

Integration of AI in Education: A Sociological Study

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Abstract

Artificial Intelligence (AI) is rapidly reshaping educational practices, institutions, and relations among students, teachers, and families. This paper synthesizes recent literature and policy documents to examine the sociological implications of AI integration in education. Using a sociological perspective this paper analyzes how AI alters pedagogy, teacher roles, equity, access (digital divides), assessment and edtech. The present paper concludes with policy recommendations that aim to maximize pedagogical benefits while minimizing harms related to inequality, privacy, and commodification of learning.

Key Words: Artificial Intelligence in Education, Digital Divide, Educational Inequality, Technological Determinism, Social Stratification, E-learning and Automation, Human-Machine Interaction, Knowledge Society

Introduction

Artificial Intelligence (AI) is one of the most important technological advancements of the modern era. It refers to the ability of machines to perform tasks that normally require human intelligence, such as understanding language, recognizing patterns, solving problems, and making decisions. AI is transforming industries, shaping societies, and influencing the way people live, work, and learn. From voice assistants like Siri and Alexa to complex algorithms used in medicine and finance, AI has become a vital part of everyday life.

At its core, Artificial Intelligence is a branch of computer science that aims to create systems capable of thinking and learning like humans. AI works through algorithms and sets of instructions that allow computers to process information, learn from data, and improve performance over time.

The benefits of AI are vast and far-reaching. It increases efficiency by automating repetitive tasks, allowing humans to focus on creativity and innovation. In industries such as manufacturing and logistics, AI improves productivity and reduces human error. In science and research, AI accelerates discoveries by processing massive amounts of data faster than humans ever could. AI also improves accessibility for people with disabilities through technologies like speech-to-text and visual recognition tools.

Despite its advantages, AI also presents serious challenges. One major concern is job displacement, as automation replaces certain human roles. Data privacy is another issue, since AI systems often rely on collecting and analyzing large amounts of personal information. Additionally, algorithmic bias can occur when AI systems reflect or amplify human prejudices present in their training data. Ethical and transparent AI development is essential to ensure that these technologies are used responsibly and fairly.

The future of AI holds immense promise. As technology continues to evolve, AI is expected to play an even greater role in shaping society, economy, and education. Researchers are working on creating more advanced, ethical, and human-centered AI systems that can work alongside humans rather than replace them. However, global collaboration and regulation will be needed to manage AI's risks and ensure its benefits are shared equitably.

Artificial Intelligence (AI) technologies, ranging from adaptive learning systems and intelligent tutoring systems to generative AI, are being introduced into classrooms, online platforms, and administrative systems worldwide. Its potential benefits in education include personalized learning paths, timely formative feedback, automation of repetitive tasks, and insights from learning analytics that can support decision-making. Its critics warn about widening inequalities, algorithmic bias, surveillance, erosion of teacher autonomy, and the market-driven commodification of education.

Growth and forms of AI in education

Artificial Intelligence (AI) is changing how education systems work. It includes tools like intelligent tutoring systems, adaptive learning programs, chatbots, and automated grading. These technologies can create lessons, check student work, and support teachers and learners. Since 2020, and especially after the rise of powerful tools, there has been a big increase in how often AI is used in education (English, 2025).

Recent studies show that research about AI in education has grown very fast. A review of over 100 studies found that more schools and universities are using AI for personalized learning, assessment, and student support (Zawacki-Richter et al., 2019). This growth shows that AI is becoming part of how education systems work, not just a new piece of technology.

Research shows that AI can improve learning when it is used correctly. For example, students often do better when AI gives them feedback or practice exercises (Discover Education, 2025). But success depends a lot on teachers and schools. If teachers are not trained or supported, AI may not help much or it could even make learning worse. From a sociological point of view, this means technology's success depends on social factors like teacher skills, school culture, and access to resources, not just on how advanced the technology is.

AI can both help and harm fairness in education. On one hand, AI can give extra help to students who need it, offering personalized learning and support for different abilities (Preprints, 2025). On the other hand, not all schools and students have the same access to computers, internet, or training. This can make existing inequalities worse. However, if policies don't address these issues, AI may increase the gap between rich and poor schools.

AI systems that track student progress or behavior raise questions about privacy and control. Tools that collect data can help teachers understand how students learn but they can also be used for constant monitoring. From a sociological view, this kind of "data watching" can change how students feel and behave in school. Researchers like Alfredo et al. (2023) suggest that AI in education needs to be designed in a human-centered way that protects privacy and fairness.

Sociologists and educators agree that AI in education should not focus only on what technology *can* do, but on *how* it is used and *who* benefits from it. To make AI fair and effective, schools need strong policies, teacher training, and systems that ensure equality and respect for privacy (English, 2025). In short, AI should be seen as a social tool that reflects our values, not just a technical one.

From Functionalist Perspective AI tools as innovations that can increase system efficiency (e.g., automating grading, supporting individualized instruction) and help education fulfill functions of skill formation and social mobility if integrated thoughtfully. From this lens, AI is an instrument to improve systemic performance, but successful integration requires supportive structures (teacher training, infrastructure).

Conflict Theory emphasizes power, inequality, and commodification. AI integration is shaped by corporate actors, investment flows, and market incentives that can prioritize profit over equitable educational outcomes. This lens draws attention to who controls data, who profits from student attention and learning analytics, and how private interests shape educational priorities. Recent industry shifts and investment trends reveal an uneven economic landscape with winners and losers in edtech markets.

Symbolic Interactionism focuses on micro-level interactions: teacher-student exchanges, how AI-mediated feedback alters identities and meanings attached to learning, and how students interpret and negotiate AI's role. For instance, students might come to view knowledge as something produced by machines, affecting motivation, self-efficacy, and trust in human expertise.

Methodology

This paper uses a qualitative method based on secondary sources. Sources include peer-reviewed empirical studies, systematic reviews, major policy documents (UNESCO, OECD), and recent analyses on equity and ethics. The selected sources published between 2018–2025 are selected to capture contemporary developments, especially the effects of generative AI. Thematic analysis was used to extract recurrent sociological themes and synthesize findings under the theoretical frameworks.

Findings and Discussion

1. Pedagogy and Learning: Personalization vs. Standardization

AI is often praised for its ability to personalize learning. It can adjust lessons, pace, and feedback to fit each student's needs. This supports a long-standing goal in education to help every learner progress at their own speed. Research shows AI can improve learning, especially in subjects like mathematics, when used with good teaching design and teacher guidance (Holmes et al., 2021; Chen et al., 2024).

However, large-scale personalization often depends on data such as test scores, speed, and accuracy. This means that what gets measured tends to matter most, pushing schools toward test-based and easily quantifiable goals. As sociologist Michael Young (1971) argued, education systems decide what counts as "legitimate knowledge." When AI emphasizes measurable skills, it may weaken attention to creativity, critical thinking, and social learning.

2. Teacher Roles, Professional Identity, and Labor

AI tools can grade assignments, manage reports, and even suggest teaching strategies. This can free teachers to focus on mentoring, social-emotional support, and creative instruction (Luckin et al., 2016). Yet, studies show many teachers feel uncertain about how to use AI effectively and need strong professional-development support (Zawacki-Richter et al., 2019).

There are also labor-market concerns. As AI handles more routine work, demand may rise for teachers skilled in technology, while others, especially part-time or low-paid educators may face job insecurity (Williamson & Piattoeva, 2022). When technology companies control educational platforms, they may also gain influence over curriculum and assessment decisions, shifting authority away from teachers.

3. Equity, Access, and the Digital Divide

Not all students benefit equally from AI. Those with better internet access, newer devices, and trained teachers tend to gain more (OECD, 2023). Meanwhile, students in rural areas or low-income schools may be left

behind. Furthermore, algorithms trained on limited or biased data can reflect and reproduce social inequalities (Noble, 2018).

4. Surveillance, Assessment, and Learner Rights

AI can track student progress in great detail, helping teachers give timely feedback. But this constant data collection raises questions about privacy and trust. Continuous monitoring might make students feel watched or pressured, which could discourage creativity and risk-taking (Selwyn, 2019). International organizations like UNESCO and the OECD call for clear ethical rules, such as transparency, data minimization, and informed consent to protect students' rights (UNESCO, 2023).

5. Political Economy: Commodification and Market Forces

AI is now a major part of the global education technology market. Big companies invest heavily in AI-powered learning tools, often shaping what kinds of educational technologies are developed (Williamson & Hogan, 2020). Market priorities, such as profit, scalability, and data ownership, sometimes outweigh local educational needs. This can lead to "vendor lock-in," where schools become dependent on specific companies for content and assessment tools.

AI systems are built on data that reflect the cultures and languages of their developers. As a result, they may favor certain ways of thinking or communicating while overlooking others. For example, English-language AI systems can unintentionally marginalize local languages and knowledge traditions (Couldry & Mejias, 2019; UNESCO, 2023).

Conclusion

AI's integration into education presents transformative possibilities and serious sociological risks. From a functionalist perspective, AI can enhance efficiency and personalization; from a conflict-theory perspective, it raises questions about commodification, data ownership, and inequality; and from a symbolic interactionist perspective, it alters classroom interactions and learner subjectivities. Policymakers, educators, technologists, and communities must collaborate to design frameworks that protect rights, promote equity, and preserve the pedagogical values that foster democratic and humane education. The future of education with AI will be shaped less by technological potential than by the social choices, governance arrangements, and investments societies make today.

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