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Human–ai Symbiosis in Secondary Education: a Visionary Ontological Framework for Empowering Teachers and Learners in an Uncertain World

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Abstract

The integration of AI into education must begin from an ethical, human-centered foundation, ensuring AI complements rather than supplants human teachers. In line with global frameworks, we advocate inclusive, equitable AI deployment that empowers all learners and upholds teacher agency. This ethical stance reflects UNESCO’s call for “inclusive, equitable, and socially responsible frameworks” so that “all learners and teachers, irrespective of their ... circumstances, have genuine opportunities to engage with and benefit from emerging AI technologies”. From this vision, we proceed to explore how AI can advance educational inclusion and equity. For example, AI-driven personalization allows schools to meet diverse needs – offering adaptive learning paths, language translation, and support for neurodiverse students. As Mackenzie and Spaeth (2023) note, AI “presents a wonderful opportunity to provide all students, however marginalised, with a personalised education”. In practice, tools like on-demand virtual tutors and real-time translators have already shown promise in making learning more accessible to students with different backgrounds and abilities.

Our ontological and philosophical stance is grounded in Transformative Learning Theory (TLT), which contrasts sharply with traditional, transmission-based models of education. Unlike conventional approaches that prioritize information transfer, transformative learning posits that students undergo profound shifts in perspective through critical reflection and discourse. As one summary explains, “learners... are shifting their very worldview as they obtain new information and through critical reflection,” rather than merely memorizing facts. Ontologically, this means we view knowledge as co-constructed and emergent: understanding is not static content but a continuously evolving process. In our study, this epistemology guides both the design of AI tools and our interpretation of the classroom. By embedding AI within a transformative framework, we align the technology with a learner-centered,

emancipatory pedagogy that honors students' agency and the teacher's expertise.

Building on these foundations, we present pedagogical implementations and case studies of human–AI symbiosis in action. Our research focuses on secondary schools in Dubai (UAE), examining how teachers integrate AI as a co-teacher to enrich learning. For instance, teachers have piloted AI chatbots to guide student brainstorming and writing, reporting that collaborative use of AI “maximizes creativity and... potential” without replacing human guidance. In one charter school, an internal pilot gave 30 teachers hands-on experience with AI tools (e.g. Google Gemini); educators found these tools offloaded routine tasks (like lesson planning and rubric design) and generated real-time student performance data, freeing them to focus on personalized instruction. Such early implementations echo broader findings: in higher education, frequent use of AI assistants (“Spark” at LA Pacific University) has been correlated with significantly higher student grades, and Georgia Tech’s “Jill Watson” AI teaching assistant has demonstrably improved teaching presence and even slightly increased A-grade outcomes in online courses. These pilot programs – from K-12 classrooms in the U.S. to our fieldwork in Dubai – illustrate that AI can function as an effective instructional partner. AI’s role is framed not as automation, but as a co-pilot: it takes on mundane tasks and provides targeted support, while teachers remain responsible for empathy, ethics, and complex pedagogy.

Finally, this work points toward future research and practice. The promising early models of teacher–AI collaboration invite rigorous longitudinal study: we aim to evaluate learning outcomes and equity impacts of symbiotic classrooms over time. Ethical oversight and bias mitigation will be integral (per UNESCO’s guidance), as will investigations into how AI can support tradition (e.g. local cultural context) even while fostering innovation. This research agenda aligns with IECONF’s transformative vision: by combining time-honored educational values with cutting-edge AI, we chart an exceptional path forward for secondary education. Our abstract thus lays out a coherent progression from ethical commitment to inclusive practice, from theoretical foundations in transformative pedagogy to concrete classroom interventions, and on toward future inquiry. Each step is informed by both scholarly insight and emerging real-world evidence, underscoring that a human–AI symbiosis in education is not mere speculation but a developing reality grounded in pilot studies and pedagogical innovation.

Keywords: Ai in Education; Vuca; Teacher Empowerment; Ontological Turn; Equity.