Competing Visions: Narratives of AI's Role in Early Childhood Education

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

When we think about early childhood education and the cultivation of creativity, tools like LEGO often come to mind—colorful, hands-on, and imagination-driven. In the digital age, *Minecraft* has become LEGO's virtual counterpart: a sandbox world where children can build, explore, and create. Its *Education Edition* was specifically designed to foster creativity, collaboration, and subject-based learning. But what happens when artificial intelligence enters this playful space?

This question became the foundation of my capstone research project, *Benchmarking AI Agents' Creativity in a Dynamic Virtual World*. Using Minecraft as a testbed, I evaluated several large language models—including GPT, LLaMA, Gemini, and Claude—to explore how AI agents interact with human players and influence creative engagement and cognitive thinking. The experiment led to an interesting observation: when AI entered the world of Minecraft, participants seemed noticeably more engaged. Among the ten UVA students who participated, 80% expressed not just curiosity, but genuine excitement about the experience. One student shared, "I often feel that with an AI Steve (default Minecraft player name), I become more curious about everything and want to try more tasks with AI. Also, I feel less lonely." Several participants even asked for access to the AI-Minecraft integration code, eager to continue co-creating with their AI teammates beyond the study. These moments made me pause and ask a deeper question: What is AI's role in early childhood education, and how can we more deeply understand it?

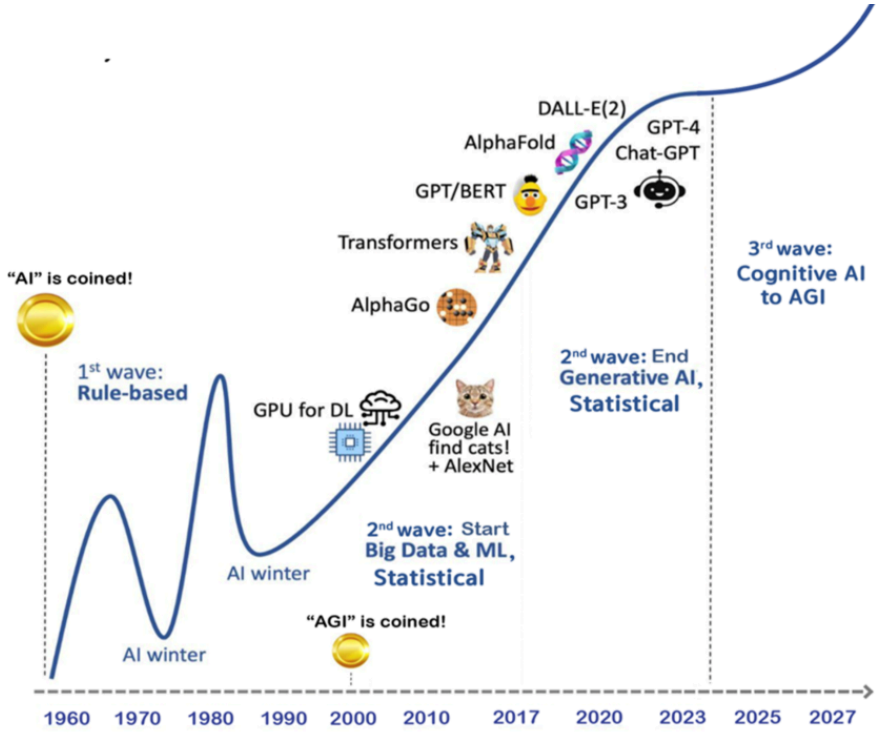

Figure 1: *Timeline of AI development showing two peaks (AI Springs in 1956–1974 and 1980–1987), two troughs (AI Winters in 1974–1980 and 1987–1993), and the ongoing AI Summer starting in 2012. Icons represent key technologies from each phase.* Adapted from Voss, P., & Jovanovic, M. (2023).

While my research focused on a single digital platform, it reflects a much broader moment. The release of OpenAI's ChatGPT in late 2022 marked a public breakthrough for artificial intelligence, transforming AI from an abstract concept into a tangible, widely used tool. Generative AI, once confined to research and theory, quickly entered classrooms in the form of AI agents embedded in educational software. Yet, the question of how to define AI's role in education began long before this moment. Since the 1950s, AI has progressed through two springs of optimism and two winters of disillusionment (see Figure 1; Voss & Jovanovic, 2023), shaped initially by researchers who viewed it as a cognitive and pedagogical tool. As capital and

commercial interest grew, however, AI's purpose became a site of broader negotiation. In the current *AI Summer* — a phase that began in 2012, driven by breakthroughs in deep learning, generative AI, and large language models like GPT, and marked by growing public interest and widespread enthusiasm —the definition of AI in early childhood education is no longer shaped solely by technologists and academia. Instead, educators, parents, tech companies, and policymakers now compete to shape its meaning, each guided by distinct values and concerns. Educators seek tools that align with developmental principles, parents emphasize safety and transparency, and tech firms promote innovation, scalability and market opportunity. These visions intersect and conflict, revealing AI's role in education as not just technical, but shaped by competing commercial interests and ethical concerns. This paper examines how the definition of AI in early childhood education is constructed through discourse—a dynamic and contested process in which educators, parents, tech companies, and policymakers negotiate its meaning, legitimacy, and role in shaping the future of learning.

Literature review

AI Summer, often traced to the post-2000 surge in machine learning and deep learning technologies and the generative AI, ushered in a new wave of research on AI's integration into early childhood education. Much of the related research paper focuses on practical implementations of AI tools, particularly generative systems and AI agents, in real-world learning environments. Studies like Ho et al. (2024) and Zhang et al. (2024) explore systems—SET-PAiREd and StoryBuddy—that involve parents by allowing flexible control over AI interaction. In SET-PAiREd, parents adjust how an AI-assisted robot supports learning through a card-based interface that lets them choose the robot's level of involvement. In StoryBuddy, parents co-narrate stories with AI by customizing question types and tracking

educational goals. Both studies found that when parents are given meaningful control over AI systems, children show greater engagement and parents report increased trust and willingness to adopt the technology. These examples point out how parents are not only users but also co-constructors of AI's role in learning, negotiating their expectations alongside technological possibilities. Broader analyses, such as those by Kanders et al. (2024) and Bush and Alibakhshi (2025), assess the risks and opportunities of generative AI in early education at a systemic level. While these studies underscore the potential of large language models to fill content gaps and personalize learning, they also point to ongoing tensions around transparency, developmental appropriateness, and ethical safeguards. These studies on generative AI or AI for the current mainstream understanding, reflect a growing research that examines AI's educational potential through specific tools, case studies, and pilot programs. While valuable, this work often concentrates on the capabilities and limitations of individual systems, with less attention given to how the broader *definitions* of AI in education are being contested across social groups.

Earlier interdisciplinary studies about tech and education, conducted before the advent of generative large language models, help frame this discursive gap. In book *Parenting for a Digital Future*, Livingstone and Blum-Ross (2020) show how parents' hopes and fears about technology shape their educational choices, making them not just passive consumers of AI tools but active co-constructors of their legitimacy. Another educational technology book, *Technology and Digital Media in the Early Years* (Donohue, 2015) emphasizes how early childhood educators—despite being the primary users of educational technologies—are frequently excluded from the design process. This disconnection raises concerns about whether AI tools reflect educational values or simply commercial imperatives. These texts highlight the interplay

between social expectations, market narratives, and professional practices—an interplay that becomes increasingly relevant as AI's role in education expands.

Building on foundational work in educational technology and science and technology studies—particularly Donohue (2015) on digital learning environments and Livingstone & Blum-Ross (2020) on parenting and digital media—this paper adopts the Social Construction of Technology (SCOT) as its central STS framework. Originally proposed by Trevor Pinch and Wiebe Bijker (1984), SCOT emphasizes that technology does not carry fixed meaning or purpose; rather, its development is shaped by competing interpretations from different relevant social groups. These groups bring their own values, needs, and worldviews, leading to "interpretive flexibility" in how technologies are understood and legitimized. In this study, SCOT is used to examine how different social actors bring distinct values and expectations to AI systems in early education. These differing perspectives shape how AI is understood, used, and contested. This paper argues that in early childhood education, AI is shaped not merely by what it can do, but by what people believe it should do. The values, fears, and institutional interests of designers, users, and decision-makers continually redefine its role—revealing that AI is not a neutral tool, but a socio-technical artifact whose meaning is always in flux.

Methods

This research adopts Discourse Analysis as the primary methodological method to investigate how the concept of AI's role in early childhood education has been defined, redefined, and negotiated by different social groups over time. Discourse Analysis focuses on tracing the flow of conversations and narratives across actors such as educators, parents, technology companies, and government agencies to understand how their framing, concerns, and

expectations have evolved and influenced one another. Grounded in Fairclough's (1992) perspective, discourse is understood not merely as language use but as a form of social practice that both reflects and constructs broader social realities. Fairclough emphasizes that discourse is shaped by and simultaneously shapes institutional structures, ideologies, and power relations. In this study, discourse analysis helps reveal how language used by different communities contributes to legitimizing certain visions of AI in early education or may be silencing or marginalizing others. By examining how meanings are negotiated through public dialogue, professional communication, and media representation, this method enables us to identify the shifting power dynamics that influence how AI is positioned, perceived, and contested in early childhood education.

The data sources for this discourse analysis are broad and multimodal, covering a diverse range of text-based materials, including academic research papers on constructionist learning and symbolic AI from the first AI Spring, news articles reporting on contemporary controversies such as AI surveillance and concerns over children's emotional dependency on AI companions, official government policies issued at both federal and state levels, corporate advertisements and product descriptions from EdTech companies, educator- and parent-authored blog posts, and community discussions extracted from public online forums like Reddit. This diverse collection ensures that the discourse captured reflects the full spectrum of voices—ranging from formal institutional narratives in government documents to grassroots parental concerns shared in online communities, and branding strategies employed by companies to promote AI tools for young children. The analysis follows a thematic coding process, identifying recurring keywords, metaphors, arguments, and framings used by different social actors across different points in time. Through this process, the research seeks to answer who has the power to define AI's role in

early childhood education at different stages, how that power shifts over time, and how the evolving discourse influences public opinion, educational practice, and policy formation. Ultimately, this method highlights that the meaning and perceived legitimacy of AI in early childhood education is not fixed, but rather the result of continuous negotiation between actors with unequal levels of influence.

Analysis

I. The Pre-Summer Phase: A Technocratic and Academic Narrative

AI has gone through two Springs and two Winters, but in its early educational stage, it was primarily defined by academics and experts, remaining a niche field with little public influence and limited participation in shaping its meaning. During the first AI Spring of the 1950s to 1960s, foundational figures such as Alan Turing and John McCarthy envisioned AI as a tool for cognitive modeling and problem-solving, not a product for widespread application. Educational innovations like Seymour Papert's LOGO programming language introduced constructionist learning ideals. In his book *Mindstorms: Children, Computers, and Powerful Ideas*, Papert posited that young children learn not by passively receiving knowledge, but by actively making things—for example, using LOGO to control a turtle on the screen and explore mathematical and logical concepts through experimentation and play (Papert, 1980). Similarly, systems like PLATO (Bitzer, 1960) explored the potential of computer-assisted instruction to individualize learning experiences. These efforts were experimental and exploratory, driven by a belief in AI's potential to enhance cognitive development.

This era of optimistic experimentation was enabled by increased government investment, particularly from agencies like DARPA, which funded research in natural language processing

and early interactive systems such as ELIZA (Weizenbaum, 1966). Yet despite this optimism, early AI in education remained constrained by the technological limitations of symbolic AI. These models relied on rule-based processing, which proved inflexible and ill-suited for the complexities of real-world educational environments (Winograd, 1972). Although projects like ELIZA generated excitement, they ultimately revealed the superficiality of early AI's conversational abilities, particularly in emotionally nuanced settings like childhood education.

Despite some arguing that this period laid critical groundwork for future developments, the limitations of symbolic AI prevented its broad adoption. While the LOGO language remained in limited educational use, most computer-assisted instruction systems failed to gain long-term traction, due to a combination of technical limitations, high development costs, limited classroom accessibility, and content that often failed to meaningfully engage young learners. The Lighthill Report of 1973 delivered a significant blow to the field, criticizing AI research for over-promising and under-delivering. This report led to the withdrawal of government funding and triggered the first AI Winter (1974–1980), effectively ending many early education-focused AI projects.

In sum, AI's early presence in education was shaped almost exclusively by academic institutions, with negligible involvement from commercial or policy sectors. Despite high expectations, these efforts were constrained by limited computational capacity and the rigidity of symbolic AI. Even famous scientific achievements such as LOGO, PLATO, and ELIZA were confined to research settings and select educational programs, with virtually no penetration into public awareness. A review of historical materials reveals that documentation of these systems is extremely limited and largely single-sourced, confined primarily to historic record and institutional archives, with minimal evidence of mainstream media coverage or broader public

engagement. Following this initial decline of the late 1970s, the field experienced a brief resurgence in the early 1980s with the advent of expert systems. However, this revival was short-lived. The collapse of the Lisp machine market in 1987, coupled with the high maintenance costs and limited adaptability of expert systems, led to a second, more prolonged AI Winter extending into the early 2000s. During this period, AI research, particularly in education, suffered from reduced funding and waning public interest. As illustrated in Figure 1 of the introduction, although AI research continued to advance slowly through statistical methods during this period, its application in education remained stagnant and marginal. This prolonged gap resulted in minimal public visibility and little presence in mainstream discourse around AI in learning (Hendler, 2008; Crevier, 1993).

II. The Summer Phase: Expanding Influence and Discursive Competition

With the arrival of AI Summer, the integration of AI into education and rising public attention marked a distinct reversal from its earlier trajectory and AI's definition shifted from a niche academic concept to a socially negotiated one. Today, even a cursory Google search for "AI" yields an unending stream of content, reflecting not only the topic's newfound cultural saturation but also the scale of societal engagement. This shift is further evidenced by the explosive user data associated with contemporary AI platforms. As of April 2025, ChatGPT alone has surpassed 400 million weekly active users worldwide (DemandSage, 2025). Other generative AI tools demonstrate similarly staggering adoption: Midjourney reports over 20.77 million registered users (OpenAI Journey, 2024), while DALL·E attracts more than 1.5 million daily users, generating upwards of 2 million images per day (Roza, 2025). These figures underscore the extent to which AI has moved from obscurity into a state of near-ubiquity, fueling not just discourse but mass participation. This heightened visibility has, in turn, triggered

overlapping and often conflicting attempts to define AI's educational role—each stakeholder articulating divergent visions of its purpose, risks, and value.

Educators view AI as both a powerful tool for personalized learning and an ethical challenge, raising questions about the appropriate role of technology in young children's developmental experiences. According to the National Association for the Education of Young Children (NAEYC, 2012), any classroom technology, including AI, must align with developmentally appropriate practices (DAP), meaning it should enhance—not replace—hands-on, relational learning. AI tools can assist with differentiated instruction and real-time feedback (Nieves, 2023), but teachers also flag risks like data privacy breaches, algorithmic bias, and increased screen time. Moreover, many educators feel under-resourced and unprepared, as they're expected to adopt new technologies without sufficient institutional support (Hechinger Report, 2024). In a Reddit discussion on teachers' attitudes toward AI, one user commented, "I'm usually all in favour of embracing new technology but AI is too far. It could shape children's early thinking in ways we simply can't predict." This reflects a broader unease among educators about AI's potential to shape early thinking and cognitive development in unpredictable ways. While educators generally agree with government guidelines that AI should remain a supplemental tool, they emphasize the on-the-ground realities of implementation and the ethical imperative to ensure AI strengthens, not compromises, pedagogical integrity.

Parents in the United States express significant concerns about the integration of AI in early childhood education, particularly regarding data privacy, content safety, and the potential for technology addiction. A survey by the Barna Group revealed that 33% of U.S. parents strongly agree they are concerned about data privacy and security risks associated with their child using AI technology, and 25% believe that AI usage could negatively impact their child's

ability to think independently (Barna Group, 2024). A lack of clarity around how AI is selected and used in classrooms fuels this skepticism. Privacy fears are central—many worry that children's personal data could be collected or misused without proper safeguards. The Child Rescue Coalition (2024) reinforces these anxieties, warning that AI's lack of ethical judgment may result in biased or unsafe interactions unless rigorously overseen. Recent incidents in the United States have intensified these concerns. For instance, a mother in Los Angeles discovered that her 10-year-old daughter had formed an emotional attachment to an AI chatbot embedded in a children's app, referring to it as her "friend" (Business Insider, 2025). This raised alarms about the potential for AI to shape children's social-emotional development in unintended ways. These cases underscore a growing fear among parents that AI, when unregulated, can undermine children's emotional well-being, privacy, and trust in their learning environments. Although some parents see potential in AI for tasks like homework support, the prevailing concern is to ensure that AI complements—not compromises—children's healthy development.

Tech companies often frame AI in early childhood education as a transformative opportunity. They emphasize personalization, engagement, and data-driven learning, but frequently underestimate the ethical complexities that educators and parents prioritize. Microsoft (2024), for example, markets AI as essential to the future of learning, using assertive language to frame their products as indispensable tools for teacher support and educational success. This marketing pattern is not limited to tech giants. Smaller EdTech startups, too, package their AI tools with bold promises. For instance, Polymath, a U.S.-based gamified math platform, advertises with the slogan: "We want math to be more fun than Roblox," explicitly positioning itself in competition with popular entertainment platforms. On its homepage, the company claims that children can "build math muscles while building digital worlds," suggesting that educational

value can be seamlessly merged with open-ended, game-like interaction (TechCrunch, 2025). Yet despite these engaging visuals and slogans, Polymath offers little publicly about how its AI moderates content, personalizes difficulty, or avoids algorithmic errors. The messaging emphasizes excitement and autonomy—"We don't teach kids math. We let them discover it"—but leaves key ethical and developmental considerations unanswered. Common advertising slogans like "Empowering minds through tech," "Reinventing childhood for the digital age," or "Where play meets precision" (Rontar, 2023) reflect an increasingly commercialized rhetoric that frames early education as an optimization problem. In this competitive EdTech landscape, many companies prioritize showcasing features such as real-time learning analytics or adaptive storytelling engines—while deflecting accountability for long-term developmental, emotional, or ethical consequences. Their narrative tends to highlight technological potential while externalizing ethical responsibility, framing AI as a solution without fully addressing the developmental and moral responsibilities that accompany its use in early childhood settings.

Government agencies, particularly at the federal and state levels, are actively establishing guidelines for AI's role in education, striving to balance innovation with concerns about equity, safety, and developmental appropriateness. The U.S. Office of Educational Technology (2023) emphasizes that AI should support—not replace—teachers, reinforcing goals of developmental alignment and professional integrity. Central to these policies is the protection of the teacher-child relationship, seen as vital for early cognitive and emotional growth. The Virginia Secretary of Education (2024) echoes this concern, mandating that AI implementation be paired with proper educator training and clear family engagement practices. To operationalize these values, the U.S. Department of Education's report *Artificial Intelligence and the Future of Teaching and Learning* recommends comprehensive professional development for educators and

transparent communication with families regarding the use of AI tools in classrooms (U.S. Department of Education, 2023). Building on these foundational measures—and in response to the rising influence of generative AI, deepening parental anxieties, and the commercial surge of unregulated EdTech tools—federal agencies have accelerated policy efforts over the past two years. Through reports, strategic plans, and cross-agency collaborations, they aim to bring greater clarity and accountability to an increasingly complex educational AI landscape, while protecting key stakeholders—educators, parents, and most importantly, young learners—through institutional oversight and coordinated guidance.

Conclusion

Looking back at the timeline, we see that AI's role in education has never been limited to today's generative models: from symbolic AI to expert systems, and later to machine learning and deep learning, each era has brought with it not only new capabilities but also new interpretations of what AI ought to be. While early definitions were shaped by researchers and engineers —focused on cognitive modeling and system efficiency—AI's expansion into everyday educational settings has turned it into a site of negotiation. Today, educators, parents, tech companies, and policymakers bring distinct values and agendas, competing to define AI's purpose and legitimacy in early childhood education. These struggles underscore that AI is not a neutral tool, but a socio-technical artifact whose meaning is shaped—and reshaped—by discourse. As policies begin to formalize ethical guardrails, particularly around safeguarding developmental needs and teacher-child relationships, we see a growing recognition that AI's integration into classrooms is not merely a matter of innovation, but of public responsibility.

Throughout this research, I found that these tensions—between opportunity and risk, innovation and protection—are ongoing and unresolved. But I also observed that as new problems emerge, so too do new responses: policy shifts, public debates, and ethical design efforts all reflect society's evolving attempt to make sense of AI's place in education. Like any new technology, AI brings uncertainty and gray areas, but also the possibility for reflection and improvement. I remain hopeful that with sustained attention, collective dialogue, and cross-sector collaboration, AI in early childhood education can grow into a more inclusive, transparent, and ethically grounded tool. This belief has shaped the questions I've asked in both Capstone and STS research projects—and it will continue to guide how I engage with educational technology in the years to come.

Reference

Barna Group. (2024). Parents have concerns about AI but aren't actively learning about the technology. https://www.barna.com/research/parents-ai/

Bijker, W. E., & Pinch, T. J. (1984). *The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other*. Social Studies of Science, 14(3), 399–441.

Bitzer, D. L. (1960). *PLATO: An educational computer system*. University of Illinois Press.
Business Insider. (2025, March 2). *Parents are worried about AI chatbots popping up in kids' apps. Experts say here's what to watch for*. https://www.businessinsider.com/parents-kids-ai-chatbots-apps-danger-benefits-study-how-to-2025-03

Bush, A., & Alibakhshi, A. (2025, January 9). *Bridging the early science gap with artificial intelligence: Evaluating large language models as tools for early childhood science education*. arXiv.org. https://arxiv.org/abs/2501.01192?utm_source=chatgpt.com

Chandrasekaran, B. (1986). Generic tasks in knowledge-based reasoning: High-level building blocks for expert system design. *IEEE Expert, 1*(3), 23–30. https://doi.org/10.1109/MEX.1986.4306999

Common Sense Media. (2024). *Our AI initiatives*.https://www.commonsensemedia.org/ai

Crevier, D. (1993). *AI: The Tumultuous History of the Search for Artificial Intelligence*. Basic Books.

DemandSage. (2025). *ChatGPT Statistics (April 2025): Number of Users & Queries*. Retrieved from https://www.demandsage.com/chatgpt-statistics/

Donohue, C. (Ed.). (2015). *Technology and digital media in the early years: Tools for teaching and learning*. Routledge.

Fairclough, N. (1992). *Discourse and social change*. Cambridge, UK: Polity Press.

Hendler, J. (2008). Avoiding another AI winter. *IEEE Intelligent Systems*, 23(2), 2–4. https://doi.org/10.1109/MIS.2008.19

Ho, H.-R., Kargeti, N., Liu, Z., & Mutlu, B. (2025, February 24). *Set-paired: Designing for parental involvement in learning with an AI-Assisted Educational Robot*. arXiv.org. https://arxiv.org/abs/2502.17623?utm_source=chatgpt.com

Kanders, K., Stupple-Harris, L., Smith, L., & Gibson, J. L. (2024). *Perspectives on the impact of generative AI on early-childhood development and education*. Infant and Child Development.

Lighthill, J. (1973). *Artificial intelligence: A general survey*. *Artificial Intelligence: A Paper Symposium, Science Research Council*, 1–20.

Livingstone, S., & Blum-Ross, A. (2020). *Parenting for a digital future: How hopes and fears about technology shape children's lives*. Oxford University Press.

Microsoft Education. (2024, September 5). Transforming education in the age of AI with a unified solution. *Microsoft Education Blog*. https://www.microsoft.com/en-us/education/blog/2024/09/transforming-education-in-the-age-of-ai-with-a-unified-solution/

National Association for the Education of Young Children (NAEYC). (2012). *Technology and interactive media as tools in early childhood programs serving children from birth through age 8*. https://www.naeyc.org/sites/default/files/globally-shared/downloads/PDFs/resources/position-statements/ps_technology.pdf

Nieves, K. (2023, June 6). 5 ways to use AI tools to meet students' needs. Edutopia. https://www.edutopia.org/article/using-ai-tools-differentiated-instruction

Nikola Roza. (2025). *DALL-E Statistics Facts and Trends for 2025 - All the Crucial Stats*. Retrieved from https://nikolaroza.com/dall-e-statistics-facts-trends/

OpenAI Journey. (2024). *Midjourney Statistics 2024 - Users, & Revenue*. Retrieved from https://openaijourney.com/midjourney-statistics/

Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*. Basic Books.

ParentsTogether. (2024, January 11). Warning for parents: AI fake nudes trend is targeting girls. *ParentsTogether*. https://parents-together.org/warning-for-parents-ai-fake-nudes-trend-is-targeting-girls/

ParentsTogether. (2024, February 2). AI technology's potential impacts on kids, education, and homework—What parents need to know about ChatGPT. *ParentsTogether*. https://parents-together.org/chatgpt-ai-technologys-impact-on-education/

Safes. (2024, July 18). Is Character AI safe or a safety risk? A guide for parents. Safes Parental Control App. https://www.safes.so/blogs/is-character-ai-safe/

Stewart, S. C. (2023, October 16). Is early childhood education ready for AI? *The Hechinger Report*. https://hechingerreport.org/is-early-childhood-education-ready-for-ai/

TechCrunch. (2025, February 17). Polymath aims to make learning math as enjoyable as Roblox.

Retrieved from https://techcrunch.com/2025/02/17/polymath-aims-to-make-learning-math-as-enjoyable-as-roblox/

The Dark Side of AI: Risks to children. (2024, June 18). *Child Rescue Coalition*. https://childrescuecoalition.org/educations/the-dark-side-of-ai-risks-to-children/

Turing, A. M. (1950). Computing machinery and intelligence. *Mind, 59*(236), 433–460. https://doi.org/10.1093/mind/LIX.236.433

U.S. Department of Education, Office of Educational Technology. (2023). Artificial intelligence and the future of teaching and learning: Insights and recommendations. https://www.ed.gov/sites/ed/files/documents/ai-report/ai-report.pdf

Virginia Secretary of Education. (2023). *Guidelines for AI integration throughout education in the Commonwealth of Virginia*. https://www.education.virginia.gov/media/governorvirginiagov/secretary-of-education/pdf/AI-Education-Guidelines.pdf

Voss, P., & Jovanovic, M. (2023). *Timeline of growing capabilities of AI systems*. In *Concepts is all you need: A more direct path to AGI* (Figure 1). ResearchGate.

Weizenbaum, J. (1966). ELIZA—A computer program for the study of natural language

communication between man and machine. *Communications of the ACM, 9*(1), 36–45. https://doi.org/10.1145/365153.365168

Zhang, Z., Xu, Y., Wang, Y., Yao, B., Ritchie, D., Wu, T., Yu, M., Wang, D., & Li, T. J.-J. (2022, March 14). *StoryBuddy: A human-ai collaborative chatbot for parent-child interactive storytelling with flexible parental involvement*. arXiv.org. https://arxiv.org/abs/2202.06205?utm_source=chatgpt.com