



# EXPANDING EDUCATIONAL OPPORTUNITY

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Assistive Technology





# FOREWORD

Blackboard understands that the way people learn is dynamic and that the education landscape is continuously evolving. Our mission is to partner with the global education community to enable student and institutional success, leveraging innovative technologies and services. And one of the things that technology can do is to help “Expand Educational Opportunity.”

Whether it is providing anytime / anywhere access to learning, expanding the availability of courses to all students regardless of location, fostering additional faculty and student engagement, enabling personalized learning, or making online learning more accessible to students with disabilities, Blackboard is at the forefront of working with institutions to provide technology and services that focus on the learner and improve student outcomes.

As a leader in enabling technology to help learners, educators, institutions and companies thrive in a complex and changing environment, we help our clients see the possibilities to come. We have the experience and expertise to make a positive difference throughout the world.

We’re proud to sponsor this eBook. We hope these essays help you open more doors for students and expand educational opportunity for everyone, wherever they are, whatever their needs, and however they learn.



Regards,  
**Katie Blot**  
Chief Strategy Officer

## Blackboard®

At Blackboard, we’re shaping the future of education with big ideas that are transforming the landscape. Every day we help millions of people around the world find new ways to learn, connect and advance. With innovative technologies and solutions we bring them closer to the knowledge they seek and the potential they can achieve. Blackboard is the leading provider of learner success-focused technology solutions and services to the education market. We help our clients overcome diverse and complex challenges through our broad portfolio of solutions and services that make education more accessible, engaging and relevant to the modern day learner.

# INTRODUCTION

We've spoken with 20 educational leaders to learn more about how institutions tap technology to improve education and make it available for all students, including those with differing abilities. We asked them the following question:

***Please share a specific story (or perspective) about how you or your institution used technology to provide greater access to students with specific needs (e.g., physical disability, location, or inability to get to campus.) What key piece of advice can you offer to someone else trying to implement your approach?***

A generous partnership with Blackboard makes it possible for us to share with you experiences that institutions have had implementing these technologies, how they've worked to overcome problems, and the outcomes they've seen from those efforts.

These experts offer their perspectives on challenges, successes, and lessons learned. They discuss everything from design and development strategies to the changing role of higher education and educators. Most of these professionals agree that when you expand availability to education by using accessible technology, whether it is video captioning, text to speech, or more advanced technologies, even students who don't identify as having disabilities use these services and that they increase student success rates and improve learning overall.

I trust you'll find these experts' successes and advice useful and that after reading this, you'll have solid strategies to help advance your use of technology to broaden access to education for all students.



All the best,  
**David Rogelberg**  
Publisher



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# Assistive Technology

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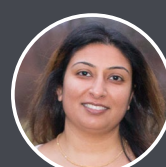
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# PLATFORM ACCESSIBILITY: MILESTONES REACHED, BUT A NEW FRONTIER



**RAY  
HENDERSON**

Founder,  
Lessons Learned Ventures,  
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Ray Henderson is an educational technology entrepreneur, strategic advisor, and seed state investor. As an operating executive, he helped conceive and launch several of the most recognized products in the education technology market. He's an evangelist for open technology standards, including Common Cartridge and LTI. Today, he is developing promising young companies through Lessons Learned Ventures, LLC, a boutique ed tech investment and strategic advisory firm.



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Over the course of his career, Ray Henderson has been a developer of digital learning products and platforms. He's observed the industry in the period from its first awakening around the need for assistive technology, to today.

Henderson notes, "In the 1990's as the ed tech industry really began to explode, we were so focused on inventing first generation digital platforms that we were oblivious to the need for assistive technologies." But after these early products gained traction on campus, educators and advocacy groups brought attention to the issue. Responding to this, Congress created the Section 508 amendment to the Rehabilitation Act of 1973. This landmark legislation required publicly funded institutions to provide comparable access to digital information. "Section 508 was a real awakening to the needs for assistive technologies," Henderson says. "It had an immediate impact on product developers across industry, and caused a lot of change in both product roadmaps and quality assurance programs." >>>



*Section 508 had an immediate impact on product developers across industry, and caused a lot of change in both product roadmaps and quality assurance programs.*



## KEY LESSONS

- 1 Learning Management Systems vendors have come a long way in supporting assistive technologies.
- 2 Machine learning technology may provide educators with insight on how to further improve the accessibility of their courses.

# PLATFORM ACCESSIBILITY: MILESTONES REACHED, BUT A NEW FRONTIER

Initially, the industry faced legislation that lacked clarity. There were no precise definitions for what a 'comparable experience' was, nor templates to follow. "We were scrambling to understand the issues, just as universities were. We began to collaborate with university accessibility labs to understand practical steps we could take to improve the experience based on what they were seeing on the ground." Among the most important developments at that time was the development of sophisticated screen readers that provided text-to-speech capabilities for visually impaired students. Henderson notes that this brought significant clarity to platform developers. "Screen readers gave us products we could bring into our testing labs and simulate an experience in detail. We were able to not only focus on regulatory compliance, but designing an experience with products with greater empathy for those who needed assistive technology to use them."

In Henderson's view the industry has now reached a key milestone of basic platform compatibility, but faces an important remaining challenge. "It's now rare that a core platform for digital products from a major publisher or one of the major Learning Management Systems throws significant red flags," he notes. "But as issues are resolved in the platforms, they've exposed a new category of concern." Many learning platforms provide faculty with authoring tools. As they use them, they are introducing new content for learners. And with each added piece of text, new image, or video introduced, there's new potential for challenges beyond the core platform. "Learning platforms have enabled authoring and helped educators respond to the need for more dynamic coursework. But this change brings with it a new problem – of how to ensure this content is accessible." >>

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Learning platforms have enabled authoring and helped educators respond to the need for more dynamic coursework. But this change brings with it a new problem – of how to ensure this content is accessible.”

# PLATFORM ACCESSIBILITY: MILESTONES REACHED, BUT A NEW FRONTIER

Amidst growing appreciation for the problem of making sure dynamically authored content is accessible, especially as there are now millions of educators authoring course elements, Henderson notes the promise of recent innovation to solve it. He points to Cambridge UK-based Fronteer, a company focused on solving this problem. "Fronteer is a highly innovative company and is applying the latest machine learning technology to help solve this important problem." He explains that Fronteer's product is capable of reviewing course content authored into LMS platforms and providing personalized reporting to faculty authors about where their content might be made more accessible. It also provides institutions with a comprehensive view about courses that contain content that may not be accessible. "Fronteer's approach has made an intractable problem solvable at scale and represents a real breakthrough in digital learning." He is also encouraged by Fronteer's recent acquisition by Blackboard. "Blackboard recognized this innovation early, and can now add their global scale and support to this much-needed technology. This clearly ranks among the most important new developments in accessibility in the last decade." ■



College students with full-time jobs and distance learners who are unable to attend a physical campus benefit from being able to strengthen their knowledge or review core concepts from their home, during their commute, or between shifts at work. A mobile-optimized learning platform helps learners carry their courseware in the palm of their hand, and using W3C-WAI guidelines helps make learning platforms accessible to all students. Meeting students where they are is the best way to empower their education.



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ANDREW SMITH  
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Co-Founder & CEO, Cerego





## KOREY SINGLETON

Assistive Technology  
Initiative Manager,  
George Mason University

Korey Singleton is manager of the Assistive Technology Initiative (ATI) for George Mason University (GMU). The ATI is tasked with guiding and implementing a university-wide strategy for addressing the electronic and IT accessibility needs of GMU students, staff, and faculty. For more than 20 years, he has been an advocate for the accessibility and assistive technology needs of individuals with disabilities in K–12, higher education, and state and local government.



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Korey Singleton is an assistive technology (AT) specialist who has broad experience helping students with all levels of disability, especially those with visual impairments. From his post managing AT services at George Mason University in Washington, D.C., he has collaborated with interdisciplinary teams to provide specific solutions for students, staff, and faculty who need worksite modifications, classroom accommodations, and other technology solutions. Helping students with known disabilities can be rewarding, but Singleton has recently noticed that when made more widely available, some AT is being used by students who may not traditionally seek help but have need nonetheless.

“We essentially make sure that students with disabilities here at George Mason University have equivalent access to all the technology resources used at the school,” says Singleton. “But we are happy to sit down and provide training for any student here on campus.” This open approach has resulted in direct benefits to a wider student population. >>>



*We essentially make sure that students with disabilities here at George Mason University have equivalent access to all the technology resources used at the school.*



## KEY LESSONS

- 1 Making tools available to as much of the student population as possible benefits those who may not typically seek help through AT programs.
- 2 Broadly deploying AT can be an effective recruiting tool for students who may need additional help but do not always self-identify as having a disability.

# WELL-CRAFTED ASSISTIVE TECHNOLOGY OFTEN DELIVERS BENEFITS IN UNEXPECTED WAYS

One good example Singleton cites is the growing use of literacy support solutions, which include all variety of language, vocabulary, and reading tools such as text-to-speech applications, that have been particularly successful at George Mason University. In addition to making it easy to convert printed text into audio, these applications typically incorporate spell check tools and other kinds of literacy tools like dictionary support and verb checkers—all elements that can be supportive for students who have learning challenges.

The university has successfully negotiated site licenses for many of these applications, which makes them available to any student who has a university user name and password. The results have been positive. Singleton's team regularly sees 50 to 60 students using the text-to-speech and other capabilities of the software each quarter. New users are always coming on board.

"These tools are designed for people who have a print impairment, but can see and interact with a computer (unlike visually impaired students)," he says. "They just may have difficulty reading standard text, whether it be in a book or on the screen." Because it reads different formats, text-to-speech software can read from a website, a Microsoft Word document, or a PDF document and can convert electronic text or typewritten text into audio files, which allows students to listen at their convenience. "It's an alternative strategy to help a broad group of students learn and take in information as opposed to making them sit down in front of a printed resource or at a computer," says Singleton. >>>

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*I find that a lot of the people who consult our office to learn about AT are not registered with the disability services office or even have a documented disability. They are just trying to find the most efficient strategy for accessing their instructional resources.*

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One thing the university did to make it easier for people to take advantage of text-to-speech capabilities was install a few high-speed scanning stations around campus. Students wanting to take advantage of these text-to-speech tools are encouraged to have their books cut so that they can run them through these scanners; in 15 to 20 minutes, they can convert a 400- to 500-page textbook into a PDF document that the software can then read to them.

"I find that a lot of the people who consult our office to learn about AT are not registered with the disability services office or even have a documented disability," says Singleton. "They are just trying to find the most efficient strategy for accessing their instructional resources." ■

# ADA COMPLIANCE LEADS TO BETTER LEARNING DESIGN



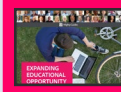
**KAREN  
RUBENSTEIN**

Director of Academic  
Technology Services,  
Morgan State University

Karen Rubinstein is the director of Academic Technology Services (ATS) at Morgan State University in Baltimore, Maryland. She and the ATS staff strive to enhance teaching and learning through the identification, evaluation, adoption, and integration of technology into online, hybrid, and traditional courses.



Website



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Several years ago, Morgan State University started offering online courses, says Karen Rubinstein, director of Academic Technology Services. “But then we had to go back and make sure that all the software that we use has Americans with Disabilities Act (ADA) statements and is compliant—even our student registration. Now, we always take steps to make sure that the vendors we work with have compliant products. We make sure we’re cognizant of that.”

Rubinstein says that beyond basic compliance with the ADA, her university tries to provide assistive technology that will be useful for all students. One such technology is a software program that reads web interfaces and documents. “This software allows us to reach students who might have a reading disability or who prefer to hear something being read over reading it themselves. It also applies to different learning styles. It’s not a screen reader; rather, it’s for students who have a learning challenge or even for those who just want things to be read to them.” For example, Rubinstein says that one of her graduate students uses the technology to listen to course-related documents when traveling in the car. >>>



*Determine all the different units on campus that can contribute to the effort. You might discover bits and pieces of technology that you didn't realize were there and that you can bring together under one umbrella.*



## KEY LESSONS

- 1 Compliance with legislation such as the Americans with Disabilities Act is one way institutions can begin to offer assistive technologies, but it should go deeper than those basic requirements.
- 2 Compliance and needs assessments should reach deep into an institution's different business units to determine whether existing technologies are appropriate for and can be extended to increase accessibility for the whole school.



# ADA COMPLIANCE LEADS TO BETTER LEARNING DESIGN

"When we're evaluating different software, we want that software to meet the needs of the smaller group, but we always look to see how broadly it can be applied, how well it will serve the needs of everyone at the university. So, this technology is a great tool for anyone who wants to use it regardless of whether they "need" something like that."

One challenge that Rubinstein highlights is the decentralized nature of some institutions. Because not all the business units of an institution are connected, technologies may be in use in one department that another department might be missing out on. "Try to take a broad and inclusive approach to creating a needs assessment. Determine all the different units on campus that can contribute to the effort," she says. "You might discover bits and pieces of technology that you didn't realize were there and that you can bring together under one umbrella, at least as far as awareness and communication, so that you can start to have a more organized and intentional implementation."

"Then, put together teams from the different areas to create a plan so that you can begin to implement those existing technologies university-wide rather than having one school do one thing and another school do another thing." Unity is a requirement for successful implementations, and a great first step to implementing technology institution-wide is to create a single technological front. She explains, "There must be a centralized effort: Just try to get that organized. Our school has always been decentralized in many respects, so it can be a challenge. The same is probably true for many other colleges and universities." >>

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*Number one, make sure that you're not excluding any students from participating in your school because you can't accommodate their needs. It's the right thing to do.*

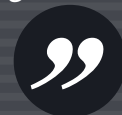
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# ADA COMPLIANCE LEADS TO BETTER LEARNING DESIGN

“At the most basic level, being an accessible institution is quite simply the right thing to do. Number one, make sure that you’re not excluding any students from participating in your school because you can’t accommodate their needs. It’s the right thing to do. And number two, we’re also a state school, and that obligates us to comply with the ADA. More and more schools are being sued, and we don’t want that situation, so it’s important to strive for compliance,” she says. “But you should do this anyway—even if you’re not obligated by law.” ■



*While working at a school in NYC for students with language-based learning disabilities, I saw the true power of technology. The school provided access to a wide variety of digital tools to help the teachers teach and the students learn. These were simple things like a microphone that enabled an incredible History teacher to read and record the entire textbook and transfer the audio to the students' iPods so they could listen along while reading. Video cameras and editing software made it possible for severely dyslexic readers to embrace the language of film and create wonderful short movies based on their understanding of the texts we were reading. Technology access is the gateway to knowledge and a key tool in unlocking the potential creativity in all learners.*



**ADAM BELLOW**  
Co-Founder, Breakout EDU

# CONTENT IN MULTIPLE FORMATS PROVIDES THE GREATEST ACCESS



## KRISTA GREEAR

Assistant Director,  
Disability Resources  
for Students,  
University of Washington

Krista Greear's drive to help students and love of technology and data make her a great fit for her position managing the Access Text & Technology program and Captioning program for all 3 University of Washington (UW) campuses. She has served in higher education disability services, providing students with alternate text, since 2007, with four years as a part-time employee at Central Washington University and the rest as a full-time employee at UW.



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A core realization that has come from Krista Greear's many years of helping students who have learning disabilities is that access and associated learning can work only if the material is in a format appropriate to each student. "What technology is doing for our students with disabilities," she says, "is allowing for greater flexibility by giving them choices as to how they consume content." This flexibility may be as simple as changing a TIFF file to a Word document or as complex as text-to-speech translation, video captioning, or converting a PDF file into HTML markup. Fortunately, solutions are available to help institutions create the most accessible content possible, and this help isn't just benefitting learning-disabled students.

"What I love is that essentially, technology is being created for students or end users who have disabilities, but it benefits everyone," says Greear. She cites Apple's built-in text-to-speech and other, similar capabilities as a great starting point. For example, the University of Washington, where Greear manages accessible document conversion, has provided all students' access to an online file-conversion tool that takes in common file formats and converts it to a more accessible version. >>>



*What technology is doing for our students with disabilities is allowing for greater flexibility by giving them choices as to how they consume content.*



## KEY LESSONS

- 1 More emphasis needs to be placed on the issues of creating more accessible content, but sometimes something as simple as providing multiple formats of the same material can greatly improve effectiveness.
- 2 The longer-term strategy toward highly accessible content creation will require a partnership among subject matter experts, experts on learning disabilities, instructional designers, and IT teams.



# CONTENT IN MULTIPLE FORMATS PROVIDES THE GREATEST ACCESS

This simple service has made it easier for faculty and students to turn graphics files into text-based documents that can be used with software for audio output. This conversion also makes searching the document possible, another universally designed (and desired) feature.

Another access-improving technology that Greear's team is testing is more of a "content accessibility service" integrated with the university's learning management system. In addition to providing the technical back end to convert documents between formats, this service helps instructors improve their existing content as well as create more compelling and useful content to combat access challenges. "Although these tools are specifically designed for students with disabilities," says Greear, "anybody, regardless of disability, can go in and choose to consume their content in a format different from what they may have been given. We also get all sorts of data and reports about how accessible each course is, which is helpful for me as an administrator because I can use data to tell my story and promote change."

Another hot topic these days among Greear's associates is captioning for videos. Thanks to recent lawsuits, many higher education institutions are looking at the vast body of video course material they deploy and developing captioning and audio description options. "Video is really hot right now, and people see the benefits of it," says Greear. "So, at the bare minimum, there must be a captioned version, where text is included on screen so that someone who is deaf or hard of hearing can participate." This process ideally should lead to the further step of including audio descriptions, which describe what's going on in the video for visually impaired students. >>

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# CONTENT IN MULTIPLE FORMATS PROVIDES THE GREATEST ACCESS

Do all these new tools mean that instructors have to become producers of technically complex and often layered materials? “I do not expect instructors to become accessibility experts,” says Greear. “I don’t think that’s reasonable. But I do expect instructors to understand the basics—understand why, for example, an image-based PDF file is worse than a text-based PDF file.” The important job moving forward, she says, is that of instructional designers or learning technologists. “This is where IT and display services have to become partners on campus,” she says, “because we are each different subject matter experts and we have to bring everyone together to create a more inclusive environment.” ■

# EMPOWER STUDENTS WITH DISABILITIES THROUGH ROBOTICS



**MONICA  
YATSYLA**

**Manager of Instructional  
Design Services,  
Hofstra University**

Monica Yatsyla is the manager of Instructional Design Services at Hofstra University. She focuses on trending teaching techniques and academic tools. Her team of instructional designers conducts faculty workshops and one-on-one faculty consultation on technology and pedagogy to engage students in the learning process as well as increase instructor efficiency. Monica and her team help faculty develop courseware to enhance content while incorporating hybrid, online, and flipped instruction teaching models into their current practices.



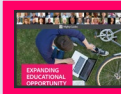
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Monica Yatsyla believes that when colleges and universities make a proactive effort to listen to the needs of their students with disabilities, they can create powerful solutions that make an incredible difference in these students' lives. At Hofstra University, where Yatsyla is manager of Instructional Design Services, she works within the IT department and partners with the Student Access Services team on an initiative that promises to make educational opportunities more accessible to students who until now have faced difficulties pursuing their education.

As is the case at many institutions, several students at Hofstra are dealing with chronic illnesses and are frequently unable to attend class. After a certain point in the academic year, their professors feel that they have fallen too far behind and recommend that these students withdraw from the class. Deborah Hancock, the assistant director of Hofstra's Student Access Services Office, says that in response to feedback from these students on the challenges they were encountering, "We asked Monica to come in and talk with us about how we could better support these students." >>>



*Why don't we roll this technology into a classroom so that students whose illness or disability physically prevents them from attending class can still participate?*



## KEY LESSONS

- 1 Leveraging technology such as double robotics can allow students who can not physically attend class the chance to not only participate virtually, but also move around the class as needed, even participate in smaller group discussions.
- 2 Strong partnership and collaboration among campus departments are essential to improving educational accessibility for students with disabilities.

# EMPOWER STUDENTS WITH DISABILITIES THROUGH ROBOTICS

At first, Yatsyla explored the idea of using videoconferencing technology to let students participate in class from a remote location. With more than 200 classrooms with varying technological configurations, however, that option presented several barriers to success. So, Student Access Services chose to try a technology called *double robotics*, also known as a *telepresence robot*, which is essentially an iPad on a stand that has a wheel—a bit like a Segway. Yatsyla asked, “Why don’t we roll this technology into a classroom so that students whose illness or disability physically prevents them from attending class can still participate? The students could simply connect to that iPad from wherever they are.”

Rather than being a static presence in the classroom, the robot is expected to provide some freedom of movement, as well. It could move around at a student’s prompting and be part of a lecture or a small group in the class, and then return to its original position at the front of the room. Hancock is optimistic about how the double robotics solution could empower students with disabilities. “We hope that this new technology will give our students a feeling of independence from home, from the hospital, or from wherever they may be able to function the best at a given time,” she says. Hofstra also hopes that the robot’s visibility on campus will help build awareness of disabilities and the importance of accessibility.

Yatsyla emphasizes that strong collaboration from the Student Access Services team and the IT department made this solution possible. For that reason, she says, “Any department on the university campus has to have a good relationship with its IT organization.” With a commitment to supporting the needs of students with disabilities, any educational institution can improve the quality of its educational experience and make meaningful educational opportunities truly available to all students. ■

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Any department on the university campus has to have a good relationship with its IT organization.

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*In my university classes, I always tell my preservice teachers that as practicing teachers “they will move mountains.” With use of technology and dedication to providing access no matter what barriers we face, they exemplified this by helping videoconference in one of our students who was ill and needing to travel for treatment. Though separated by distance, she was able to be a part of our experience and our community, and, in turn, model how learning should be within reach of all students.*



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JENNIFER WILLIAMS  
Professor, Saint Leo University

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