

Designing Assistive Technology That Works in Schools: Lessons from the Field

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Abstract

This white paper synthesizes findings from a CAST-led study examining feedback from 24 district leaders and assistive technology (AT) users on how AT tools are selected, implemented, and integrated into instructional environments and assessments. The findings highlight the significant role AT plays in supporting learners and offer practical guidance for technology developers and education leaders seeking to engage with educational technologies and design assessments that are more responsive to the realities of school systems and learner needs. Specifically, the findings underscore the importance of moving beyond isolated feature development toward more integrated approaches that consider usability, professional learning, system alignment, and participatory design.

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Introduction

As the creators of the Universal Design for Learning (UDL) framework and leaders in its implementation, CAST has a long history of working at the intersection of accessibility, assessment, and educational technology design. CAST collaborated with multiple K-12 education partners to embed Universal Design for Learning (UDL) principles and accessibility features into innovative assessments, assessment platforms, and curriculum portfolios. Through a community of practice and targeted supports—including needs assessments, coaching, and guidance on inclusive design—CAST worked with teams of designers and developers to internalize best practices in the UDL framework and in accessibility standards aligned to Web Content Accessibility Guidelines (WCAG). Across this project, CAST explored how emerging technologies, including Generative AI, can be leveraged responsibly to expand access, reduce bias, and improve the usefulness of assessments for every learner.

This project is part of CAST’s larger goal to help education systems select quality, inclusive educational materials and assessments. Partners have the opportunity to apply for CAST’s [UDL Product Certification](#) to showcase their commitment to accessibility and proactively removing barriers to learning.

The primary outcomes of this work included:

Alignment to Products and Pathways to Certification

CAST supports partners to integrate UDL and accessibility criteria directly into their products, including assessments, to ensure development goals align with district procurement expectations and federal mandates, such as the [Americans with Disabilities Act Title II guidance](#) for accessible digital materials. Through structured needs assessments, CAST works to develop customized pathways supporting internal capacity building across an organization from product development through marketing and sales.

Capacity Building via Collaboration

CAST hosts the Leadership Network Cohort to strengthen the capacity of the partners providing the ability to share areas of growth and problems of practice aligned with the UDL Framework and established accessibility guidelines. As part of the community of practice, partners explore how topics such as Generative AI and digital features can be leveraged to make assessments more efficient, engaging, and instructionally useful, while keeping UDL at the center of every design decision. CAST's role is to help partners think critically about how AI-driven features—such as personalization, item generation, or feedback—can expand access and reduce bias rather than introduce new barriers.

Scalable Design Roadmap

The CAST team develops a roadmap for each organization to support scalable, sustainable, design practices that can inform future development.

Goals of this White Paper

In order to amplify the perspectives of educators and assistive technology users across this project, CAST conducted a series of data collection opportunities with district leaders and individuals who use AT to explore their experiences and reflections about procurement, technology design, accessibility, and UDL. The team leveraged UDL to design an accessible and inclusive data collection process that offered flexible options for participants to share insights on designing more inclusive and usable educational technologies. Specifically, we examined the question:



How can assistive and educational technologies be designed and implemented in ways that align with the realities of school systems while more effectively supporting learner variability and access?

The conversations with district leaders and AT users revealed that challenges in accessibility are not limited to the presence or absence of features, but are shaped by broader systems, including procurement processes, professional learning, communication across community members, and the inclusion—or absence—of user voices in decision-making. Specifically, this white paper illuminates the following themes:

1. perspectives on inclusive design and its impact on learners,
2. reducing barriers in educational technologies, and
3. advice for edtech companies.

For each theme, we synthesize participants' insights and share representative quotes to center participants' voices. We then explicitly connect these findings to assessment design and offer recommendations for future research.

This white paper offers a set of field-informed insights for AT users, education leaders, and researchers. The findings highlight the importance of moving beyond isolated feature development toward more integrated approaches that consider usability, training, system alignment, and participatory design. In doing so, this paper contributes to a growing understanding that inclusive technology design must be grounded in the lived experiences of those it is intended to support.

UDL and Educational Technologies and Assessments: The Current Landscape

The rapid expansion of educational technologies has transformed digital tools into a central component of teaching, learning, and assessment in K–12 education. This shift has created new opportunities for flexible, multimodal learning, while also exposing persistent inequities in terms of access, usability, and design. Within this context, Universal Design for Learning (UDL) has emerged as an approach for addressing learner variability by guiding the design of more inclusive and flexible educational technologies and assessments (Meyer & Rose, 2005; Meyer et al., 2025). Drawing from

research in neuroscience, the learning sciences, cognitive psychology, disability studies, inclusive education, and asset-based pedagogies, the UDL framework is grounded in three principles: design multiple means of engagement, design multiple means of representation, and design multiple means of action and expression (Meyer & Rose, 2005; Meyer et al., 2025). CAST developed the [UDL Guidelines](#) to support educators, researchers, educational technology developers, assessment developers, and other members of the education community to apply these three principles to practice (CAST, 2024).

Digital technologies are uniquely positioned to operationalize UDL in ways that reduce barriers and increase access to meaningful and challenging learning opportunities. EdTech platforms and assessment systems are increasingly incorporating UDL features such as multimodal content, customizable interfaces, and flexible ways for students to demonstrate learning. Advances in artificial intelligence are further expanding these possibilities through real-time supports such as text-to-speech, captioning, and adaptive learning pathways. At the same time, policy and regulatory developments are reinforcing the importance of accessibility, with growing expectations that digital content and tools meet established standards and are designed to be usable by all learners from the outset.

Despite these advances, significant challenges remain. Many existing tools are not originally designed with UDL or accessibility in mind and require ongoing retrofitting. Further, many districts are just beginning to develop systems to support procurement and are not yet considering UDL or accessibility in implementation of these tools. Moving forward, the education community faces a critical opportunity to shift from fragmented approaches toward more intentional design grounded in UDL, ensuring that educational technologies and assessments are accessible, inclusive, and responsive to every learner.

Methods

Participants

A purposive sampling strategy was used to connect with two different groups of participants:

1) adults and young adults (over 18 years old) who use a range of assistive technologies for communication, navigation, access, expression (screen readers, AAC, alternative input devices, etc.) in educational or workplace settings, and 2) school administrators and school leaders who purchase AT (from AT for individual students to AT across the district) and educational technologies, manage accessibility, or design digital assessments.

A total of 24 participants were recruited for this study: 8 participants were AT users and 16 participants were district leaders. Participants represented a wide range of ages, from 18 to over 65 years old. Participants reported a wide range of self-identified identities. Responses included individuals identifying as female, male, cis-gendered, heterosexual, Hispanic, Black, White, Caucasian, Native American, autistic, neurodivergent, blind, visually impaired, and individuals with cerebral palsy, ADHD, and other disabilities. Several participants described multiple and intersecting identities, including disability status alongside gender, race, or age. These descriptions were self-reported and voluntary.

Geographically, participants were located across at least fifteen U.S. states, including Arizona, California, Massachusetts, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Texas, Utah, and Washington. Utah represented the largest single state group (20.8 percent, n=5), with remaining participants distributed across other states.

Finally, participants represented a broad range of professional contexts and roles. Educational settings included early childhood, elementary, middle school, high school, adult education, and college or university contexts. Leadership roles included district leadership (37.5 percent, n=9) and state leadership (4.2 percent, n=1). Participants identified roles in workforce development, after-school and community-based programs, advocacy organizations, business or nonprofit organizations, self-employment, and student roles.

Data Collection

In order to reduce barriers and increase access to participation in the study, our research team offered participants three different options for sharing their experiences:

1. participating in a virtual focus group
2. participating in a virtual interview, or
3. documenting their responses asynchronously via a “Home Base” document.

The goals of each option were the same:

1. to explore all participants’ perspectives on accessibility, barriers, and UDL in educational technology,
2. to explore AT users’ experiences and perspectives using AT and the success and barriers they encounter, and
3. to explore administrators’ and school leaders’ perspectives and experiences on purchasing AT, managing accessibility, and designing digital assessments.

Each option was designed through a UDL lens, embedding options for engagement, representation, and action and expression.

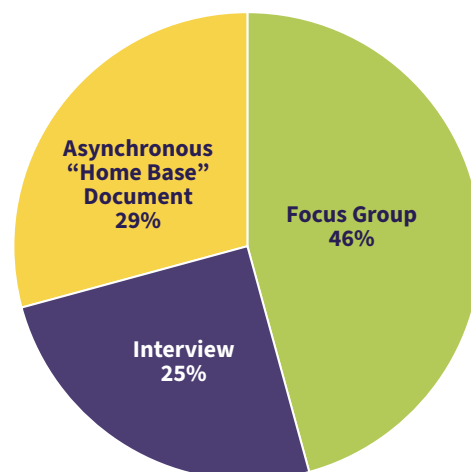
Virtual Focus Groups: The focus group option was designed to offer a shared experience where participants could not only contribute their own ideas but also learn from the ideas of other participants. Focus groups consisted of 3-5 participants and lasted approximately 90 minutes. Focus groups were video-recorded and documented via fieldnotes. During the focus groups, a “home base” document was available for participants to record (via text, images, video, etc.) any ideas that they want to share. 46% of participants (n=11) selected this option.

Virtual Interviews: The interview option was designed to offer a more individualized, flexible opportunity for participants—particularly those preferring one-on-one discussion—to share their experiences and reflections. Interviews were designed to last approximately 30-60 minutes. The interviews were video-recorded and documented via fieldnotes. Similar to the focus group option, a “home base” document was available for participants to record ideas. 25% of participants (n=6) selected this option.

Asynchronous “Home Base” document: The “Home Base” option was designed to offer an asynchronous opportunity to respond to the same questions posed in the focus groups and interviews via a range of modalities. Participants could choose to write/type or add audio/video to an accessible “Home base” document. Participants were encouraged to use the mode of communication that worked best for them. 29% of participants (n=11) selected this option.

Table 1. Participant Selection of Data Collection Options

Value	Percentage	Count
Focus Group	45.8%	11
Interview	25.0%	6
Asynchronous “Home Base” Document	29.2%	7
Totals	100%	24



After participants engaged in the focus group, interview, or asynchronous option, they completed a follow-up survey. The survey was created using an accessible survey design tool and was designed to take participants approximately 10 minutes to complete. The survey asked for demographic information and explored participants’ perspectives on the UDL features embedded into the design of the focus group, interview, and asynchronous “Home Base” document options.

Data Analysis

To analyze the range of complementary data collected across the study, the research team generated an initial code set based on both open coding strategy (Saldaña, 2016) of themes that emerged from the participants as well as an etic coding strategy (Maxwell, 2013) based on key themes in the literature. Examples of open codes included “building trust” and “autonomy and agency.” Examples of etic codes included “barriers in professional learning” and “accessibility barriers.”

To establish the trustworthiness of our data, we engaged in “member checking” to test our emerging themes with study participants (Lincoln & Guba, 1985). We shared themes along with example illustrative quotes and asked participants for their feedback to ensure these themes accurately reflected their lived experiences and perspectives. These emerging themes were shared via an accessible document to ensure that participants could access the text, and participants could share their feedback via multiple modes through email.

Findings

1. Perspectives on Inclusive Design and its Impact on Learners

Across all forms of data collection, participants reflected on what inclusive design meant to them. References to definitions of inclusive design were coded 34 times across the dataset, underscoring both the consistency and importance of this concept for participants. Participants conceptualized inclusive design across four major themes: **a proactive mindset**, **beneficial for all learners**, and **the presumption of competence**. Further, many participants generously shared their **lived experiences** with exclusion and reflected on the dangers of learning environments that are not intentionally designed for inclusivity.

Inclusive design as a proactive mindset

Participants framed **inclusive design** not as a checklist of features, but as a mindset and an ongoing commitment to anticipating variability and ensuring that all learners can engage meaningfully. Participants emphasized that this approach reflects core principles aligned with UDL, particularly in its attention to multiple means of engagement, representation, and action and expression.

Representative Quotes from Participants:

“From my perspective inclusive design means intentionally creating learning environments, tools, and systems that work for all students from the start, rather than adapting them only after barriers arise. It is a proactive approach that recognizes the individual needs of students and ensures multiple ways for students to access information, participate in learning, and demonstrate understanding.”

“Inclusive design is not a task we check off a list. It is a continual mindset shift from the way things used to be and a commitment to designing learning so that every student can participate fully.”

Inclusive design as beneficial for all

Rather than viewing accessibility as a specialized accommodation for a subset of learners, participants agreed it must be understood as a shared responsibility that **benefits all students**. This shift extends beyond individual classrooms to districts and the educational technology industry, calling for systemic changes in how tools and learning environments are conceptualized and developed.

Representative Quotes from Participants:

“In my experience, inclusive design is all about removing barriers while offering options that meet the needs of all learners. This type of design maintains rigor and increases engagement because all students can find an entry point.”

“I wish people would realize that they may need to use it [Assistive Technology], that assistive technologies are benefiting everyone in lots of different ways and lots of points in their lives.”

Many participants emphasized that conceptualizing accessibility as a shared responsibility that benefits all students supports a sense of belonging in the classroom. When tools and features are available to all students, it reduces stigma and creates a collective learning environment where students don't feel singled out.

Representative Quotes from Participants:

“Students who know they have a disability or need are unlikely to ask to have their needs met when their peers don't have access to the same program or accommodations. Ideally, a program is accessible to everyone, and all students benefit. It isn't designed solely as an accessibility tool.”

“Turn it [accessible features] on for all kids, you can use it at any time, these are for everyone! Makes kids feel like they belong.”

Presuming competence

Participants also emphasized that true inclusion is not limited to surface-level access, but engages students in challenging and rigorous ways of thinking and doing. Several participants referenced the notion of “**presuming competence**,” the belief that every individual is capable of thinking, learning, and communicating (Biklen & Burke, 2006). This notion is grounded in what Anne

M. Donnellan (1984) calls “the least dangerous assumption,” which puts forth “that in the absence of conclusive data educational decisions should be based on assumptions which, if incorrect, will have the least dangerous effect on the student” (p. 142).

Several participants described experiences where this presumption of competence was not upheld. They shared stories of being offered simplified or restricted tools that limited their ability to demonstrate knowledge or engage with grade-level content. The decisions to offer these simplified tools, often made in the name of support, resulted in reduced expectations for participants and denied them access to meaningful learning. This dimension of inclusion as the presumption of competence was closely tied to ideas of dignity and respect. Participants made clear that inclusive design must support learners not only to participate, but to do so in ways that presume and reflect their full capabilities.

Representative Quotes from Participants:

“In my case, because I was presumed incompetent, the educational technology that was presented to me was remedial and lacked higher level thinking. As an autistic child with communication challenges, I was offered a limiting picture exchange communication system. Even though I had limited speech, I was literate. It wasn’t until I was 10 years old and I was introduced to text based AAC did I begin to communicate my thoughts. My inability to speak did not mean I did not understand, but still, I was not afforded grade appropriate academic learning as a special education student. This has been my greatest loss.”

One participant who identified as being born with spastic quadriplegic cerebral palsy shared,

“I had high school teachers in my honors program—I was in honors for math and science—I had high school teachers constantly assume I was in the wrong class.” She contrasted this with another teacher, sharing, “My band director was my favorite teacher I ever had in my life because she expected nothing less of me.”

Lived experiences of exclusion

Many participants shared **story-rich accounts of exclusion**—moments when inaccessible tools or environments created barriers to participation. These narratives revealed not only functional breakdowns but also their emotional consequences. Learners described feeling left out, embarrassed, or unable to fully access content, particularly in real-time classroom contexts where breakdowns are visible and immediate. The volume and depth of these stories suggest that accessibility is experienced not as an abstract principle, but as something that directly shapes learners’ dignity and sense of belonging.

Representative Quotes from Participants:

“When teachers put a PowerPoint with a lot of text up on a screen, and I can’t read it. That makes me mad and (feel) left out.

“At work a lot of our technology policies and procedures and tools are not accessible to me... I don’t go to work to feel marginalized.”

2. Reducing barriers in educational technologies

Across the data collection options, participants consistently emphasized that accessibility cannot be reduced to the presence of individual features. While many tools include accessibility options, participants described a persistent gap between what is technically available and what is actually usable in real-world contexts. This theme highlights a central tension: accessibility, as experienced by learners and educators, depends not only on design features, but on usability, implementation, training, and alignment across systems. Specifically, participants emphasized three major themes to reduce barriers and enhance accessibility: **the importance of learning from users’ perspectives and lived experiences**, the **need for more transparency regarding accessibility features**, and the **need for ongoing support for educators**.

Learning from users' perspectives and lived experiences

A significant barrier identified by participants was the absence of key individuals' voices in the design and adoption of educational technology. Participants emphasized the critical role of **centering and amplifying users' perspectives and lived experiences** in design and procurement processes. Yet, findings revealed that those closest to the day-to-day realities of learning are often excluded—particularly students who experience barriers with communication, movement, and reading, as well as multilingual learners, paraprofessionals, educators, and families. Even in systems described as collaborative, participants noted that student voice remains consistently underrepresented, especially for those who experience barriers to self-advocating.

Representative Quotes from Participants:

“Getting the thoughts and opinions of our marginalized students, but also the paras and support staff that work with our marginalized students. I think are often left out of the equation.”

“The user of the technology is often forgotten about. Especially when that user is a student. Too many steps to get the extensions to use the text-to-speech extension. Having us included and/or having the students' voices included in the procurement process is critical. Including the students makes them feel so special.”

More transparency needed regarding accessibility features

Participants also pointed to a lack of **transparency** from organizations regarding accessibility efforts. Even when companies are engaging in inclusive design practices, these efforts are not always visible or clearly communicated to users, making it difficult for educators and families to make informed decisions. Further, participants surfaced a disconnect between how accessibility is marketed and how it functions in practice. They frequently described tools labeled as “accessible” that failed to meet their needs in authentic learning environments. And, even when accessibility features are present, they are often difficult to use, inconsistently implemented, or not integrated in

ways that support real classroom use. Reports included poor screen reader compatibility, unreliable functionality, and interfaces that were overwhelming or difficult to navigate. These experiences suggest that accessibility is often approached as a compliance exercise—meeting minimum requirements—rather than as a meaningful support for learning.

Representative Quotes from Participants:

“Most frustrating are developers, who include bells and whistles in their product, only to misrepresent the amount of time a teacher would need to implement the tool for all students. Good intention, but more partnership needed.”

“One of the most significant barriers our district encounters in making digital learning fully accessible is the inconsistency of accessibility across digital tools, particularly when vendors do not design with universal access in mind. Many platforms advertise features like captions, visual supports, or compatibility with assistive technology, but in practice these features may be limited, difficult to locate, or not activated by default.”

Related, several participants expressed a desire for clearer signals of a product’s commitment to accessibility, including the potential role of certifications or standards aligned with frameworks like UDL. These reflections suggest that inclusive design is not only a matter of implementation, but also of communication and accountability.

Representative Quotes from Participants:

“A badge or some kind of clear indicator or identification that the technology or curriculum has been vetted or tested or is fully accessible.”

“Our state is compiling a list of trusted vendors for textbooks, however, there needs to be clear policy that holds vendors accountable for accessibility standards.”

Ongoing support needed

Finally, participants highlighted the role of **professional development, time, and system capacity in shaping accessibility outcomes**. Even when tools include robust accessibility features, educators may not feel prepared to use them effectively. District leaders noted that accessibility needs are expanding more rapidly than systems can support, particularly in the absence of dedicated staffing or sustained training. One-time professional development was described as insufficient; instead, participants emphasized the need for ongoing, embedded support that aligns with instructional practice.

Representative Quotes from Participants:

“Our PD person or our tech person comes in and says, ‘Here’s this new thing and here’s why it’s cool’... for 10 minutes of part of a long staff meeting... and if you don’t have time to really play through it... the technology becomes more cumbersome than useful.”

“We don’t have a lot of professional development built into our calendar (for AT or for learning what AT is available within ed tech).”

3. Advice for EdTech Companies

Participants offered clear and often urgent guidance for educational technology companies, grounded in their direct experiences navigating tools, systems, and supports.



This advice reflects not only what is currently missing, but what is needed to create more accessible, responsive, and trustworthy learning environments and includes the following recommendations:

- strengthen the role of families
- develop strong lines of communication
- frame accessibility as beneficial to all
- support multiple means of representation and expression

Strengthen the role of families

A central recommendation focused on **strengthening the role of families**, particularly in understanding how to advocate for technology in educational settings. Participants noted that parents and caregivers can often request assistive or supportive technologies during IEP processes, yet many family members are not aware of this option or do not have the support needed to guide them through the process. At the same time, participants emphasized that companies need a deeper understanding of how technology is selected and procured within school systems. Without this knowledge, tools may be designed without consideration for the decision-making structures that shape access.

Representative Quotes from Participants:

“[One AT vendor] created a parent resource. I felt like that was a great step for the vendor to make. It was a simple idea for parents, how can the parents use this tool at home to help their student...”

“We are a vocational technical high school with one school in our district. We primarily select accessible technology through consultation with our IT department for technical assistance and from teachers about how the technology is actually being used in the classrooms. This leverages our IT team’s expertise in understanding the practical application of the tools that are used daily. While this method provides strong technical oversight and teacher buy-in, it misses the important perspectives from students who struggle with the technology but don’t feel empowered to speak up, as well as input from parents and families who may need to support the technology use at home.”

Develop strong lines of communication

Participants also highlighted the importance of **developing strong lines of communication between technology companies, districts, and families**. Yet, at the same time, they emphasized how these lines of communication can often break down. Even when strong tools exist, limited interaction between groups creates gaps in understanding, implementation, and trust. In many cases, participants described a lack of clear procedures or pathways for input, resulting in the continued absence of key voices—including students, parents, and educators—from decision-making processes.

Representative Quotes from Participants:

“Getting approval for technology that has not previously been approved is long and tedious, and decisions can be made without a lot of outside input.”

“I feel like it would be really important to have an ongoing relationship with the developers to communicate, just to keep that conversation going.”

Frame accessibility as beneficial for all

Another important recommendation focused on **how accessibility is framed and communicated to purchasers and decision-makers**. As described above, participants urged companies to move away from positioning accessibility features as add-ons or specialized supports. Instead, they emphasized that these features benefit all learners and strengthen instruction across learning environments.

Representative Quotes from Participants:

“It [the technology] would feel like it was built with intention, not an afterthought. When using the AT, students wouldn’t need to get a separate device; they could look and feel the same as other students.”

“Most importantly, inclusive design promotes emotional well being, self-reliance, and equitable access to content by reducing environmental barriers and ensuring that all students—not just those with documented needs—can fully engage and thrive.”

Support multiple means of representation and expression

Participants also reflected on broader instructional practices that intersect with technology design. Many noted that learning and assessment systems still rely heavily on reading and text-based interactions, which can exclude a significant portion of learners. These insights were particularly evident among participants who engaged through the “Home Base” approach to our data collection for this study, which allowed for more flexible and personalized expression and provided participants the opportunity to share images or hyperlinks that supported their ideas or comments. This suggests that both technology design and instructional practices must evolve together to support more inclusive participation.

Representative Quotes from Participants:

“I appreciated that the materials were sent in advance in an accessible format and that there were multiple ways to respond. Other research studies I have been a part of were dependent on seeing what was shared on screen over Zoom or being able to read and write in the chat, which can be challenging when using a screen reader. (When navigating the chat feature, I need my screen reader to read to me, which can make it hard to hear the person who is speaking on the Zoom call.)”

“Students for whom reading is difficult have very little voice in education and educational technologies.”

These are examples (not represented via text) shared by participants through the “Home Base” document, when asked to draw, describe, or link to items that showcase accessibility:

- [My Disability Roadmap](#), an Emmy-Award winning documentary following Samuel Habib, a 21-year-old community college student with cerebral palsy and epilepsy who travels to meet successful adults who have disabilities to create a roadmap for himself and others [video]
- [“Whatever it Takes”: SWIFT Inclusive Academic Instruction film](#), a SWIFT film that offers real-world examples of how educators implement inclusive education [video]
- [Resources curated by Optimal ACCESS](#), a disability services and support organization in Newburgh, Indiana [webpage]



In this related white paper, [Universal Design for Learning \(UDL\) as a Lever for Inclusive and Accessible Data Collection](#), CAST examines how intentionally embedding UDL into research design can increase participation, improve participant experience, and produce richer, more meaningful data for research and innovation.

Implications for Assessment Design & Future Research

While this study focused specifically on district leaders and AT users’ experiences with assistive and educational technologies, their insights connect to the project’s broader aims of embedding UDL and accessibility features to improve the usefulness of assessments for every learner. The findings challenge the assumption that assessments function as neutral measures of learning. While assessments are often positioned as objective instruments, participants’ experiences demonstrate that assessment design, format, and implementation conditions actively shape who

is able to participate and what is ultimately measured. Rather than simply capturing knowledge or skill, assessments operate as lived, real-time experiences in which accessibility either enables or constrains performance. In high-stakes contexts, these dynamics are intensified, as timing constraints, grading implications, and public performance conditions amplify the effects of inaccessible design. What are commonly treated as standard assessment practices—timed responses, text-heavy formats, and independent interaction—privilege certain ways of processing, communicating, and demonstrating knowledge while constraining others. As a result, assessments may capture speed, access, or familiarity with tools rather than the intended learning goals. These conditions directly impact learners, shaping not only their performance but also their sense of competence, inclusion, and belonging. When learners cannot fully engage or demonstrate what they know, barriers become decisive, influencing outcomes and contributing to misinterpretations of ability.

At the same time, reducing barriers in assessment requires moving beyond the assumption that accessibility can be achieved through the inclusion of discrete features. Although many assessment systems offer supports such as text-to-speech or extended time, their effectiveness depends on how they function within real conditions of use. In practice, time constraints, platform restrictions, and complex interfaces often undermine usability, increasing cognitive load and shifting attention away from the assessment task itself. Learners must navigate tools, manage settings, and troubleshoot in real time, creating additional demands that are unrelated to the constructs being measured. This highlights that accessibility in assessment must be understood as an integrated property of the system, where supports are reliable, usable, and aligned with authentic contexts. For edtech companies, this has important implications. Designing accessible assessments requires prioritizing usability, interoperability with assistive technologies, and simplicity of interaction, while reducing unnecessary constraints that distort measurement. It also requires centering learner voice in design and evaluation processes, ensuring that those most affected by assessment conditions inform how tools are built and selected. Without this alignment, assessments risk appearing accessible while continuing to exclude learners in practice, limiting both equity and validity in what they are intended to measure.



This project is connected to CAST’s contributions to the [Interweaving AI, Assessment, and Accountability in Responsive Education](#) project, an initiative led by Menlo Education Research (MenloEDU). The project convened a series of three in-person meetings designed to examine how AI and other emerging technologies are reshaping educational assessment. Explore the white paper “[Interweaving Assessment in the Age of AI](#)” for a synthesis of policy-relevant insights and recommendations from across the convenings, with a focus on the first convening’s emphasis on AI, accessibility, and designing for learner variability.

To learn more about assessment design through UDL explore these resources:

- [UDL Tips for Assessment](#) [PDF]
- [The UDL Assessment Playbook Video Series](#) [YouTube playlist]
- [Designing Assessment Series](#) [webpage]

Future Research

These findings—as well as our broader collaborations with our edtech partners throughout this project—have generated numerous areas for future study to deepen and extend our work.



As part of this larger project, we developed this [Research Agenda for Inclusive and Accessible Assessments and Educational Technologies](#). In this agenda, we identify key questions and areas of investigation to advance inclusive design in assessments and curricula. Specifically, we articulate lines of inquiry in four areas: **Building Capacity around Accessible and Inclusive Assessments and Educational Technologies**, **Strengthening Systems around Inclusive Assessments and Educational Technologies**, **Designing for Learner Variability**, and **Expanding Inclusive and Accessible Research Design**.

Conclusion

The findings from this study reinforce a central lesson that has emerged throughout CAST's work at the intersection of Universal Design for Learning, educational technology, and assessment: **accessibility cannot be achieved through retrofitted features, isolated accommodations, or compliance-driven approaches alone. Rather, accessibility must be understood as a dynamic interaction among design, implementation, context, and the lived experiences of learners and educators.** The experiences and perspectives shared by district leaders and assistive technology users demonstrate that barriers emerge not only from the absence of specific tools or supports, but also from the systems, assumptions, and decision-making processes that shape how technologies and assessments are developed, selected, and used.

Participants consistently challenged the notion that accessibility can be reduced to a technical checklist. Instead, they described accessibility as a matter of usability, dignity, belonging, and opportunity. They emphasized that educational technologies and assessments must account for the full variability of the human experience and be evaluated not only by the features they contain, but by how effectively they support meaningful participation in authentic contexts. These findings reinforce a core principle of UDL: learner variability is predictable, and educational systems should be designed proactively to support that variability from the outset rather than responding to barriers after they emerge.

For educational technology developers, assessment designers, researchers, and education leaders, this work offers both a challenge and an opportunity. As emerging technologies, including artificial intelligence, continue to reshape teaching, learning, and assessment, there is an urgent need to move beyond compliance-driven approaches and toward systems intentionally designed for learner variability, human dignity, and authentic participation. Ultimately, the participants in this study remind us that inclusive design is not simply about making existing educational technologies and assessments work better for some learners. It is about fundamentally rethinking how we design

learning and assessment systems so that learner variability is expected, valued, and supported from the beginning. This is both the promise of Universal Design for Learning and a necessary condition for creating educational technologies and assessments that are equitable, valid, and truly responsive to the strengths, needs, and aspirations of every learner.

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