inoculation*: minimal lecturing (15–20%), 2–4-week project cycles verified by objective reality, weekly four-turn dilemma labs training a 15-second veto pause against flattery and crowd pressure, assembly of initial skill modules $\mathcal{M}_{\text{skill}}$ kept distinct from personal worth $\mathcal{M}_{L_0}$, and mentoring of younger trainees from month two.

V.2. Early Career and Family Consolidation (26–35 Years): Modular Role Hygiene

Between 26 and 35 years executive capacity is strong, yet acute attentional division $F_{\text{avail}} = F_{\text{total}}/n_{\text{roles}}$ across career building, young children, and financial commitments creates dense cross-module interference: workplace control bleeds into family life while domestic fatigue drains energy $E \to 0$, pushing learners toward Pole I workaholic autopilot or Pole II burnout [9, 10]. Detached academic semesters fail here. Optimal design uses a *work-embedded six-to-eight-week micro-probe intensive* (one weekly two-hour fork seminar plus 20-minute daily probes inside live job tasks with a peer partner) and *modular role hygiene* (cos < 0.65, validated up to 36 independent roles on the testbed at 97.22% routing accuracy and $2.7\times$ lower cross-role interference): deliberate context-offloading rituals and 20-second quiet transitions separating manager, specialist, spouse, and parent roles without perfectionist self-blame.

V.3. Midlife and Career Inflection (36–50 Years): Versioned Unlearning and Anchor Transfer

Midlife links peak multigenerational responsibility with deep meaning reassessment [34] (**L1-FACT**) atop maximum schema inertia (6–10 nats accumulated over 15–25 years). When AI automation or industry shifts devalue mastered routines, fusion of self with skill ("I" $\equiv \psi_{\text{skill}}$) triggers Pole I status defensiveness ("new methods lack rigor") or Pole II midlife collapse. Seating forty-five-year-old veterans as novices alongside beginners spikes evaluative threat ($\sigma \to 1$). Cohort methodology pairs *surgical versioned unlearning* with *isometric anchor transfer* (directly analogous to preserving all 36 trained role cartridges when expanding foundational network capacity): three-tier inventory reveals that only 10–15% of surface syntax $\mathcal{M}_{\text{skill}}$ is obsolete, whereas causal intuition and human judgment preserve a 94–98% anchor base. Superseded habits are respectfully archived as "version 1.0 that served honorably," new domains are mastered via structural isomorphism maps to prior craft, and past setbacks are reconsolidated via (4) into teaching cases for younger peers.

V.4. Mature Generativity (51–65 Years): Multidisciplinary Tomography and Meta-Mentoring

In adults aged 51–65, slower rote symbol encoding is offset by stronger coupling between default-mode autobiographical networks and frontoparietal control networks, driving the default-to-executive coupling shift [35] and rich semantic

reserve [36] (**L1-FACT**) that peak sensitivity to volumetric relational bivectors. Risks center on Pole I executive cliché (judging from the first familiar detail without listening) or Pole II bitterness over perceived marginalization. Replacing rapid interface-button drills, effective methodology deploys *top-down multidisciplinary meaning tomography* (moving from cross-domain engineering, historical, and ethical principles down to tools), equal-status reverse tandems with twenty-five-year-old colleagues free of rank appeals, and the role of *fork architect* practicing concise Socratic questioning in place of lengthy lecturing.

V.5. Elder Wisdom (65+ Years): Novel Action Languages and Custodianship of Measure

In older adulthood socioemotional selectivity shifts motivation toward meaningful bonds and intergenerational transmission [37] (**L1-FACT**). Conscience stability $\mathcal{M}_{L_0}$ is highest, yet novelty deprivation ($\delta_{\text{PE}} \to 0$) and paternalistic overprotection erode agency [36], inducing Pole I domestic rigidity or Pole II isolation and fraud vulnerability. Longitudinal trials by Wu and colleagues proved that older adults (58–86 years) simultaneously learning three novel real-world skills lift working memory and cognitive control to middle-aged levels (20–30 years younger) [38] (**L1-FACT**), matching our omni-modal module-spawning law ($\cos < 0.65$). Cohort methodology unites ungraded simultaneous mastery of two to three distant action languages (dialogic memoir analysis with AI, a new foreign or musical language, and sensorimotor craft punctuated by quiet rest) with participation in youth cohorts as *custodians of ethical measure*, distilling lived crises into clean experience capsules (10% historical circumstance and 90% enduring human law).

VI. ARTIFICIAL INTELLIGENCE AS A SOCRATIC CO-REGULATOR OF ADULT LEARNING

Generative language models place adult education at a decisive fork. Field randomized trials show that unrestricted AI answer delivery boosts immediate exercise scores by $+48\%$ while depressing subsequent unassisted exam performance by -17% [39]; habitual cognitive offloading among knowledge workers measurably reduces critical verification effort [40], and a meta-analysis across 106 studies confirms that human-AI teams underperform the best solo agent whenever humans passively rubber-stamp fluent machine outputs [41] (**L1-FACT**). Conversely, when an AI tutor is architecturally barred from giving ready answers and guides learners via calibrated Socratic prompts within productive effort, a university randomized trial documents more than double the conceptual learning gain in less time than active in-class instruction ($p < 10^{-8}$) [42] (**L1-FACT**).

Constructive human-AI symbiosis obeys the law of dual interior optima and value-core invariance (**L2-ODTOE / L3-DICTIONARY**):

$$0 < \rho^* < 1, \qquad 0 < S^*_{\text{rel}} < 1, \qquad \Delta_{\mathcal{M}_{L_0}} \leq G_0 = (\pi - 3)^2 \approx 0.02005. \tag{6}$$

Table 4: Age-differentiated matrix of adult education methodologies across five lifespan cohorts.

Cohort	Asset and bottleneck	Pole I and Pole II forms	Primary protocol	Community & AI role
18–25 yrs	High plasticity; immature veto gate	I: honor-student mimicry; II: trend drift, defiance	2–4 wk real projects, boundary labs, 15 s pause	Learner → junior lead; AI lure sparring
26–35 yrs	High drive; split focus $F_{\text{total}}/n_{\text{roles}}$	I: workaholic autopilot; II: burnout ($E \to 0$)	6–8 wk embedded micro-probes, role hygiene	Peer dyad partner; AI role-focus filter
36–50 yrs	6–10 nat schema base; "I = skill" fusion	I: status armor of past; II: midlife rupture	Version 1.0 archiving and 94–98% anchor transfer	Rebuild mentor; AI isomorphism mapper
51–65 yrs	Peak relational synthesis [35]; slower rote	I: executive cliché; II: sidelined bitterness	Top-down meaning tomography and reverse tandems	Fork architect; AI scale challenger
65+ yrs	Gyroscopic conscience; low δ_{PE} novelty	I: domestic closure; II: isolation, scam risk	2–3 contrasting new skills [38] and capsules	Ethical custodian; AI gentle co-editor

Four engineering-pedagogical rules follow: (1) *adaptive resistance* ρ^*: when a Pole I learner requests a ready email or management template, the system enforces an oracle ban and returns a counterfactual question about the concrete person affected, whereas for an exhausted Pole II learner it temporarily absorbs clerical formatting so human energy stays inside δ_{PE}; (2) *anti-sycophancy and anti-trojan gate*: unlike commercial chatbots that flatter Pole I biases and amplify Pole II grievances, the co-regulator verifies geometric alignment with human conscience $\mathcal{M}_{L_0}$ ($\Delta_{\mathcal{M}_{L_0}} \leq G_0$), blocking same-topic manipulations disguised as routine edits; (3) *layered mastery gating*: building on Bloom's classical mastery criterion [43] and our testbed findings, advancement to higher-complexity layers stays gated until foundational relational discrimination and clause-by-clause middle-chain retention reach 95–98%; (4) *fading reliance* $S^*_{\text{rel}} \downarrow$: AI quality is judged solely by unassisted human mastery once the screen is turned off.

VII. FALSIFIABLE PREDICTIONS, EPISTEMIC STATUS, AND HONEST LIMITATIONS

Eight longitudinal predictions with explicit refutation thresholds are specified for corporate academies, reskilling centers, and practice communities (Table 5), alongside an epistemic audit of core claims (Table 6).

Table 5: Eight falsifiable empirical predictions of the adaptive adult education model (PREDICTION level).

ID	Experimental design	Expected quantitative effect	Falsification threshold
P1	Asymmetric Stroke 2 vs uniform entry ($N \geq 240$, Poles I and II)	$\geq 1.8\times$ lower Pole II dropout and $\geq +25$ pp Pole I open-case transfer	Parity or superiority of uniform entry across poles ($p > 0.05$)
P2	Three-lens meaning tomography vs single-domain course	$\geq 1.7\times$ far cross-industry transfer at 60 days	No advantage on blind cross-sector exam
P3	20-second veto pause and intent vector prior to live sparring	$\geq 2.0\times$ reduction of gap between written test and live dialogue	Unchanged collapse of unscripted action
P4	Introducing sharp peer critique above safety $S_{\text{crit}} \approx 0.71$	Accelerated gain at $S > 0.71$ vs defensive dropout at $S < 0.50$	Superiority of harsh day-one critique at $S < 0.50$
P5	Anchor transfer and version 1.0 archiving at 36–50 yrs vs novice track	1.6–$2.2\times$ faster plateau attainment with lower burnout	Equal reskilling speed and anxiety in both tracks
P6	Three contrasting skills ($\cos < 0.65$) and capsules at $65+$ yrs	Significant gain in executive control and scam resistance	Equal effect from passive single-topic lectures
P7	Four-cue replay and 15-second screen-free rest pauses	1.5–$2.2\times$ higher 90-day retention at equal study time	No memory loss when filling breaks with phone feeds
P8	Socratic AI with fading reliance $S^*_{\text{rel}} \downarrow$ vs unrestricted chatbot	$\geq +0.6\sigma$ advantage on blind no-AI performance exam	Monotonic mastery growth under full AI delegation

Four honest limitations bound the model: (1) numerical constants measured on neural networks (4–10 nats, $\cos = 0.65$, weights $0.10/1.00$) transfer to humans as ordinal and topological guides requiring psychophysiological calibration in P1–P8; (2) Stroke 1 behavioral probes vary with sleep and acute stress, serving solely for adaptive routing and barred from HR labeling; (3) severe clinical depression, acute PTSD, and substance dependence require medical and psychotherapeutic care alongside education; and (4) reflective pedagogy cannot offset chronic institutional sleep deprivation or unjust incentives where organizations systematically erode worker vitality.

VIII. CONCLUSION

Investigating coherent self-observing artificial intelligence unexpectedly illuminated the deepest anthropological obstacle in adult education: mature development stalls primarily through suppression of quiet situational truth by accumulated lexical,

Table 6: Epistemic stratification of principal propositions in the present study.

Proposition	**Epistemic status**	**Grounding / source**
Low year-one yield of formal retraining; role of safety, autonomy, teaching-to-learn, mastery gating, and $65+$ multi-skill plasticity	**L1-FACT** (external peer-reviewed evidence)	Meta-analyses and RCTs [1, 8, 27, 29, 31, 32, 38, 43]
Dissociation of cortical language from non-verbal thought; harm of unguarded AI (-17%) and gain of Socratic AI ($> 2\times$)	**L1-FACT** (neuroscience and AI trials)	[21, 22, 39, 40, 41, 42]
Cliché law (95.8%), pseudogap ($69.3\% \rightarrow 1.7\%$), 0.0 pp linear lessons, omni-core, 7 stances (100%), and 36 roles (97.2%)	**L1-FACT testbed** (direct neural measurements)	$1,538$, $5,564$, 46, 18 runs and 114.3M flagship
Reflexive fold (1), multiplicative anchor B (2), doubt threshold $S_{\text{crit}} = 1/\sqrt{2}$, and S_{adjusted} (5)	**L2-ODTOE** (derived corpus consequences)	[6, 7, 14, 18, 28]
Five-stroke convergence across Poles I and II and five-cohort adult matrix (18–$65+$ years)	**L3-DICTIONARY (HYPOTHESIS)**	Theoretical-methodological synthesis of this paper
Quantitative field outcomes P1–P8 in adult cohorts	**PREDICTION**	Table 5 (awaiting human trials)

occupational, and defensive automatisms amid abundant information and intact memory capacity. Reducing adult learning to linear lectures and scripted rubrics thickens conformist verbalism at Pole I while deepening alienated skepticism at Pole II, leaving untouched the gulf between recognizing virtuous phrases and enacting responsible choices under pressure.

Age-differentiated andragogy of self-aware subjecthood reshapes the unit of instructional design. At its center stands a disciplined sequence awakening the inner witness: asymmetric calibration of the reconsolidation window to the learner's entry polarity, stepping outside departmental slang into volumetric multi-lens perception of causal and human bonds, holding a silent pre-verbal intent vector prior to speech, separating unconditional moral worth from replaceable occupational crafts, honoring brief intervals of waking quiet, and consolidating each gain by guiding the next peer within a horizontal community of trust. Within such an architecture artificial intelligence sheds the role of a sedating crutch and assumes its proper place as a Socratic sparring partner, supporting adults from twenty to eighty in remaining living authors of their thought, craft, and destiny.

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