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Coded Narratives: Leveraging Women AI Scientists' Memoirs for Inspiration and Knowledge in K-12 AI Education

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Abstract: This conceptual paper explores how autobiographical memoirs by prominent AI women scientists can be integrated into K-12 AI literacy curricula to inspire and educate students. Drawing on research on the motivating influences of role models and narrative stories in STEM learning, the paper analyzes *The Worlds I See* by Fei-Fei Li, a Chinese immigrant; *Unmasking AI* by Joy Buolamwini, a Black woman of Ghanaian descent; and *Girl Decoded* by Rana el Kaliouby, an Egyptian Muslim immigrant. We argue that these works from diverse women in AI offer relatable, motivating, and engaging narratives that will resonate with students from underrepresented groups. The analysis explores how such memoirs can demonstrate resilience in the face of challenges, identity affirmation, and career pathways while providing accessible insights into core AI literacy topics such as the critical role of data in AI, ethics & bias in AI, societal impacts, computer vision, and affective human-centered AI. We argue that such resources are powerful catalysts for inclusive education, serving both as motivational tools and as pedagogical resources that deepen AI understanding.

Keywords: AI Literacy, STEM role models, inclusive education, storytelling

1. Introduction

The rapid spread of artificial intelligence (AI) and machine learning (ML) across domains—from education to transportation—signals a transformative shift that necessitates AI literacy in K-12 education. As AI increasingly mediates human experiences, students must learn to understand, evaluate, and shape these technologies—not just as users, but as informed citizens and potential innovators (Touretzky et al., 2019). AI literacy, encompassing technical knowledge, ethical awareness, and societal implications, is critical for preparing youth for a world shaped by AI (Long & Magerko, 2020). Yet, current K-12 AI education often lacks depth and accessibility, especially for students from historically marginalized backgrounds who face systemic barriers, including the absence of relatable role models in STEM (NSF, 2022).

The learning sciences have long called for inclusive pedagogies that integrate STEM concepts with motivating narratives to foster comprehension and aspiration (Pena, 2014). STEM research also shows that role models enhance motivation, self-efficacy, and persistence, especially for marginalized students (Shin et al., 2016). To address this need, this conceptual paper proposes the integration of memoirs into AI literacy efforts. We analyze three recent memoirs by pioneering women in AI—Fei-Fei Li's *The Worlds I See* (2023), Joy Buolamwini's *Unmasking AI* (2023), and Rana el Kaliouby's *Girl Decoded* (2020)—to demonstrate how these narratives offer both motivation and rich AI content K-12 curricula. These deeply personal stories intersect with critical AI/ML topics, making them compelling tools for engaging students, particularly women and those from underrepresented groups. Each memoir exemplifies the blend of technical insight and human experience. Li, a Chinese immigrant, recounts her path through hardship and into leading advancements in computer vision. Buolamwini, a Black woman of Ghanaian descent, reveals how AI bias affected her personally and drove her to become a leader in algorithmic justice. El Kaliouby, an Egyptian-Muslim immigrant, explores affective computing while navigating personal and cultural

complexities. These narratives add the human element to AI development, helping students see humans like them as part of the AI story.

Additionally, storytelling as pedagogy increases engagement and helps ground abstract ideas in relatable human contexts (Dahlstrom, 2014). These memoirs, therefore, function as dual-purpose tools: they inspire through representation and provide substantive entry points into AI literacy. Each memoir contributes conceptual insights aligned with AI4K12 (n.d)'s "Big Five Ideas". Li explains the pivotal role of big data in revolutionizing ML. Buolamwini critiques algorithmic fairness and the societal impacts of biased AI, while also modeling ethical dataset creation. El Kaliouby introduces affective computing and the interplay between technology and humanity. These stories thus interweave personal, technical, historical, and ethical threads, addressing key AI literacy competencies.

Following a literature review and brief analysis of the memoirs, this paper proposes a pedagogical framework positioning them as both motivational catalysts and sources of AI conceptual content. Centering such diverse human stories supports inclusive education and broadens participation, helping students envision themselves as future AI innovators.

2. Theoretical Framing

This work is grounded in (a) the need to address AI literacy and pedagogies to support AI literacy education, (b) research on the benefit of role models to address underrepresentation in STEM fields in general and AI in particular, and (c) the power of narratives and storytelling to engage learners along the cognitive as well as intrapersonal dimensions of learning.

2.1 AI Literacy in K-12 Education

AI literacy efforts in K-12 education are growing globally to prepare students for an AI-driven world. Initiatives like "Day of AI" and "National AI Literacy Day" offer free curricula, tools, and professional development. Nonprofits like the AI Education Project, Raspberry Pi Foundation, EqualAI.org and TeachAI.org promote AI learning and provide resources for educators and communities to engage with AI responsibly. UNESCO's AI Competency Framework (2024) emphasizes a human-centered, ethics-infused approach across STEM and social studies.

Core AI literacy curricula combine technical, practical, and ethical components, captured by AI4K12 (n.d.)'s Big 5 Ideas: *Perception* (using sensors to interpret the world); *Representation and reasoning* (modeling and reasoning); *Learning* (AI learns from data); *Natural interaction* (communication through language and emotion); and *Societal impact* (AI's positive and negative effects). Grover (2024) highlights how students explore AI through accessible tools like Google's Teachable Machine and TensorFlow or code in Scratch and Python, and interdisciplinary projects link AI to real-world contexts like criminal justice and healthcare. For younger or tech-limited learners, unplugged activities introduce AI concepts. Ethical themes—bias, fairness, privacy—are central. Many curricula reference Buolamwini & Gebru's (2018) *Gender Shades* study and Buolamwini's TED Talk on AI bias. However, few go further to incorporate personal stories of underrepresented AI scientists.

2.2 Promoting diversity through role models in STEM education

Women remain underrepresented in AI, comprising under 19% of U.S. AI/CS Ph.D. graduates and only 16% of tenure-track CS faculty (Stanford HAI, 2021). African Americans and Hispanics make up just 2.4% and 3.2% of AI Ph.D. recipients. Addressing this imbalance requires continued emphasis on engaging underrepresented students.

Research shows role models with shared identities—by gender, race, or background—boost self-efficacy and aspirations for marginalized learners. Students exposed to relatable figures report higher confidence and actively seek role models who reflect their values (Gillooly, Hardt, & Smith, 2021). According to social cognitive theory, perceived similarity strengthens belief in one's potential (Gladstone & Simpian, 2021), and role models who share struggles and counter stereotypes are especially motivating (Steinke et al., 2022).

This evidence has shaped STEM curricula that bring in scientists from academia and industry, though such visits are often brief. Broader efforts include museum and online initiatives like *I Am a Scientist* (2023) which showcase diverse scientific role models.

2.3 The Power of Stories and Narrative in STEM Learning

Storytelling enhances STEM learning by anchoring technical content in emotionally resonant, human-centered contexts. As the oldest teaching form, storytelling organizes complex ideas into sequences that improve retention and critical thinking (Barchas-Lichtenstein et al., 2023). Its benefits are well-supported in STEM education (Dahlstrom, 2014).

Stories about scientists humanize STEM and make abstract concepts relatable. The "narrative effect" improves learning by boosting emotional engagement and memory (Soares et al., 2023). Personal stories also address representation gaps by challenging stereotypes and helping underrepresented students imagine themselves in STEM (Collins, 2022). Narrative pedagogies also place science within historical and cultural frames. Hobbs and Davis (2013) identify "inward-looking" narratives that connect to students' lives and "outward-looking" ones linking science to societal issues—both enhance relevance. Hearing how others overcame similar obstacles promotes a sense of belonging and encourages persistence particularly for students facing systemic barriers. (Dahlstrom, 2014).

3. Analysis of three memoirs

3.1 'The Worlds I See' by Fei-Fei Li

Background and Journey. Born in Beijing and raised in Chengdu, China, Li immigrated with her family to the U.S. at age 15. The family settled in New Jersey and faced language, cultural, and financial hardships. Despite these, Li excelled academically, earning a scholarship to Princeton to study physics. She continued her graduate work at Caltech, completing a Ph.D. in electrical engineering (computer vision), and later held CS faculty positions at Princeton and Stanford.

Inspiration and Mentors. Li's credits her father, an electrical engineer who modeled deep intellectual wonder, and her mother who pushed her to pursue a career in science. Mr. Sabella, her high school math teacher, became a pivotal mentor and family supporter, even helping finance their dry-cleaning business. Her Ph.D. advisors at Caltech, Pietro Perona and Christof Koch, shaped her scientific path.

Major Contribution to AI/ML: Data Matters. Li's signature achievement is *ImageNet*, a dataset of over 14 million labeled images in 22,000 categories. Initially met with skepticism, ImageNet proved that large-scale data could transform ML, launching the deep learning revolution. Li also co-founded *AI4ALL*, a nonprofit introducing AI to underrepresented youth.

Challenges and Persistence. Li's mother's chronic illness was a constant challenge and caused financial strain in their early U.S. years. Professionally, creating ImageNet took years and faced repeated dismissal from experts. Only after adopting Amazon Mechanical Turk could her team crowdsource the needed image labels. While she doesn't dwell on gender bias, she reflects on its impact, noting shared frustrations with fellow female AI researchers.

"North Star" and Student Advice. Li champions "human-centered AI" that enhances, not replaces, human capabilities. She warns of biased algorithms, privacy risks, and power concentration, urging AI to be ethically grounded from the start. Her guiding principle is to reimagine AI as a deeply humanistic endeavor. She also notes: "The best work is often done...in shared spaces of science...rather than within the bubbles of our own fields."

3.2 Unmasking AI by Joy Buolamwini

Background and Inspirations. Born in Canada to Ghanaian parents, Buolamwini describes herself as a "daughter of art and science." Her mother, Frema the Akan, was an artist, and her

father, Dr. John Buolamwini, a medical chemist and computational researcher. This dual influence shaped her approach to tech, blending creativity with scientific inquiry. A PBS segment featuring a young MIT professor, Cynthia Breazeal, and her robot *Kismet* sparked her early interest in AI and robotics.

Mentors and Supporters. Buolamwini was deeply inspired by her parents and ancestral lineage. At MIT, Ethan Zuckerman, her advisor at the Center for Civic Media, encouraged her to connect technical work to issues of power and inequality. Dr. Timnit Gebru, both mentor and collaborator, supported her development in computer vision and advocacy work.

Major Contributions and Achievements. Having to wear a white mask to get face detection software to recognize her face launched Buolamwini's landmark "Gender Shades" study. It revealed commercial facial recognition systems had the highest error rates on darker-skinned women, exposing racial and gender bias in tools from IBM, Microsoft, and Face++. She coined this systemic issue "the coded gaze." Her spoken-word video *AI, Ain't I A Woman?* highlighted misclassifications of iconic Black women like Michelle Obama and Serena Williams, launching her idea of "evocative audits"—artistic demonstrations of algorithmic harms. She also created the *Parliaments Benchmark Dataset*, addressing bias in training data by selecting diverse parliaments from Africa and Nordic countries and using Fitzpatrick skin types rather than racial categories. Personally labeling 1,270 images by skin tone and gender, she enabled intersectional analysis that revealed disparities hidden by aggregate metrics.

Challenges and Navigating Discrimination. When she shifted her research toward algorithmic bias, peers warned it could jeopardize her career. She faced pushback from companies like Amazon, which challenged her findings. Despite this, she gained support from researchers who publicly defended her work. As one of few Black women in AI, Buolamwini also encountered discrimination. At an EU tech panel in Brussels, she was denied entry by security. On *60 Minutes*, despite contributing to a segment, she was ultimately not featured.

Views on an AI-Driven World & Advice for Students. "AI will not solve poverty… or discrimination," she writes, noting that these are cultural, not technical, problems (p. 22). She rejects tech determinism and calls for algorithmic justice—ensuring people have "a voice and a choice" in AI systems that shape their lives (p. 305). Her message to students: "You don't need a PhD from MIT to make a difference… All you need is a curious mind and a human heart" (p. 303). She urges young technologists to "question the status quo… listen to those harmed by algorithms… and explore intellectual terrain beyond computer science" (p. 298).

3.3 Girl Decoded by Rana El Kaliouby

Background and Journey. Raised in Kuwait and Egypt, el Kaliouby grew up in an education-focused household. Her mother was among the first female programmers in the Middle East; her father taught computer science. Reading *Affective Computing* by MIT's Rosalind Picard during her undergrad at American University of Cairo sparked her interest in Emotion AI. She pursued this path through a master's at AUC, a PhD at Cambridge, and a postdoc at MIT.

Mentors and Support Networks. Her PhD advisor, Dr. Peter Robinson, and autism researcher Simon Baron-Cohen provided key research support. At MIT, Picard became both mentor and co-founder. Her mother's unwavering support was also crucial.

Major Contributions. El Kaliouby pioneered Emotion AI—teaching machines to recognize emotions. Her research led to *FaceSense* and *Affectiva*, involving training models on 9 million faces from 87 countries, with applications spanning healthcare, education, and autism support.

Challenges and Navigating a Male-Dominated Field. She faced personal challenges as an Arab-Muslim woman balancing solo parenting, cross-continental moves, and divorce while building a career. Fundraising for Affectiva was difficult in a male-dominated tech space that undervalued emotion-based technologies. Though not the focus of her memoir, she notes pitching only to white male investors and stresses the risks of homogenous AI development: "we will be unwittingly duplicating the biases that exist in society."

Vision for an AI-Driven World and Advice for Students. Her mission is "bringing emotional intelligence to computers." She champions ethical, inclusive, privacy-conscious AI.

Her story shows students that empathy, persistence, and diverse perspectives are vital to creating tech that serves everyone.

3.4 Additional AI-related Insights from the Memoirs

Across all three memoirs, recurring themes include persistence through adversity, questioning the status quo, unwavering pursuit of a “North Star”, and a clear understanding that both data and human choices shape AI at every stage. All memoirs also offer the following lessons and technical, conceptual, and humanistic insights into AI research and discovery in tangible ways:
1. AI innovation is inherently interdisciplinary,
2. It is built through collaboration across diverse teams,
3. AI augments—not just replaces—human abilities,
4. AI needs diverse data to serve everyone,
5. AI reflects societal biases—it is not neutral,
6. Personal experience can drive powerful research questions,
7. Innovation often unfolds in small, iterative steps,
8. Creative expression can convey complex technical ideas
9. AI is still evolving, and
10. Everyone has a role in shaping AI’s future.

4. A Pedagogical Framework for Integrating Memoirs for AI Literacy

Integrating memoirs of women of color AI scientists into K-12 AI literacy calls for a pedagogical approach that balances technical learning with identity affirmation. Drawing on narrative research in STEM, and inspired by Meier (1997)’s "learning in small moments," we propose a four-part framework where biographies offer accessible entry points into complex concepts.

1. **Align Narratives with AI Literacy Goals**: Use memoirs to illustrate key AI concepts such as perception, learning from data, societal impact, and reasoning (AI4K12, n.d).
2. **Foster Identity Affirmation**: Highlight diverse scientists’ contributions and stories to help students see themselves in STEM, promoting belonging.
3. **Engage Underrepresented Students**: Leverage relatable narratives to make STEM more inclusive and meaningful.
4. **Design Lessons Around Personal Stories**: Integrate technical content with memoir excerpts to deepen comprehension and motivation.

This framework supports both cognitive and emotional learning. Aligning stories with AI concepts allows students to extract conceptual insights embedded in lived experiences. For example, students might identify and discuss AI principles within memoir excerpts, grounding abstract ideas in human stories. Identity affirmation responds directly to barriers in STEM participation. Memoirs that challenge dominant assumptions about who belongs in STEM. help underrepresented students reimagine pathways into STEM. This approach moves from viewing STEM through abstract systems to “seeing it big” (Greene, 1995)—through personal narratives that illuminate both technical ideas and aspirational journeys.

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5. Limitations, Implications, and Conclusion

This paper argues that autobiographical memoirs by pioneering women in AI serve a dual purpose: they are both motivational and rich content sources for AI literacy. By embedding technical concepts within personal narratives, these stories make AI more tangible, relatable, and inspiring—especially for underrepresented learners. While further empirical research is needed, the proposed framework offers a foundation for inclusive, human-centered AI education. Centering diverse voices is not only a matter of equity but essential to cultivating the next generation of ethical, critical, and innovative thinkers in an AI-driven world.

This conceptual paper has limitations. It draws on three memoirs which, while rich, reflect a narrow slice of the diverse experiences within AI. These narratives represent specific cultural, geographic, and disciplinary perspectives and are written in English, largely situated

within the U.S., which may limit their global resonance. Articles or interviews of women scientists in media could be used to expand the pool of stories as resources.

Although the framework is grounded in existing literature, its effectiveness must be validated through empirical studies across varied educational contexts and age groups. Meaningful integration into AI curricula will also require effort from educators and curriculum designers. Time must be allocated for reading and discussion, and teachers will need to connect story elements with technical content. Accessibility may pose additional challenges—due to reading level, language, or resource constraints—necessitating age-appropriate adaptations such as summaries or excerpts.

Despite these limitations, integrating memoirs into AI literacy holds promise for inclusive STEM education. These narratives humanize AI development, disrupt stereotypes, and foster belonging for students historically excluded from STEM. They also open doors for important ethical and societal discussions. Memoirs also offer interdisciplinary possibilities, blending computer science with literacy, history, and social studies. This aligns with learning research advocating culturally responsive, engaging teaching. To support implementation, curriculum designers would need to create supplementary materials—lesson plans, guides, and digital resources—to scaffold classroom use of these powerful stories.

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