

Accessibility In Transition

From Remediation to 'Born Accessible' in
Post-Secondary Education

Presented to you by:



Accessibility In Transition

From Remediation to 'Born Accessible'
in Post-Secondary Education

Presented by:





Summary

Information and communication technologies (ICT) has always been vital for education, but accessibility, which serves the needs of students with disabilities, has not been integral to the post-secondary environment. Part of this is due to gaps in the frameworks that define accessibility. But digital technology is having a profound effect on education, and students with disabilities are becoming empowered as consumers, capable of advocating on their own behalf. Central to this shift is the evolution of accessibility information from technical jargon to a more user-friendly language available to students, teachers, and administrators.

This paper examines the evolution of accessibility from the analog to the digital era, and the different frameworks supporting accessibility. A model framework is presented that encompasses accessibility for education in the digital era.

Acknowledgements

Axel Leblois, President, G3ict

Dr. Christopher Lee

Robert Martinengo

Joy Kniskern

Patricia Redmond





G3ict is a non-profit organization in the state of Georgia, USA. It was launched in 2006 as an advocacy initiative by the United Nations Global Alliance for ICT and Development. G3ict as an international network of ICT Accessibility experts to develop and promote good practices, technical resources and benchmarks for ICT accessibility advocates around the world.

AMAC Accessibility Solutions is a research and service center of the Georgia Tech College of Architecture. AMAC's expertise, tools and technology empower not only college disability service providers, but also K-12 educators, corporations, non-profits, and government institutions throughout the United States, to provide equal access to education, work and life for individuals with different types of disabilities.

Contents

Accessibility Eras.....	1
The Analog Era.....	2
Analog to Digital.....	3
The Digital Era - The 90's and onward.....	4
The Accessibility Landscape.....	6
Frameworks.....	7
Legal/Regulatory.....	7
Technical.....	7
Social.....	7
Educational.....	7
Service Providers.....	8
Government.....	8
Non-Governmental Agencies.....	9
Institutions.....	10
Consumers.....	11
Vendors.....	12
An Accessible Education.....	15
What's Working.....	16
What's Manageable.....	17
What's Lacking.....	18
Elements of an Accessible Education.....	20
Administration.....	20
Faculty.....	21
Students.....	21
Empowering the Consumer.....	23
Institutional Cooperation: Moving Toward an Accessibility Framework.....	25

Accessibility Eras

The Analog Era



Information and communication technologies (ICT) have always played an integral role in empowering persons with print-related disabilities to participate and succeed in post-secondary education. Prior to the advent of digital technologies, the process of transcribing media into an accessible format, such as producing a braille textbook or providing sign language interpretation, took place in the analog realm. The source material and output format were predetermined, and trained transcribers and narrators were employed to produce the required formats.

While these analog production methods were considered refined for their time, the limiting factors were timeliness and capacity. If a book was needed in braille format on short notice, but it had not already been transcribed, the process could take longer than the class period itself, placing the student at a disadvantage in relation to non-disabled students. Limits on capacity were not as critical at that time, since the proliferation of custom textbooks, textbook bundles, and frequent edition changes were not as frequent as they are today.

Captioning and Audio Description

Providing equal access to video and multimedia materials for students who are deaf or hearing-impaired relies on captioning and transcription. Technology has created new opportunities for real-time captioning that can be performed remotely, where the captionist is not present in the classroom.

Audio description is provided for students who are blind or visually impaired so they can gain an equal understanding of video and film material. Audio describers verbalize important visual elements and insert them between lines of dialog.

Analog to Digital

With the widespread availability of personal computers starting in the 1980s came the growing expectation that computer technology would provide greater levels of accessibility. Individuals with disabilities were early adopters of technology such as synthetic speech and braille translation software. These innovations began to appear more often in school settings, as students with disabilities became accustomed to the accessibility features available in mainstream and specialized products.

In this new environment, students with disabilities began leveraging the added capabilities of the technology, essentially enhancing the accessibility available to them over the analog equivalents. Static print materials were now converted to dynamic electronic texts that could be spoken aloud, highlighted, searched, and otherwise manipulated. This created the unlikely scenario in which students with disabilities had access to digital tools that sometimes surpassed what was widely available to non-disabled students.

However, there were still limitations on timeliness and capacity, along with technical limitations, that prevented complex material such as mathematics, chemistry, and other sciences, from being fully accessible in the new digital formats. In this phase, post-secondary institutions began acquiring high speed

document scanners to more efficiently scan high volume materials such as printed textbooks. This required removing the spine from the book, which had implications for the student who wished to resell the book.

The introduction of Optical Character recognition (OCR), software that converts 'pictures' of printed text into editable digital text, combined with faster scanning technology, allowed schools to 'reverse engineer' printed books to create a digital equivalent.

The AccessText Network

Since the mid-90s, colleges and universities have been contacting textbook publishers to request electronic files they can use to provide 'alternate' formats to students with disabilities. In 2009 the Association of American Publishers (AAP) chose AMAC to develop and run the AccessText Network (ATN) - an online portal to streamline this process.

Under AMAC's management, ATN has attracted over 2,110 college and university members, as well as doubling the number of member publishers, including the three largest textbook publishers in the country. With ATN, the disability service staff at a college can log in and make requests to any of the member publishers through one simplified interface. Over 80,000 requests were processed through ATN in 2013.

By the mid-1990s, colleges began contacting publishers to request electronic files of educational textbooks for students with print-related disabilities. The majority of publishers who responded to these requests provided PDF files, the most commonly used file format for print production and archiving.

The number of file requests grew rapidly in the 2000's, and the publishing industry responded by launching the AccessText Network (ATN) in 2009 to manage the process efficiently. In 2013, over 80,000 requests for electronic files were made through the AccessText system by the disability service offices at over 1,400 colleges, which was 20,000 more requests than 2012.

The Digital Era- The 90's and onward

By the mid-1990s, though digital technology had permeated the publishing production process, textbooks were still primarily printed on paper. It was not until the spread of lower cost consumer devices, such as tablet computers, e-readers, smart phones, and lightweight laptops that demand grew for digital educational materials. At first, these materials were ancillaries and supplements to the 'core text', but as the textbook itself came under scrutiny for high cost above perceived value, students and instructors looked

for ways to reduce or replace the role of the textbook as the centerpiece of the syllabus.

The ubiquitous availability of new digital materials also ushered in a new era of accessibility. For the first time, instructional materials could be made accessible from inception, potentially removing constraints of timeliness and capacity. Yet digital materials produced today are still, by and large, only partially accessible to students with dis-

abilities, if at all. The primary reason is that the publishers encrypt or protect content, which then is not compatible with screen readers used by students with print-related disabilities.

But even if that barrier were not an issue, most digital materials lack the tagging features that would make them accessible and more usable. For example, if an electronic book is not structured so that the chapters and subsections are properly identified (tagged), the book becomes very difficult to navigate with screen-reading technology.

Adding to the challenge is that the same protective mechanisms that prevent an end user, such as a student with a disability, from accessing the content using a screen reader will prevent the students' disability service office to make the material more accessible. In other words, digital materials that are not accessible as sold cannot generally be altered and made accessible after they have been acquired.



The Accessibility Landscape

The concept of disability can be considered in a number of frameworks, including legal, technical, social, and educational. Each framework has different aspects that affect the way disability is viewed, and which must be aligned to create accessibility.

In addition, there are several well-established categories of service providers who are responsible for converting instructional materials into accessible formats. The nature and volume of work done by the providers has already shifted dramatically, and is expected to continue to do so.



Frameworks

Legal/Regulatory

For educational institutions, a fundamental part of their legal framework is that a student should not be discriminated against on the basis of a disability. In regards to physical barriers, inequality is often visibly discernible: buildings without ramps are clearly inaccessible to students who use wheelchairs or who have compromised mobility function. Inaccessible digital content, unlike stairs, cannot be “seen” by screen readers.

In the classroom, discrimination can be harder to predict or measure. A professor may give a quiz without sufficient time for an accessible format to be produced, or a topical video might be shown without captions. In these cases, discrimination may be sporadic and not severe, but the cumulative effect can be that a student with a disability does not have the same chance to succeed as non-disabled students.

Technical

Technology is always a lively and dynamic context for addressing accessibility, and is usually viewed as part of the problem and the solution. The ability of technology to augment the senses, such as with glasses and hearing aids, and to provide new capabilities to existing media, such as with

synthesized speech, means that it is never far from any accessibility discussion.

But the pervasiveness and constant innovation in the technology field can draw attention from other more deeply rooted causes of inaccessibility. The pursuit of technological solutions to social problems is hardly limited to accessibility, but in education there is a danger of it becoming an end in itself.

Social

The social framework of accessibility can be described as a patchwork of perceptions, stigmas, biases, and cultural trends that change over time. The word ‘disability’ is most closely associated with a medical/diagnostic view, such that being ‘on disability’ is shorthand for having a medical condition that interferes with one’s employment. In education, the social implications of disability can be subtle, yet far reaching and complex. Students may not want to be identified as disabled, fearing it may mark them in their professors’ view as less capable.

Educational

During the analog era and into the early digital era, as discussed previously, it seemed to be generally accepted by administrators, if not always by students with disabilities, that a school would be in compliance with the legal framework

for accessibility if they provided 'accommodations' - adjustments to instructional materials or classroom settings designed to make the experience accessible.

However, as the digital era took hold and digital technologies permeated the educational infrastructure, the conundrum described above - that technology can be the solution and the problem - came to roost in the classroom. If teachers required that students use inaccessible digital technologies

as part of class that were similar to, if not often compatible with, the same technologies used to provide accessibility, why were inaccessible technologies being used at all?

Perhaps, even when an instructor or administrator stopped to consider if the new technology they were piloting or adopting was going to be usable by students with disabilities, they assumed, or hoped, that accessibility issues could be addressed by the 'disability services office', who would find an accommodation retroactively, as they had done before.

Service Providers

Government

One well established institution for providing reading materials in accessible formats is the library. Governments have supported library services for people with disabilities for many years. These libraries are rooted in the analog era, where print materials only had to be converted once into an accessible format, such as an audio recording or brailled book, and then placed on a shelf to be checked out.

The main difference between this and a traditional library is that the library has to convert the materials to the accessible format (or in some cases contract out for conversion).

Also, access to the library mate-

rials is restricted to people with disabilities, requiring some sort of authentication of the individual's disability in order to receive library privileges.

The United States federal government has also funded conversion of grade school textbooks into accessible formats, primarily braille. In the United States, a federally funded center was established to house files in a file format known as the National Instructional Materials Accessibility Standard (NIMAS) These files are then used to prepare 'student ready' accessible formats, either by the school district or their appointed intermediary.

Non-Governmental Agencies

Another traditional source of accessible materials and resources is the non-profit/NGO sector. An example of services directly related to post-secondary education is Recording for the Blind, which was established after World War II to help veterans who were blinded in combat take advantage of educational opportunities. The Servicemen's Readjustment Act of 1944, also known as the G.I. Bill of Rights, guaranteed a college education to all veterans. What was not guaranteed was an effective means of accessing educational materials for veterans who were blind. Although a limited amount of braille materials existed, they were not an effective means of access for soldiers who did not read braille.

Braille and PROFIT

While the rates of braille literacy have fluctuated over the years, braille continues to be a vital component of education for students who are blind. Braille is especially important for dealing with complex material, as it provides students with greater access to content such as mathematics and foreign languages.

AMAC has produced hundreds of braille textbooks and supplementary materials such as quizzes and handouts. AMAC also completed the PROFITT grant, which provided inmates with standardized braille transcription training. Gave them an opportunity to develop marketable skills, while at the same time contributing to the educational and employment opportunities of people who are blind.



Volunteers were recruited to read textbooks aloud, which were recorded and distributed on records and tapes, and more recently converted into digital format. In the 1970s, the organization changed its name to Recording for the Blind & Dyslexic to extend services to reach persons diagnosed with learning disabilities.

More recently, mirroring the popularity of efforts to eliminate stigmatizing language, the organization changed its name to Learning Ally. To date, Learning Ally offers close to 80,000 titles, with materials for students ranging from kindergarten to graduate school. For a period of time, this service was essentially free to borrowers, thanks to funding provided by the U.S. Department of Education. Borrowers were not required to pay any charges or fees.

In 2011, the federal appropriation was eliminated, and since then, individuals have been required to pay an annual amount of \$119. Hardship waivers have also been made available to individuals who qualify.

Although this service model has been vital in establishing the importance of access to accessible materials, it is limited in size and scope, causing schools to seek additional assistance from vendors, as will be discussed, and to assume more of the responsibility for creating accessible content themselves.

Institutions

Post-secondary institutions have always provided a variety of services for students with disabilities, but assuming responsibility for the conversion of textbooks into accessible formats has strained, and at times exceeded, their capabilities. In the analog-to-digital era, an essential piece of hardware has been a high-speed scanner, and for even greater efficiency, a heavy-duty paper cutter which removes the spine from a textbook so the pages could be fed through the sheet-feeder of a scanner.

The critical software program that also plays an essential part in digital conversion is one that performs optical character recognition (OCR). This software 'reads' the scanned book page and converts the image of the text into computer editable text. In effect, it reverse engineers the printed book into electronic format. While accurate with plain text, OCR software is not reliable with symbols, foreign characters, and other items encountered in textbooks. The process of scanning, OCR, and editing is often time-consuming, and removing the spine of a textbook can reduce or eliminate its resale value.

Schools also began contacting book publishers to ask for electronic files in the mid-1990s. While not all publishers are able or willing to provide files, the Association of American

Publishers (AAP) received enough support from their higher education member companies (Pearson, McGraw-Hill, Cengage, Wiley, and Elsevier, among others) to create a web portal called AccessText to streamline the process. Using AccessText, a college or university can log into one system and make requests to different publishers (16 at this time, representing over 90% of the college textbook market). The service is open to post-secondary institutions within the United States and US territories.





Consumers

Technology available to individuals to produce their own accessible formats has become increasingly sophisticated and inexpensive. Scanners can be purchased for less than \$100 and the OCR software is often included. However, the process is slower and more cumbersome for an individual, and is not practical for a student who needs to focus on studying rather than converting their textbooks. In addition, the visual interface of some software programs may not be accessible for individuals with disabilities.

A new wave of mobile devices has brought even more power and convenience to individuals who use assistive

technologies so that tablet computers, and even smartphones, support accessibility features previously limited to full-sized computers.

While these products are still fairly new, they offer the promise of ubiquitous, accessible and personalized interfaces, suitable for individuals with different types of disabilities.

The weak spot with consumer grade technology is that the vendor controls the interface, and can therefore restrict or prevent the user from mixing and matching the content and software they prefer. For example, an e-book purchased from one vendor is

likely to work only with that vendor's reading software, which may not have the capabilities needed by a student with a disability. Their options are to try working with the vendor to see if the product can be made accessible, or resorting to analog methods, such as scanning the equivalent print edition of the book.

Vendors

In the analog and early digital eras, vendors that specialized in products for people with print-related disabilities were often small, family run businesses that knew their customers and their needs intimately. Products tended to be expensive, as development costs had to be recouped from a limited number of customers.

Many 'assistive technology' programs ran independently of other software, such that a customer using screen-reading software and magnification software at the same time would often find their computer crashing unexpectedly. Things began to change when computer technology became more deeply entrenched in everyday life, and personal computers evolved with more sophisticated graphical interfaces.

In the last few years, with the widespread adoption of tablets and smartphones coupled with integrated apps for shopping, reading, posting pictures, etc., the trend is towards more seamless experiences for the user,

STEPP

The Student E-rent Pilot Project (STEPP) was a multi-year project funded by a grant from FIPSE. The goal of STEPP was to give students with disabilities the same opportunity as non-disabled students to save money by renting textbooks. For STEPP, AMAC partnered with CourseSmart, the prominent e-textbook vendor, to make their content accessible to disabled students.

Over the grant period, AMAC remediated hundreds of e-textbooks, helping to make CourseSmart the most accessible commercial e-textbook platform at the time. As part of STEPP, AMAC developed the concept that students with disabilities would benefit from increased access to information about the accessibility of commercial products. The early versions of this project, called the Document Accessibility Profile (DAP) was tested as part of the STEPP website.

which has left many specialized programs designed for individuals with disabilities on the outside of the interface without a way in.

For example, programs designed to read text aloud and highlight the words being read are being blocked from working with commercial e-books by various technical measures, designed to keep the user from making unauthorized copies. To the commercial software, the assistive technology software can look like an unauthorized use, and thus be blocked.

The implications of this shift towards more and more sophisticated technology available to individuals is becoming clear to vendors of educational content and learning platforms. Accessibility is no longer something that can be addressed and achieved without direct integration with the same technology used throughout the campus environment.

Vendors who have only recently become aware of the extent of accessibility concerns about their product may find that schools are using accessibility as criteria when making important purchasing decisions.

Vendors in this space who want to be taken seriously know they need an accessibility policy. Even if they are not sure how they are going to fully address their accessibility issues, they know they must have a credible response to questions from campus procurement officers. The challenge comes when companies developing cutting edge products use technology that is attractive to professors searching for innovative teaching methods, or administrators searching for ways to cut costs using technology, yet is inaccessible to students with disabilities.

An Accessible Education

Accessibility, or the lack thereof, is often defined by the most significant barrier to the user, which in the past was usually the consistent unavailability of instructional materials in accessible format. But when availability is no longer the main issue, the next level of barriers becomes more apparent.

We are entering an era where the availability of accessible materials will not be limited primarily by technology. Social and educational barriers are moving more to the forefront as the technology of accessibility becomes the norm. One example of a social/legal barrier is the control of the text-to-speech function on Amazon's popular kindle platform. When first released, text-to-speech was at the control of the user, but groups representing authors and publishers objected, and Amazon changed the platform so that the vendor controlled the speech function.

In education, which has historically had strong legal and social frameworks supporting accessibility, most of the focus has been on technological barriers. But the educational environment itself is changing, as the quest for innovation balanced with cost reduction has sparked many new concepts and controversies (i.e., MOOCs, OER, online classes, 'bring your own device', social media, etc.).

So, with all this in motion, what is the next step for accessibility in education? What are the most pressing issues, and how are they best addressed? A review of what's working well, and what needs improving, leads to a vision of a new accessibility framework for education, combining the best of what has come before.

What's Working

At the post-secondary level, there is a well-established process for assessing and accommodating students with disabilities, although the depth of expertise and availability of resources varies from school to school. Students are assessed to identify how their disability impacts their interaction with the educational setting, so that appropriate accommodations can be designed. Not all accommodations are high-tech. Some are as basic as allowing extra time on tests or providing a distraction-free testing environment.

Braille, large print, audiobooks, synchronized text-to-speech, speech recognition, text magnification, captioning, interpreting, screen readers... these are some of the established technologies and systems used to support students with disabilities.

The challenge with many of these methods is preparation time, such as converting a book into braille after a class starts, or scheduling an interpreter on short notice. Also, some of the computer-based technologies work well with plain text, but are less effective with complex materials found in college level math and science courses.

The proliferation of personal computers, laptops, and tablets means very few students are without some form of computing capacity. Many apps have been developed specifically to leverage the accessibility features on smartphones. Internet bandwidth is still limited in some areas but has been growing steadily, and high-speed connections have become the norm.



What's Manageable

While there is a strong foundation for accessibility in education, there are areas where schools and students must devise workarounds because of the lack of resources or expertise, complex and dynamic accessibility challenges, or often some combination of all these factors.

Thus, a student who has received their textbook in braille in advance of class, thanks to good planning by the student and the disability service provider at the school, may find the instructor handing out pop quizzes that have not been transcribed. Or, a student with a learning disability successfully using a file obtained from a textbook publisher may find their school was not able to obtain a file for a different textbook.

In some cases, the student and the disability service provider may work together to assemble a unique, if makeshift, accessibility solution. The instructor may agree to allow the student to use a previous edition of a textbook that is available in an accessible format, or a fellow student may be recruited to record sections of a textbook that are not easily converted into electronic text.

SAM

The Student Accommodation Manager (SAM) was developed by AMAC as an adjunct to providing alternate media. SAM allows colleges and universities to manage and improve the process of working with students with disabilities in academic settings. SAM provides a world-class data management facility, and advanced security and data protection through daily back-ups. For institutions requiring additional IT technical support, SAM offers a viable multi-user, web-based solution at a reduced cost.

The line between what is manageable, and what constitutes an undue burden on the student, may depend on the student's own experience and attitudes. A student who has struggled to obtain services but who has strong ambition may decide to file a complaint, whereas a less motivated student may simply drop a class, or drop out of college altogether.

“Our goal is that in the not too distant future, access will no longer be a barrier - the focus will have shifted to providing the best educational support in ways that best suits all learners regardless of their profiles.”

Rick Ferrie | Head of Accessibility Advocacy | Pearson Education

What's Lacking

What may be most frustrating to students with disabilities, and to advocacy groups concerned with equal access to education for those students, is not the occasional patchwork availability of accessibility in the current classroom, but the adoption of glossy new technologies seemingly without any consideration of their lack of accessibility. The ‘digital divide’ is not just about who has access, but what kind of access they have.

Combine this with existing accessibility limitations, and you can get a situation where a college adopts a brand new online program for teaching mathematics that is completely inaccessible to a student who is blind, and may be almost as inaccessible to a student with a learning disability. The college’s own disability service office may find there is little or nothing they can do to make the online program accessible, so the only solution may be substituting a different course for the student with a print-related disability.

Advisory Commission on Accessible Instructional Materials

The Advisory Commission on Accessible Instructional Materials in Postsecondary Education for Students with Disabilities, established by the Higher Education Opportunity Act of 2008, brought together government leaders, representatives from the publishing industry, individuals with print disabilities, representatives from two-year and four-year institutions of higher education and leaders in accessible technology. The Commission studied the state of accessible materials for students with disabilities in postsecondary education and made recommendations to the U.S. Congress for improving access to, and the distribution of, instructional materials in accessible formats.

Educational institutions simply do not have strong enough systems in place to ensure that their educational infrastructure is accessible to all students. This is not limited to the educational activities in the classroom, but can have far-reaching implications throughout the institution. This ranges from learning management systems to the registration process, and can even include campus websites. Many schools are finding that traditional methods of obtaining accessible materials are not able to meet the demand for customized textbooks and online instructional environments, and there is little that can be done to retrofit these systems.

While the institutions struggle to meet the demand, and to establish a systematic approach to accessibility, students now have more powerful computing technologies at their disposal, which only highlights the gap between the experience they encounter in the classroom and what they perceive as being available to them through technology. Ultimately, if the legal framework holds, accessibility must be woven into the technology and educational infrastructure, otherwise students with disabilities may continue to experience a very uneven playing field.

“As demand grows for digital products Cengage Learning has woven accessibility upstream in our product development. This proactive approach...addresses the needs of our Educational institution customers, moves towards the close of the digital divide, and allows the engagement of ALL learners.”

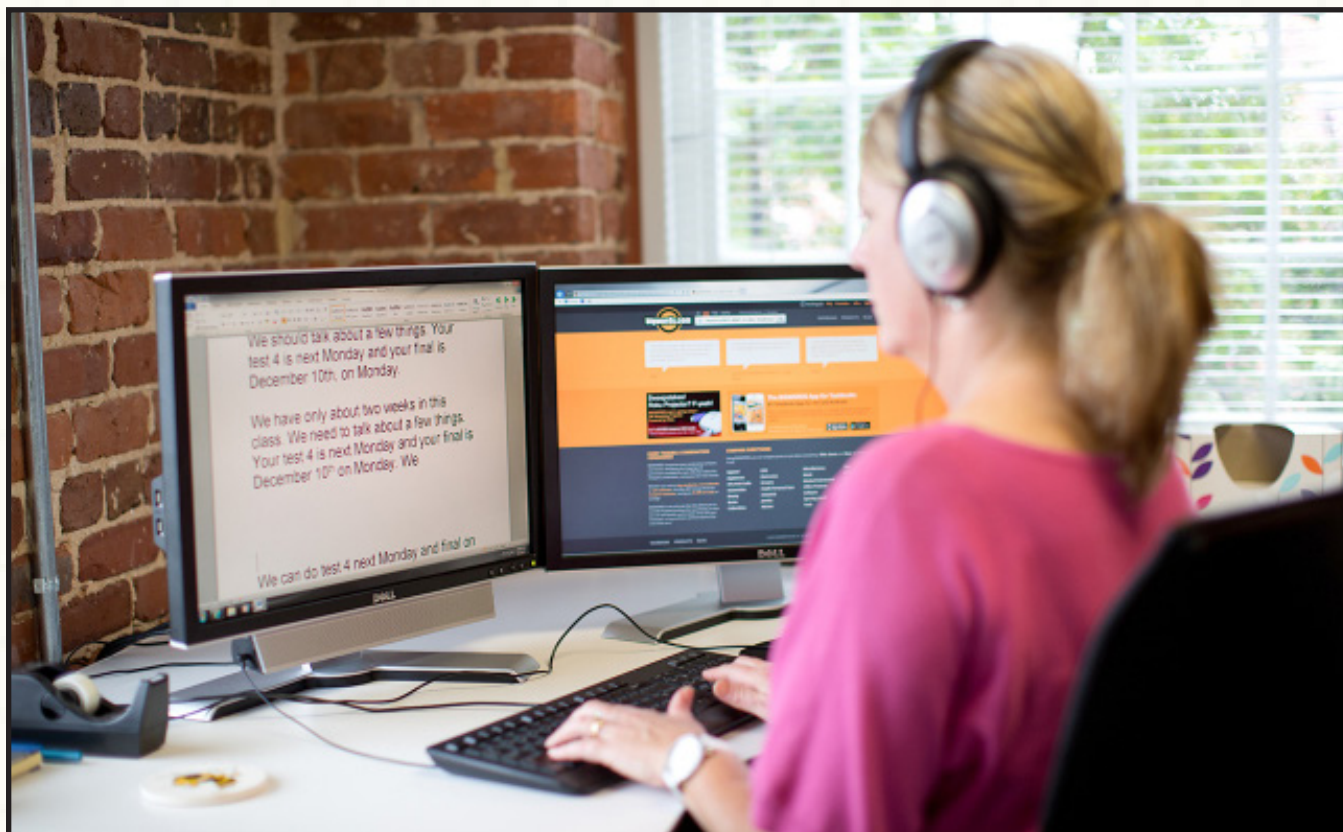
Michele L. Bruno | Program Manager, Accessibility | Cengage Learning

Elements of an Accessible Education

Administration

Colleges, universities, vocational schools - take pride in offering the best academic (and for some, athletic) experience to students that they can. The administration and staff is responsible for ensuring that all the required pieces are in place to deliver on this promise. In that regard, the message that students should not, and will not, be discriminated against by virtue of disability must start from the leadership at the top.

While the facilities department understands that building codes specify physical accessibility pursuant to the Americans with Disabilities Act, such as proper ramps and corridor widths, there is no equivalent level department charged with ensuring accessibility in the digital realm. Most institutions rely on the accommodation model, which is another way of saying, 'it's OK to create accessibility barriers because we have a department for removing those barriers for students with disabilities.



Making a high-level commitment to accessibility means that staff, such as procurement officers, will need to push vendors hard to address accessibility issues, while other college staff will need to work with faculty to ensure that they do not introduce new accessibility hurdles into the system.

In addition, faculty will need to look critically at new products and programs, to ask the right questions about accessibility, and not to settle for inaccessible materials.

Faculty

Teachers have the responsibility of conveying information to students and assessing what they have learned. Teachers are accustomed to having some freedom in how they teach, what textbooks they assign, and selecting supplemental course material. Some accessibility challenges arise from how the teacher conceives a learning objective. An exercise based on interpreting visual information without any textual equivalent is likely to be inaccessible to a student who is blind.

While the faculty may create some accessibility challenges, they are also positioned to remove many barriers by taking into account the diversity of learning styles of all students, including students with disabilities. Ideally, faculty will embrace the challenge of

teaching in a different way than they may have previously considered, and take a fresh look at how their curriculum is designed. Universal design for learning is a practice of considering different ways to communicate information, and to provide multiple methods for students to engage with learning.

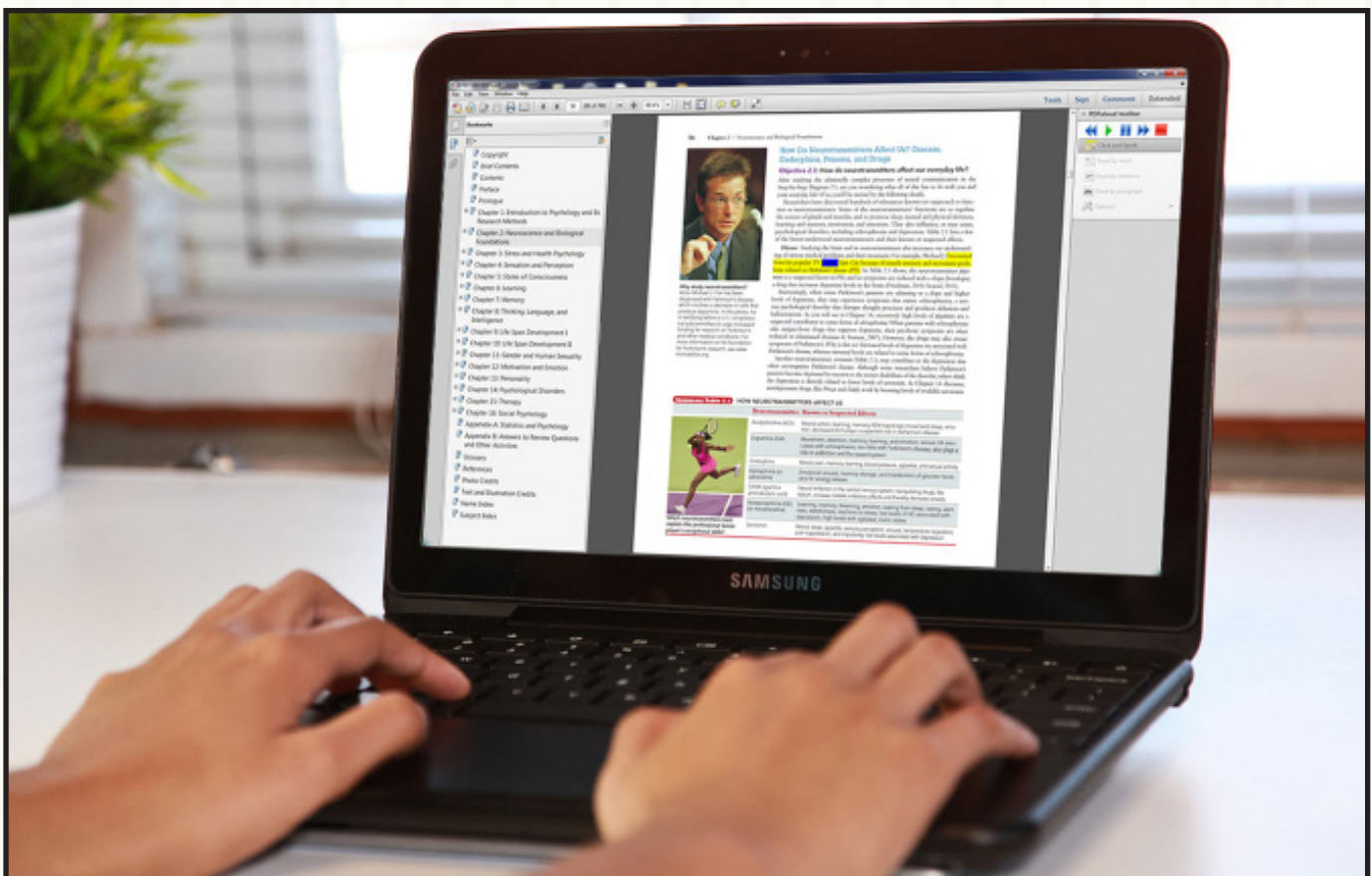
Faculty and staff must work together to evaluate the technology used to provide instruction. This is a significant challenge and is best addressed by institutions acting in concert. As long as faculty adopt inaccessible technologies, and administration does not prevent them, vendors will continue to offer inaccessible products. But in the digital era the school may be unable to remediate the inaccessibility, and students with disabilities could experience significant discrimination, in violation of the legal framework put in place to protect their rights.

Students

Ultimately, students need to be their own best advocate. With so many technological advances, and the rapid pace of change affecting all areas of education, it is more important than ever that students get to know their own strengths and weaknesses, as well as their legal rights. Students with disabilities need to accept that they will often have to negotiate additional layers of technology and administration.

Students have two critical challenges - to learn, and to demonstrate what they have learned. While usually listed in that order, students are typically wanting to understand what they will be expected to be tested on, so they can focus on important content and safely ignore extraneous teachings. Students with disabilities are no different, and must be equally aware of any challenges they face in writing, speaking, participating in class, and otherwise expressing themselves. Once they have those skills in place, they must tackle the additional skills of reading, studying, note taking, and synthesizing information in order to succeed.

If they are smart about their own abilities and challenges, they will be better able to identify the technology that will help them the most. Additional challenges, such as affording the hardware and software they may need, may still be formidable, but it is best to start with a clear direction. Students who have a good sense of what they need will also be able to help the faculty and staff understand their needs, which will help them design appropriate accommodations where necessary, and hopefully, will result in a more inclusive and accessible classroom for everyone.



Empowering the Customer

In order for students with disabilities to identify products that are accessible to them, information about product accessibility must be easy to find and use. This becomes even more important in educational settings as students must be able to integrate technology platforms provided by the institution with personal devices and applications that support students' accessibility needs.

What is needed is a consistent and transparent method for technology and content vendors to label their products with relevant information that the consumer with a disability needs in order to make informed purchasing decisions. Product information that is clearly understandable and easy to find will be important for students with disabilities. As an example, a consumer should be able to determine if an electronic book can be 'read aloud' using computerized speech, prior to the e-book being purchased. This function, often referred to as TTS, or Text-to-Speech, is dependent on the nature of the e-books' proprietary file format, in conjunction with the platform and device used to display the e-book. In addition, even with e-books and platforms that support TTS, the feature may be turned off at the discretion of the content publisher (as in the Kindle platform).

DAP

The Document Accessibility Profile project (DAP), builds on the social framework for accessibility. The premise is that buyers and sellers of digital content benefit when information about accessibility is widely and easily available. Modeled on the Nutrition facts labels for food packaging, a DAP label will provide the consumer, such as a student with a disability, information about the accessibility of digital products. This can benefit the seller, since it gives them the opportunity to market their digital content to a larger and more diversified customer base.

Unlike nutrition labels, DAP will be a virtual label linked to the product wherever it is sold or distributed. DAP is currently in the development stage and is expected to take several years to reach critical mass.

“Elsevier is currently working on creating the necessary infrastructure to make our content more accessible...We are modifying our DTD and our workflows in order to create, edit, store, and deliver alternative text and closed captions...We continue to make improvements to our various platforms, most notably Science Direct and the Elsevier.com website. We have made many improvements to the accessibility of Science Direct in recent years, including HTML articles that are screen reader friendly, keyboard friendly, and with clear, consistent navigation links. The Elsevier.com website has also been recently upgraded and now boasts a home page that is highly accessible.”

Tripp Narup | Manager, Global Books Digital Archive | Elsevier

Understanding these nuances, which apply to only one accessibility criteria, can be challenging. A consumer-friendly accessibility label would address this issue by bringing pertinent information together in one place, and by promoting a common understanding between buyer and seller, which is so important for accessibility.

To be effective, such a label must be supported throughout the digital content ecosystem. It may require support from the legal framework, similar to how the Nutrition Facts label on food packaging is mandated by the Food and Drug Administration. Mandating consumer-friendly labeling for products has many precedents, and given the potential for complex interactions between digital products, such a system may be inevitable as consumer demand grows for compatible and easily interoperable content and services.

Institutional Cooperation: Moving Toward an Accessibility Framework

Educational technology is already a complex area with numerous stakeholders, standards, vendors, and platforms. One of the challenges for a post-secondary institution addressing accessibility across every touch point is to manage the tremendous amount of information needed to make appropriate procurement decisions, just as students with disabilities face similar concerns about the best technology to buy for their own use.

Add to this mix the fact that information about accessibility can be difficult to come by and even more difficult to understand, and it is clear that colleges and universities need to cooperate more closely to have any hope of making truly informed procurement decisions. Colleges and universities will benefit from a reliable central source of information about the accessibility of hardware and software marketed for educational use. Not only will this help the institutions take accessibility into consideration when selecting or upgrading their infrastructure, it will provide a focal point for comments and feedback about those products from users across the spectrum. This type of due diligence in selecting products that are accessible, and proactively addressing accessibility issues as they arise rather than when a student with a

FITW Grant for Center for Accessible Materials Innovation

AMAC was recently awarded a US Department of Education 'First in the World' grant of \$3.8 million (over four years) to establish the Center for Accessible Materials Innovation.

The intent of this center will be to expand the marketplace for innovative and accessible digital content for students with disabilities, with the ultimate goal of improving retention and graduation rates.

The center will develop an 'accessibility label' for digital content as part of an informational application related to instructional materials. Additional activities include the production and distribution of accessible textbooks and assistive technology.

In addition, researchers will examine the causes of under-utilization of accessible textbooks at Minority Serving Institutions (MSI), and will develop a related Massive Open Online Course (MOOC).



disability encounters them, is becoming increasingly important: the legal framework requires non-discrimination which means technology, as a framework, must keep doors open, not closed.

Ideally, testing and evaluations to determine the accessibility of educational infrastructure software needed by institutions will complement the accessibility labeling of content for students with a disability as proposed above. Together, these processes and systems will provide buyers and sellers with a reliable roadmap of the accessibility landscape.

Educational institutions and the vendors who serve them have many unique challenges and opportunities that will require coordinated efforts for them to be effectively addressed, especially concerning the complex interaction between elements needed to increase accessibility and equality of opportunity for students with disabilities. Drawing from legal, technical, social, and educational domains, an accessibility framework will serve the needs of individuals and institutions, be they students, staff, faculty, or vendors.