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A QUALITY MATTERS WHITE PAPER

Course Design for Digital Accessibility: Best Practices and Tools

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RECOMMENDED ACTION PLAN

- ☑ Administrators can demonstrate an institutional commitment to digital accessibility by establishing a recognition system for faculty or staff who champion inclusive online course design.
- ☑ Course developers should educate campus partners on best practices related to digital accessibility, such as color contrasts, alternative text, captioning, document design, and more.
- ☑ Faculty can contribute to digital accessibility initiatives by participating in a peer review system focused on reviewing colleagues' courses for accessible pedagogy.



Table of Contents

Abstract	3
Introduction	3
Overview of Universal Design for Learning	3
Designing Online Courses for Accessibility	4
Tools for Promoting Accessibility of Online Courses	5
Methodology	6
Research Questions	6
Procedure	6
Participants	6
Data Analysis	7
Results & Discussion	8
Conclusion	11
References	12

Abstract

This second white paper in the digital accessibility series summarizes results of a benchmarking survey of Quality Matters (QM) institutions with a focus on course design practices and tools. Instructional designers and faculty members use a range of strategies and tools to proactively create documents, media, and web pages that meet the needs of diverse learners. The collection of course development practices includes the use of alternative text, heading styles, color contrasts, captions, and descriptive hyperlinks. Survey results indicated that most institutions caption multimedia assets, but practices involving the use of plain language and keyboard accessibility are less common. Current accessibility tools include Microsoft and Adobe products, in addition to learning management system (LMS) integrations.

Introduction

The growing number of online programs in the United States has expanded access to higher education for students with disabilities (Seaman, Allen, & Seaman, 2018). Learners with special needs often prefer online courses because they perceive them as less stressful and more flexible, allowing them to work at their own time and pace (Rao & Tanners, 2011). In addition, the online environment permits these students to work in a comfortable location (often at home with assistive technologies), which can facilitate their management of pain and personal needs. For students with disabilities, the online platform can be more academically and socially inclusive, as they can control the disclosure of sensitive information regarding their disability to faculty and peers (Verdinelli & Kutner, 2016). Given the many affordances of online learning for diverse learners, it is critical that courses comply with federal guidelines for accessibility, such as the [Americans with Disabilities Act](#).

Some institutions, however, continue to face legal action related to inaccessible instructional materials (Foresman, 2020). In online learning, common barriers

for students with disabilities include inaccessible publisher materials, untagged PDF files, videos without captions, insufficient alternative text (alt text) on images, among others (University of Washington, n.d.). Such barriers preclude students from accessing the information and resources needed to be successful in their coursework. Importantly, inaccessible course materials may contribute to low retention rates for students with disabilities in online courses (Linder, Fontaine-Rainen, & Behling, 2015).

Advances in technology make it possible to proactively create accessible instructional materials and review them for compliance. However, limited research explores the course development practices and tools used by experienced online practitioners. As a leader in online and hybrid education, Quality Matters (QM) equips faculty and course designers with the knowledge and skills to implement high-impact, inclusive practices through professional development and a community of practice. Moreover, the QM Higher Education Rubric™, Sixth Edition, is among the most popular frameworks used by online learning experts to review content for digital accessibility (Moorefield-Lang, 2019). Given QM's international presence, this study benchmarks the accessibility practices and tools applied by member institutions to ensure that online courses meet the needs of all students.

Overview of Universal Design for Learning

Universal Design for Learning (UDL) is a longstanding framework for proactively designing accessible instructional materials across all learning environments. UDL, also known as *design for all* or *inclusive design*, consists of three guiding principles: (1) multiple means of presentation, (2) action and expression, and (3) representation (CAST, n.d.). These principles encourage faculty and course developers (i.e., instructional designers, technologists, multimedia specialists, etc.) to use accessible materials, delivery methods, and assessment strategies from the outset of the course

development process (Rogers-Shaw, Carr-Chellman, & Choi, 2018), reducing barriers for students with disabilities. UDL minimizes the need for individual accommodations for students with disabilities and for retrofitting existing course content, which can be time-consuming and costly (Tandy & Meacham, 2009). It also promotes a culture of inclusiveness, where students with disabilities are not required to disclose their disability to gain equal access to education.

Applying UDL principles enhances pedagogy and maximizes learning for all students (Dell, Dell, & Blackwell, 2015). For students with disabilities, UDL's proactive approach reduces their wait time to access instructional materials that may require adaptation (McGowan, 2019), contributing to increased satisfaction with course instructors and improved retention rates (Tobin, 2014). Incorporating UDL principles into online instruction can also benefit diverse student populations, such as non-traditional students, international students, or students with older operating systems. For instance, captioning media provides multiple means for presenting content to learners (UDL Principle 1), ensuring that audio content is accessible via text. This practice not only ensures that content is accessible to students with hearing impairments, but also assists learners for whom English is a second language, as well as students working on mobile devices or in distracting environments (Bastedo, Sugar, Swenson, & Vargas, 2013).

Despite the benefits of UDL for online learners, some course developers and instructors remain unaware of strategies for improving the accessibility of digital course materials (Gladhart, 2010). According to research conducted by the OLC/WCET (2019), most participating institutions reported a lack of knowledge on how to proactively address accessibility (68%) and a lack of funding (64%) as the primary challenges in developing digitally accessible courses. Further research is needed on time- and cost-effective ways of leveraging UDL principles to meet the needs of students with disabilities in online settings (Burgstahler, 2015; Phillips, Terras, Swinney, & Schneeweis, 2012).

Designing Online Courses for Accessibility

At institutions of higher education, course developers and instructors often lack preparation in accessible online course design (Linder, Fontaine-Rainen, & Behling, 2015). The failure to implement UDL course design practices inadvertently erects barriers for students with disabilities in virtual settings (Burgstahler, 2015). Such barriers prevent students from accessing web-based instructional materials requisite for their learning. Common barriers include uncaptioned videos, unclear navigation, lack of alt text for images, and poor color contrasts (Gladhart, 2010, Burgstahler, 2015). While each student has unique needs that educators strive to address during the course development process, most practices can be grouped by four major disability categories identified by the [Centers for Disease Control and Prevention \(CDC\)](#): (1) vision, (2) hearing, (3) mobility, and (4) cognitive impairments.¹

Visual impairments are the most frequently cited disabilities that impact online course design. They include total blindness, low vision, and color blindness. Students with visual impairments, particularly total blindness, may make use of screen reader technology to scan webpages or documents for text that is read aloud, rendering the content accessible. Yet these devices have limitations and cannot read content embedded within graphics, interactives, or video files. They also rely on semantic structure, which is the application of headings or tags to navigate webpages or documents in the intended order (Crow, 2008). Further, users of screen readers benefit from descriptive words or phrases (rather than URLs) when accessing hyperlinks to online resources (Burgstahler, 2015). The addition of alt text is necessary to provide a concise description to screen reader users of non-text elements, such as photos or graphics (Whitney, 2020). To assist students with low vision, designers recommend the use of sans serif fonts as well as high color contrasts to enhance readability. For color-blindness, course designers should avoid presenting information in a way that

¹ Practices related to cognitive impairments are beyond the scope of this study.

relies exclusively on the use of color to convey meaning (Sokolik, 2018).

Students with hearing impairments may have a diminished ability to hear certain frequencies or difficulty hearing all frequency levels (National Institute on Deafness and Other Communication Disorders, n.d.). For audio, video, and multimedia materials, some students require real-time text captioning to facilitate learning. According to [Section 508](#), a printed version of the text (i.e., a transcript) does not substitute for real-time captioning (Crow, 2008). Research indicates that closed captioning benefits all learners. These benefits include increased attention and motivation, reinforcement of prior knowledge, and heightened understanding of course content (Tobin, 2014). Given the value captioning adds for learners, it should be a standard practice in online course development. Captions can be created through multiple means such as speech-to-text software, dictation, third-party vendors, or by internal course development staff, student employees, or faculty members (Morris, Frechette, Dukes, Stowell, Topping, & Brodosi, 2016).

Motor impairments that impact online learning involve students' limited use of their hands, making it difficult for them to interface with their computers. To enhance motor accessibility, faculty and course designers should consider providing alternative formats for activities that require a high degree of motor dexterity, such as real-time synchronous chat, games, or simulations. Bearing in mind that some students navigate their keyboard using assistive technologies, such as mouth sticks or eye tracking devices (Crow, 2008), it is also critical that documents, activities, and course pages are structured for keyboard-only navigation.

By applying accessible course development practices, faculty and course developers have the greatest opportunity to promote the success of students with disabilities. Research on faculty attitudes notes that while faculty generally support inclusive instruction, they may not take the necessary action to provide accessible course materials (Gawronski, 2014; Khan, 2020; Lombardi, Vukivuc, & Sala-Bars, 2015). This inaction can be attributed to a lack of time,

resources, budget, or specialized skill set, as many faculty members are not explicitly trained in online pedagogy (Bunk, Rui, Smidt, Bidetti, & Malize, 2015; Mitchell, Parlamis, & Claiborne, 2015; The Academy Senate for California Community Colleges, 2018).

The ease of applying online course development practices may be mitigated by the type of disability and technology. Faculty suggest that making online materials accessible for students with sensory disabilities, specifically visual and hearing impairments, can be especially challenging. Practices that are perceived as requiring less effort include allowing flexible deadlines, enlarging font, and providing alternative formats, while designing for assistive technologies (i.e., voice-activated software) may be more effortful (Phillips, Terras, Swinney, & Schneeweis, 2012). To ensure the maximum benefit for students with disabilities, some institutions provide guidance on the level of effort required to implement accessibility practices relative to their potential impact on the learner experience (see [Pitt Online accessibility recommendations](#), 2020).

Tools for Promoting Accessibility of Online Courses

Advancements in technology make the process of creating and checking digital course materials for accessibility compliance easier than ever before. Applications such as the Microsoft and Adobe suites offer tools for designing accessible documents and slide presentations. These features include the ability to add alt text for images, plus headings and styles for screen readers (Moorefield Lang, 2019). Nonetheless, assistive technology is ineffective if the content is not designed to be accessible (Acosta, Zambrano-Miranda, & Luján-Mora, 2020). Few studies benchmark the use of accessibility applications by online course designers. Over a decade ago, early research on QM institutions by Frey and King (2011) indicated that Microsoft Office (85%) and Adobe Acrobat Pro (67%) were among the most popular tools.

Multimedia files are abundant assets in online courses, with videos comprising a third of all online activities (Acosta, Zambrano-Miranda, & Luján-Mora, 2020). Making multimedia files accessible involves using speech-to-text software to create captions and transcripts. In 2011, Dragon Naturally Speaking was noted by Frey and King as a popular captioning option (24%), although QM institutions tended toward human captioning methods, such as in-house staff (58%), faculty developers (50%), and fee-based services (56%). Currently, employing student workers or assigning a course development team member to captioning or transcription tasks may be a more cost-efficient option for institutions (Cifuentes, Janney, Guerra, & Weir, 2016).

In addition to applications for creating accessible instructional materials, there are tools for identifying and correcting accessibility issues, including Microsoft and Adobe products with accessibility checkers. Web Accessibility in Mind (WebAim) also offers web-based services, such as a [color contrast checker](#) and a [web accessibility evaluation tool \(WAVE\)](#) that scan applications and websites to determine their level of digital accessibility (WebAIM, n.d.). Most learning management systems (LMS) (i.e., Blackboard, Canvas, and D2L) now have integrated accessibility checkers, such as [Ally](#) and [Udoit](#), that flag and report inaccessible components throughout a course. Nonetheless, automated checkers cannot replace human knowledge and experience for identifying and addressing accessibility barriers (Lieberman, 2018).

Methodology

QM institutions represent a broad spectrum of institutions of higher education around the world. Data for the current study were drawn from a larger QM-sponsored research project on digital accessibility. This data subset focused on course development practices and technology tools that support the digital accessibility of online courses within institutions of higher education.

Research Questions

The following research questions were explored using a mixed-methods survey design:

1. What *course development practices* (if any) are used by QM institutions to create accessible online or hybrid courses for students with disabilities?
2. What *technology tools* (if any) are used by QM institutions to ensure that online or hybrid courses are accessible?

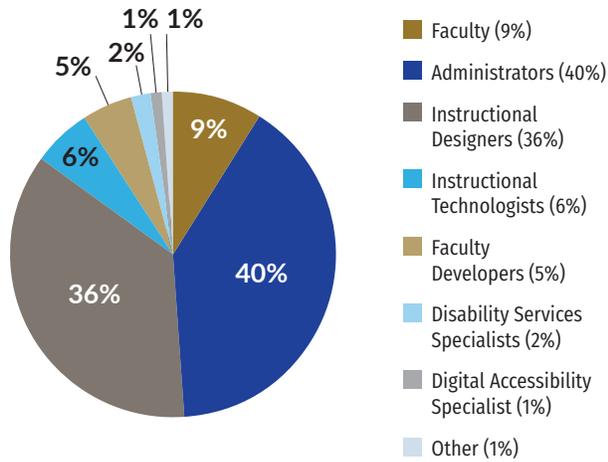
Procedure

Survey participants were identified through a database of active QM Coordinators. The survey instrument consisted of 30 qualitative and quantitative questions targeting five areas of digital accessibility: institutional policies, administrative processes, technology tools, course development practices, and professional development needs. It was administered via Qualtrics, a web-based dissemination tool and took approximately 10-15 minutes to complete. Regular reminder emails were sent through the listserv to encourage participation. Participation was entirely voluntary; participants could enter a drawing for one of 10 gift cards.

Participants

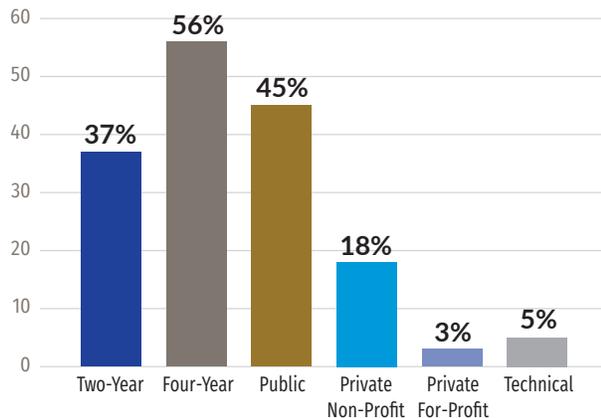
Survey participants were [Quality Matters \(QM\) Coordinators](#), representing their institutions. The electronic survey was disseminated to 1,721 subscribing colleges and universities who were contacted through the QM database, yielding a response rate of 16%, or 273 respondents (one survey per institution). After removing incomplete surveys, there were a total of 209 participants, most of whom were administrators and instructional designers. Faculty comprised a small group of respondents in addition to faculty developers, instructional technologists, disability specialists, and digital accessibility specialists (Figure 1).

Figure 1
Breakdown by Participant Role



The sample categorized institutions in various ways, by control, degree level, total enrollment, online enrollment, and number of online offerings. Two-year and four-year institutions were well represented, and nearly half of participating institutions were public, followed by private non-profit. Unfortunately, few trade or technical institutions and few private for-profit institutions responded to the survey (Figure 2).

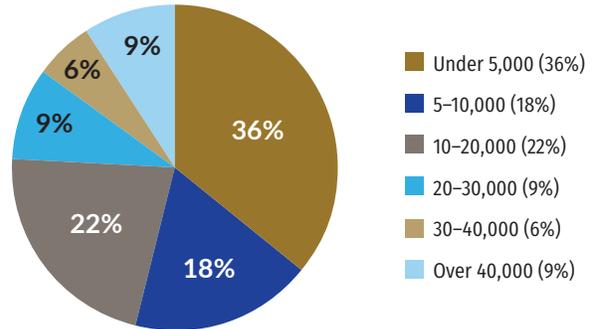
Figure 2
Breakdown by Institutional Control



Responding institutions ranged in size from small colleges to large universities. Institutional enrollments were generally under 20,000 students. Most respondents were from institutions with fewer

than 5,000 total students, followed by institutions with 10,000-20,000 students. Extremely large institutions were less common (Figure 3).

Figure 3
Breakdown by Institutional Size



Slightly over half of the responding institutions had less than 3,000 online students, while only 10% indicated more than 11,000 online enrollments. In addition, most institutions (62%) offered less than 400 online courses, while few institutions (9%) offered more than 800 online courses.

Data Analysis

Deidentified survey data was exported from Qualtrics into SPSS statistical analysis software (version 26). All incomplete surveys were removed from the dataset. Questions with multiple select options were recoded using dummy codes (UCLA Institute for Digital Research and Education, n.d.). Afterward, frequency distributions and descriptive statistics were calculated for all quantitative questions, and visualizations were generated. When appropriate, Chi-square analyses (Onchiri, 2013) with cross-tabulations were performed to examine relationships among institutional demographics and participant responses.

Qualitative, text-based questions were coded using a combination of inductive (open) and deductive (pre-structured) techniques (Jansen, 2010). Both researchers coded the data independently and then compared their results to reconcile discrepancies and generate a final codebook.

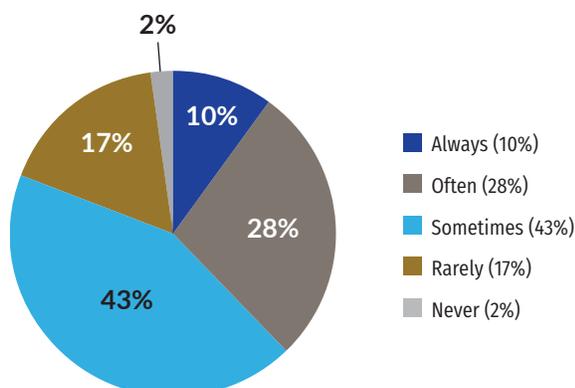
Results & Discussion

Results from the QM-responding institutions are presented according to the two research questions, which center around course development practices and tools.

What course development practices (if any) are used by QM institutions to create accessible online or hybrid courses for students with disabilities?

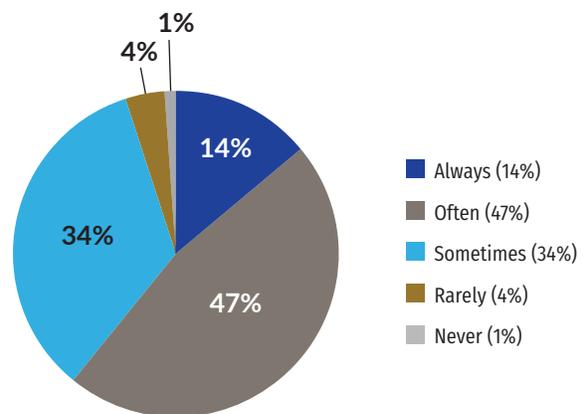
QM respondents varied in their use of transcription as a course development practice. While 38% always or often created transcripts, 43% used them only sometimes (Figure 4). Few institutions rarely or never made use of transcripts (19%). Overall, these findings highlight improvements in transcript usage over time compared to Frey and King’s (2011) initial benchmarking findings. While the percentage of respondents who did not post a transcript with audio files remained stable (19% in both studies), there was a marked increase in usage, as 2011 respondents transitioned from “sometimes” (68%) to “often” or “always” in 2019. This tendency toward greater use of transcripts may be attributed to heightened awareness of their importance for accessibility or possible advances in speech-to-text options for transcript generation. At the time of this survey, less than 50% of the responding QM institutions routinely incorporated transcripts (always or often), which may be due to a gravitation away from audio recordings (i.e., podcasts) to more sophisticated audiovisual media formats.

Figure 4
Use of Transcripts Across Reporting QM Institutions



QM responding institutions provided captions more frequently than transcripts. Most respondents adhered to captioning as a course development practice, responding that they used captions always or often (60.8%). An additional 34% sometimes captioned multimedia (Figure 5). Over the past decade, there has been a noted increase in captioning. In Frey and King’s (2011) early work, most respondents reported no use of captioning (74%); however, in 2019, the majority of respondents “always” (14%) or “often” (47%) captioned media. This may indicate a growing awareness of the need for captioning or reflect the ease with which captions may be auto generated by speech-to text technology. In addition, the growth in captioning may be commensurate with advancements in technology that facilitate the creation and number of multimedia assets in online courses.

Figure 5
Use of Captions Across Reporting QM Institutions

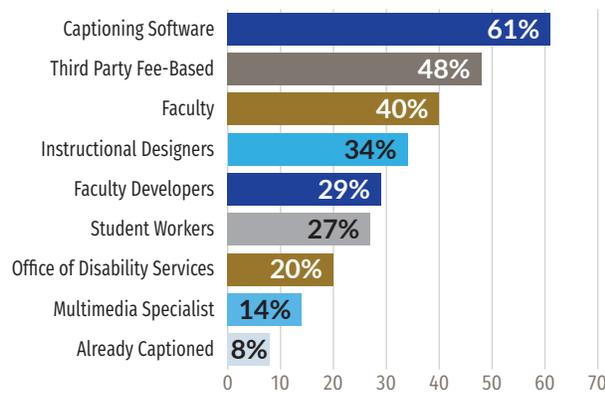


Respondents indicated that captions were typically created using a variety of overlapping methods (Figure 6). Captioning software that produces computer-generated subtitles was the most commonly reported method (61.2%), followed by third-party, fee-based services where human captioning is available (48.3%). Captioning applications, such as [Amara Editor](#), provide free, web-based solutions. Since the initial benchmarking survey in 2011, speech-to-text software has become the preferred captioning solution due to its speed and accuracy, now at 90% or higher (Frommert, 2018). At some responding institutions, faculty (39.7%) and

instructional designers (33.5%) were responsible for manually creating captions.

A Chi-Square analysis indicated that faculty members were more likely to generate captions using computer software, $\chi^2(1) = 7.076$ $p = .008$, while instructional designers tended to use a combination of computer captioning software $\chi^2(1) = 7.542$ $p = .006$ and/or third-party captioning services, $\chi^2(1) = 7.237$ $p = .007$ during course development. Differences in captioning methods among faculty and instructional designers might reflect a lack of instructional design services at some institutions, requiring faculty to provide their own captions. In addition, faculty members possess the subject matter expertise, including discipline-based terminology, that is necessary for creating captions. It is also possible that instructional designers work in centralized offices that allocate a budget for captioning media assets. Given the expense of generating captions through third-party providers, it is surprising that a Chi-Square analysis yielded no relationship between an institution's budget and use of captions.

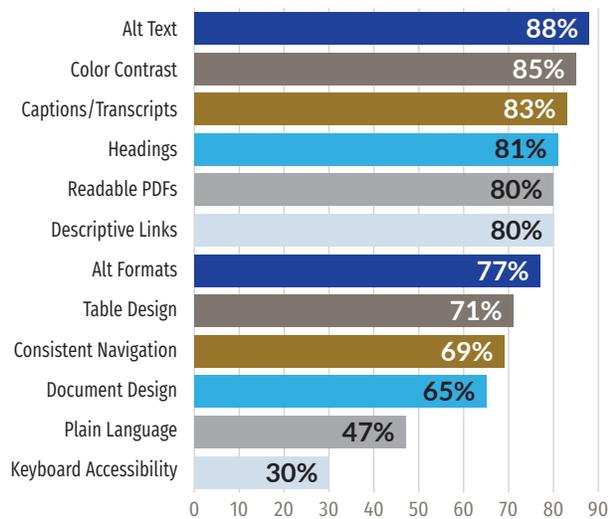
Figure 6
Summary of Captioning Methods Across Reporting QM Institutions



Survey respondents incorporated a continuum of digital accessibility practices into the instructional design process for online courses. More than 80% of participants regularly used alt text for image files, accessible color contrasts, captions or transcripts, style headings, readable PDFs, and descriptive hyperlinks when designing course materials. Emerging technologies make designing accessible course materials a less manual, easier process for developers and faculty, which is evidenced in the heightened use of some of the surveyed practices. For example, the frequent use of alt text may be due to advances in LMS features that now prompt users to insert alt text when uploading graphics. Applications within the Microsoft Suite also auto-generate alt text for images to facilitate accessibility. Other document design tools like Adobe Acrobat Pro help to quickly enhance PDF files by analyzing the heading structure to flag possible accessibility barriers, making them readable (even on mobile devices). Participants' high usage of accessible color contrasts may be attributed to institutional style guidelines that provide templates and color palettes, or to the use of color contrast checkers that identify inaccessible color contrasts and suggest alternatives.

Among the least utilized practices were plain language and keyboard accessibility, reported by less than 50% of participants (Figure 7). The term "plain language" means concise and clear writing that uses the active voice and is geared toward the target audience's literacy level. The low usage of these accessibility practices might indicate a lack of knowledge or skills. For instance, faculty or course developers may not be aware of how to test software for keyboard accessibility. It might also be necessary for course developers to query the publishers of third-party materials regarding keyboard accessibility. The low levels of plain language use might suggest a tendency toward a scholarly style of communication that may not be inclusive of all learners.

Figure 7
Summary of Accessible Course Development Practices Across Reporting QM Institutions



Although an array of course development practices was reported for making digitally accessible materials, respondents indicated that some practices required more effort than others. Specifically, creating alternative formats and captions or transcripts to accompany media required the highest level of effort. Respondents reported low-level efforts for creating descriptive hyperlinks; style headings; consistent navigation menus; and accessible colors, fonts, and contrasts (Table 1).

Table 1
Effort Ratings for Accessible Course Development Practices Across Reporting QM Institutions

Low	Medium	High
Descriptive Hyperlinks	Plain Language	Alternative Formats
Style Headings	Alternative Text	Captioning/Transcripts
Consistent Navigation	Readable PDFs	
Colors/Fonts/Contrasts	Table Design	
	Document Design	
	Keyboard Accessibility	

Respondents indicated a set of common challenges when creating digitally accessible course materials. The top four barriers noted were a lack of: (1) institutional and/or faculty support for inclusivity, (2) time, (3) resources and funding, and (4) training and faculty skills. These responses are congruent with faculty and staff barriers frequently cited in the research literature, including a lack of technical expertise, sufficient financial support, and time for authoring accessible content (Kurt, 2019). Additional participant responses included a lack of policy, which is an indicator of institutional prioritization, and a driver of a supportive infrastructure for accessibility (Mancilla & Frey, 2020).

What technology tools (if any) are used by QM institutions to ensure that online or hybrid courses are accessible?

Survey respondents utilized multiple tools for asset creation; the most commonly cited technology was Microsoft Office, followed by Adobe products and learning management systems. The widespread use of these tools has remained steady over time, as they were also identified as key development tools by respondents in the Frey and King (2011) survey. These findings are also somewhat expected, given that .pdf and .doc formats are among the most common for digital texts. A similar suite of tools was used for reviewing assets for accessibility barriers. Most respondents made use of the accessibility checkers in the LMS, Microsoft Office, Adobe Suite, and WebAIM, specifically the color contrast checker and WAVE evaluation tools. The increased usage of LMS accessibility checkers aligns with the growing number of Ally licenses, as institutions shift toward a culture of inclusion (Straumsheim, 2017). Similarly, WebAIM checkers have been cited as integral tools for reviewing online content for digital accessibility compliance (Cifuentes, Janney, Guerra and Weir, 2016). Finally, a few participants reported using screen reading software, such as JAWS and NVDA, to manually review materials. Table 2 summarizes all the tools and their frequency of use.

Table 2

Frequency Distribution of Technology Tools for Creating and Reviewing Accessible Instructional Content Across Reporting QM Institutions

Tool	Frequency for Creation	Frequency for Review
Microsoft Office	101	79
Adobe	65	42
Learning Management System	41	92
YouTube	29	0
Camtasia	23	0
Ally	22	0
WebAIM	0	24

Conclusion

In this 2020 study, QM member institutions were surveyed regarding the practices and tools they used to support digital accessibility throughout the online course development process. Results indicated that responding QM institutions ($n = 273$) consistently applied a continuum of accessible practices to design online courses, including adding alt text to images, ensuring adequate color contrasts, and captioning multimedia. These practices align with QM specific review standards 8.2 (readability), 8.3 (text and images), and 8.4 (multimedia access). Nonetheless, some course design practices associated with these standards were underused, such as incorporating plain language and structuring documents for readability, indicating a need for continuous improvement. Concerning multimedia, captions and transcripts have become a routine practice over the past decade, with captions more commonly provided than transcripts. Even so, few institutions reported total compliance with captioning (14%) and transcribing (10%) of multimedia assets, demonstrating room for additional growth. Findings also revealed that the course development practices were achieved through the use of a limited set of technologies for creating and reviewing course materials. Responding QM institutions primarily relied

on tools for document creation, such as the Microsoft Suite and Adobe Creative Suite, and accessibility checkers embedded within LMSs. Implications of this research extend to various higher education stakeholders, including administrators, course developers, and faculty members.

It is critical for campus *administrators* to establish a culture of inclusivity that undergirds all online course development efforts and prioritizes the digital accessibility of instructional materials. One strategy that demonstrates a campus-wide commitment to accessibility is recognizing the work of faculty and staff who develop inclusive online courses through awards, certifications, or badging programs (National Center on Disability and Access to Education, n.d.). Leaders can also create a supportive infrastructure for course developers and faculty members by allocating fiscal and human resources. As the use of multimedia continues to increase in online courses, administrators can account for the cost of captioning services provided through third-party vendors or human captioners (i.e., student workers) in their course development budget. The annual operating budget may include software licenses for auto-captioning tools and other technologies that enable accessible document design and review (i.e., Adobe Acrobat Pro) as well as accessibility checkers integrated into LMSs. Administrators can also support online course development through hiring personnel with specialized skillsets in multimedia, instructional design, graphic design, and instructional technology to assist faculty in developing accessible materials. Finally, administrators can cultivate the collective expertise of development teams by providing ongoing professional development opportunities on topics associated with digital accessibility.

Course developers model accessible course development practices for faculty and other institutional stakeholders. As experts in online course design, course developers can implement a train-the-trainer model (ToT) (Gleeson, 2017) at their institutions, focusing on providing face-to-face or virtual trainings on standard practices such as captioning, document design, alt text, color contrasts, and more. As the integration of digital

accessibility checkers becomes commonplace in LMSs, course developers can also educate campus partners on specialized topics such as how to generate and interpret the data from online course reports from tools like Ally and UDOIT. Moreover, the campus community may use just-in-time resources such as a micro-learning series, repository of training references and templates, routine spotlight on accessibility disseminated through email or newsletters, or help desk analysts who are trained to respond to accessibility inquiries. As the primary facilitators of campus training on digital accessibility, course developers may benefit from continuous professional development by external trainers to ensure they are adequately prepared to apply the full repertoire of accessibility practices.

As facilitators of online instruction, *faculty members* are responsible for delivering inclusive online courses that allow all learners to be successful. Faculty may start by self-assessing areas for personal growth and setting professional development goals. Based on the results of the present study, these goals may entail learning how to design accessible documents or navigation menus, among other practices that bolster digital accessibility. Faculty members can also foster an inclusive culture within their respective departments by advocating for accessibility and collaborating with colleagues to share resources that enhance their programs. Such resources may include a repository of templates and guides that model best practices for accessible course design.

In addition, faculty members may institute a peer review or buddy system whereby instructors identify barriers to accessibility in colleagues' online courses, ensuring that instructional materials meet the needs of all students. Similar to course developers, faculty members may also take on mentorship roles within their departments as they gain expertise in accessibility (i.e., nominate an accessibility expert within each department). Finally, it is recommended that faculty training focus on the most common applications used by faculty to design course materials, the Microsoft and Adobe Creative Suites. This will enable greater faculty autonomy and skill in the course development process.

In sum, future QM research might explore the relationship between faculty and course developers' self-reported use of accessible course design practices and data from LMS accessibility checkers on common barriers. This information could also form the basis of a needs assessment for faculty and staff training curriculum. Additional studies might explore the impact of training on specific course development practices (i.e., alternative text, plain language) and the frequency of their application in online course design. Following training, it may also be useful to investigate the role of ongoing support for faculty and course developers. Lastly, research could query the impact of administrative programs, such as recognition systems, on the advancement of inclusive course design.

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