AI4Edu: Education at the time of Generative AI

Maria Vittoria Isidori
Dipartimento di Scienze Umane
Università degli Studi dell'Aquila
L'Aquila, Italia
0000-0001-7863-9486

Henry Muccini
FrameLab at DISIM
Università degli Studi dell'Aquila
L'Aquila, Italia
0000-0001-6365-6515

Abstract—This abstract reports on the University of L'Aquila research group's work on AI for Education.

Index Terms—Education, AI, LLM

I. INTRODUCTION

AI4Edu (Artificial Intelligence for Education) is the subject of a broad debate that is increasingly characterized by an expanded interdisciplinarity: education, psychology, neuroscience, linguistics, sociology, and anthropology. It is characterized by its complex epistemological status and broad interdisciplinary debate. These are generative systems designed to interact with the world through specific intelligent abilities and behaviors, enabling the evaluation of available information in a given context or environment to select the most appropriate action(s) for achieving a declared goal and in relation to various learning needs (European Commission, 2020).

Therefore, the integration of Artificial Intelligence in education represents a transformative opportunity to redefine teaching and learning within a smart community (of teachers*)-city ecosystems.* This approach moves beyond traditional classroom boundaries, creating interconnected networks where teachers, students, policymakers, and AI systems collaborate to foster inclusive, sustainable, and adaptive education.

The design of learning environments through AI must meet criteria and models of accessibility, reliability, and robustness to encourage the personalization of paths (Messina et al., 2024). The entire educational and instructional field (school and university) faces two main needs: developing AI systems and tools to improve teaching-learning processes (*AI for Training*) (Chen et al., 2020); designing curricula that adapt to the current situation characterized by increasing AI technology use (*Training for AI*) (Madhu & WHIG, 2022).

AI for Training

AI for Training applies tools like chatbots, virtual assistants, facial recognition, and robotics to facilitate learning. AI-driven pedagogical models enhance learner training by enabling: personalized feedback and support (tutoring), efficient assessment of comprehension and communication through natural language processing (assessment), tailored learning paths (personalization), engaging activities like interactive games (gamification), analysis of student data to optimize learning (data analysis), and automated creation of educational content such as texts, images, and exercises (content generation).

Training for AI

Training for AI begins in education, emphasizing how AI and data literacy shape essential skills for adapting to AI's impacts. It underscores the need to design training paths for roles like designers, teachers, educators, and trainers involved in AI education, ensuring accessible learning content. Key areas include defining AI competencies, developing AI curricula (with peer and interdisciplinary teacher collaboration), training educators, and providing work-based training such as prompt engineering to optimize AI model performance.

II. THE INVESTIGATION FINDINGS OF OUR GROUP RESEARCH

This abstract synthesizes the research group's contributions in the field and investigates the integration of Artificial Intelligence in education, focusing on teachers' training, pedagogical methodologies, and educational implications.

Our work spans educational sciences, computer science, and neuroscience, with a strong emphasis on:

- Teacher Competencies: Assessing digital literacy and AI readiness among educators [1].
- Pedagogical Innovation: Exploring correlations between AI tools (e.g., adaptive quizzes, chatbots) and active teaching methods (e.g., problem-solving, role-playing).
- Sustainability and Inclusion: Examining AI's role in promoting equitable education and ecological transitions.

Key Findings from the studies are:

- *Teacher Preparedness and Attitudes:* surveys of 293–396 teachers in Abruzzo reveal 'moderate AI adoption', with 52.4% using AI for language simulations but 14% resisting it (Isidori et al., 2025). In terms of training gaps, 6.9% of teachers lack ML knowledge, and 35.1% feel unprepared to use AI.
- *AI in Sustainable Education:* Teachers recognize AI's potential for ecological transitions (59% cite industrial automation benefits) but rarely apply it in curricula.
- *Generative AI Challenges:* misconceptions persist, with 43.4% attributing "human-like" knowledge generation to AI systems (Isidori et Al., 2025).

III FUTURE RESEARCH DIRECTIONS: AI4EDU IN ACTION

Research activities are conducted with academics (Isidori et al., 2025), in-service teachers at all school levels (primary, secondary, etc.), and specialist teachers training for inclusive education programmes (Isidori et al., 2024). We have goals in progress and others in the long term.

A. Ongoing Objectives

Teacher Empowerment: AI Literacy Programs: Training 300+ Abruzzo teachers on AI tools (e.g., ChatGPT, Gradescope) through workshops.

Peer Collaboration Models: Interdisciplinary teams co-design AI-enhanced curricula (e.g., STEM + ethics).

Digital Hubs: Creating shared online repositories (e.g., OERs for AI lesson plans) accessible to all city educators.

Research & Advocacy: Monitoring AI Adoption: Tracking teacher readiness via longitudinal surveys.

B. Future Directions

- Creative Labs: Testing different LLM models in education classrooms.
- Teacher-AI Co-Design: Developing prompt engineering guides for educators to tailor AI outputs.

IV CONCLUSIONS

The AI4Edu initiative exemplifies how *Smart Communities of Teachers* can drive urban educational transformation. By aligning ongoing teacher training, ethical AI design, and city-wide collaboration, we can build *Resilient Schools* (adaptive to technological and societal shifts), and *Inclusive and sustainable Cities* (where AI bridges—not widens—educational gaps).

References

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. IEEE Access, 8, 75264–75278.

European Commission. (2020). White Paper on Artificial Intelligence: A European approach to excellence and trust.

Isidori, M.V., Muccini, H., & Evangelista, C. (2025). Generative intelligence: A possible redefinition of teaching and formative assessment. A survey among teacher trainees. Giornale italiano di educazione alla salute, sport e didattica inclusiva, 9(1)(in press).

M. V. Isidori, H. Muccini, and C. Evangelista, (2024) "Teachers and the challenges of generative artificial intelligence : A survey in primary and secondary schools," Italian Journal of Special Education for Inclusion, XII, 1, 197-202, vol. XII, no. 1, pp. 197–202.

Isidori, M.V, Muccini, H., Evangelista C., (2024). Teachers and the challenges of generative artificial intelligence (AI): a survey of all levels in the Abruzzo Region. Emotion vs Algorithms in Education. 4th International Conference. REN CONFERENCE 2024

Isidori, M. V., Muccini , H., Santelli, A., & Evangelista, C. (2024). Education and training for sustainability. Towards Artificial Intelligence: An Exploratory Investigation on teachers. Form@re - Open Journal Per La Formazione in Rete, 24(1), 294–300. https://doi.org/10.36253/form-15452

Messina, S., Diniz, J. A., & Huang, R. (2024). Designing AI-powered learning environments: Accessibility, reliability, and personalization. Computers & Education.