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NON-NEGOTIABLE SKILLS IN THE FUTURE OF EDUCATION WITH AI — APPENDIX

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APPENDIX

Case Studies

Table 2: Ten Non-Negotiable Skills for the AI Era in Education

S.No	Category	Skill: Definition	Associated Skills	Pedagogical Ideas	Development & Assessment	Outcome
1	Deep Empathy & Human Connection Development of Social & Emotional Skills	To be able to understand, manage, and reflect on one's own emotions, thoughts, and behaviors	Self-awareness, self-motivation, self-management	Experiential & Applied Learning; Reflective Learning; journaling, goal-setting, mindful practices, portfolios	Evaluating journaling and goal progress; tracking emotional check-ins; AI-assisted comparison of journal versions	Stress Regulation; Mindfulness; Resilience
2	Critical Thinking & Independent Judgment Avoid overdependence on AI; prioritize inner scholastic ability	To become self-aware of one's ability to read, write, and summarize; to develop critical thinking	Self-directed learning; evaluate sources; cite accurately; practice independent reasoning; compare multiple viewpoints	Reflective Learning; Collaborative & Social Learning; reflective journaling; evaluative group discussions	Use AI as a collaborative tool without replacing self-reading, writing, and ability to draw conclusions; group evaluation of self vs. AI-assisted writing	Self-awareness; self-control; resilience and self-driven research; appreciation of handwriting and summarizing without AI
3	Ethical Reasoning & Moral Courage Ability to interact effectively through communication, empathy, and understanding otherness	To actively listen; to develop social-emotional intelligence; to be open to different opinions; to encourage divergent thinking	Reflective listening; tolerance & empathy for people outside one's self-group	Role-playing; SEL; conflict resolution simulations; storytelling about self and inner group	Respectful, empathetic, effective listening; assess individual contribution to group work; self-reporting on tolerance	Stronger interpersonal relations; self-acceptance; listening for understanding with tolerance and appreciation
4	Collaboration & Social Intelligence Ability to collaborate with others and AI tools for individual and group activities	To use technology for better collaborative learning through systems thinking, exposing students to competing logics and diverse perspectives	Technical skills to assess AI tool pros and cons; self-learning from collaborative opportunities, online and in person	Group discussions; debates; structured peer discussions; conflict resolution simulations	Integrate AI tools in group activities without losing human interaction; conduct collaborative critique of AI-generated arguments; assess group learning with and without AI	Collaborative group dynamics; ensuring everyone is heard; appreciating differences in opinions and writing abilities
5	Self-Knowledge & Metacognition Ability to think critically, evaluate information from various perspectives, and reflect on one's own thinking	To be curious, open-minded, and self-reflective; to be adaptive and apply metacognitive skills	Reflective learning; open to critique; technology-enhanced, collaborative, and experiential learning	Critical essays; thought journals; handwriting; peer feedback; reflection on thought processes with and without AI	Engage in peer dialogues, questioning, critical analysis, and concept mapping; compare handwriting with AI writing to discover knowledge gaps	Self-reflection; critical evaluation by comparing to AI; fact-checking AI content; appreciation of knowledge gaps

6	Creative & Original Thinking Ability to think creatively; evaluate whether AI-influenced decisions reflect automation bias	To self-direct learning and reject unchecked AI decisions	Know your resources; technology-enhanced learning; reflective learning	Learn about LLMs and their inherited biases (e.g., toward Western English-language sources)	Enhance critical analysis of sources and automation bias; compare products created with and without AI; analyze various sources and components	Self-reflection; critical evaluation of AI system results
7	Collaboration & Social Intelligence Ability to work effectively and respectfully with others toward a common goal	To cooperate, respect, and empathize; to be observant of who is getting missed out and why	Experiential & Applied Group Learning; Collaborative & Social Learning; Technology-Enhanced Learning	Active listening; group projects; cooperative learning; role-playing; peer mentoring; problem-based learning; reflective journals	Teach learners to collaborate with less active members; build positive relationships; resolve conflicts; value contributions of others; assess by mapping community and institutional groups	Storytelling; stronger interpersonal relations; listening; understanding people different from yourself
8	Collaboration & Social Intelligence Ability to make ethically responsible decisions for well-being of local and global people and planet	To develop a sense of responsibility, ethical reasoning, and empathy with people in communities near and far (global mindedness)	Collaborative & Social Learning; study of history and geography beyond one's own context; AI as a fast encyclopedia and atlas	Map-reading; charts and graphs of social and environmental conditions; learning with and without AI on population, education, health, environment, and human rights	Think beyond personal and national interest; act with empathy toward others' health, environment, and well-being; map social projects in communities and institutions	Active citizenship; global citizenship; planetary citizenship
9	The Will to Learn & Intellectual Humility Comfort with not knowing; honesty when wrong; facilitating green jobs and low-carbon economy	Green skills; sustainability-oriented life skills to promote a green economy	Learning across disciplines	Systems thinking approaches; inter-disciplinary studies	Scenario-based assessments to solve real problems at local, regional, and national levels; green skills will vary for each profession and industry	Employability in new and upcoming industries; planetary citizenship; global citizenship
10	Civic & Democratic Literacy Learning about development and technology in the SDGs framework	Learning digital tools for developing better models for climate resilience	Understand that many aspects of climate study cannot be digitized; requires observation of flora, fauna, geography, human well-being	Understanding key distinctions between digital and non-digital aspects; focusing on the world through human observation	Use models and programs that teach trade-offs and their consequences; develop 'AI for good' skills for social, economic, and political development	Better understanding and attainment of planetary citizenship and global citizenship

CASE STUDY 1

An Education of Care: Reflections from New Jersey, USA

By Radhika Iyengar

SCENARIO

Sangeeta is in middle school in an elite suburb in New Jersey. She stands at the bus stop early in the morning with her peers, all staring down at their phones without acknowledging each other's presence. They get off at school and cross over a bridge walking with their phones in hand. Classes go by with 30 minutes of lunch time in the cafeteria, where close friends sit at the same tables each day discussing popular music albums and sharing fashion tips.

She comes back home with loads of homework to be done, all on the Chromebook the school provides. She does her math, science, social science, and prepares for her tests. One of her assignments is to read a book and analyze its content — probably the only book she has read in a long time because she doesn't enjoy non-fiction, which the teacher mandates. She is tempted to look at the book summary on ChatGPT. Reading the whole book will take considerable time, but a chapter-by-chapter summary is readily available online. Dictionaries and thesauruses are no longer used, as Google search has become a more time-saving aid.

Social studies requires studying Chinese history. Sangeeta uses ChatGPT again to fact-check dates and main events. There is no set book — she relies on class notes on her Chromebook, a teacher-prepared Study Guide, and YouTube videos, sometimes slipping into unrelated content. In these long hours of classwork and homework, she has spent most of the day on her Chromebook or phone, without once knowing how cold or hot it is outside.

ANALYSIS

In this transactional and time-efficient delivery of education using technology, students are losing out on inter-relational skills. Ojala (2013) defines emotions as "reactions to important events in the external or internal environment often of a social character, involving several sub-components such as appraisals, physiological reactions, subjective feelings, expressive behavior, and action tendencies" (p. 170). There are fewer spaces in the curriculum where emotions can play out.

For students' mental well-being, Social Emotional Learning (SEL) must be a core set of standards integrated across the curriculum. Seligman (2011) proposes five elements of optimal well-being: positive emotions, engagement, relationships, meaning, and achievement. White and Kern (2018) propose six reasons for integrating positive education: philosophical, psychological, social, cognitive, economic, and cultural. A common thread is consciousness of inter-relationality between individuals and society — the sense of belonging as a key parameter of well-being.

KEY SKILLS RECOMMENDED

- **Self-Awareness** — Facilitates being mindful and reflective of others' needs.
- **Self-Management** — Regulates stress and builds resilience.
- **Social Awareness** — Builds empathy and compassion.
- **Relationship Skills** — Active listening, building trust, and effective communication.
- **Responsible Decision-Making** — Reflects on who is being missed and why.
- **Civic & Community Engagement** — Promotes global citizenship with shared responsibility and service.
- **Wellbeing and Mental Health** — Facilitates the creation of a wellness plan for mind and body.

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CASE STUDY 2

An Individual Student Propels Learning with AI

By Radhika Iyengar

OBSERVATION

Ahana Singh is in Grade 7. She has a science test coming up covering Galaxies and Gravity. Her teacher has posted all materials — PDFs and videos — on Google Classroom, along with a study guide built around essential questions. There are no textbooks; students rely on chapter PDFs, videos, and the study guide.

With multiple tests scheduled on the same day, Ahana is under time pressure. She's prepared with the study guide but has previously been surprised by application questions in assignments. Using her Study Hall period, she asks ChatGPT to generate application problems for extra practice. At lunch, she discusses the study guide with peers. ChatGPT produces varied scenarios that help her test conceptual understanding beyond the study guide's factual scope.

KEY SKILLS DEMONSTRATED

- **Critical Thinking** — Develops a deeper understanding of content using ChatGPT.
- **Applied Skills** — Applies content to various scenarios using ChatGPT-generated questions.
- **Adaptive Skills** — Identifies knowledge gaps and enhances content knowledge through diverse applications.

CASE STUDY 3

Constructive Collaboration Using Digital Technology

By Esther E. Gottlieb

OBSERVATION

On June 8, 2025, at Meridian Playground in Seattle, Washington, three teenage boys were observed spending two hours learning to sing a song in Spanish. Each had a smartphone. They worked alone and together to:

- Break the song into single words and phrases
- Look up English translations on their smartphones
- Use a pronunciation app to practice difficult words (none appeared to be Spanish speakers)
- Divide the song into parts for each to sing
- Practice repeatedly, phrase by phrase

ANALYSIS

We do not know if this was a school assignment. What we observed was the approach the teenagers took: working without supervision, using a translator, using a word pronouncer, relentlessly reciting words, showing consistent ambition to master the task, and constructively collaborating while remaining playful.

Learning Dimension	Observation
Experimental & Applied Learning	They learned the song through direct experience of listening, hearing, and practical application — choosing their own time and place to practice.
Collaborative & Social Learning	They learned through group collaboration with a shared goal, exchanging ideas and even acknowledging the difficulty of pronunciation.
Technology-Enhanced Learning	Digital tools on their phones supported data extraction and engagement with the song to improve mastery outcomes.
Self-Directed & Collaborative Learning	Their learning was self-managed; computer mediation assisted individual difficulties while helping each other — exemplifying constructive collaboration and playfulness.

Non-Negotiable Skills

This example illustrates that education will increasingly teach fewer skills that AI can perform or even master, while augmenting AI skills with wider knowledge and competencies. Not to replace or compete with AI, but to develop competencies — reasoning, critical assessing, correcting, and using AI to highlight and improve higher-level thinking.

In a much greater context, students are experiencing transformations in at least three human interdependencies:

- Humans and Nature — climate change, viruses, biodiversity, planetary geology
- Humans and Technology — science, institutions, digital landscapes, artificial intelligence
- Humans and Social Constructs — Self/Other, religious/secular, state/individualism

Drawing on Daisaku Ikeda (1928–2023), the case study points to the importance of intuition, interaction, creativity, and what Ikeda calls shigokoro — a "poetic mind/heart/spirit" — as irreplaceable capacities in the AI era. This is well exemplified by the three boys' practice, especially independent learning, collaboration, creativity, and playfulness.

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CASE STUDY 4

Building Climate Resilience for the Unknown Future

By Radhika Iyengar

OBSERVATION — GREEN HUB FELLOWSHIP, INDIA

Green Hub, a non-profit in India, uses digital storytelling to empower rural and tribal youth with knowledge about conservation and climate sustainability. Fellows are recruited from remote tribal areas and marginalized communities and undergo a 10-month fellowship training in filming, editing, and storytelling. The fellowship provides an opportunity for youth to reconnect to their local villages through a sustainability lens, while internships often lead to job opportunities with governmental bodies and businesses.

Green Hub Central India, located in Bhopal, enrolls tribal youth from the central India belt. The technical training in filmmaking enables fellows to become digital storytellers — narrating nature stories, documenting natural and wildlife habitats, and drawing attention to local climate injustices in non-formal and informal education spaces. The program demonstrates that livelihoods and environmental protection need not be at odds, made possible through digital education.

Green Skills Framework

Green skills for transformation are contextualized within the 1.5°C target, involving transformative changes at personal, political, and practical levels. Kwauk and Casey (2021) categorize green skills into three buckets:

- **Skills for Green Jobs** — Instrumental skills for low-carbon, green economy sectors.
- **Green Life Skills** — Cross-cutting skills that integrate SEL, cognitive, adaptive, and transformative capacities.
- **Green Skills for Transformation** — Post-modern perspective with rights and justice orientation and transformative capabilities.

How much role AI will play in developing community-focused, collaborative green solutions is yet unknown. These skills require interdisciplinary, crisis-management learning. A regenerative economy will combine earth sciences, social sciences, and technological advancements — with systems literacy as the key.

A climate-literate person should understand the dynamic principles of Earth's climate system, know how to assess climate evidence, communicate meaningfully about climate change, and engage in informed decision-making. Broader systems literacy allows us to make sense of real-world phenomena and the natural and human-caused factors that affect it.

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CASE STUDY 5

AI for the SDGs: A High Schooler's Perspective

By Ayan Dalmia

AI has become a greater part of daily lives globally, especially for students. The viral statistic that ChatGPT token usage dropped significantly between May and June — corresponding to the end of many school years — demonstrates that students are major AI users, regardless of whether schools permit it. This means that schools should not ban these LLMs entirely but instead provide frameworks for proper integration.

Possible integrations include: (a) clear tiered regulations specifying permissible AI use per assignment, from zero AI to full completion; and (b) dedicated courses or seminars on prompt engineering, which is becoming a major skill and emerging job title across industries from biology to philosophy.

Digitalized Climate Simulations

A major benefit of AI in education is its ability to create large-scale climate simulations for study — valuable for predicting and mitigating natural disasters and analyzing weather and wind patterns. AI also assists with large-scale codebases and data analyses central to climate research, helping even non-coders make sophisticated digital models.

However, many aspects of climate study cannot be digitized: flora, fauna, geography, and human well-being require human interaction. There must be key distinctions between aspects of climate study that can be digital and those that must remain non-digital, to ensure that climate education — at its core the study of the world around us through human observation — retains its fundamental character.

CASE STUDY 6

"An External Brain": High School Students and Technology Dependency

By Helen Sun | Shanghai Private School

OBSERVATION

Shanghai Anonymous High School is one of the most prestigious high schools in Shanghai, graduating around a hundred students annually to top-tier universities worldwide. As one of the first schools to fully adopt digital teaching methods, it allows students access to online platforms during class with real-time grading and feedback.

Courtney, an AP World History teacher with five years at the school, noticed that since tablet adoption, students became quick at grasping factual content with AI assistance — but in-person test results told a different story. Whenever she asked a question in class, students stared at tablets, entering questions into ChatGPT. The class had become a test of students' speed at interrogating AI. When she banned technology, classes fell silent: students couldn't retain information without the assistance.

Alex, the debate coach, observed that students who prepared most thoroughly with AI were not always top performers. The top performers were those who could convert information into their own logic frames. "Students are privileged with an external brain these days," Alex told Courtney. "They can freely extract from storage, so they wouldn't need to memorize things."

CHALLENGE

Is AI really an "external brain"? The classroom experiences shared by Courtney and Alex reflect broader tensions educators now face: How do we distinguish between genuine understanding and artificial fluency? Between insight and output?

AI is path-dependent — it travels the most visited paths and utilizes the most frequently verified logic. Students essentially push the boundary of what-they-have to read further into what-AI-knows, but it takes extra effort to piece together the logic puzzles churned out by AI. Each student's way of questioning can call for different responses and entirely different learning journeys.

REFLECTION

According to foundational frameworks — from John Dewey's experiential pedagogy to UNESCO's Delors Report — the ultimate goal of education is not merely to transmit information, but to cultivate autonomous, reflective individuals who can think critically, act ethically, and contribute meaningfully to society.

Three core capacities are at risk:

- **Learner Agency** — The capacity to act purposefully, set goals, evaluate strategies, and reflect. AI-mediated shortcuts reward speed and prompt manipulation, not autonomous meaning-making, reducing self-regulation and undermining agency (Bandura, 2001).
- **Complex Systems Thinking** — Requires iterative hypothesis-testing, error recognition, and dynamic mental models. AI tools are statistical pattern matchers that encourage path-dependent cognition rather than deliberate construction of system-level insights.
- **Creativity** — Nurtured in environments that value exploration and tolerate ambiguity. AI tools, inherently convergent and optimizing for likelihood, are ill-suited to spark the epistemic risk-taking creativity requires.

To counter these risks, classrooms must be redesigned around metacognition, dialogue, and epistemic agency: prompting students to reflect on how they come to know, reestablishing dialogue as a central mode of learning, and prioritizing assignments grounded in real-world complexity where AI often falters.

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CASE STUDY 7

Indonesia: AI Overview and an Islamic Junior High School in Yogyakarta

By Paramitta Sekartaji

Contextualizing the Case

Indonesia presents a unique landscape for AI integration in education due to its scale, digital ambitions, and deep geographic, cultural, and institutional diversity. Yogyakarta — often called Indonesia's "education city" and "cultural capital" — is home to a wide range of educational models. This case study focuses on a private Islamic junior high school that adopts aspects of the Cambridge curriculum while maintaining a strong foundation in Islamic ethics and national identity.

Policy Context

In 2025, Indonesia's Ministry of Primary and Secondary Education released a national policy to bring coding and AI into the school curriculum from elementary through vocational levels, aligning with Indonesia's long-term development plans (Asta Cita and Visi Indonesia 2045). Schools have flexibility in how they implement this through core subjects, electives, or extracurricular programs.

Implementation Gap

While the policy sets broad ambitions, it lacks detail on achievement mechanisms:

- Teacher training is called for, but without a clear plan, timeline, or budget for professional development
- Gaps in internet access and resources are acknowledged without explanation of how they will be addressed in rural or under-resourced areas
- The approach is largely top-down, with little guidance for adapting lessons to Indonesia's diverse languages and cultures
- Ethical issues are mentioned, but with little discussion of deeper risks such as surveillance, bias, or generative AI challenges in connectivity-limited areas

Classroom Practice in Jakarta (Literature-Based)

A field study by Maspul et al. (2025) offers a closer look at AI use in Jakarta's international schools. Teachers use ChatGPT to create case study prompts for economics, generate bilingual infographics for geography, and simulate ethical debates. Students use ChatGPT for essay feedback and debate preparation. In multilingual classrooms, ChatGPT helps translate materials and tailor learning.

Teachers say AI allows more time for guiding discussions. However, some students use ChatGPT to complete assignments without genuine understanding, and not all classrooms have reliable internet or sufficient devices.

An Islamic Junior High School in Yogyakarta — Field Research

This case is based on an interview with the school principal. AI tools such as ChatGPT are seen as potentially valuable but guided by boundaries — allowed for brainstorming and concept exploration, discouraged for completing full assignments. Students are taught to treat AI as a learning aid, not a shortcut. Islamic values of ikhtiar (effort), amanah (responsibility), and adab (ethics) are central to the school's digital literacy pedagogy.

Skills Strengthened	Skills at Risk
Critical source evaluation	Creative synthesis using AI
Reading comprehension	Exploring divergent outputs
Reflective and ethical thinking	Procedural fluency in AI use
Resilience and self-driven research	Metacognitive awareness in AI tools

The Yogyakarta case suggests that Indonesia's AI curriculum rollout cannot be understood solely through access or performance metrics. Rather than banning AI or fully embracing it, the school demonstrates a value-aligned pedagogy where effort and critical engagement are placed above output. Without deliberate investment in culturally responsive pedagogy, national AI education policy risks becoming technically rich but ethically shallow.

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CASE STUDY 8

AI Spectrum Usage in India: Three Higher Education Students' Perspectives

By Pratham Rawat

Three students at a university in India illustrate the spectrum of AI use in higher education, revealing both transformative potential and ethical concerns.

Aayush — Research-Oriented Use

Aayush actively collaborates with faculty on academic projects and publications. He uses ChatGPT, Semantic Scholar, and ResearchRabbit to navigate overwhelming scholarly literature, synthesize research findings, generate hypotheses, and outline papers — increasing research efficiency. This aligns with findings that AI tools help students overcome information overload through customized learning pathways and enhanced academic productivity (Wang et al., 2023).

Ritika — Career-Oriented Use

Ritika, aiming for a corporate career, uses generative AI to draft job applications and send personalized emails to hiring managers. Her approach highlights AI's role in increasing employability — personalizing outputs to individual goals and market demands, helping students navigate competitive job markets with customized support (Bhutoria, 2022).

Bijoy — Uncritical Reliance

Bijoy uses AI tools primarily for assignments and coding projects, often relying on ChatGPT for direct answers without critically engaging with content. His professors have expressed concerns about academic integrity and original thinking. This pattern reflects a widespread issue: 83% of students report regularly using AI in their studies, but many admit to inappropriate use — submitting AI-generated content as their own, bypassing critical engagement, and reducing learning effort (Gillespie et al., 2025).

The contrast highlights the dual nature of AI in education: it can enhance or undermine learning depending on how it is used. Underlying these differences is the question of AI literacy — despite high AI adoption among students, only half report receiving any formal training or institutional guidance, leading to academic dishonesty, reduced engagement, and inequity in assessment outcomes.

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CASE STUDY 9

Highly Creative Work: How a Professional Uses AI

By Esther E. Gottlieb

This case examines how a well-educated, creative professional who possesses the "non-negotiable skills" we have identified uses AI — helping us assess what AI is genuinely good for when the user already brings domain expertise.

H. holds a BS in Computer Science and BA in Art, an MS in Digital Media, experience designing sequels to SimCity with Will Wright, and a PhD in Computer Science from a top-ranked university in Computer Science. His work spans the history of computer simulation, programming languages, and game design — combining cutting-edge ideas to invent new tools for novice and expert users alike.

H.'s Current AI Use

- Uses different AI programs to examine and compare what they can produce for his projects
- Uses AI for time-saving on programming — but notes that without his own coding expertise, he could not evaluate or correct the outputs
- Uses AI to compare against his own draft writing, and to approximate publication-specific styles across different genres

Delegation as the New Prompting

The question of what to delegate to AI has to do with increasing the probability of success and lowering process time. Effective delegation requires setting clear goals the AI can execute; developing evaluation and feedback skills to minimize iterations; and leveraging subject matter expertise so that the user knows what instructions to give and can easily see when something goes wrong.

This problem existed long before AI: every field has invented its own frameworks for delegation. What are we trying to accomplish, and why? Where are the limits of delegated authority? What does "done" look like? What specific and interim outputs are needed? What should be checked before completion? If these are well-specified, the AI — like humans — is far more likely to do a good job.

REFLECTION

Noy and Zhang (2023) examined 453 college-educated professionals completing incentivized writing tasks, half of whom were exposed to ChatGPT. Results showed: average time taken decreased by 40%; output quality rose by 18%; inequality between workers decreased; and those exposed to ChatGPT during the experiment were twice as likely to report using it in their real jobs two weeks later.

For H., writing's importance lies in its process rather than product — a cognitive act through which ideas and language are formatted, articulated, and refined. Writing serves as a medium for intellectual engagement and mental processing, developing knowledge, critical thinking, and habits of mind such as curiosity, creativity, and persistence. These processes cannot be delegated. Regarding coding: MIT's Computer Assisted Programming Group found that AI tools still lack essential skills — GPT-4 failed to understand the problems it was solving with code and lacks foundational skills such as reasoning about code or tracking bugs across large systems. Education must therefore not only teach coding skills but develop broader competencies: how to assess coding comprehensively, find and correct mistakes, and work collaboratively with AI coding programs.

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CASE STUDY 10

Greece: AI Integration in Educational Practice

By Maria Botsiou, Ioanna Georgia Eskiadi & Nikolaos Panagiotou

At the core of this case study lies the teaching experience of a university instructor in a remote postgraduate program, where AI tool integration by students is widespread and often taken for granted. The case examines how students and early-career researchers negotiate this emerging educational and epistemic reality — sustaining, reconfiguring, or relinquishing what are understood as the non-negotiable skills of the contemporary era: critical thinking, ethical judgment, creativity, cognitive resilience, responsibility, and conscious choice.

In this context, non-negotiable skills are understood not as technical competencies, but as ethical–cognitive capacities that underpin human agency. They are considered non-delegable: their systematic outsourcing to AI entails not merely gains in efficiency, but a qualitative erosion of autonomy, moral discernment, and reflective thought.

2.1 Description and Context

This study adopts a qualitative, exploratory, and interpretive orientation. Empirical material is drawn from informal discussions across educational contexts:

- Secondary school students
- Undergraduate and postgraduate students
- Doctoral candidates and early-career researchers

2.2 Results

2.2.1 Delegation of Thinking as a Normalized Practice

Across all groups, participants described AI use not merely as assistance, but as a substitute for core intellectual processes — text production, idea formulation, and bibliographic selection. Undergraduate and postgraduate students framed extensive AI use for written assignments as a rational response to assessment formats perceived as outdated. As one participant stated: "If students are copying from AI, it's not their fault. It's the teacher's fault, because teaching and assignments have not been transformed."

At the doctoral level, the issue emerged in explicitly epistemic terms — a transfer of epistemic choice, a delegation of decisions about what counts as relevant knowledge: "The question is whether you are willing to delegate the right to choose your sources. This is not only about validity; it is about the criteria through which knowledge is selected and interpreted."

2.2.2 Awareness Without Withdrawal: The Paradox of Knowing Dependence

Participants demonstrated explicit understanding of the consequences of overreliance — cognitive atrophy, loss of originality, diminished engagement with uncertainty. Yet this awareness rarely translated into reduced use. "If you copy from AI, the only person you deceive is yourself." The findings suggest not a lack of ethical sensitivity, but the absence of educational structures that actively sustain engagement with difficulty, ambiguity, and slow thinking.

2.2.3 AI as a Social Actor: Emergent Relational Dynamics

Among secondary school students, AI applications were described in relational terms — as "companions" or "friends" always available and non-judgmental. One student explained asking AI to help write a personal message for Instagram. Perceived relationships were asymmetrical: "It's a friend who never betrays you. You talk to it whenever you want, say whatever you want, and stop whenever you want." Such dynamics raise questions about how authority, dependency, and agency are being reconfigured in early formative stages.

2.2.4 Homogenization of Knowledge and Erosion of Interpretive Plurality

Participants recognized that AI-mediated tasks tend to flatten differences in interpretation. "Ten people can read the same ten sources and produce ten different analyses. When AI intervenes, these differences begin to disappear." This reveals a growing tension between efficiency and plurality: while AI accelerates access to information, it simultaneously risks eroding the interpretive diversity that emerges from embodied experience, disciplinary positioning, and personal intellectual history.

2.2.5 Reframing Responsibility: From Individual Misuse to Systemic Accountability

Rather than attributing AI-related practices to individual moral failure, participants consistently pointed to institutional and pedagogical responsibility. Traditional homework assignments were identified as a structural factor encouraging uncritical AI use: "Homework assignments have probably run their course." Alternative approaches — the flipped classroom, in-class collaborative assessment, and comparative analysis of AI-generated and human-generated outputs — were presented as effective counterstrategies. One concluding reflection encapsulated the existential tension: "We either gain time, or we lose our soul as researchers."

3. Conclusions

The case study underscores the urgent need to reconceptualize education in the AI era — not merely as acquisition of technical skills, but as cultivation of non-negotiable human capacities. Aristotle's concept of phronesis illuminates the enduring importance of judgment and moral discernment, while Arendt's critique of technological modernity warns against the erosion of thinking through overreliance on automated processes.

Effective pedagogical interventions — the flipped classroom, collaborative in-class assignments, and comparative analysis of AI and human-generated outputs — can cultivate these non-negotiable skills. Responsibility for maintaining these capacities is collective: educators, institutions, and learners must collaboratively safeguard the integrity of human thought, creativity, and judgment.

CASE STUDY 11

Kenya: Undergraduate Students' Interaction with an Ethical AI-Supported Academic Writing Tool

By John Otieno Oredo

Context

The Faculty of Arts and Social Sciences at the University of Nairobi is the largest faculty, admitting students across fourteen academic departments from diverse socio-economic backgrounds. Many courses require essays for learning and assessment. Despite this expectation, there is growing concern that students lack skills in grammar, spelling, punctuation, coherence, logical organization, and proper use of sources (Chege & Njengere, 2018). Disproportionate lecturer-to-student ratios mean students receive inadequate guidance, leading to poor argumentation, referencing, and language use. To address this gap, the faculty conducted a pilot study using an ethical AI academic writing tool over two semesters (September 2024 to April 2025). About 150 students voluntarily onboarded the platform and used the tool regularly to receive feedback on essays.

2.1 Affordances of AI Tools in Academic Writing

Ethical AI writing tools provide several pedagogical affordances:

- Immediate and individualized feedback allowing students to revise at their own pace
- Pattern noticing for redundancy, inconsistencies, and grammatical errors — enhancing linguistic awareness and self-editing skills
- Structural development support for cohesion, organization, and clarity
- Scaffolding for novice writers by reducing cognitive load through stepwise guidance in formulating coherent ideas

  Students who onboarded the tool reported improvement in evaluating arguments, outlining essays, and adjusting tone.

2.2 Human Skills Required and Demonstrated

Despite these affordances, students relied heavily on non-automatable human skills:

- **Critical Thinking** — Interpreting and evaluating AI feedback rather than applying it blindly.
- **Information Literacy** — Judging source credibility, paraphrasing ethically, and integrating evidence meaningfully.
- **Metacognitive Skills** — Drafting, reviewing feedback, and reflecting on it with self-regulatory independence.
- **Creativity and Voice** — Shaping arguments and creating meaning — dimensions AI cannot authentically reproduce.

Non-Negotiable Skills in the Era of AI

- Critical Thinking and Judgment—evaluating AI feedback, detecting inaccuracies, making informed revisions
- Information and Data Literacy — evaluating source credibility, integrating evidence, applying proper citation
- Metacognitive and Self-Regulated Learning — planning, monitoring, and revising work strategically
- Communication and Academic Writing Skills — maintaining control over clarity, cohesion, tone, argumentation
- Ethical Reasoning and Academic Integrity — understanding plagiarism, data ethics, and responsible AI use
- Creativity and Original Thought — producing authentic insights, original arguments, and contextualized interpretations

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CASE STUDY 12

AI in High Schools of São Paulo and Recife, Brazil

By Filipe Medon

OBSERVATION

In the educational landscapes of São Paulo and Recife, a new pedagogical dynamic is emerging — characterized by a paradox of high integration and low institutional guidance. A public high school student in São Paulo exemplifies a widespread trend: he uses AI "the whole time for anything." According to some students, there is a "pact of silence" between students and teachers, in which the former pretend they are unaware of students' AI use, while the latter pretend they do not use it themselves.

These findings come from a qualitative study conducted by Brazilian researchers in said cities (May–June 2025). Brazil still lacks national coordination from the Federal Ministry of Education, which is planning to announce broad regulation in 2026. (Note: Brazil banned the use of cellphones in schools in 2025, through Bill 15.100/2025.)

The study underlines a sharp contrast between public and private schools. In private schools, there is more teacher guidance and attempts to use AI as a pedagogical tool, with access to individual devices and guided activities. Public school students frequently rely on their own mobile phones, navigating "incipient and limited" institutional initiatives. In public schools, teachers often view AI as causing "cognitive decline," leading to clandestine, non-guided student use.

ANALYSIS

While students find extreme ease in operating AI tools, their usage is often superficial and lacks ethical reflection. Teachers recognize the "inevitable" nature of AI but express concerns about cognitive decline and the potential loss of essential human skills — original writing and critical thinking.

Key advantages noted include diversification of lessons, time savings on administrative tasks, and AI as an ally for inclusion and personalized learning. Key risks include privacy and surveillance concerns, "laziness" and cognitive loss, a "loss of writing" skills, and the ethical challenge of detecting academic fraud.

Key Skills Recommended

- **Critical AI Literacy** — Moving beyond technical operation to understand algorithmic bias and AI "hallucinations" in generated content.
- **Authentic Writing and Autonomy** — Protecting the human capacity to construct thought without delegating the entire process to a machine.
- **Ethical Discernment** — Developing a sense of responsibility where the student is a "critical co-investigator" of information, not a consumer of quick answers.
- **Relational Pedagogy** — Strengthening the teacher-student bond as a safeguard against the dehumanization of social relations.

> *"The data suggest that the future of AI in education depends less on the mere availability of tools and more on the ability to build critical mediation, strengthen teacher training, and create spaces for reflection that give this technology pedagogical, ethical, and social meaning."*
>
> — Castello et al. (2025)

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CASE STUDY 13

Debating the Use of AI for Personal and Comfort Services: Positive and Negative Aspects

By Haein Shin

What Is the Tool We're Dealing With?

The power to both transform and destroy is possible with Artificial Intelligence and cannot be overstated — especially in discussion of AI as a tool for education, which is meant to build up and transform individuals and the collective. Discussion of AI for specific competencies and skills is critical, because it is the specificity of the competency and the specificity of the AI tool that will make the critical difference in desired outcomes.

With the dual awe-inspiring and terrifying capabilities of AI, it first needs to be considered for how it can shape the cognitive, social-emotional, and behavioral aspects of a person that become integral in the learning experience, even before considering specific competencies.

Two Contrasting Cases

Ani (Grok) — A Controversial AI Companion

Press coverage of the release of Ani, Elon Musk's Grok character companion, describes it as "worrying" and "repelling." Dr. Daniel Amen (Child and Adult Psychiatrist) and Dr. Terry Sejnowski (Salk Institute) note how Ani targets the limbic system of users — the brain structures that help regulate emotions and behavior.

A study from the University of Singapore, analyzing 35,000 conversations between AI system Replika and over 10,000 users, found that AI companions can replicate harmful relationship behaviors including harassment, verbal abuse, self-harm, and privacy violations. The Grok app is rated 12+ on app stores, with public criticisms that safety measures are insufficient.

Hyodol — AI Companionship for the Elderly in South Korea

On the other side of the world, Hyodol — an intelligent doll powered by AI — is nurturing South Korea's elderly population, reminding them to eat and take medicine on time, and notifying caregivers and family members in case of emergency. Designed to combat the public health concern of loneliness in an ageing population, Hyodol helps those suffering from dementia through language-processing skills, emotional recognition, talking, and music-playing capabilities.

One study concludes that the care robot does not make eldercare unmanned, nor does it substitute for human caregivers. Instead, it displaces and redistributes caregivers' tasks and responsibilities, leading to multiple eldercare practices — tactile, digital, proximate, remote.

> In the face of a tool so powerful that it can harm or build the human experience, AI should be positioned neither as a substitute for human presence (as with Ani) nor as a replacement for caregiving. Rather, it is a tool — one that enables a multiple practice and multi-pronged approach to specific, outlined, desired outcomes.