White Paper

AI + LEARNING DIFFERENCES

Designing a Future with No Boundaries

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DISCLAIMER

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Executive Summary

The rapid expansion of artificial intelligence (AI) presents an unprecedented opportunity to address learning differences when designing innovative systems. In December 2024, the Stanford Accelerator for Learning convened the AI + Learning Differences Working Symposium and AI + Learning Differences Hackathon, bringing community members together to explore how AI systems can expand learning opportunities for all.

This white paper synthesizes contributions into nine interconnected sections, each examining a critical dimension at the intersection of AI and learning differences:

1. **Ensuring Co-Design and Collaboration** highlights the importance of involving individuals with learning differences, including children, youth, and families, in every stage of developing powerful tools that adapt to individual needs.

2. **Designing Learning for the Edges** analyzes how AI systems can be developed to enable flexible, personalized learning environments that respond to the full range of student strengths and circumstances.

3. **Special Education and IEPs** focuses on how AI-powered tools can enhance individualized education through real-time feedback, scaffolding, and adaptive tools.

4. **AI in Needs Identification and Mediation Design** examines the role of AI systems in early screening, identification, and designs for responsive strategies, raising both opportunities and ethical considerations.

5. **Supporting Social and Emotional Well-Being with AI** considers how technology can be designed to recognize and respond to students' emotional and social development, which are both vital to learning and long-term well-being.

6. **AI as Assistive Technology** looks at the transformative potential of AI systems to enhance or extend existing assistive tools, empowering greater agency and independence.

7. **AI in Career-Long Teacher Education** explores how AI systems are designed to enhance educator development, personalize professional learning, and promote inclusive pedagogy at every stage of a teacher's career.

8. **AI in the Workforce** addresses how to equip the full range of learners for a future shaped by AI and automation, emphasizing inclusive access to enriching work.

9. **AI, Interdependence, and Life Satisfaction** broadens the conversation beyond school and work, focusing on how AI can be programmed to foster autonomy, community, and overall well-being across a lifetime.

Accompanying these insights, the AI + Learning Differences Hackathon Toolkit provides practical resources to facilitate co-design and collaboration among community members.

BASED ON EMERGING THEMES, THERE ARE 12 ACTIONABLE RECOMMENDATIONS DIVIDED INTO FOUR KEY GROUPS:

Developers are encouraged to engage in ongoing, compensated co-design with individuals whose lived experiences offer critical expertise, using learner variability, Universal Design for Learning (UDL), and ethical data practices.

Researchers should focus on long-term studies that center fairness, accessibility, and authentic learner experiences.

Educators require robust professional learning that integrates AI systems effectively into teaching and leadership practices, enabling deeper engagement and more responsive instruction.

Policymakers are advised to consider cross-sector collaboration and develop conditions that promote strategic investment in inclusive innovation, ensuring readiness for future societal demands.

Together, these insights and recommendations inform a cohesive strategy for leveraging AI systems to shape a future where all learners can thrive without boundaries.

Introduction

"Nothing about us without us"

— Michael Masutha and William Rowland, Disabled People South Africa

Inspired by this guiding principle, the Stanford Accelerator for Learning convened over 100 students, educators, researchers, innovators, policymakers, philanthropic leaders, and other community members to explore advances in artificial intelligence (AI) and the impact on learning differences.[1] Reflecting a deep commitment to authentic participation, individuals with intersectional identities co-designed every aspect of the AI + Learning Differences Working Symposium and Hackathon, from initial conception through the creation of resources documenting the perspectives shared.

The content and structure of this white paper are grounded in collaborative dialogue. Varied ages, cultures, capacities, and experiences were reflected in small-group discussions focused on critical topics at the intersection of AI and learning differences. These conversations were intentionally prioritized to highlight research, insights, lived experiences, and emerging ideas from those closest to the challenges and the opportunities.

ARTIFICIAL INTELLIGENCE AS A CATALYST FOR INNOVATION

Historically, tools designed to address accessibility, such as closed captioning, voice recognition, and even the telephone, have expanded to serve broader audiences. Since the launch of ChatGPT in November 2022, generative AI has catalyzed development across industries, with education emerging as a key focus area.[2] Innovative tools emerging today have the potential to reshape learning for everyone. Educators who were once resistant to using AI are now asking how it can be used to benefit learners while maintaining an emphasis on safety, agency, privacy, and creativity. Learning has become more than something to be delivered; it is something to be discovered, co-created, and understood on every student's terms.

Consider AI-powered tools like Microsoft's Immersive Reader or Khan Academy's Khanmigo that are creating new opportunities for learners who might otherwise struggle in traditional settings. Initially developed for learners with dyslexia, Immersive Reader began as a hackathon-winning project.[3] It now helps more than 20 million people each month read with confidence.[4] Khanmigo is an AI-powered "personal tutor and teaching assistant."[5] Its adaptive features personalize learning in ways that have been traditionally reserved for students who require individualized support. These tools are impressive, but they are only the beginning. We are far from the summit of innovation.

The future may bring AI tools that respond to emotional cues, adapt to learners' understanding and motivation, and guide executive functioning and creativity in ways that mirror human-like mentorship. Beyond the classroom, AI may be programmed to help individuals navigate career pathways more intuitively. Workplace tools could adjust in real time to meet cognitive and communication preferences. Community technologies might foster belonging, collaboration, and lifelong learning. These advancements will challenge us to reimagine learning as a process of acquisition and an experience of empowerment.

As users become familiar with AI tools, questions linger on applicability and accessibility:

- **What assumptions are we building into AI systems?**
- **Who is being centered in the design and who is being left out?**
- **Can AI be programmed to recognize brilliance in all its forms, even when it doesn't fit neatly into boxes?**

These are not just technical questions; they are moral ones. They demand our attention now, while the foundations are still being laid for an AI-driven future.

THE STATE OF LEARNING DIFFERENCES IN OFFICIAL GUIDANCE ON AI IN EDUCATION

Learning differences refer to the broad range of abilities, neurodiversities, and ways in which individuals experience variability.[6] We recognize that differences may be identified as disabilities in specific settings, legal contexts, or because of individual preferences.[7] Learning differences is an expansive term that recognizes variability in how people learn and experience the world around them. Consequently, we focus on opportunities that expand learning horizons for all learners, from birth to adulthood.

Numerous governments and various organizations are recognizing the immense potential of AI systems to drive innovation in sectors such as education and establishing strategies to capitalize on opportunities while minimizing risks. The European Union, for example, emphasizes accessibility in its ethics guidelines,[8] while Australia focuses on responsible, ethical design.[9] The African Union's AI strategy calls for equitable implementation,[10] and advocates in South Africa are expanding STEM access for students with learning differences.[11] The Ibero-American Intergovernmental Network for Cooperation in the Education of Persons with Special Educational Needs (RIINEE) network, an intergovernmental working group launched in 2024, promotes inclusive education through innovation among eight Latin American countries and Spain.[12] China has made AI instruction mandatory in compulsory education,[13] and organizations like Solve Education! in Singapore are using AI to deliver personalized, accessible content.[14]

Policymaking around AI in education is rapidly evolving. A growing consensus emphasizes equipping students with the knowledge and skills to use AI safely and effectively. In the United States, 26 states had issued AI in education guidance by the end of 2024.[15] At the federal level, an executive order issued in April 2025 further underscores the importance of preparing for an AI-driven future.[16] Globally, privacy and data protection remain urgent concerns. UNICEF emphasizes that AI systems must prioritize children's rights, embedding privacy, safety, and protection from data misuse into design from the outset.[17] The EDSAFE AI Alliance has established a policy framework to guide the development of safe and transparent AI education ecosystems.[18]

Even as formal guidance continues to take shape, some schools and organizations are moving forward by providing access to AI tools, AI literacy training, and related resources. A growing number of reports offer practical recommendations for using AI to support learning differences, organized into several overarching categories:

1. The importance of research.[19]
2. Priorities and recommended solutions.
3. Statistical analyses based on survey data.[20]

More resources that incorporate discourse and recommendations regarding learning differences remain a priority. It is against this backdrop that the AI + Learning Differences Working Symposium commenced.

AI + LEARNING DIFFERENCES WORKING SYMPOSIUM: NEW HORIZONS, NEW SOLUTIONS

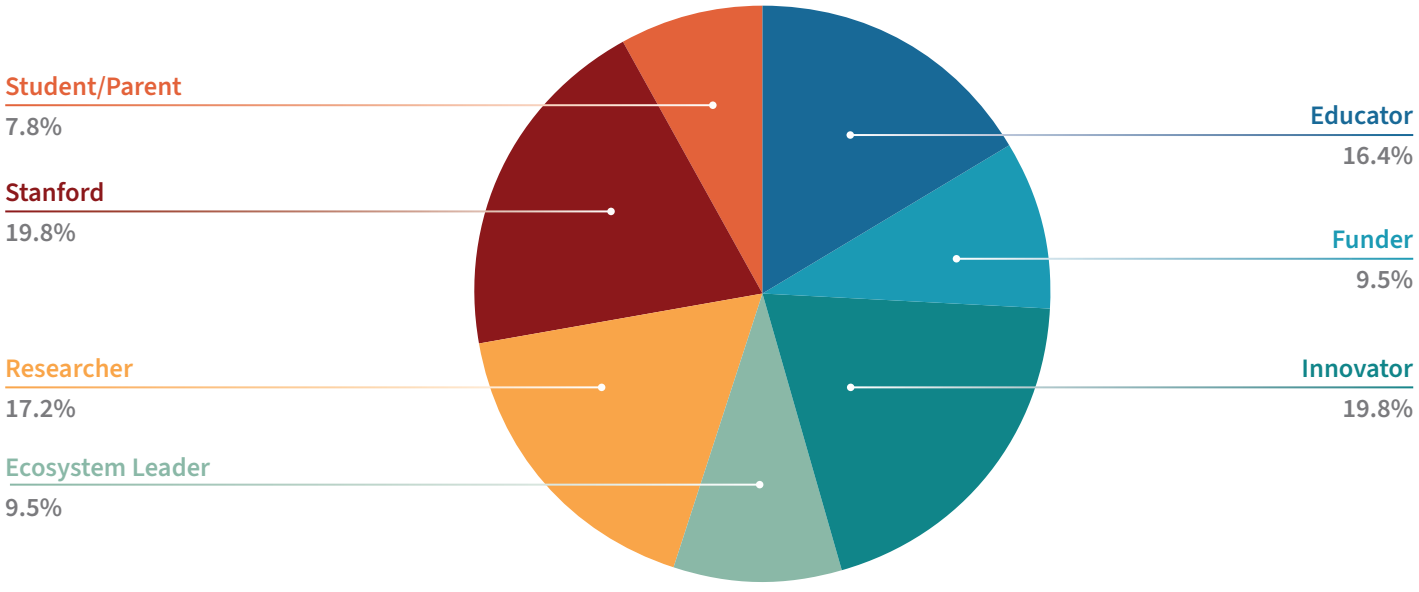
The working symposium began with a panel of leaders, many with lived experience with learning differences, representing various sectors — medicine, education, venture capital, and nonprofit organizations — each dedicated to enhancing lives in their respective fields. Their varied viewpoints set the tone for the day, offering attendees a multifaceted understanding of the subject matter and underscoring the importance of cross-disciplinary collaboration.

What followed was a convening unlike most. Nine cross-functional groups came together to generate solutions for empowering all learners. CEOs conversed with students. Educators brainstormed with both philanthropic leaders and venture capitalists. Parents and community members challenged assumptions alongside researchers and edtech founders. The room reflected a scenario we too rarely see: one in which difference was not singled out but shared; where concerns were voiced alongside hopes, and lived experience carried equal weight to professional expertise.

This white paper is organized into nine key sections that represent the rich discussions and forward-thinking ideas shared during the symposium. What emerged was both a vision and a set of recommendations that are bold, inclusive, and actionable. They invite users, educators, researchers, developers, policymakers, advocates, and community members to envision what is possible when innovation is designed with learning differences in mind. Meaningful change begins with people coming together to imagine what is possible and to shape the future together.

Figure 1. AI + Learning Differences Symposium Participant Makeup

Compiled by Leslie Martinez



AI + LEARNING DIFFERENCES HACKATHON

Hackathons offer a powerful model for innovation.[21] These events create safe spaces where individuals with and without technical backgrounds come together to solve real-world challenges. During the 2024 AI + Learning Differences Hackathon, 136 participants with intersectional identities formed 22 teams and selected one of five tracks in which to design prototypes.[22] Groups spent 12 intensive hours conceptualizing, designing, testing, and refining AI-driven tools responsive to learning differences in work, education, and leisure settings. Each team presented their product to a diverse panel of judges, reflecting the broad range of experiences needed for purposeful innovation. One of the judges, 7th grader Mae T., described her experience:

> *I was asked to share my experience and key ideas I took away from the AI + Learning Differences: New Horizons, New Solutions Working Symposium and Hackathon. I will share three. The first is how important it is to include youth like me in discussions, activities, and coming up with solutions that impact their learning and the learning of our friends. Usually, adults ask other adults, even when they are talking about kids. This was my first time getting my own invitation instead of getting a plus one from my mom, who is a professor. She was my plus one. On the second day of the hackathon, I will always remember saying goodbye to my mom because I was chosen as a judge. I got to see so many amazing ideas and thoughts and I know that this one event will help shape my life.*
>
> *The second idea I took away was how in many schools, disability is thought of as a problem and teaching solutions are based on "fixing kids." I have seen that happen at my school in the PATH programs (Positive Alternative Teaching Help) where students feel upset to be there and wonder why who they are is "bad." At the meeting, I began to really understand that instead, the problem is our ideas about disability and teaching solutions should be based on fixing our ideas about learning differences and making the curriculum flexible because everyone is different.*
>
> *The last thing I want to say is how important it is to bring a group together that really represents everyone. This can change the world! The day of the Hackathon, the place was very crowded and even though I have been to conferences with my mom before, this one seemed way more important to me because of who was there. I knew this had to be one of the greatest opportunities I have ever gotten. These are the events that also change lives.*

A TOOLKIT FOR EMPOWERING OTHERS

The AI + Learning Differences Hackathon Toolkit is included as an addendum to this white paper to serve as a guide to co-design efforts with community members. It offers practical advice, adaptable resources, and strategies for creating welcoming, collaborative spaces. By sharing the toolkit, we hope to empower more organizations, educators, and designers to launch their own co-design initiatives centered on innovation, creativity, and thoughtful participation.

The five winning Hackathon teams were:

Empower IEP (Grand Prize Winner)
The Empower IEP tool is designed to help parents navigate the Individualized Education Plan (IEP) process. The tool simplifies complex IEP documents by providing summarized, customizable information. It also supports parents during IEP meetings by recording and transcribing in various languages and reading levels. Empower IEP aims to support parents to advocate effectively for their children by making the IEP more accessible and easy to understand.

Maestra
Maestra helps teachers, who are increasingly stretched thin, support the diverse learners in their classroom. The AI tool coordinates the activity of multiple AI tools and systems. It can automatically contact the janitor or nurse to address in room "accidents", provide real-time advice on student engagement, schedule appointments, facilitate coordination with specialists, or collaborate with other tools like MagicSchool or OpenIEP. Maestra accepts typed and spoken commands or reacts to environmental conditions.

FeelLink
FeelLink is an AI-driven adaptive learning platform designed to help young adults improve social skills and emotional intelligence through interactive scenarios. The platform tailors content to the learner's age, personality, and interests, offering personalized feedback and action plans. It emphasizes self-affirmation, agency, and inclusivity, with features like text-to-speech and customizable backgrounds.

BCBAwesome
BCBAwesome aims to address the severe understaffing in ABA (Applied Behavior Analysis) therapy, with only 7,000 new BCBA (Board Certified Behavior Analyst) graduates in 2023 against 65,000 job postings. Technicians often receive minimal training, leading to inconsistent care. This solution is an AI BCBA to enhance ABA therapy by providing real-time guidance to human technicians, based on the individual's skill level. The AI is intended as a coach for therapists, not a replacement for human BCBAs, and future plans include incorporating video modeling for better learning outcomes.

Roleability
Roleability is an AI-powered tool designed to help individuals with learning differences navigate social interactions by building empathy, confidence, and adaptability. The tool is a role-playing game that simulates real-world social scenarios, offering personalized practice and feedback. It tracks progress through scenarios, allows customization of skills, and plans to include audio-visual components.

Chapter 1.
Ensuring Co-Design and Collaboration

Many tools designed for individuals with disabilities have benefited a broader audience. Some have been paradigm-shifting,[23] while others have had limited impact. The most successful ones result from listening to intended users. Bryce Johnson, a principal researcher of accessibility and inclusive design at Microsoft, cites the Xbox Adaptive Controller as an example. Developed with input from people with mobility limitations, it made gaming more accessible to a wide range of users.[24] This growing commitment to co-design, along with understanding existing barriers throughout the development process, offers a path toward more inclusive and impactful innovations to serve everyone.

A DESIRE TO CO-DESIGN

Co-design is challenging because of siloed communities that exist within educational ecosystems.[25] To paraphrase Alethea Andree, operations coordinator at the Stanford Graduate School of Education Professional Development, efforts have been made to bring community members together, but these one-off events have not produced long-term, scalable solutions. As a result, critical perspectives risk being excluded from the design process. Mathias Mejeh and Livia Sarbach (2024) emphasize that "[c]o-design is particularly successful when the concerns of different interest groups are acknowledged and analyzed."[26] Without sustained collaboration, even the most promising innovations may never reach those who need them most.

In addition to silos, the fast pace of development is another challenge as identified by Bobby Moore, chief of staff at CAST. Extensive testing to address learner variability takes time that doesn't always fit into rapid product design cycles. Consequently, making products more accessible becomes an afterthought, with some companies seeking input after initial releases. Iterating products already on the market comes with its own set of challenges, including passing on costs to consumers as additional features are added.

Funding pressures further constrain co-design.[27] Venture capitalists and public companies, focused on maximizing investor returns and shareholder value, are less likely to invest in longer, more deliberate co-design processes. "There's a tension between short-term profitability and long-term, sustainable impact," acknowledged Nereyda Salinas, assistant dean for professional development at Stanford Graduate School of Education. Her statement underscores why market demands sometimes overshadow inclusive design. Yet Aaron Kline, an engineer serving at the Stanford University School of Medicine, sees potential for new incentive models that support co-design while driving better, more resilient innovations.

Symposium contributors presented promising examples that are already active. "We strive to integrate different people into our teams," shared Mariah Moon, an accessibility product manager at Google, when describing efforts to leverage usability studies and co-creation early in the development process. Jessamy Tang, managing director of the Stanford Down Syndrome Research Center and The Matthew Foundation, highlighted the Speech Accessibility Project at the Beckman Institute for Advanced Science and Technology at the University of Illinois Urbana-Champaign. The program involves training an automated speech recognition tool and is funded by Amazon, Apple, Google, Meta, and Microsoft.[28] Opportunities exist to make these examples the norm and not the exception.

Spotlight: Santa Clara Research Practice Learning Partnership

The Santa Clara Research Practice Learning Partnership (RPLP) emphasizes a collaborative co-design approach to designs for learning, research, and innovation. Through its steering committee of educators and researchers, a team coordinates various projects designed to reach inclusivity goals focused on well-being, learning, and social-emotional health. By integrating diverse expertise, the RPLP creates an inclusive learning environment that addresses the varied needs of all students and faculty. A collaborative initiative between Stanford University's Initiative on Learning Differences and the Future of Special Education and the Santa Clara Unified School District (SCUSD), the RPLP develops and tests effective practices for inclusive education through ongoing educator and researcher collaborations. Key initiatives include the Student Voice Inclusive Lesson Design Project, the Para Pro Academy which provides professional development for paraeducators; the Stanford Teacher Education Program (STEP), Social/Emotional Skill Building for Educators, and the Rapid Online Assessment of Reading (ROAR), an open-access tool designed to efficiently assess student literacy.

Educators from three schools participate in co-designing inquiry projects that build the capacity of campuses to support students with learning differences in classrooms with their peers. The RPLP is led by Professor Elizabeth Kozleski, faculty co-director of the learning differences initiative at Stanford, and Kathie Kanavel, assistant superintendent for educational services at SCUSD. Nicole Henderson serves as the project lead from Stanford, while Sandra Velásquez is the RPLP liaison for SCUSD. The steering committee includes principals from the SCUSD Agnews campus in San Jose, CA: Joe Young (Abram Agnew Elementary School), Dawnel Sonntag (Dolores Huerta Middle School), and Nelson Hori (Kathleen MacDonald High School).

THE PEOPLE BEHIND THE DESIGN

When co-designing AI tools, it is essential to involve individuals with a variety of experiences throughout every stage: conception, design, implementation, and evaluation. Clear entry points that define who contributes, when they are engaged, and how their input shapes developments are critical to relevant collaboration. Although there are additional existing frameworks, Moon, from Google, outlined three types of disabilities that inclusive design can address.[29]

Table 1: Shifting Disability Boundaries

Permanent	Temporary	Situational
Definition: Physical or mental impairment that lasts indefinitely.	Definition: Physical or mental impairment that lasts temporarily.	Definition: Impairment or condition that arises under certain contexts.
Impact: Work, home, social	Impact: Work, home, social	Impact: Work, home, social
Example: deafness	Example: ear surgery	Example: inability to hear in large crowds

Engaging eventual users is an important initial step in the co-design process. Consider the examples in Table 1. Input from a person who is deaf, someone recovering from ear surgery, or a person experiencing hearing loss in crowded spaces could all lead to better, more responsive designs for assistive listening devices. Inclusive designers and project managers like Moon already use tools such as persona spectrums, visualizing how people with varied experiences might interact with a product.

Contributors identified open-ended surveys and ethnographic studies led by skilled researchers as methods to gain insights into the lived experiences of individuals with learning differences. Navigating daily barriers gives these individuals expertise to share that no study alone can capture; however, expecting marginalized communities to educate and inform without requisite support leads to fatigue and resentment. Stanford's Salinas indicated that incentives could alleviate this type of cultural taxation.[30] Authentic input is a cornerstone of effective design and must be valued accordingly through compensation and recognition.

Along with compensation, ethics and privacy are other major concerns.[31] For example, people may not want to expose their disabilities to a wide audience. Depending on the underlying disability or difference, laws and regulations such as the Family Educational Rights and Privacy Act (FERPA) and the Health Insurance Portability and Accountability Act (HIPAA) may prevent designers and researchers from sharing their findings beyond pre-authorized stakeholders.[32] These concerns, along with the who, what, and why, must be addressed before co-design efforts begin.

SOLUTIONS FOR ENGAGING THE COMMUNITY

Creating ample space at the table for multiple voices to be heard is crucial. It requires identifying the appropriate audience to engage, and incentivizing the participation of those who provide authentic input. Part of the solution lies in reducing existing barriers, ranging from designing in silos to funding challenges, while additional steps are necessary to ensure co-design efforts are impactful and sustainable.

The process must be guided by intentionality, with incentives encouraging participation from individuals with learning differences. Technology companies can benefit by embedding co-design into early strategic stages. To further expand the impact of co-designed tools, solutions such as certification initiatives, procurement incentives for organizations, and family engagement strategies were proposed. These approaches collectively aim to foster a more inclusive and effective co-design process, ultimately leading to better outcomes for all learners.

Researchers and developers involved in co-design should evaluate their current processes to determine levels of inclusiveness. Famaye et al., (2025) advocate for a slow-research approach when co-designing with children due to the extended time it takes to build the trust and capacity needed for effective input.[33] Courtney Gallen, program director at the National Institute of Child Health and Human Development, reinforced the significance of "understanding how tools are being used now and how efficacious they are." She stressed the importance of evaluating whether existing tools are universally designed, accessible, and informed by informal use in real-world settings, including student experiences and data.

The time required to undertake co-design can influence available funding levels. Moore briefly discussed a promising pathway in which CAST partners with venture-backed edtech companies through accelerator programs to offer consultation on accessibility and inclusive product design. Alternatively, private philanthropy can help ease these pressures and long-term government grants offer additional pathways. However, as Gallen pointed out, grants should focus on broad research questions rather than narrow, tool-specific outcomes to maintain relevance over time.

Educators are also finding new ways to center student voices in the discussion. "We often think of the tech world as an abstract, distant space that people with learning differences can never access and they have to wait for people to ask for their feedback," observed Eric Baskett, a high school teacher from California. After watching students with learning differences work in an AI-based programming class, he realized that the curriculum failed to reflect how they engage with and apply knowledge. Since he knew the students could complete the tasks, Baskett decided to teach a course where students can explore programs and "see what works." Through this approach, students can build confidence in their capabilities as they transition into adulthood.

We are in a moment where change can occur. The impact of systematic and sustainable co-design and collaboration with the learning differences community is immeasurable.

CONTRIBUTORS

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Chapter 2.
Designing Learning for the Edges

Learning spaces are often imagined as structured environments: four walls, desks in rows, and a teacher at the front. But what happens on the edges of this imagined classroom? Although the description is a metaphor about students who are not fully seen or supported in traditional classrooms, edges include places where educational assumptions are challenged and where the complexity of learner variability become most visible. Barbara Pape, senior director of the Learner Variability Project at Digital Promise, shared an observation that points to a broader shift: “Providing students what they need is not an edge,” she stated. “It’s just learning.”

THE LEARNERS ON THE EDGE

The edge is not defined by any one experience or label. It could be a student with ADHD, a teen navigating trauma, a kid who speaks three languages, or someone whose learning unfolds in ways no test can truly measure. While we sometimes describe these learners as being "on the edge," they are not apart from the learning community; they are a vital part of its fabric. "It's called 'rightful presence'," said Kathleen King Thorius, director of the Learning Futures Collaborative at Arizona State University. "If everyone has the right to be present, there's no longer any conversations about inclusivity because it already exists."[34] Cindy Lopez, director of community engagement at the Children's Health Council, stressed the importance of giving learners agency and a sense of belonging. When kids feel like they belong, everything shifts. Behavior improves. Curiosity returns. They take risks. Their academic achievement soars.

Still, educators are asking tough questions: How do we provide consistent access for all students? How do we describe learners without defining their limits? Kristin Wright, an executive director at the Sacramento County Office of Education, described "raising the floor," when referring to lifting our baseline expectations to gauge who requires something different and who has simply been left behind by the system. Elizabeth Kozleski, professor at the Stanford Graduate School of Education, encouraged educators to elevate student voices. As she noted, students often know what it feels like to be misunderstood and what truly helps them thrive.

There is always a risk of misidentifying learners, especially when behaviors are interpreted without context. A student who avoids eye contact might be described as disinterested. A kid who screams in class could be labeled disruptive. Those behaviors might just be expressions of self-regulation. Tracy White Weeden, former CEO of the Neuhaus Education Center, raised the stakes: when we misunderstand students, the consequences aren't just academic. "It's part of a pipeline," she said, referencing the connection between poor educational fit and school discipline that can lead to juvenile justice involvement.

Failure to engage learners on the edge, who often face systemic inequities, can lead to other undesirable outcomes. Educational systems are fragmented and Diana Mercado-Garcia, director of the Stanford Sequoia K-12 Research Collaborative, indicated that the "siloing of systems" has led to a separation in educators who serve students. For example, collaboration between general education teachers and special education teachers can be challenging due to time constraints and district protocols. As a result, they are unable to share information on learners in meaningful ways.

Educators are expected to support all learners, yet they often lack the resources necessary to succeed. Many training and professional development programs do not adequately prepare teachers to recognize learning differences or design lessons for students on the edge.[35] At the same time, educators are held accountable for raising achievement for every student. This pressure contributes to what Mercado-Garcia described as initiative overload. Assessments that fail to capture the abilities of all learners add to the challenge, creating deeper inequities. Assigning blame will not effect change; however, offering solutions will.

AI AS A DESIGN ASSISTANT

Central to the issue of designing learning on the edges is how and when AI systems are used. Pedro Hartung, CEO of the Alana Foundation, suggested "starting with a common ground that AI developers could consider during the design process."[36] It's also important to specify the type of AI being used. For example, programming large language models to act as generative AI chatbots could facilitate personalized learning. To tailor content that reflects learner variability, designers can build adaptive systems featuring individualized pacing and scaffolding.

Educators can create differentiated resources using AI tools, such as interactive simulations or gamified activities. Kozleski envisioned a tool that could encourage student inquiry using AI by involving students in lesson design and feedback processes, making it a more integrated part of education. AI tools can analyze learning data to recommend adjustments in instructional design, lesson planning, and assessments. When ethically designed, AI can reduce biases in outputs, making learning more inclusive at a digital scale.

Integrating AI systems into education brings real risks, including the amplification of existing biases and concerns around data privacy and safety that must be proactively addressed.[37] As more educational ecosystems embrace learner variability, more schools, companies, and organizations will incorporate the concept into their designs while employing AI to facilitate implementation.

In a 2018 report on learner variability, Pape asserted the term is a "recognition that all students differ, and learning sciences shows that these differences matter for learning."[38] By embracing an understanding that each learner "presents a unique reservoir of skill sets and challenges," she explained that learner variability informs design and results in different decisions being made on "how to create optimal environments to support learning." When used to enhance inclusive learning design, AI systems contribute to educational settings where all learners can thrive.

Spotlight: Digital Promise's Learner Variability Project

The Learner Variability Project (LVP) by Digital Promise is an initiative dedicated to understanding and addressing the diverse strengths and challenges of each learner. It recognizes that every student has a unique combination of cognitive abilities, social-emotional skills, and background experiences. To support this variability, the LVP provides educators and edtech developers with research-based strategies designed to meet learners where they are. At the center of this effort is the Learner Variability Navigator (LVN), a free, open-source web application that offers a comprehensive framework and evidence-based resources to enhance whole-learner development. LVN includes learner models for grades pre-K through 12 in literacy, math, and 21st-century skills (Portrait of a Learner), as well as a model for adult learners.

LVN is a collaborative effort involving a diverse team of researchers, practitioners, and advisors. Each learner model is developed through an iterative process that includes literature reviews, consultations with expert research advisors, and continuous refinement to ensure robustness and accuracy. Currently, the LVP is working with Yourway Learning to integrate LVN's robust factors and strategies into tools that support teachers in writing personalized lesson plans. By combining insights from the learning sciences with practical classroom strategies, the LVP strives to create inclusive, effective learning environments that recognize and celebrate the uniqueness of every learner.

A CASE FOR UNIVERSAL DESIGN

Perhaps the best solution to designing learning for the edges is erasing the edges. When learning is designed for every learner, the default becomes seamless designs that offer multiple on ramps for learning, community, engagement, and accomplishment. Enter Universal Design for Learning (UDL). Architect and disability advocate Ronald Mace coined the term "universal design" in the late 1960s.[39] His focus was designing products and housing accessible to the maximum number of people. In the mid-1990s, David Rose and Anne Meyer, co-founders and researchers at the Center for Applied Special Technology (CAST), began applying Mace's concept and the principles of universal design to education.

CAST released the first version of the UDL guidelines in 2008.[40] The organization published UDL Guidelines 3.0, shown in Figure 2, in July 2024. Jenna Gravel, Interim Chief Research Officer and Senior Research Scientist with CAST, explained that the updates reflected intentionality in supporting learner agency and "honoring learners' multiple and intersecting identities."

Figure 2: Universal Design for Learning Guidelines 3.0, CAST[41] Used with permission.

The UDL framework is focused on three core design principles: multiple means of engagement, multiple means of representation, and multiple means of action and expression. In the latest version, there is an emphasis on identity as a part of variability, acknowledgement of barriers that limit learning for all, and a shift toward learner-centered language. Although UDL was developed over 30 years ago, the framework has recently gained more prominence in global education circles as communities strive to create more inclusive and flexible learning environments.

The process of developing UDL Guidelines 3.0 serves as an example for schools and organizations considering transformation in learning design. CAST established an Advisory Board, a Guidelines Collaborative, and a Young Adult Advisory Board. This step allowed input from multiple voices. The organization also conducted 40 focus groups and reviewed more than 1,000 research publications. To update and expand the research base, CAST completed systematic literature reviews and examined work provided by members of the advisory boards and the collaborative. Before releasing the final draft, the organization hosted a webinar and released a draft for feedback.

CAST's actions reveal successful steps in change management critical to implementing AI and learning differences initiatives:

1. Include community members in the strategic process.
2. Gather data from people and publications.
3. Engage the wider community through a webinar.
4. Seek and incorporate feedback.

Modifying existing learning systems can be difficult. Educational institutions can follow the steps from CAST to increase buy-in for shifts in learning design that advance sustainable progress.

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Chapter 3.
Special Education and IEPs

As we approach the fifty-year anniversary of the Individuals with Disabilities Education Act (IDEA),[42] it is crucial to highlight the central role of Individualized Education Programs (IEPs) in supporting students with disabilities. The IEP, a cornerstone of IDEA, is a primary tool for ensuring that each student receives a free and appropriate public education (FAPE) in the least restrictive environment (LRE).[43]

The IEP is a comprehensive document that outlines an individual student's goals, strengths, learning priorities, and the specially-designed instruction necessary to meet those goals. Moreover, IEPs detail essential accommodations, modifications, and services tailored to each student's unique requirements.[44] The importance of IEPs cannot be overstated in the context of IDEA and the Americans with Disabilities Act (ADA) of 1990, which together provide legal protections and access to public education for children and adolescents with disabilities. By meticulously crafting and implementing IEPs, educators and support staff can help students with disabilities access the individualized guidance essential to their academic and personal growth.

A STATE OF SEPARATION

The IEP is designed to foster collaboration among general educators, special educators, and related service providers. The aim is to coordinate the team's efforts to create and implement personalized supports that help students with disabilities progress toward their individual goals. Unfortunately, heavy workloads and tight work schedules too frequently leave educators working in silos. Due to the state of separation that too often exists between general education and special education teachers, a gap forms that impacts students and classrooms. As Sarah Arden, principal researcher with the American Institutes for Research, reported: "special education teachers often do not feel a sense of community within a school setting."

Think of the following scenario: during in-service, special education teachers and general education teachers may be separated. Special education teachers receive updates on laws and regulations, teaching practices for areas such as inclusion, and other pertinent special education topics. General education teachers receive academic content updates and training on implementation. Special education teachers may not have the content training necessary to plan to serve students. General education teachers may not have the in-depth knowledge necessary to navigate the number of students needing special services in their classrooms. Frustration ensues.

Arden described a situation that exemplifies this scenario: a high school student enrolled in a science class but reading at an elementary school level. The secondary high school teacher is trained in science content but has no training in how to teach reading. A special education teacher who works with the student has a caseload of 50–60 students and knows how to simplify complex texts but doesn't have time to connect with the teacher to better understand what's necessary for the student to succeed. "What does this mean for documenting progress towards IEP goals?" Arden asked. "What does this mean for the case manager who is working with the biology teacher while working with the kid who is in all these classes to document this?"

Ongoing professional learning is crucial for all teachers, as most educate at least one student with an IEP. However, as Matt Baldwin of the Santa Clara Unified School District put it, time, the "four-letter word in education," often stands in the way of implementation. While AI tools for students with learning differences exist, the fast pace of development of these tools, along with teachers' busy schedules, leave them with little capacity to master them effectively. Adele Smolansky, CEO of AI÷Learners, exemplified this by describing a district unprepared to adopt her company's program due to the number of existing tools teachers already had to learn.

Priscila Okama of the Alana Foundation highlighted another challenge — even when professional learning is available, schools often lack resources for proper training or student devices. This creates a disparity between students with access to AI systems and other technologies both at home and school, and those without. Furthermore, the readiness levels of schools within districts or communities vary widely. Well-funded or innovative schools can promote initiatives and invest in AI and assistive technologies, while others lag behind.

Contributors recognized that edtech companies are developing effective learning tools, but they are not used widely in all schools. Part of the reason may be that administrators and teachers are inundated with hundreds of new tools. Availability may be another reason why these tools aren't in the hands of teachers and students. Opportunities exist for AI tools to help reduce the separation and administrative burden between general and special education teachers, particularly when working with students who have IEPs. However, teachers have not yet been able to take full advantage of AI's potential. Limited access to effective tools and poor alignment with real-world learning environments continue to present significant challenges.

AI AS A CATALYST FOR COLLABORATION

While tools and systems designed for 'average' students often fall short, IEPs outline specific requirements for special education students. Creating and implementing high-quality IEPs demands significant time and collaboration. Mehul Rathod, senior manager at LinkedIn, raised key questions: "What are the pain points in the cycle? Where can AI come in?"

AI tools are emerging as valuable resources for improving how IEPs are created and applied in practice. They can help to address time constraints in reviewing student data and designing intervention plans by enhancing "off-line" collaboration and planning efficiency. Similarly, AI tools that organize information, pre-fill required documents, and facilitate asynchronous collaboration offer a way to streamline the IEP process without depending on in-person team meetings.

Additionally, AI could assist in generating purposeful goals and associated evidence-based interventions based on student data. Some caution is needed, however, as IEPs are legally required to be individualized — not drawn from stock IEP goal banks or pulling from a limited number of basic interventions. Thus, it is important that educators lead with AI as an assistive tool. Although it is preferable that IEPs should be developed during meetings among teams, Baldwin suggested that members could use AI tools to automate parts of the process.

Leveraging AI to create IEP templates for certain documentation is a time-saving step for teachers and administrators. Adaptive learning solutions can provide student performance data that can indicate if interventions are effective or if adjustments are required. If the IEP can access data and suggested interventions, students may be able to receive assistance faster than if AI is not part of the process. Polaris is one example of a system that promotes collaboration during the IEP process by providing step-by-step guidance, recommendations, and progress monitoring.[45]

A third promising use of AI is to help families navigating the special education process. David Flink, founder and CEO of The Neurodiversity Alliance, outlined the idea of an AI-powered chatbot to guide families through the IEP process. For many, learning that a child will benefit from special services and then facing the complexities of special education can be overwhelming. AI tools such as chatbots can provide just-in-time learning and guidance, helping families better understand referrals, evaluations, and placement decisions. While students, their families, and educators should remain at the center of the process, AI has the potential to enhance efficiency, improve organization, and strengthen communication among all community members.

These new tools offer exciting possibilities; however privacy is an important concern, a key point raised by Lakshmi Balasubramanian, senior researcher at the Stanford Graduate School of Education. Identifiable data, including sensitive reports on students' physical and mental health, must be safeguarded when interacting with AI systems. Moreover, as part of the decision-making process, determinations must be made regarding whether AI is necessary under general and specific circumstances. Evaluation of AI tools is also a crucial step; efficacy should be measured based on student outcomes and teacher efficiency and effectiveness.

Spotlight: Kai

Christopher J. Lemons, associate professor, Stanford Graduate School of Education

Artificial intelligence holds tremendous potential to help educators adapt instruction and individualize feedback more quickly for students. A team led by Stanford Associate Professor Christopher J. Lemons has developed Kai, an AI tool designed to support the reading comprehension of students with intellectual and developmental disabilities (IDD). The tool adapts an evidence-based reading intervention specifically focused on comprehension.

Learners are given a content-area passage (e.g., science) along with a "Purpose Question" to guide their reading. Lemons' team pre-teaches key vocabulary and background knowledge before students work to create the main idea, or "gist," statements for each paragraph. Students identify the most important who or what, the key information about it, and then condense their understanding into a 12-word statement. These gist statements are then used to answer the original purpose question. Immediate corrective feedback and instructional scaffolding — both evidence-based practices — are integrated into the design of the AI tool.

Kai's ability to adapt to student responses and deliver timely, personalized feedback keeps learners engaged and supported as they work to comprehend complex texts. The potential for AI to further personalize learning is immense, and this work represents an exciting step toward making that future a reality.

SPECIAL EDUCATION WILL REMAIN A NEED

Special education and general education operate under distinct legal frameworks, and professionals in each field often receive different training. These differences have contributed to an ongoing divide that is often felt most acutely by students receiving special education services. As a result, some have questioned whether the solution lies in eliminating special education altogether or, alternatively, in strengthening preparation for general educators to better serve an increasingly diverse population of learners.

While this is a delicate and complex question, it's clear that with substantial professional learning, we can move toward a future where general and special education teachers are equipped to collaborate to create responsive learning environments for all students. Children and adolescents needing extensive support require educators who bring their combined expertise together to design effective academic and behavioral interventions. AI has the potential to facilitate that collaboration by ensuring that goals, strategies, and outcomes are readily available so that educators can make nuanced shifts as students advance.

Whereas the idea of helping one general educator enhances learner variability for a broad group of students sounds promising, the reality is that all humans have limited capacity. In most fields, from physicians to real estate agents to content producers, we understand that specialization is important. Education should be no different. Educators with specialized skills play a critical role in helping students with learning differences reach their full potential.

Effective learning organizations make the time to share and develop cross-disciplinary expertise so that each learner has the support and the ongoing assessments necessary to adjust learning experiences. AI can be programmed to assist educators in building the knowledge required to better engage and serve all their students effectively. The protected status of learners with IEPs demands a comprehensive and coordinated approach to address their unique educational requirements.

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Chapter 4.
AI in Needs Identification and Mediation Design

How early is too early to identify a learning difference? The debate is ongoing. Michelle Knapik, president of the Emily Hall Tremaine Foundation, voiced the importance of early identification — as early as age 4 — to ensure that children receive what they need to thrive. For Knapik and others, early support has the potential to positively shape a child's developmental and educational trajectory.

The costs of delay are high. David Chalk, an entrepreneur, was diagnosed in adulthood with prosopagnosia (face blindness) and dyslexia. His reflections on schooling are sobering: "The moment I walked in the door…it was destruction for 12 years." Misinformation and mischaracterization followed him through his early years, where he was transferred from a traditional school setting to a special school after being labeled "mentally retarded." Upon graduation, he was told he would likely "end up dead or in jail." Chalk learned to read later in life and is a successful business leader. Yet the absence of early support left a lasting scar. "That's my pain. It was horrific for me," he recalled.

Chalk's story is not isolated. It is a reminder that the absence of identification is potentially harmful.

EARLY AND ACCURATE IDENTIFICATION

Early, accurate identification is critical for ensuring students receive timely and effective interventions; however, variations exist in eligibility criteria and funding. In the United States, Ohio and Texas are examples of states that include the low birth weight of children as a qualifying condition for early identification. Others, such as Alaska and Georgia, do not. Even funding sources differ depending on the state of residence. According to the National Institute of Early Education Research, 32 states rely primarily on state funds for early identification programs, while 14 states depend more heavily on federal assistance.[46]

Globally, definitions and instruments vary even more widely. In 2022, UNICEF reviewed five early detection tools in the Middle East and North Africa. There were significant differences in how tools were used and what they measured, further affirming the lack of global consensus on what constitutes effective early identification.[47]

Determining what constitutes accuracy in identification remains an open and complex question. Lindsay Jones, CEO of CAST, posed it directly: "Is [accuracy] a baseline of what is perceived as normal?" This framing challenges the field to reconsider which benchmarks are being used and whether they reflect variations of learners' experiences. Knapik further emphasized that inconsistencies in eligibility criteria and diagnostic instruments contribute to both over-identification and under-identification.

As AI becomes more central to identification, these concerns grow more urgent. Systems trained on biased datasets risk reproducing exclusion. Glenna Wright-Gallo, vice president of policy at Everway, cited a company that based hiring decisions on data drawn from narrow perceptions of intelligence and success. If AI models in education follow similar patterns, the lived experiences and ways of knowing that differ from the dominant norm may be overlooked.

In addition, inherent in assessment systems are existing tools designed to identify deficits. Unfortunately, these types of assessments position students as the problem. Unless proactively planned for and addressed, there is a possibility that AI-enhanced identification processes could lead to tracking, separating students early on in ways that can narrow their opportunities, undermine confidence, and shape how others see their potential. Protocols such as UDL are necessary to avoid integrating programs that promote grouping students according to their perceived abilities.

Auston Stamm, a digital accessibility instructional specialist, offered a simple solution to the deficit challenge. Perhaps more assessments that indicate strengths and minimize labeling can be part of the analysis. Assessments can be a source of stress or embarrassment for some children and families. Building upon strengths could have a positive impact on the attitudes toward assessment and eventual student progress. Jones offered a slightly different take: "I think the label can be very empowering," the CAST CEO offered. "The label itself is not the problem. Society is misunderstanding the label." She suggested that instead of minimizing labels, they could be seen as sources of strength.

AI INTHE PROCESS

Artificial intelligence offers opportunities to identify learning differences at an earlier age and with more accuracy. Instead of assessments that are administered in controlled environments, Wright-Gallo offered an intriguing innovation: ambient data collection by AI systems that could provide a less intrusive solution to identify and support learning differences. As students interact with teachers, classmates, and learning activities, an AI-powered system would be programmed to observe students through visual, audio, or a combination of both. This approach minimizes the need for formal assessments and reduces barriers to appropriate identification for students.

With seamless screening, AI-powered tools can integrate daily screenings, from analyzing spelling tests, to infer reading difficulties, to monitoring engagement during lessons. Through multiple classroom interactions, an AI program could serve as an early detection tool for possible learning differences without additional burdens on students or teachers. Trained professionals would then review data to identify students at-risk. At this point, additional assessments could be recommended or evidence-based interventions could be applied.

As mentioned previously, measures are necessary for this type of screening system to avoid tracking, over-labeling, or stigmatization. To reiterate Wright-Gallo's point, AI models used for screening must be trained on data representing diverse populations and learning pathways so they accurately identify learning differences.

Spotlight: Rapid Online Assessment of Reading (ROAR)

The Rapid Online Assessment of Reading (ROAR) is an open-access, web-based platform developed by the Stanford University Reading & Dyslexia Research Program and supported by the Stanford Accelerator for Learning. The platform is designed to efficiently and accurately assess foundational reading skills in K–12 students through engaging, gamified tasks that require no test administrator, enabling large-scale classroom or remote assessments. Validated with over 20,000 students from more than 20 states, ROAR is widely used in schools. The California Department of Education approved the platform as a dyslexia screener.

Looking ahead, the ROAR team plans to expand its use of artificial intelligence to improve efficiency and equity. One major enhancement includes implementing Computerized Adaptive Testing (CAT), which uses AI to adjust the difficulty of test items based on each student's responses, allowing for quicker and more precise assessments. ROAR is also exploring the use of generative AI to create and evaluate test items, with a focus on minimizing linguistic bias for students who speak in certain dialects. By integrating AI, ROAR aims to deliver more inclusive and effective tools for identifying reading challenges early, helping educators in providing timely and tailored interventions.

Overall, ROAR represents a significant advancement in reading assessment, offering an efficient, scalable, and research-backed solution to monitor and support students' reading progress across various educational settings.

THE CRUCIAL ROLE OF HUMANS

Humans must remain in the loop for identification and should be central to the decision-making process, especially when determining appropriate supports for students with learning differences. While AI can play an integral role, it should not replace human judgment. AI tools can enhance this process by generating individualized instructional materials and assessments based on student profiles. This approach to personalized learning may be more time-efficient and resource-effective than completely overhauling the existing educational system.

Time was often cited by contributors as a barrier to innovation and transformation. Whether teachers lack time to implement changes or researchers require more time to conduct studies, the clock is ticking on how to best leverage AI systems in school settings. Studies have revealed how educators perceive AI as saving time with administrative tasks and lesson planning.[48] Similarly, AI can alleviate time constraints in access to interventions.[49] For example, an AI tool could be programmed to identify disparities in access to resources, enabling targeted supports to address inequities.

Using AI successfully for identification and intervention will require cross-sector collaboration between families, educators, researchers and industry-leaders. Together, these stakeholders can advance development of scalable, evidence-based tools with an understanding of where using AI is appropriate. In the process, educators will remain crucial in interpreting data and building authentic relationships with students. Deployed AI systems will include protective measures with priorities focused on accuracy, privacy, and transparency. If approached with care and coordination, AI can become a transformative tool in identifying and responding to students with learning differences.

CONTRIBUTORS

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Chapter 5.
Social and Emotional Well-Being with AI

Social and emotional well-being is fundamental to the learning process. It requires healthy, sustained relationships and the emotional intelligence to interpret, understand, and respond to others' perspectives and needs. Individual and collective well-being is sustained through the connections that develop and persist in nests of relationships that offer companionship, care, and joy over lifetimes. While there has been an emphasis on the impact AI can have on academic performance, less focus is placed on how the technology can influence social and emotional well-being.

When considering the whole child, these aspects of student life must be addressed. As AI systems are increasingly integrated into educational tools, its potential to support students' social and emotional development invites both promise and scrutiny. AI does offer opportunities to nurture students through the development of tools that help build connections, resilience, and personalized approaches that promote well-being. Although the technology can potentially identify and address learning challenges, concerns remain about unintended trade-offs, especially those affecting resilience, agency, and human connection.

MORE RISK, MORE HOPE

Margaret Honey, CEO of the Scratch Foundation, emphasized that many current systems are structured to intervene quickly and automatically *on behalf* of students. While well-intentioned, this dynamic risks undermining students' ability to develop agency. "Doing for has nothing to do with centering empowerment," she noted. Technology can empower young people to reflect on their experiences and decisions, laying the foundation for social and emotional well-being.

Social and emotional well-being is essential for all youth; the lived experiences of children with learning disabilities make clear the importance of proactive care and attention. According to the Learning Disabilities Association of America, approximately 30% of individuals with learning disabilities experience mental health challenges — a rate significantly higher than in the general population.[50] Factors such as undiagnosed or under-identified disabilities contribute to increased anxiety, depression, and behavioral issues among these learners.[51] Clinical psychologist Carlina Ramirez Wheeler from the Children's Health Council described this connection as a "crisis in education."

In the United States, school counselors play a central role in advancing the social and emotional health of children in public schools, drawing on programs from organizations like the Collaborative of Academic, Social and Emotional Learning (CASEL)[52] and Harmony Academy.[53] Despite growing access to social and emotional learning (SEL) resources, Lindsay Kubatsky (2023) observed that research on SEL initiatives often neglects how students with disabilities respond to specific curricula.[54]

There are instances of successful implementation. Nationwide Children's Hospital in Columbus, Ohio, embedded comprehensive social, emotional, and behavioral health services within clinics in 15 schools.[55] Similarly, the Landmark School in Massachusetts prioritizes social and emotional well-being for students with language-based learning disabilities.[56] These examples, although specifically addressing children with disabilities, demonstrate the broader potential and benefits of intentional, well-implemented social-emotional programs for all children.

While replicating successful programs remains challenging, personalizing social and emotional well-being efforts would be the optimal solution. However, implementation costs and personnel shortages remain barriers to this type of expansive innovation. Discussions on the topic revealed several competencies to consider, including:

- belonging,
- self-control,
- resilience,
- self-management,
- responsibility, and
- relationship skills.

Advances in AI-powered technology could solve some of the pressing issues that limit the number of students who receive SEL support.

AI+SEL

Imagine an app that allows students to share their current mental or emotional state and receive personalized strategies to cope. This is not a futuristic concept. Affective computing, which is also known as emotion AI or emotional AI in some circles, refers to systems designed to recognize and respond to human emotions to improve interaction and personalization.[57] Affective computing generally involves gathering cues from voices, body gestures, and facial expressions to determine emotional states.[58] Several AI-powered programs such as Alongside offer real-time guidance for students navigating emotional and mental health concerns.

Spotlight: Alongside

Alongside is an innovative digital platform that provides preventive mental health support for students in grades 4-12 through an engaging, chat-based interface. Co-designed by clinicians and teens, Alongside's llama mascot, Kiwi, guides students through conversations that help them build coping skills, clarify values, and manage everyday emotional challenges.

Following an evidence-based framework, Alongside blends cognitive-behavioral and acceptance-based strategies into short, interactive chat modules. Students can choose structured guidance for a specific topic (e.g., test anxiety, conflict with friends) or open-ended sessions when they just need to vent or release stress. The experience is personalized, stigma-free, and designed to fit easily into the school day.

Available 24/7 and in 37 languages, Alongside is FERPA- and COPPA-compliant and offers educator dashboards to identify emerging trends, flag students in distress, and track engagement across campuses. Alongside also includes staff well-being with a self-care mode for educators featuring stress-reduction tools and burnout prevention resources. Unlike AI chatbots that risk unregulated, unguided interactions, Alongside is structured to ensure conversations remain developmentally appropriate and clinically grounded.

Research conducted by Northwestern University has demonstrated meaningful impact for students with both severe and more moderate mental health support needs. After three months, 76% of high-risk students reported no suicidal ideation, while 25% of students with anxiety experienced clinically significant improvement. Overall distress and hopelessness also declined among the general student population.

In a time of rising student demand and limited staffing, Alongside offers a scalable, accessible solution — one chat at a time.

Alongside is touted as a preventive tool, but it also represents what is possible when integrating AI into products designed for mental, social, and emotional well-being. Researchers Dana Vertsberger, Navot Naor, and Mirène Winsberg (2022) studied the benefits of conversational agents for supporting mental health.[59] Data collected from more than 10,000 participants showed that one AI-powered, mobile-based companion, Kai.ai, had the potential to improve well-being in youth. These early, positive results demonstrate that further studies are necessary to show if chatbots and conversational agents improve the social and emotional well-being of youth with learning differences.

Meanwhile, a recent Stanford study reveals that AI therapy chatbots may not only lack effectiveness compared to human therapists but could also contribute to harmful stigma and dangerous responses.[60]

AI tools like Alongside and Kai.ai can help students and alleviate the burden on school counselors and other mental and behavioral health specialists, particularly in districts with staff shortages. When considering the appropriateness of deploying AI systems, Simon Blackwell, a semi-retired researcher, advocated for AI systems that provide support when trained professionals are unavailable due to lack of providers or capacity. There should always be a human professional to monitor AI systems used by students in school settings, and AI offers opportunities to assist more students while still ensuring they have in-person or live access.

A TEACHER'S TOUCH

If AI is deployed for SEL, what happens to the educator's role in the process? While CASEL and other organizations provide training and resources to build capacity, teachers have not had adequate opportunities to take advantage of those offerings. AI-powered tools, along with a prioritization of student well-being in schools, could further propel the goal of providing mental and behavioral health services for all students.

Since AI can be programmed to have adaptive and conversational abilities, AI tools can simulate scenarios teachers may encounter when interacting with students. The tools could be designed to provide actionable feedback based on the simulated interactions. When teachers are better equipped to handle situations, they can build stronger relationships with students.

Indeed, the time-saving aspects of AI-powered tools, coupled with the capabilities programmed into the technology, can deepen the human connections between teachers and students. Developers should focus on creating tools that foster belonging and reduce "othering" for both students and teachers.

A NOTE ON PRIVACY

Although there has been an emphasis on the social and emotional well-being of students, contributors stressed that mental and behavioral health remains a sensitive topic. Often, students are at their most vulnerable when sharing their troubles. Therefore, any AI systems designed for interactions with students must integrate stringent privacy guidelines and guardrails. Privacy is a critical concern and must be considered when building AI tools for vulnerable populations.

CONTRIBUTORS

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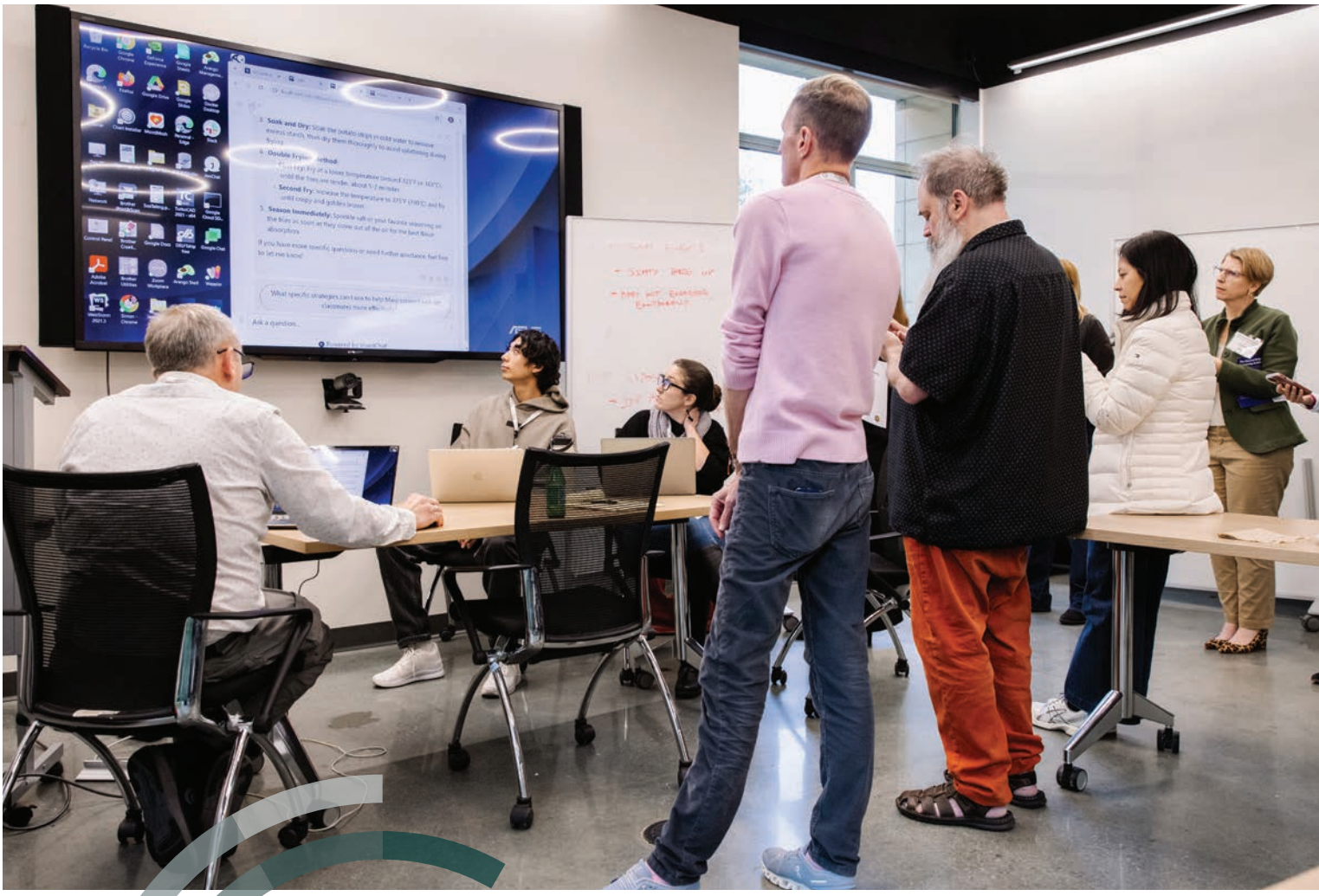

Chapter 6.
AI as Assistive Technology

Many tools we now consider universal, such as wheelchairs, canes, hearing aids, sign language, crutches, and remote controls, were initially developed to assist individuals with disabilities. Closed captioning is one of the most popular examples. Originally designed for people with hearing disabilities, it is now used by millions to enhance their viewing experiences.[61] Advances in artificial intelligence have enhanced captioning systems, improving accuracy and enabling real-time translations into multiple languages. These enhancements show how assistive technologies can rapidly expand their impact. As AI continues to evolve, how else might assistive technology support a broader range of users?

PRIORITIZING GROUPS FOR ASSISTIVE TECHNOLOGIES

Patrick Hynes, senior manager for research communities at the Stanford Institute for Human-Centered Artificial Intelligence, posed a question that served as a catalyst for conversation: "Who are the people assisted technology should serve?" Given the limitless possibilities of AI, there are ideas of an assistive technology system that could adapt to any person's needs. There is also the recognition that specific attributes of learning differences may require a broader spectrum of tools. Within this context, developing assistive technologies for the most vulnerable populations remains a priority, particularly when significant barriers exist for learning.

In response to Hynes' initial question, Bryce Johnson, an inclusive designer with Microsoft, noted that while some disability communities are well-known, others remain less recognized. He remarked, "From a digital technology point of view, assistive technology has largely been focused on the blind." Johnson added that other groups, such as those who are neurodivergent or have undiagnosed conditions, often receive less attention in the realm of assistive technology development.

An initial priority may be to develop solutions where the demand is greatest. According to the National Institutes for Health (2023), dyslexia accounts for 80% of diagnosed learning disabilities.[62] The International Dyslexia Association states that approximately 15–20% of the global population exhibit symptoms of dyslexia.[63] Currently, assistive technologies such as text-to-speech, audiobooks, and dyslexia friendly fonts are available to aid dyslexic learners. With proper intervention, students with dyslexia can receive the services necessary to thrive.

Contributors listed another emerging area for assistive technologies: social and emotional well-being. The World Health Organization (2024) indicates that one in seven adolescents ages 10–19 experiences mental health challenges worldwide.[64] Poor mental health can lead to significant learning challenges; therefore, Johnson stressed the significant role that assistive technology can play in the context of removing barriers. Currently available AI solutions that directly address social and emotional well-being include mindfulness and medication apps, mental health chatbots, and gamified tools that help build confidence and resilience. Some of these solutions, while not suitable for all age groups, particularly younger students, present a point of departure for the broader integration of AI-powered assistive technology.

Even when assistive tools appear to provide sufficient access, ensuring no one is excluded remains a primary concern. The ability to communicate is vital, yet many people who are non-speaking, who have challenges such as autism or cerebral palsy, lack access to technology that can help them communicate. Dan Feshbach, founder of Multiple, highlighted one implication of this challenge, stating, "so many people who are non-speakers are assumed not to be intelligent, and they're typically spoken down to their expectations."

The issue is not necessarily the ability to communicate but having a set of tools that provide access to understanding. For example, a person with cerebral palsy could use one AI tool to assist with writing and a different tool to convert writing into audio. Although two tools are helpful, one tool to address both functions could be better. Part of the issue involves the availability of tools limited in scope. Another part stems from the lack of innovation due to causes such as funding.

RISKS AND PROMISES OF AI-POWERED ASSISTIVE TECHNOLOGY

While the benefits of assistive technology are well documented, continuous innovation in this field presents new opportunities and challenges. Bree Jimenez, a professor at Baylor University, expressed concern about the gap between research findings and their implementation in schools. Although fewer studies are available on the effectiveness of AI-powered assistive technology, initial indications suggest a positive potential impact.[65] Researchers have opportunities to examine how, when, and where AI adds value. In considering the role of educators, Jimenez emphasized, "[It's] never about the students, it's about the teachers providing opportunities… We have the evidence, but we're not seeing it in our schools."

Meanwhile, developers of innovative assistive technology products are not waiting for the completion of research studies before moving forward. The lengthy process of conducting research often conflicts with the market pressure to launch products quickly. That said, the predictive capabilities of AI software could potentially accelerate both research and development. By analyzing design parameters, AI could identify products with the greatest probability of success or generate novel concepts for exploration, potentially bridging the gap between thorough research and rapid product development.

This AI-accelerated research and development process could also enable teachers to acclimate to AI in education. As Jimenez and special education teacher Julie Donovan pointed out, it's well-known that teachers are overwhelmed, with many leaving the profession. The demands of following IEPs and ensuring students receive proper accommodations and interventions leave little time for teachers to learn about innovations in educational technology. To address this challenge, a gradual integration of AI-powered assistive technology could be beneficial. Such an approach, incorporating adequate professional learning, coaching support, and evaluation protocols, may yield more success in the long term. This measured implementation would allow teachers to adapt to new technologies at a manageable pace while still benefiting from the advancements in AI-powered assistive tools.

Conversely, instead of focusing on the product, developers could focus on the experiences of end users. Russell Shilling, owner of Shilling Forge Consulting, used autism as an example when describing how engaging potential users could make an end product more accessible since the levels of autism vary across the spectrum. Developers should co-design tools through a process that includes people with disability, parents, educators, researchers, and industry professionals. While issues can arise in finding people to test products, using social media and other platforms to recruit beta testers may be an effective way to address that challenge. One university, for instance, uses crowdsourcing to recruit product testers. Along with these prospective benefits, such approaches may also reduce the bias often found in one-size-fits-all solutions.

Spotlight: UNICEF Accessible Digital Textbooks for All Initiative

UNICEF's "Accessible Digital Textbooks for All" Initiative is a groundbreaking effort to ensure that every child—regardless of ability—has access to inclusive, high-quality learning materials. By combining advances in accessibility and artificial intelligence, the initiative aims to transform how educational content is created and delivered, particularly for learners with disabilities.

At its core, the initiative is focused on accessibility, integrating features such as text-to-speech, sign language interpretation, and adjustable text formats to meet diverse learning needs. To accelerate this work, UNICEF is partnering with OpenAI to develop an AI-powered tool that can rapidly convert static documents into accessible digital textbooks—dramatically reducing the time, cost, and complexity of production.

This work is being piloted in several regions, including Latin America and the Caribbean, as well as Eastern and Southern Africa. These pilots are helping to refine both the AI technology and the accessible textbook formats, ensuring they are locally relevant and user-centered.

Beyond technology, the initiative is rooted in a deep commitment to inclusive education. By making digital textbooks accessible to all students, it fosters shared learning environments where children with and without disabilities can learn side by side—advancing equity, participation, and belonging in classrooms around the world.

THE INTERSECTION OF ACCESSIBILITY AND ASSISTIVE TECHNOLOGY

Accessibility is interconnected to assistive technology, but it remains a persistent challenge in the adoption of AI and digital tools for learning.[66] As Elias Constantopedos of UNICEF noted, even when the technology itself is available, barriers like Wi-Fi or broadband access can prevent meaningful use. In both rural communities and under-resourced urban areas, globally and in the United States, connectivity is inconsistent or absent, often due to infrastructure gaps.[67]

Despite these challenges, promising solutions are emerging; however, accessibility gaps can persist when datasets used to train AI tools are incomplete or unrepresentative.[68] When AI systems are trained primarily on data from well-resourced or majority populations, the realities of students in low-connectivity settings or those with disabilities may be overlooked, reinforcing inequities in design and function. As Faraz Abidi, founder of Indy AI, explained, small language models (SLMs) offer a viable path forward by running locally on laptops or other modest devices, reducing dependence on cloud-based systems.

Additionally, strategies like zero-rating educational data — exempting certain apps or websites from mobile data charges — can help make tools more accessible in low-connectivity communities. Offline functionality is another essential feature for widening access, ensuring that students in under-resourced communities are not excluded from learning opportunities. These solutions show that, when accessibility is prioritized and datasets reflect the full range of people and their experiences, inclusive AI becomes possible.

In the United States, state and local governments must make web content and mobile applications accessible.[69] Although some countries have adopted similar guidelines,[70] others have not, leaving accessibility to the discretion of developers or private entities. This disparity can lead to uneven access to AI-enhanced tools for individuals with learning differences or those in marginalized communities. To promote fair access worldwide, developers and decision-makers must commit to accessibility regardless of legal obligation by using guidelines such as the Web Content Accessibility Guidelines when developing products.[71] When technology is designed to be accessible by default, it becomes a force for expanding opportunity for all.

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Chapter 7.
AI in Career Long Teacher Education

For decades, the structure of teacher preparation has remained largely unchanged. Candidates earn certification through traditional or alternative programs and gain practice with inconsistent levels of feedback. Many enter the profession with only foundational training and leave within three years due to burnout. Professional development often consists of routine in-service sessions tied to district goals and occasional workshops, which may fall short of addressing evolving classroom demands. Meanwhile, shifting student demographics, experiences, capacities, and languages challenge long-standing assumptions about how, where, and with whom learning occurs.

While AI has great potential to assist educators, too many remain unfamiliar with how it can augment their practice.[72] As Sarah Wood, an accessibility scientist with Educational Testing Service, observed, AI advances rapidly while professional learning struggles to keep pace. If AI is to expand schools' capacity to personalize instruction, teacher preparation and ongoing professional learning must be reimagined, redesigned, and retooled.

A MOMENT FOR MOVEMENT

The teaching profession is at a crossroads. The attrition rate for U.S. teachers was approximately 7.9% in 2023.[73] Teacher shortages are a global concern, and 44 million teachers will be needed to serve primary and secondary students by 2030.[74] Individual reasons for leaving the profession vary, but the themes are consistent: large class sizes, lack of support, overwhelming workloads, and minimal professional learning opportunities.[75] Recruiting new teachers and retaining existing teachers have both become major challenges. In light of the persistent challenges around teacher retention, Christine Bywater, Associate Director of the Center to Support Excellence in Teaching (CSET) at Stanford, raised the question of whether building educators' knowledge of AI could serve as one component of a broader strategy to keep teachers in the profession and support their long-term career development.

As noted, professional learning is one area that warrants greater attention. It starts with teacher preparation programs, but "the state of teacher preparation is in a shaky, shaky place," noted Nathan Jones, the commissioner of the National Center for Special Education Research. Increasingly, the coursework taken during programs does not reflect the realities of the classroom.[76] Without adequate training and guidance, teachers are ill-equipped to serve in classrooms of students with varying needs.

AI TO THE RESCUE

One of the biggest benefits of some AI-powered tools is they are designed to assist teachers with tasks such as communications, lesson planning, and reducing cognitive load.[77] The time-saving aspects of AI could provide teachers with more time to build relationships and facilitate learning for students.[78] Statistics on the number of teachers using AI vary, with percentages as low as 18% and as high as 80%.[79] While the extent of teachers' AI usage remains unclear, there is widespread agreement around strengthening AI training in education.

The one-size-fits-all and one-and-done days of professional development are not as effective as a longer-term professional learning cycle. Training should be part of a greater effort to incorporate AI into subject area content throughout primary, secondary, and higher education institutions. Recognizing that teachers, like students, have unique learning journeys, personalized learning pathways for educators could be beneficial. Such an approach may help build capacity and potentially reduce teacher attrition rates.

There is also a growing urgency to embed AI literacy and integration strategies into teacher preparation programs. Current curricula do not adequately address AI's role in educational settings. Although more programs are incorporating AI into coursework, additional steps are necessary to ensure teachers are prepared.

Spotlight: Ellis from the Children's Health Council

Unlike resources solely focused on students, Ellis champions the educator experience by delivering evidence-aligned strategies tailored to specific teaching styles and student scenarios. When an educator encounters a challenge — whether it's a student struggling with reading comprehension or a student exhibiting signs of anxiety — they simply describe the situation and instantly receive actionable guidance customized to both teaching style and student needs. With Ellis, educators are equipped to lead the way in inclusive, supportive teaching.

Ellis uniquely integrates support for the learning and well-being needs in one comprehensive platform. Its intuitive interface eliminates hours of research, giving back valuable time to educators.

Ellis ensures access across all schools. Pilot results demonstrate its impact: 89% of educators report improved individualized planning; over half use Ellis weekly; and 82% feel more confident supporting student needs, making Ellis an essential co-pilot in every inclusive classroom.

By blending AI innovation with collective expertise from education and mental health leaders, Ellis empowers educators to support every learner effectively, transforming not just individual learning environments but entire school communities.

By synthesizing collective expertise into actionable guidance, Ellis redefines the learning environment – one educator, one student at a time.

MAINTAINING THE HUMAN CONNECTION

While AI can automate aspects of instruction, human connection remains central to effective teaching. Students are increasingly comfortable using AI-powered tools in various contexts, but often without the skills to question, evaluate, or responsibly apply what these tools produce. AI can help students explore complex ideas across subjects, but its impact depends on their ability to think critically and creatively. Teachers play a vital role in helping students navigate content, analyze information, and build deeper understanding. Preparing educators to guide this kind of inquiry requires ongoing professional learning that pairs content expertise with digital fluency.

Contributors identified one emerging approach to prepare teachers for this evolving role: AI-powered simulations. Designed to reflect real-world interactions, simulations give teachers a safe space to develop skills in instruction, communication, and decision-making.[80] These immersive tools emulate aspects of instructional coaching, offering feedback on classroom management, communication style, and pedagogical decision-making. Rather than replacing coaches, simulations can extend their reach, especially in settings where coaching resources are limited. For example, a coach might review AI-generated feedback from a simulation, add personalized notes, and follow up with the teacher in person. This blend of AI insight and human mentorship can deepen instructional readiness. Some graduate programs are already integrating simulations into teacher training, signaling their promise as a scalable tool for professional growth.[81]

Beyond simulations, AI tools can supplement instructional coaching by analyzing observation data, identifying trends, and generating recommendations to improve practice. Teachers must also adapt to new ways students express knowledge through language, visual media, and crowd-sourced content. Positive outcomes depend on teachers having consistent coaching and collaborative opportunities to help students use AI wisely and build lifelong critical thinking skills.

Robert Pennington, the William T. Bryan Endowed Chair in Special Education Technology at the University of Kentucky, noted that AI can help extend coaching beyond the moments when human presence is available. In the absence of a coach, AI tools can assist teachers in identifying gaps in instruction or student understanding. This is especially valuable for general education teachers, who may receive less training on learning differences than their special education counterparts. With timely access to relevant strategies and insights, teachers can respond more effectively to learners and make a lasting impact on their success.

Spotlight: Mursion

Mursion is an immersive simulation platform that blends artificial intelligence with human facilitation to provide educators with real-time practice in high-stakes interpersonal scenarios. Designed to replicate complex classroom and school environments, Mursion allows teachers to build skills in classroom management, communication, and instructional leadership through interactive role-play with AI-driven avatars guided by trained human actors.

These simulations create a safe, low-risk space for educators to refine their approaches to real-world challenges, such as parent-teacher conferences, student behavior management, or staff collaboration. Whether participating in scheduled live sessions with coaching or accessing on-demand simulations for self-paced learning, teachers receive immediate, actionable feedback that supports continuous professional growth.

School systems have adopted Mursion to strengthen leadership development, enabling aspiring administrators to practice key decision-making and communication skills before stepping into new roles. As the demands on educators grow, Mursion offers a scalable, flexible, and evidence-based tool to help them navigate their professional responsibilities with greater confidence and effectiveness. Through repeated, authentic practice, Mursion enhances teacher readiness, ultimately contributing to more supportive and successful learning environments for students.

A CAREER WITH AI ON THE SIDE

To recruit and retain teachers, AI must be positioned as a technology that supports, not replaces, teachers. AI systems are "guides on the sides" that assist teachers in creating and maintaining optimal learning environments for students. As education evolves, AI can act as a training and collaborative partner for teachers on their specific learning journeys. When these types of systems are in place, educational institutions can leverage AI in similar ways to working with students. For example, AI-powered tools can flag when students are at risk of failing a course or dropping out. Similarly, administrators could use tools to identify if teachers require coaching or to target indicators for retention.

Fully integrating AI into teaching does have challenges. Without consistent standards for AI development and use in education, some teachers will benefit more from AI-enhanced professional learning than others. Resistance to change is another challenge, and educational leaders will have to incorporate change management principles into strategic planning. Including teachers and other community members as part of the integration process will maximize the potential for success.

The unattributed phrase "cradle to career" describes how students progress through the educational system to the workforce. For teachers, AI can serve as a partner from "first year to final cheers" as they navigate and continuously learn from the ever-changing landscape of education.

CONTRIBUTORS

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Chapter 8.
AI and the Workforce

From the moment ChatGPT entered the mainstream, generative AI has become synonymous with artificial intelligence in general. While chatbots and the large language models behind their programming are important, there are many AI and machine learning systems operating in multiple sectors. Preparing all students for the workforce of the future includes teaching them how AI is integrated into different career fields.

THE FUTURE OF WORK

Any plan to expand career paths for people with learning differences must start with AI's growing role in the workforce. "If we assume that in 5 to 10 years that AI can do a large fraction of the work we do today," stated Utkarsh Contractor, senior research fellow at Stanford Graduate School of Education, "we should look at what work means for anyone as a baseline."

That redefinition is already underway. Technology-focused jobs were among the top on growth charts included in the *World Economic Forum's Future in Jobs Report 2025.*[82] The organization also recognized the expansion of generative AI in the workforce and the need for skilled labor in the field. Since other types of AI and machine learning are integrated across different sectors, workers with a deep knowledge base are necessary to fill positions in jobs ranging from agriculture to healthcare.

At the same time, McKinsey & Company (2023) predicts that more than 30% of hours worked currently could be impacted by AI and automation by 2030.[83] The stark reality is that AI is already replacing some jobs.[84] Numbers alone do not answer the deeper ethical question posed by Vanessa Parli, Director of Research and Education Programs at Stanford's Institute for Human-Centered Artificial Intelligence (HAI): "[T[echnology should augment, not replace, the human workforce. Is the question what work will look like in the future or what we want work to look like in the future?"

To illustrate her point, Parli highlighted a persistent issue identified by the disability rights movement: the 'four Fs.' This term refers to food, filth, flowers, and filing and the industries that disproportionately employ people with disabilities, often in low-skilled roles.[85] Parli then shared a study on call centers, which showed that new employees using AI support tools saw significant productivity benefit from using those tools.[86] Their more experienced counterparts only saw marginal improvements. This finding raises important questions about the potential of AI tools to empower and uplift lower-skilled workers on a broader scale, potentially opening up more employment opportunities.

Spotlight: Enable Ventures

Enable Ventures is the first impact venture fund dedicated to closing the disability wealth gap while achieving competitive, market-rate returns. They invest in and scale early-stage companies that leverage disability as an asset and unleash untapped economic potential through products and services powered by universal design.

Their investment approach focuses on four key impact areas:

- **Up-Skilling, Re-Skilling, and Future-Proofing Work:** Bridging skills gaps and training workers in the credentials they need for the 21st-century economy.
- **Founders With Disabilities:** Supporting entrepreneurs with disabilities, recognizing their lived experience as an asset that drives innovation.
- **Work-Related Technology:** Investing in technologies that are universally designed to maximize global human talent.
- **Next-Gen Assistive Technology:** Advancing technologies that will make marked improvements in the daily lives of people with disabilities.

Led by Founder and Managing Partner Regina "Gina" Kline, an investor, entrepreneur, and civil rights lawyer, Enable Ventures is part of the Sorenson Impact Institute platform of funds. The firm is backed by Jim Sorenson and Sorenson Impact Institute's vast, world-class experience in impact and market-rate investments.

Their portfolio includes companies such as Ava, Cionic, Inclusively, Be My Eyes, Daivergent, and Mindset Care, reflecting their commitment to investing in solutions that break through persistent barriers and empower people with disabilities.

THE ROLE OF EDUCATION IN THE WORKFORCE

Preparation for an AI-driven workforce starts in school; however, Julia Beth Dimitriou, a teacher, sees a gap: "There is a disconnect between K–12 education and workplace skills." She described how some students primarily learn independent living skills at school while other students receive greater emphasis on preparation for colleage and meaningful employment. Secondary students, including those who receive special education services, have opportunities to take career and technical education (CTE) courses. In states with these types of programs, there are stringent requirements involved, such as having a CTE representative in IEP meetings to discuss possible courses and pathways.[87]

Students with learning differences, including those with disabilities, offer significant value to the workforce. But, as Runkle explained, there are existing barriers, both perceived and authentic, such as the impact on productivity, higher costs for inclusion, and misconceptions about abilities. These factors, and others, can lead to employers overlooking capable potential employees based on their conditions, and risk people with disabilities being marginalized in the workforce, Runkle said.

Well-designed technology can "reprogram assumptions of the system" by lifting individuals with disabilities beyond the lower skill label and matching their talents with employers' requirements. Factoring AI into the future of work starts with removing barriers, increasing access, and expanding knowledge about the abilities of people with learning differences when students are still in school. "We need to redefine what smart work looks like," posited Sam Johnston, chief postsecondary and workforce development officer at CAST. "That's a value proposition that's not being made in enough workplaces."

SUPPORTING LEARNING DIFFERENCES IN THE WORKFORCE

AI may serve as a catalyst to redefine smart work. Some statistics show that even though "almost two-thirds of adults with disabilities are not in the workforce… there are already many employers that are subconsciously hiring and thriving on a disability workforce."[88] One goal is to educate the populace more about learning differences, including the experiences of working with disabilities.

Human resources departments, for instance, are relying more on AI systems to screen applications. If AI models are trained to include learning differences, the algorithms are more likely to match applicants with available positions. This type of tool benefits both employers and applicants. Interoperable training datasets are critical at this stage; biased data can misinterpret skills or exclude talent entirely.[89] Complementary data sources, rather than a single dataset, help capture the diverse strengths of applicants.

Once hired, onboarding is one of the next steps in the process. To support people with learning differences, AI-powered onboarding and training systems could break down tasks into manageable steps. Immersive technologies such as virtual reality can ensure employees get necessary training. According to contributors, incorporating principles of Universal Design for Learning (UDL), variability, and interoperability into onboarding and training processes could reduce costs and benefit more employees.

As employees transition from new hires to team members, accommodations may be necessary to provide functional work environments. Regina Kline, founder of Enable Ventures, explained that people are not "entitled to a particular product or technology, but they are entitled to a functionality needed." Workplaces are evolving to provide the assistance employees with learning differences may require to succeed.

Fulfilling work also includes starting businesses. Beyond the workforce, Kline championed giving individuals with learning differences greater exposure to entrepreneurship. Opportunities exist to invest in entrepreneurs with disabilities and assistive technologies that support learner differences in the workforce. Increasing exposure to these types of ventures promotes what she called "a positive cycle of employment and intergenerational well-being."

AI is already reshaping the future of work. The key question now is how we can guarantee these changes open doors rather than create new barriers, especially for individuals with learning differences. By choosing inclusive approaches that honor capabilities and match opportunities with potential, more workplaces can become spaces where differences are actively valued.

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Chapter 9.
AI, Interdependence, and Life Satisfaction

"Is independence a goal?" The question asked by Callie Turk, co-founder of REEL, a nonprofit serving neurodivergent learners and their families, sparked a discussion about independence and interdependence. "There is often more discussion about interdependence and community and supporting each other," she continued. Independence can imply agency and self-sufficiency, but it may also suggest isolation. In contrast, interdependence speaks to our shared humanity and mutual reliance. For individuals who engage with AI tools to navigate daily life, interdependence may offer a more accurate and empowering lens. Perhaps life satisfaction, in general, is dependent upon individuals connected to each other, technology, and society.

RANGE OF LIFE SATISFACTION

In the process of designing tools for learning differences, a crucial consideration emerges: the balance between fostering independence and promoting interdependence, and how this balance impacts overall life satisfaction. Jennifer Ybarra, an advisor for tech companies, captured the essence of this challenge: "[It] might depend on who you are and what you need." This perspective underscores the importance of recognizing that people's preferences and conditions vary, and the tools developers design should reflect this diversity. To identify these considerations, gathering information through simple instruments such as surveys can be an effective starting point.

How data are used in the design process is also a factor in determining the measure of life satisfaction. Training data for generative AI "include many different forms of life satisfaction," John Honerkamp, a special education educator, explained while discussing whether products should focus on strengths, weaknesses, or both. Instead of having predefined goals based on the pretrained data, Stanford Associate Professor Christopher Lemons suggested an AI-powered tool could be programmed so that individuals define their own goals. The tool could then aid in goal attainment.

Since AI is not a one-size-fits-all technology, the decision should not be independence or interdependence as a measure of life satisfaction. At some points, an individual will require agency to complete tasks while at other times, the same individual may require assistance. If AI's current capabilities are the primary focus, people may not consider the impact of the technology over a lifetime. Given how AI has evolved, Daniel Hiterer, an educator from New York, wondered if AI will be able to perceive and understand what occurs in the human world and react in a way that represents empathy.

Even if AI exhibits more humanlike capabilities, human interaction will always be necessary. Although "we want people to be successful," explained Lemons, "they're in a society that is not inclusive. How do we build tech that is useful and accessible but that isn't constantly part of us?" As noted, part of the answer is collecting training data on strengths. A tool programmed to assist individuals with learning differences could support goal-setting by providing encouragement and adapting as the individual grows. The tool would be designed to enhance life satisfaction by helping users cultivate agency, empathy, and interdependence.

Spotlight: Autism Self-Reliance Support Network (ASR) and ITI Assistive Technologies, Inc.

The Autistic Self-Reliance Support Network (ASR) is a nonprofit dedicated to promoting the well-being and success of adults with autism. ASR operates with an all-neurodivergent team, focusing on flipping the power dynamic in autism research and support by centering the experiences of individuals with autism. Their approach encompasses four pillars: education, assistance, community building, and research and advocacy. Notably, their Mobility Autonomy Program (MAP) is a scalable training initiative aimed at helping adults with autism navigate transportation and communication challenges, currently piloted in Central Ohio.

To further their mission, ASR established a for-profit subsidiary, ITI Assistive Technologies Inc., which develops digital tools designed by neurodivergent individuals for neurodivergent users. Their flagship product, Decide is an AI-powered app that offers structured guidance to reduce cognitive overload and assist with daily decision-making. The app features two modes: Guided, which provides context-specific reflections and recommendations, and Random, which allows users to create custom lists for routine decisions based on their energy levels. Importantly, ITI emphasizes user privacy, ensuring that personal data is not used to train large language models.

Together, ASR and ITI exemplify a model where lived experience drives innovation, creating tools and programs that empower adults with autism and promote autonomy and well-being.

AI FOR LIFE

Advancing AI in ways that help foster agency and interdependence can also nurture the development of environments where all people can thrive. To achieve success in implementing AI in education, it's crucial to learn from and avoid the pitfalls of previous technological transformations. Two examples stand out: first, mitigating negative effects, as seen with social media's impact, and second, implementing inclusive development processes from the outset. Recognizing that teachers cannot shoulder this burden alone, Turk advocated for developers to leverage "AI and machine learning for things [teachers] cannot do," thereby enhancing educators' capabilities rather than overwhelming them.

In the world of education, there are concerns that developers should consider the learning sciences when designing tools. "What does each group need to make [the product] effective and how do you assess those needs?" Gail Evenari, documentary filmmaker, asked. Answering this question requires more than just bringing people with intersectional identities together for a discussion. Riley Mulcahy, executive director of the RILEY Project, recommended that developers administer strengths-based assessments. The data collected could provide a deeper understanding of what features make people happier and more connected.

Evaluation is equally essential. Ybarra and Hiterer proposed that setting clear goals and success criteria could establish an effective feedback loop. In this scenario, developers, researchers, policymakers, and educators would provide feedback during and after the development cycle. Feedback provided should inform, guide adaptations, and promote change.

Researchers studying the impact of AI on learning differences have a responsibility to collect data from a broad range of users. Turk posited that researchers should not only define life satisfaction but also consider who determines how life satisfaction is measured. In the spirit of collaboration, Hiterer proposed that researchers and developers work together to evaluate the efficacy of tools. Measurement and evaluation are methods that can be used to determine the viability of AI-powered tools and their usefulness in modern classrooms.

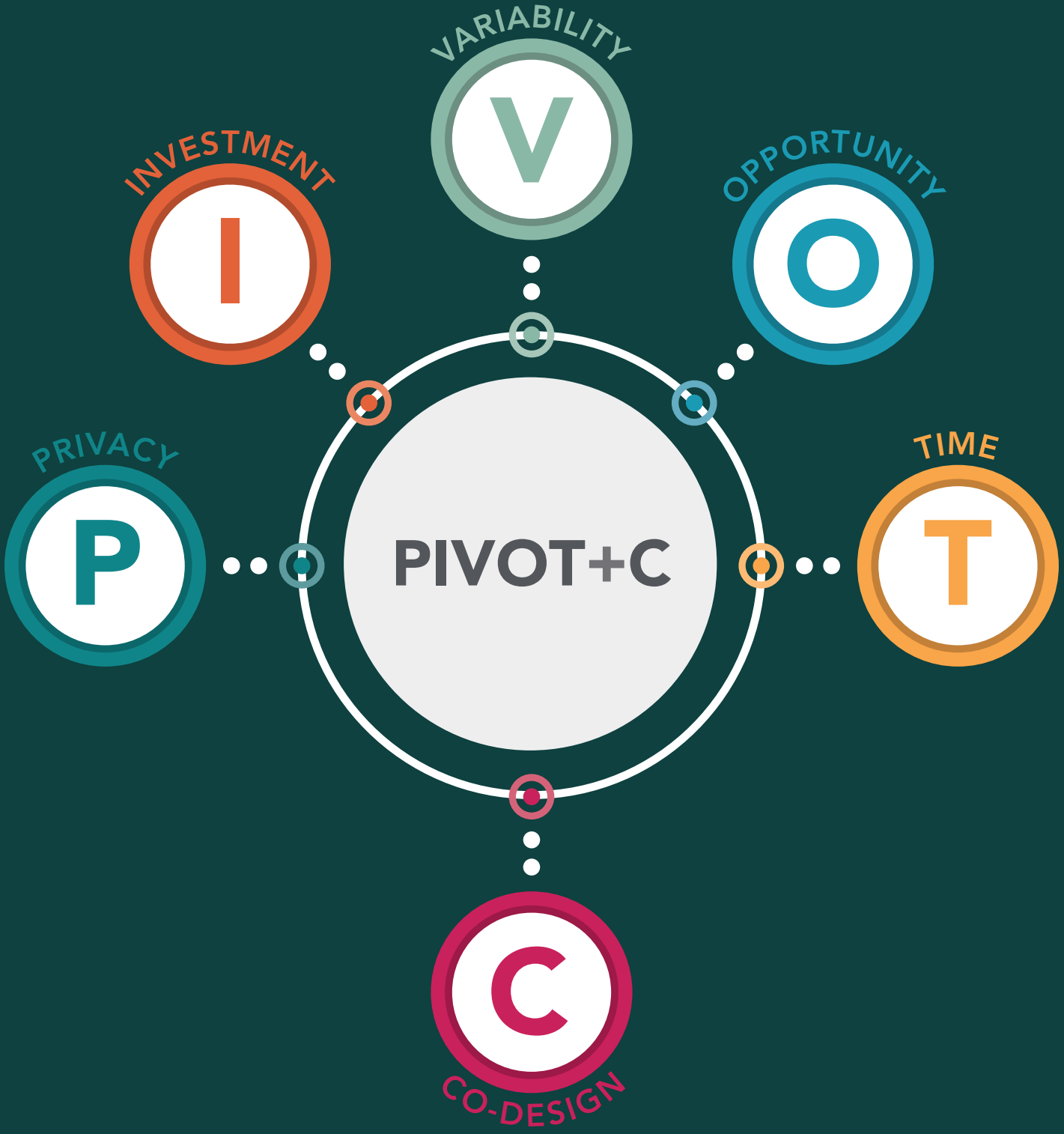
Educators, on the other hand, should take time to tinker with new technology. Teachers are still optimally positioned to support all learners in navigating AI. Nancy Lambert, director of the Schwab Learning Center, stated, "Educators need to be involved from the get-go. [There is] no replacement for human connection and human teaching." A shared perspective among educators is that time is a critical constraint, and AI may offer pathways to alleviate this pressure. For example, since teachers do not always have time to adapt lesson plans to align with IEPs, Lemons suggested an AI tool that could adapt teachers' work into IEPs.

With the advent of artificial intelligence and its applications focused on learning differences, a question persists whether learners could lose the protections afforded under federal and state laws and regulations. Policymakers grappling with AI in education, as well as the broader conversations on learning differences and life satisfaction, must address these challenges. Privacy and data protection for students is another area where solutions are necessary.

Effective policies can stand the test of time and serve as springboards for transforming education. As Lemons reflected, "In a perfect world, we could have one education system that is individualized for each person, but we're not there…yet."

CONTRIBUTORS

- **Catherine Chase**, Stanford Accelerator for Learning, senior research scholar
- **Gail Evenari**, documentary filmmaker
- **Daniel Hiterer**, educator
- **John Honerkamp**, Santa Clara County Office of Education, special education educator,
- **Nancy Lambert**, Schwab Learning Center, director
- **Christopher J. Lemons**, Stanford Graduate School of Education, professor
- **Riley Mulcahy**, The RILEY Project, executive director
- **Ryan Peterson**, elementary school principal
- **Callie Turk**, co-founder, REEL
- **Jennifer Ybarra**, technology company advisor


VARIABILITY
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Recommendations

Capturing the harmonies of more than 100 distinct voices represents a chorus of change. Upon review of the nine group discussions focused on aspects of AI and learning differences, common themes emerged. For example, co-design was a constant throughout recommendations from contributors. Other ideas emerged during each discussion, and they can be summarized by the following words: privacy, investment, variability, opportunity, and time. Collectively, these terms are represented by the acronym PIVOT+C:

PRIVACY **Protecting data is essential when using AI, ensuring compliance with ethical and legal standards while maintaining trust.**

INVESTMENT **Allocating resources to develop and implement AI-driven solutions can expand access to substantive learning for all students.**

VARIABILITY **Designing AI systems that respond to the many ways individuals process information, interact with content, and express understanding.**

OPPORTUNITY **Opening new opportunities with AI systems by providing accessible, tailored solutions that enhance engagement and success.**

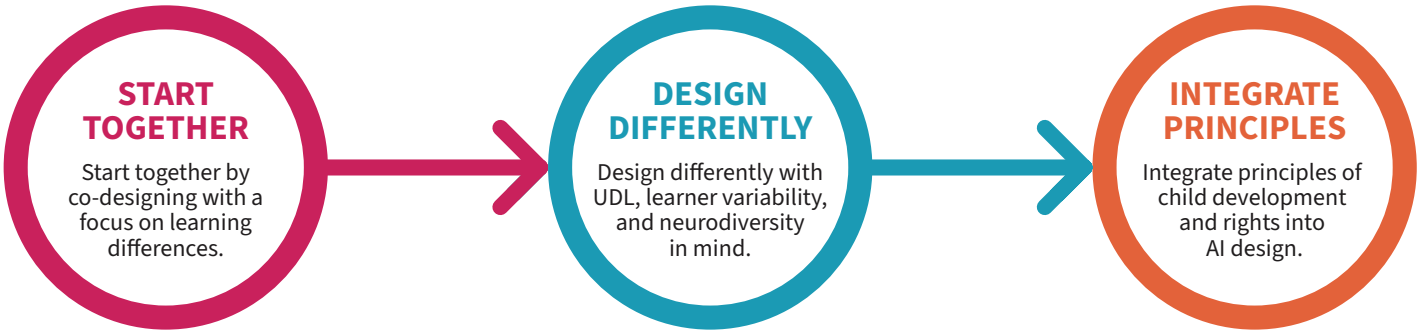
TIME **Streamlining workflows using AI frees up capacity for meaningful interactions, individualized support, deeper research, and comprehensive product design and development..**

CO-DESIGN **Collaborating with individuals with diverse needs to design AI tools that are accessible and have the potential to reach all learners.**

People can work together to pivot from existing barriers by considering learning differences and by including individuals with diverse needs in the co-design of AI tools and AI-infused learning environments. Along with major themes, each group also shared recommendations for four core groups: developers, researchers, educators, and policymakers. In the spirit of taking the first step toward action, PIVOT+C steps are included with each recommendation. A PIVOT+C step is an example starting point that empowers individuals or organizations to move from insight to action.

DECISIONS FOR DEVELOPERS

In keeping with the tradition of the typewriter, telephone, text messaging, and other tools designed for the specific that elevated to the expansive, developers must innovate with intentional inclusivity at every step. The most transformative AI tools will be multimodal and designed to anticipate and support learner variability. Integration of Universal Design for Learning (UDL) principles is a key component to an enhanced design process.



START TOGETHER by Co-Designing with a Focus on Learning Differences

Innovative development requires developers to break traditional silos by co-designing and focusing on learning differences at the earliest stages. A strong start involves forming design groups that actively engage youth, adults, and families with lived experiences of learning differences. Providing fair compensation validates contributors' insights and aligns the development process with ethical design principles.

Developers can also audit training datasets for representation gaps. Using evidence-based datasets ensures that AI systems are not being trained with information that is biased or incomplete.This dual approach, authentic co-design and evidence-based data practices, advances ethical innovation and results in tools that are contextually relevant, emotionally resonant, and more likely to enhance how people learn and interact with technology.

PIVOT+C Step: Review co-design initiatives from companies, organizations, or educational institutions such as CREATEd from the University of Delaware or CRAFT from the Stanford Graduate School of Education.

DESIGN DIFFERENTLY with Universal Design for Learning (UDL), Learner Variability, and Neurodiversity in Mind

Innovation will require the development of AI solutions that adapt to how users process information, express themselves, and interact with digital environments. Earlier AI tools often relied on limited forms of input and output. Today's multimodal AI can process and generate responses to speech, text, gestures, and visual cues. For instance, some developers of multimodal systems combine computer science and AI-related technologies such as natural language processing for speech recognition, expert systems for decision pathways, and machine learning for adaptive personalization to power tools such as digital reading tutors. Looking ahead, multimodal systems could generate emotionally attuned, immersive environments that adjust in real time to a user's mood, behavior, and modes of communication.

One actionable step is to embed customizable settings into early prototypes, allowing users to tailor how they receive and express information. To guide implementation, teams can draw from CAST's UDL framework and review additional resources related to UDL, variability, accessibility, and neurodiversity. Designing with UDL not only addresses diverse cognitive and sensory variability, it also pushes developers to rethink the very architecture of learning tools. Accessibility becomes a source of possibility rather than an afterthought.

PIVOT+C Step: Explore the benefits of UDL from CAST and learner variability from Digital Promise Global.

INTEGRATE PRINCIPLES of Child Development and Rights into AI Design

Developers must recognize children's vulnerabilities and design AI systems that promote children's well-being. Consider incorporating Children's Rights by Design, an approach that explicitly embeds the UN Convention on the Rights of the Child into the core of digital innovation. This framework emphasizes children's rights to privacy, safety, agency, and participation in decisions that affect them. Rather than treating children as passive users, it calls for actively considering their developmental needs and diverse experiences in every phase of design and deployment.

Age-appropriate design requires AI systems to reflect children's developmental stages. Features should include child-friendly explanations of how AI functions, opt-in choices that build agency, and clear limits on data collection to promote transparency and safety. Developers must avoid attention-manipulating or addictive design, especially in educational tools. Centering children's best interests in design leads to a safer, more equitable digital world for learning, play, and growth.

PIVOT+C Step: Gain familiarity with the UNICEF Policy Guidance on AI for Children and the General Comment No. 25 of the UN Committee on the Rights of the Child.

RETHINKING FOR RESEARCHERS

Realizing AI's potential to improve education and the workforce requires sustained research focused on accessibility, fairness, and measurable outcomes. Research findings have long informed the development of evidence-based educational and workforce programs. Ongoing and future research related to AI and learning differences will drive similar advancements. Although conducting effective research poses challenges, opportunities exist to collaborate among disciplines and engage diverse participants. Designing studies that reflect real-world contexts can lead to more breakthrough innovations.

STUDY AI's Long-Term IMPACT

The importance and impact of effective research cannot be overstated. Prioritizing longitudinal studies will be essential for understanding the efficacy of AI tools and whether they genuinely encourage participation, reduce barriers, and enhance outcomes for students and workers. Longitudinal data also allow researchers to track changes in life satisfaction, an increasingly relevant metric that must be clearly defined in relation to autonomy, engagement, and opportunity over time.

To strengthen real-world relevance, research designs should include mixed methods approaches that combine qualitative input from lived experiences with quantitative data over time. Partnerships with research institutions can provide infrastructure and oversight. Sustained, inclusive research is essential to determine whether AI systems expand opportunity or simply reinforce existing inequities.

PIVOT+C Step: Visit the Generative AI for Education Hub Research Study Repository, part of the SCALE initiative from Stanford Accelerator for Learning.

CREATE STANDARDS to Assess and Certify Ethical AI

Researchers should lead efforts to develop standards for evaluating and certifying ethical AI use similar to the efforts of the International Society for Technology in Education (ISTE), Digital Promise Global, and Common Sense Media. A starting point could include convening interdisciplinary working groups that can review existing frameworks and identify areas where gaps exist. New standards should be created with multidisciplinary community members, including, but not limited to, ethicists, educators, and technologists. Ethical certification frameworks help uphold fairness, transparency, and accountability while aligning with the unique goals and constraints of school systems and workforce development programs.

PIVOT+C Step: Examine the ISTE Seal, the nonprofit's product certification, and the suite of certifications from Digital Promise Global.

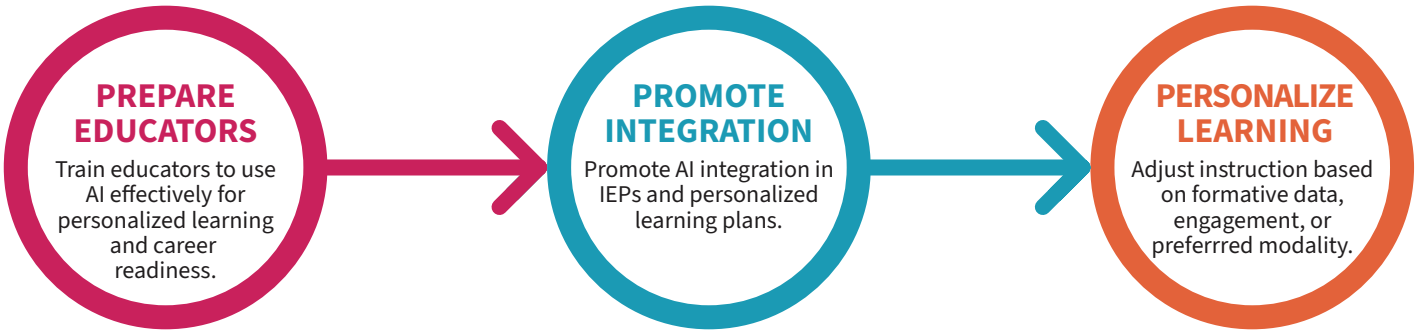
RECRUIT PARTICIPANTS by Using Multiple Channels and Educator Partnerships

Researchers can expand the reach and relevance of AI studies by forming strong partnerships with educators and recruiting participants through multiple channels, including teacher networks, research registries, early adopter districts, and crowdsourcing platforms. For example, some nonprofits have established educator advisory boards that collaborate with university researchers to pilot and refine AI-enhanced tools.

Along with innovative recruitment efforts, alternative funding strategies such as foundation grants or public-private partnerships may be essential to ensure sustainability. When research efforts are closely aligned with district goals and classroom realities, they are more likely to influence policy and practice. The integration of applied research and practice increases the likelihood that AI will drive lasting, systems-level impact.

PIVOT+C Step: Review an example of a research registry landing page from the Stanford School of Medicine's Autism and Developmental Disorders Research Program (Department of Psychiatry and Behavioral Sciences).

EMPOWERMENT FOR EDUCATORS



Educators are entering an exciting new era where AI systems can amplify their impact and better engage every student in their learning journey. With the right tools and training, AI systems become partners in personalizing instruction, enhancing professional growth, and preparing students for the future. While pressure exists to act fast, empowering educators requires purposeful, strategic planning and a commitment to consistent support. Because educators work closely with students, their voices must shape the decisions about how AI is used in learning environments. AI will never replace educators, but in the hands of those who understand students best, it can help reframe what learning makes possible.

PREPARE AND SUPPORT EDUCATORS to Use AI Effectively

Educators deserve access to high-quality learning that equips them to prepare students for an ever-evolving future. District and school leaders can begin by investing in sustainable professional learning systems that integrate AI tools for lesson design, real-time feedback, and customizable instruction. Personalized dashboards, intelligent coaching platforms, and AI-informed communities of practice allow teachers to engage in learning aligned to their own goals, content areas, and the realities of their classrooms. When considering learning differences, student success is often shaped by how well educational tools are used to adapt to variability. Educators can elevate access, engagement, and learner achievement by embedding AI systems into professional practice and planning.

PIVOT+C Step: Take the AI 101 for Teachers course from Code.org and read about the challenges and opportunities related to AI and professional learning in a paper from the Research Partnership for Professional Learning (Annenberg Institute at Brown University).

PROMOTE AI INTEGRATION in IEPs and Personalized Learning Plans

As part of this shift, it is essential to advocate for integrating AI into IEPs and other personalized education frameworks. Taking this action aligns with technology and student-centered design, reinforcing the connection to individualized learning. Given the ethical and legal considerations of the IEP process and implementation, district and school leaders can support communities of practice that break down silos between general and special education. In these collaborative spaces, teachers can explore resources, share strategies, and innovate together, strengthening the connection between technology and student-centered instruction.

PIVOT+C Step: Read how researchers are using artificial intelligence for IEP development from the Center for Innovation, Design, and Digital Learning (CIDDL).

PERSONALIZE LEARNING Using AI

AI systems enable educators to customize instructional content, pacing, and assistance based on real-time student engagement. Begin by piloting an AI-powered platform that adjusts instruction based on formative data, such as reading level, engagement, or preferred modality. Tools like adaptive learning apps or intelligent tutoring systems can offer differentiated pathways aligned with students' strengths and challenges. Review outputs regularly to check for bias or mismatches in recommendations. Through thoughtful implementation, AI becomes a bridge between instructional design and learner variability. It can enhance access, deepen engagement, and promote growth for all learners.

PIVOT+C Step: Watch a video from Stanford Accelerator for Learning about the latest AI tools and personalized learning: AI-Generated Content and Autonomous Teaching Agents: Personalization at Last?

PRIORITIES FOR POLICYMAKERS

As artificial intelligence reshapes education and the workforce, policymakers have an opportunity to lead with frameworks for AI that expand opportunity for all. By focusing on governance, cross-sector alignment, and purposeful investment, policy can turn AI into a force for societal good. Early efforts offer a foundation for empowering every learner and worker to thrive.

ESTABLISH COMPREHENSIVE POLICIES for AI Governance

Creating thoughtful, forward-looking governance structures is not about slowing innovation; it is about shaping it with care and purpose. Much like the healthcare field, which has long relied on robust standards to protect the public while advancing cutting-edge tools, AI usage and applications deserve clear, ethical, and evidenced-based policy. Comprehensive governance ensures that AI systems are fair, transparent, and designed to serve everyone. When policymakers lead the way in setting these safeguards, they promote environments where society can confidently embrace AI's promise.

PIVOT+C Step: Join the EDSAFE AI Alliance AI Policy Network and review the 2025 Artificial Intelligence and Democratic Values report from the Center for AI and Digital Policy (CAIDP) featuring AI policies and practices worldwide.

ENCOURAGE COLLABORATION among education, workforce, and AI sectors

Real progress happens when siloes are dismantled. Policymakers can spark powerful transformation by fostering collaboration between community members. Consider bringing groups together during initial strategic AI policy meetings or asking group members to provide input or testimony during committee meetings. Cross-sector collaboration makes it more likely that AI is developed with innovation in mind and centered on real-world contexts at heart. In a system where interests are aligned, schools prepare students with the skills employers need and the AI integrated into learning environments is designed with input from multiple communities.

PIVOT+C Step: Download the policy documents from TeachAI, a cross-sector collaborative of companies and organizations and review the Recommendation on the Ethics of Artificial Intelligence from UNESCO, which is applicable to all member states of the organization.

PROMOTE INVESTMENT in AI-driven Innovation

Policymakers have a pivotal role to play in advancing inclusive innovation by outlining clear parameters for investment in entrepreneurship and AI tools that open workforce pathways for individuals with learning differences. Establishing targeted innovation grants and dedicated public-private funding streams could support both early-stage development and scaling of inclusive technologies. These efforts should prioritize tools co-designed with end users to maximize relevance and impact. By backing initiatives and investments that reflect a broader definition of talent and potential, policy leaders send a powerful message that building the future is a collective effort.

PIVOT+C Step: Read Chapter 6 (beginning on page 325) of the Artificial Intelligence Index Report published by the Stanford Institute for Human-Centered Artificial Intelligence (HAI) and review Principle 2.1 of the Organisation of Economic Co-operation and Development (OECD) AI Principles, "Investing in AI Research and Development."

Conclusion

This white paper explores how AI can impact learners with diverse needs and experiences. The real potential of AI emerges only when tools are designed alongside the people they aim to support. This approach honors the principle of "nothing about us without us," elevating the perspectives of students, educators, families, and communities who live these experiences daily.

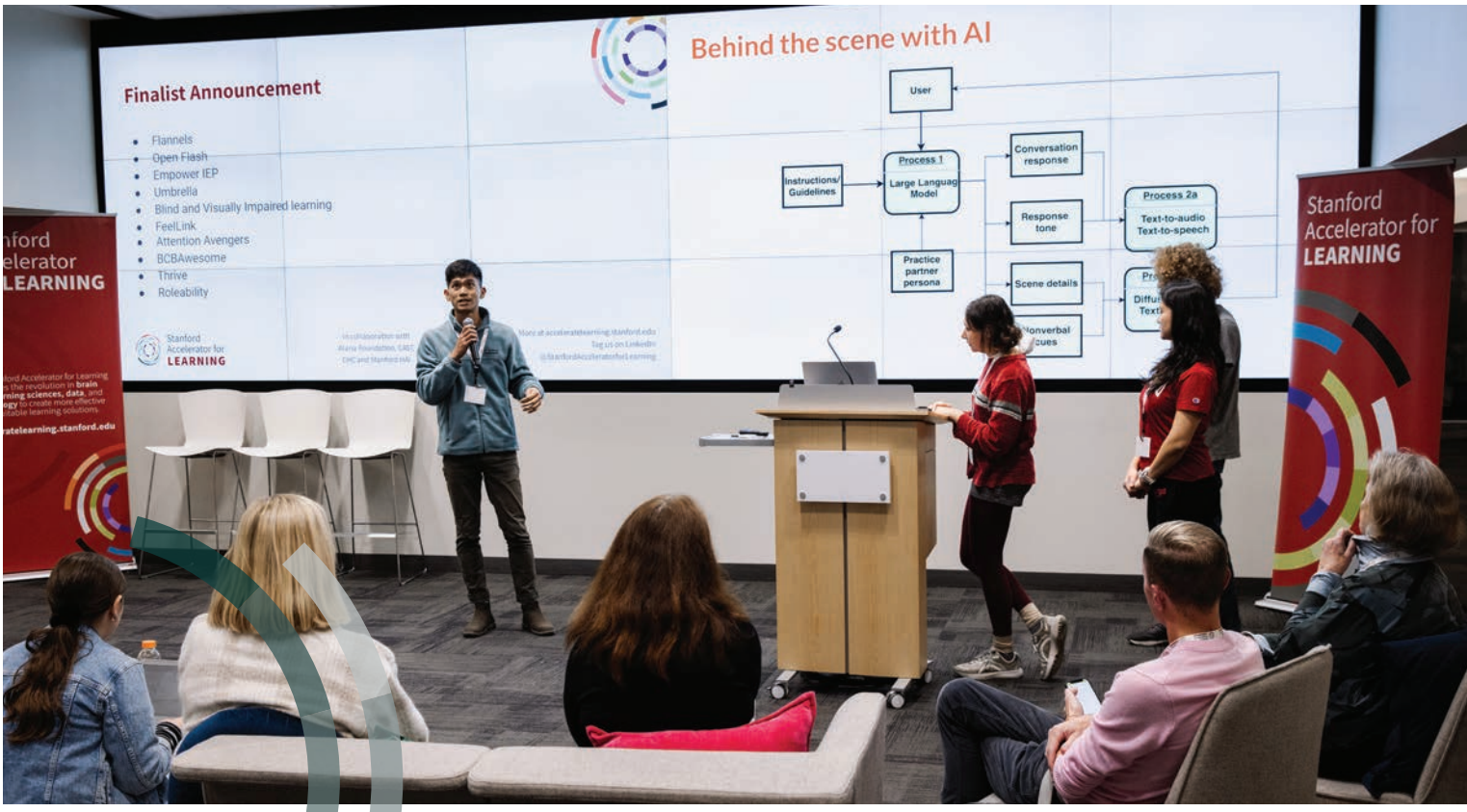
The nine sections presented reflect the depth of insights shared during the AI + Learning Differences Working Symposium. From co-design to workforce integration, each chapter addresses essential opportunities for innovation. Contributors emphasized the importance of engaging individuals with learning differences from the start, creating flexible and personalized learning environments, and aligning IEPs and interventions with ethical, inclusive AI practices.

Social-emotional well-being was explored as foundational to learning. Assistive technology and AI-powered tools were viewed as pathways to greater agency and accessibility. There were calls for personalized professional learning to better integrate AI into instruction. The need to prepare all learners for a rapidly changing workforce remained a central theme. The potential impact of AI on interdependence and life satisfaction rounded out the discussions, drawing a connection between individual experiences and long-term well-being..

The recommendations outlined in this paper offer actionable steps across sectors. Developers are encouraged to lead with inclusive design, ethical data practices, and compensation for lived experiences. Researchers are called to prioritize longitudinal studies, blend qualitative and quantitative data, and partner closely with schools. Education leaders are urged to initiate sustained professional learning and foster collaborative communities of practice. Policymakers are in a position to establish funding streams and frameworks that promote inclusive innovation and align with long-term goals for access and opportunity.

The AI + Learning Differences Hackathon demonstrated what's possible when collaboration drives design. Meaningful innovation became achievable as participants with and without technical backgrounds came together around a shared purpose. Projects emerging from the event affirmed that tools initially designed for specific purposes can have broader applications, ultimately benefiting all users. Organizers planning similar hackathons will find comprehensive guidelines and strategies within the accompanying toolkit.

This moment represents a critical pivot for education, technology, and community collaboration. The rise of AI brings with it both immense possibility and profound responsibility. Moving forward depends entirely on the intentional decisions made today. With commitment and courage, technologies can be shaped to affirm every learner's worth, amplify their voices, and create a future where difference genuinely drives innovation.



Addendum

Hackathon Toolkit

1. INTRODUCTION

Following the **AI+Learning Differences Symposium**, the Stanford Accelerator for Learning hosted a hackathon on the same theme of AI+Learning Differences on December 7.

The Hackathon Toolkit is structured to help others design impactful hackathons focused on accessibility and learning differences. By sharing our insights and experiences, we hope you can replicate—and even exceed—our success when planning your own event.

Event Snapshot: AI + Learning Differences Hackathon

- **Date & Participants**

  Held in December 2024, the hackathon brought together over 100 participants—including students, educators, developers, industry partners, and individuals with lived experiences of learning differences.

- **Mentors & Judges**

  More than 25 mentors and judges offered guidance. These experts included AI professionals, educators, and people with firsthand knowledge of learning challenges.

- **Focus Areas**

  Teams developed AI-driven prototypes to address a variety of learning challenges, such as dyslexia-friendly reading tools, real-time ADHD support, and accessible math tutoring platforms.

What is a hackathon?

Hackathons are fast-paced, participant-driven events designed to achieve specific goals. Participants with diverse backgrounds collaborate to develop projects that align with their interests. In the AI + Learning Differences Hackathon, teams focus on creating solutions that enhance accessibility and personalized learning, producing shareable prototypes by the event's end.

Definitions

Learning differences refer to the broad range of abilities, neurodiversities, and ways in which individuals experience variability. We recognize that differences may be identified as disabilities in specific settings, legal contexts, or because of individual preferences.Learning differences is an expansive term that recognizes variability in how people learn and experience the world around them. Consequently, we focus on opportunities that expand learning horizons for all learners, from birth to adulthood.

Inclusive education is a philosophy and practice of teaching that ensures all learners—regardless of their abilities, backgrounds, identities, or circumstances—have equitable access to quality education in the same learning environment. It values diversity and the unique contributions each student brings, and seeks to remove barriers to learning by adapting teaching methods, materials, and school cultures to meet individual needs.

2. TIMELINE

This section covers the essential elements for setting up your hackathon, from clarifying objectives to outlining responsibilities and planning logistics. We recommend beginning the planning process at least 4–6 months before your event date.

2.1 OBJECTIVES

Set Clear Objectives

1. **Define the Focus and Intended Audience**
   - **Pinpoint Specific Aspects:** Identify the primary learning differences or educational challenges you want to address (e.g., AI-driven personalized tutoring, assistive reading technology, inclusive classroom tools).
   - **Consider the Intended Audience:** Identify best ways to include targeted sub-population.
   - A**lign with Broader Goals:** Connect your hackathon's theme to larger institutional or research goals. For instance, our event aligned with broader accessibility initiatives.
2. **Identify Key Outcomes**
   - **Clarify Your Aim:** Decide if you're seeking research insights, working prototypes, advocacy, or early-stage startup development.
   - **Unify the Vision:** A common understanding of expected outcomes helps keep teams and organizers on track.
3. **Incorporate Tracks & Prizes**
   - **Define Tracks:** Create project tracks that support your theme (e.g., K–12 Education, Mental Health, Assistive Technologies). Consider flexibility for innovative ideas.
   - **Offer Targeted Prizes:** Consider prizes such as cash awards, mentorship programs, or accelerator/ incubator opportunities to drive engagement.
4. **Select the Format**
   - **Event Duration:** Decide on a single-day sprint vs. a multi-day format. We found that a weekend sprint following a symposium worked well for rapid innovation.
   - **Purpose of the Event:** Shape your hackathon based on whether it's part of a class project, a community innovation initiative, or a larger research effort.

2.2 ROLES & RESPONSIBILITIES

Mentors

- **Technical Mentors**

  Provide practical guidance on AI, AR/VR, data handling, and best practices. Offer real-time code reviews or architecture critiques.

- **Researchers and Other Mentors**

  Consider also inviting researchers with domain expertise as mentors or as guiding experts, as well as product managers or project leaders who can help with the initial ideation phase, scoping and pitching.

- **Mentors with Lived Experiences**

  Individuals who have firsthand experience with learning differences (e.g., dyslexia, ADHD). Their insights ensure solutions remain user-focused.

- **Mentor-to-Team Ratio**

  Aim for a 1:4 mentor-to-team ratio. This ensures every team receives sufficient feedback without overburdening mentors.

Judges

- **Composition & Expertise**

  Include AI experts, educators, and individuals with direct knowledge and experience with learning differences to design with, instead of designing for learners with learning differences. A diverse panel offers balanced feedback on both technical feasibility and user experience. Consider involving youth judges, who may be users of the technologies.

- **Evaluation Criteria (See example here)**
  - **Relevance:** Does the solution address a genuine need in the realm of learning differences?
  - **Innovation:** Is there a creative or novel application of AI or design principles?
  - **Feasibility:** Could this be scaled or piloted post-hackathon?
  - **Impact:** Is there a clear benefit to learners, and does it promote inclusivity?

Participants

1. **Target Audience**
   - Encourage a mix of students, educators, developers, designers, and advocates who care about learning differences and inclusive education.
   - Prioritize cross-functional teams that blend technical and non-technical expertise—including people with lived experiences.
2. **Outreach Strategy**
   - **Partner with Relevant Groups:** Collaborate with student clubs focused on disability, AI, and tech for social good, advocacy organizations, and nonprofits focusing on accessibility.
   - **Leverage Networks:** Promote via newsletters, LinkedIn, campus bulletins, and professional communities.
   - **Facilitate Team Formation:** Host pre-event hybrid or in-person networking sessions so participants can find teammates with diverse skills. Leverage Discord or other platforms to facilitate connections among participants.

2.3 LOGISTICS

Assemble Your Core Team

- **Planning Committee:** Assign leaders for scheduling, communications, mentor coordination, food, and marketing.
- **Volunteers:** Recruit volunteers early for event-day operations and participant support. This includes check-ins, help desk support, and managing workshop or speaker schedules.

Venue & Platform

- If hosting **in-person**, secure an accessible venue with reliable Wi-Fi, collaborative spaces, and necessary equipment.
- If hosting **virtually**, choose a robust platform (e.g., Zoom, Microsoft Teams) that supports breakout rooms, screen sharing, and inclusive features like captioning.

Sponsors & Partners

Seek partnerships with organizations and donors whose missions align closely with inclusive education and learning differences. In our experience, university departments and external nonprofits have been essential funding sources. (See an **example letter** in the appendix)

For recurring events, develop a clear and structured **sponsorship packet** detailing:

- **Quantitative Impact:** Provide specifics such as past participant numbers, demographics, number of projects developed, and notable successes.
- **Defined Sponsorship Levels:** Clearly outline contribution levels associated with tangible benefits, such as T-shirt branding, keynote speaking opportunities, or exclusive access to participant resumes.

Actively engage with sponsors post-event to identify what information (participant data, career outcomes, engagement levels) they find most valuable, ensuring sustained and informed support year-over-year.

Budget & Resource Allocation (See illustrative example here)

- Estimate costs for **catering, swag, marketing, prizes**, and **software licenses**.
- Designate a budget lead to track expenses and handle sponsor relations.

Marketing & Promotion

- **Targeted Outreach:** Use social media, mailing lists, and campus clubs to reach the right audience.
- **Showcase Past Success:** Reference examples from previous hackathons—like our **AI + Learning Differences** event—to inspire would-be participants.

2.4 SAMPLE TIMELINE

Below is a rough guide for the final 2–3 months. Adjust as needed:

- **4-6 Months Before**
  - Invite keynote speakers for panel sessions.
  - Invite judges.
  - Finalize venue or virtual platform.
  - Secure sponsors, partners, and budget approvals.
  - Confirm planning committee roles.
  - Launch marketing campaign.
- **4–6 Weeks Before**
  - Finalize mentor and judge lineup.
  - Continue outreach and participant registration.
  - Confirm keynote speakers and panel sessions.
- **2 Weeks Before**
  - Send detailed agenda including schedules and collaboration tool links (e.g., Slack, Discord) to participants and mentors. (See example agenda here)
  - Ensure all logistics (transportation, parking, accessibility guides) are clearly communicated.
  - Organize any final promotional pushes or raffles to boost engagement.
  - Coordinate an pre-event meeting for mentors and judges, or set expectations through a document in advance (e.g. “How to Mentor”).
- **1 Week Before**
  - Do a dry-run of the event, including outline of key individual responsibilities.
  - Finalize volunteer logistics and instructions. Send volunteers final confirmation of their schedule and a brief overview of their role/expectations.
- **Pre-Event Mentor & Judge Training**
  - Organize a dedicated pre-event orientation session or workshop for mentors and judges, clarifying expectations, responsibilities, and providing guidance on effective mentorship and judging criteria.
  - Provide an accessible “How to Mentor” document outlining best practices, strategies for effective engagement, and clear role definitions, supporting first-time mentors and judges to confidently contribute and grow professionally.

3. HACKATHON PHASES

3.1 OPENING CEREMONY & TEAM FORMATION

1. **Welcome Remarks**
   - Introduce the theme, e.g., **AI + Learning Differences**.

- **Emphasize real-world impact:** "Your prototype could potentially help these groups of learners struggling with traditional methods."

2. **Keynote Speaker Engagement**
   - **Showcasing Technology:** Invite technical speakers to demonstrate innovations, tools, or research related to the theme.
   - **Lived Experiences:** Feature individuals who have firsthand experience with the challenges being addressed, sharing their stories to inspire and ground projects in real-world needs.
   - **Interactive Q&A:** Encourage an open dialogue where participants can ask questions and gain insights to inform their projects.
3. **Team Formation and Idea Pitching**
   - Host a pitching session where participants briefly present their ideas.
   - Encourage those with lived experiences or unique perspectives to speak up.
   - Support team formation with diverse skill sets to tackle challenges from multiple angles.
4. **Registration & Accountability**
   - Ask participants to **register with their location or group** so mentors can easily find them.
   - This helps keep track of participants, especially if you're running a hybrid or virtual event.

3.2 HACKING PHASE

1. **Mentor Engagement**
   - Encourage mentors to circulate among teams, providing **real-time feedback** on everything from AI model selection to accessibility design.
   - For clarity, share a **public list of projects** and team locations (or virtual breakout room links) so mentors can locate the teams that need their expertise most.
2. **User-First Approach**
   - Remind teams to test their solutions early with mentors who have lived experiences or with potential user groups.
   - Key questions for teams:

     "Who is your user?"

     "What is your biggest technical barrier?"

     "How will you ensure your solution remains accessible?"
3. **Ongoing Support**
   - Include active and passive forms of breaks to promote healthier participation. Active could include designated times to host therapy dogs, paper airplane contests, etc. Passive may include a table with coloring books, puzzles, crafts, that is open during the entire hackathon.
   - Provide communication channels (e.g., Slack, Discord) for teams to ask quick questions or request mentors at any point.
   - Offer mini-workshops on AI ethics, data management, or user-centric design as needed. Consider recording them (with presenter permission) to share with participants as a form of accessibility, provide slides or other documents.

3.3 CLOSING CEREMONY & JUDGING

1. **Final Presentations**
   - Teams present concise demos highlighting their problem statement, approach, AI model, and accessibility features.
   - Consider starting with a science expo-style fair, allowing participants and judges to circulate. Then progress to a final round of deeper evaluation.
2. **Awards & Next Steps**
   - Present prizes based on the hackathon tracks (e.g., K–12 Education, Mental Health, Assistive Technologies).
   - Share follow-up opportunities such as pilot programs, research collaborations, or startup support.
3. **Celebration & Community Building**
   - Conclude with an informal gathering (in-person social or virtual breakout).
   - Encourage participants and mentors to stay connected via Slack, Discord, or LinkedIn to keep projects moving forward.

4. POST-HACKATHON

4.1 MEASURING SUCCESS & IMPACT

1. **Participant Satisfaction & Diversity**
   - Collect demographic data (while respecting privacy) to gauge inclusivity.

- Distribute **feedback surveys** to measure participant engagement, satisfaction, and suggestions for future improvements.
- Consider a workshop form, incentivized with raffles. Ask for feedback from judges, mentors, and volunteers to collect ways to improve for future events.

2. **Project Outcomes**
   - Track how many prototypes progress to further testing or development, and proceed with a startup venture.
   - Note any new partnerships that emerge (e.g., a developer teaming with a nonprofit to pilot an assistive technology).
3. **Community Building**
   - Observe whether interest in **AI for accessibility** grows afterward. Do participants publish or present their work at conferences and meetups?
   - Encourage teams to share updates on social media or internal newsletters to inspire continued collaboration.
4. **Long-Term Impact**
   - Check in periodically (*e.g.,* 2–3 months post-event) to see if winning teams or other promising ideas have advanced.
   - Consider incentivizing with recording a demo or other form of pitch to highlight past projects in advance of upcoming events.

4.2 FOLLOW-UP & SUSTAINING MOMENTUM

1. **Event Documentation**
   - **Photo Sharing:** Share event photos only with consent. Collect consent during registration, and indicate it with either colored lanyards or wrist bands.
   - **Certificates & Proof of Attendance:** If possible, issue digital certificates, indicating each participant's role and the event date.
2. **Team Support**
   - Offer **ongoing mentorship** to winning teams or anyone seeking further assistance.
   - Consider inviting participants to become organized if they enjoyed the event and wish to contribute in other ways.
   - Connect participants with **incubators or accelerators** if they aim to continue prototype development.

5. PRACTICAL TIPS

1. **Center Real Voices**
   - Ensure mentors, judges, and speakers include people with direct experience of learning differences.
   - These voices keep solutions authentic and grounded.
2. **Foster Inclusivity**
   - Offer multiple communication formats (text, video, live captions).
   - Use **plain language** so participants from various backgrounds can engage fully.
3. **Balance AI & Human-Centered Design**
   - Stress that technology is a **means, not the end**. Start with user needs and then find the right AI tools to address them.
4. **Leverage Partnerships**
   - Collaborate with **educational institutions, nonprofits, and industry** to secure resources and potential pilot sites for successful projects.
5. **Celebrate Progress**
   - Recognize partial or "in-progress" solutions to encourage iterative development.
   - Share each team's journey to spark ongoing curiosity and collaboration.

CONCLUSION

Hackathons have the potential to **ignite creativity, foster collaboration**, and **accelerate** the development of AI solutions that genuinely support diverse learners. By focusing on inclusivity, empathy, and meaningful real-world outcomes, you can build an event that resonates long after its closing ceremony.

In the December 2024 **AI + Learning Differences Hackathon** organized by the Stanford Accelerator for Learning, we saw firsthand how a well-structured, human-centered approach drives lasting impact. Whether your goal is to produce tangible prototypes, advance research, or raise awareness, we hope this toolkit helps you craft a memorable and transformative hackathon experience.

Appendix A – Resources for Hackathons on Learning Differences

When organizing a hackathon on a specialized theme—like AI + Learning Differences—participants may join with limited knowledge or preconceived assumptions. Providing background materials up front helps everyone build a more accurate, empathetic understanding of the topic. By watching informative videos or reading official guidelines, teams can root their solutions in real needs.

Why Share These Resources?

- **Prevent Misconceptions:** People often rely on personal experience or media portrayals, which may not reflect the full range of user realities.
- **Foster Empathy:** Firsthand stories and accessible explanations help participants see challenges from the perspectives of individuals with learning differences.
- **Promote Inclusive Design:** With a strong grasp of frameworks like Universal Design for Learning (UDL), teams can craft more user-centered prototypes.

Learning Differences & Disabilities

1. **What Are Disabilities?**

   https://bit.ly/3Nhl6b2

   A quick overview challenging common assumptions about who is affected and how.

2. **Rights Under the UN Convention on the Rights of Persons with Disability (UNCRPD)**

   https://bit.ly/3YabUvp

   Covers global legal protections to ensure inclusive, equitable opportunities.

3. **DISABILITY | How You See Me**

   https://bit.ly/4dxNArN

   Explores the impact of language and societal bias on the disability experience.

4. **Inclusion Makes the World More Vibrant**

   https://bit.ly/3Y8VVOo

   Discusses how accessible design benefits everyone.

5. **See What Children with Disabilities Can Do**

   https://bit.ly/3YluCk9

   Spotlights the capabilities of children when given supportive, inclusive environments.

Universal Design for Learning (UDL)

1. **UDL Guidelines**

   https://udlguidelines.cast.org/

   These principles aid in creating flexible, barrier-free learning experiences that can be referenced in solution design.

Appendix B – Checklist for Hackathons on Learning Differences

1. **Purpose & Scope**
- Have I clearly identified why this hackathon is focusing on learning differences?
- Do the objectives reflect real-world needs and opportunities for inclusive design?

2. **Participants & Team Formation**
- How am I recruiting participants from varied backgrounds (technical, non-technical, and those with lived experiences)?
- Are there channels (e.g., pre-event mixers, Slack/Discord groups) to help teams form around complementary skill sets?

3. **Mentors & Judges**
- Have I included mentors and judges with firsthand experience of learning differences or accessibility challenges?
- Is there a clear structure (e.g., mentor-to-team ratio) so that every participant can access meaningful guidance?

4. **Educational Resources**
- Do participants have easy access to materials—videos, articles, frameworks—that explain the nuances of learning differences?
- Have I shared best practices, like Universal Design for Learning (UDL), to guide inclusive project development?

5. **Logistics & Accessibility**
- Is the venue (physical or virtual) fully accessible (e.g., ramps, closed captions, text-based chat, high-contrast slides)?
- Are there quiet spaces or flexible schedules for participants who may need them?

6. **Event Flow & Structure**
- Am I dedicating time for users or mentors with lived experiences to share insights, ensuring projects stay user-focused?
- Have I scheduled checkpoints (mini demos, mentor feedback) to steer teams toward accessibility considerations early?

7. **Ethics & Data**
- If data is being used, is it collected and handled responsibly (privacy, consent, relevance to learning differences)?
- How am I instructing participants to respect confidentiality and ensure that user data won't be misused?

8. **Inclusivity & Communication**
- What steps am I taking to use plain language, visual aids, or alternative communication methods during the event?
- Have I provided diverse modes (written, verbal, visual) for pitching ideas and presenting final solutions?

9. **Judging & Awards**
- Are judging criteria weighted to reward inclusive design and measurable impact for learners with differences?
- Is there a plan to follow up with winning or promising teams to see how their prototypes evolve?

10. **Post-Hackathon & Sustainability**
- How will I measure success (e.g., participant feedback, number of prototypes advanced)?
- Do I have channels (social media groups, newsletters) to keep the community connected and projects moving forward?

References & Further Reading

Hackathon Planning Kit
A broad guide covering 12 essential design decisions for impactful hackathons.

MLH Hackathon Organizer Guide
A student-focused playbook on scaling hackathons, offering tips on sponsorship and community-building.

Other relevant research:

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