Accessibility in Digital Humanities: Making Clio Available to All
Marshall University Research Corporation
White Paper

We are thankful to the National Endowment for the Humanities for the continued support as we build and improve Clio to better serve the needs of humanities organizations, educators, and the public. This grant supported our efforts to make Clio more accessible for those with limited or no vision, including better text-to-speech functionality, screen reader compatibility, alt-text for images, an extra-large AR arrow to offer real-time directions, and arrival notifications. Thanks to a supplement of nearly $30,000 in the early months of the pandemic, we also built a feature to help museums and sites offer simple virtual tours. As museums and sites reopen and plan for both virtual and in-person experiences, we hope to continuously improve this feature to better serve humanities organizations, educators, and the public.

Thanks to the support of the National Endowment for the Humanities, our partnership with the American Foundation for the Blind, and the dedicated work of our humanities scholars, students, and developers, Clio offers a variety of accessibility features and a virtual museum tour feature.

Background and Overview
After learning about the experiences of Clio users who are legally blind, and after talking with graduate students and former students in the humanities, including one who now works for the American Foundation for the Blind, our team recognized the potential of a website and application like Clio to reach the millions of people who have limited vision. Since Clio is free and therefore dependent on grants for financial support, our team searched for grants that might fund accessibility features. Our goal from beginning was to use technology to help people discover and share history and culture, and we believe that a digital platform should be accessible to all.

For this reason, we reached out to numerous experts in the field of accessibility, starting “at home” with faculty at Marshall University. Huntington is also the home of one of the American
Foundation for the Blind’s regional offices. Believing that history is for everyone, we visited with the staff at the AFB office in Huntington. They were generous with their time and offered advice for some simple steps how we could make Clio more accessible with just a few developer hours—the kind of work we usually support with small donations.

During the grant period, Clio grew to include over 1000 walking tours. We believe that this demonstrates the value of accessibility in this and other public-facing digital projects.

We were able to make small improvements to the way Clio interacted with screen readers, but also found that there were significant opportunities that would require changing the way Clio was built. Because Clio was built piecemeal as funds became available, and because it had grown into a complex (and often unwieldy) series of interrelated systems, the first step to make the website and mobile application accessible was to rebuild some of the essential building blocks as well as updating code and the underlying open-source software. Recognizing that this would take substantial funding, we began searching for external support in 2018 and were delighted to learn that our 2019 application to the National Endowment for the Humanities was successful.

“Just as texts can be accessible through audiobooks, and computers can be accessible through screen readers, Clio can be accessible through existing technology. We’ll start there, but just as AFB’s hashtag #NoLimitsAFB suggests, there are no limits to what we might create.”

Clio Founder David J. Trowbridge quoted on the American Foundation for the Blind website: https://www.afb.org/blog/entry/helping-make-history-more-accessible
After securing this grant, work began on accessibility features, and we were able to release several updates prior to the start of the global pandemic. As the spread of COVID-19 closed offices, it led to new demands for AFBs services as major companies turned to digital solutions. In addition, dozens of museums and other organizations reached out with requests for features that could help them reach the public virtually. At that moment, our mission to make Clio accessible took on new meaning and an enlarged scope.

No matter what browser or operating system, Clio now offers options to change font size, color scheme, and contrast. Users can save their preferred setting and it will be the default mode for them when they use Clio on the web or as a mobile application in iOS and Android.

Thankfully, two extensions and modest additional funding allowed us to complete each of our original accessibility goals in addition to completing a series of improvements to both the website and mobile application. Additional funds from the NEH also supported the creation of a virtual museum tour platform within Clio, a feature that has been utilized by scores of museums and has recently been expanded to better support in-person interpretation of museums and sites.

**First Steps Toward Accessibility:**

Our first priority was improving the way Clio works with accessibility features within both mobile applications (Android and iPhone) and each of the leading web browsers. AFB communicated with our developers via Zoom meetings, email, and a special Trello board we created. AFB consultants offered advice for improving text-to-speech within text fields and headers, and they also shared ideas for how Clio could move beyond compliance related issues to offering something unique that demonstrated the potential of technology to eliminate boundaries of access. AFB’s consultants have years of experience, mostly assisting companies as they work to reach and maintain compliance. As a result, many of our conversations with AFB consultants began with the assumption that Clio was a company concerned only with reaching legal compliance. As they understood that our goals were deeper, we enjoyed many conversations about the ways that a digital humanities project might offer more than simply larger font sizes or alt-text descriptions. But of course, we needed to start with these accessibility features, so our first four months were largely dedicated to improving the way Clio worked for those who utilize screen readers and those who needed larger fonts.

After building essential first steps like the option to modify text size, color, and background, better compatibility with screen readers, alt-text for images, and a native text-to-speech option for the introduction and backstory sections, we began work on the part of this project we believe was the most compelling—building a new system to make platforms that offer directions more useful for all people. Conversations before and during the grant period led to the idea of building two interactive augmented reality arrows within our mobile applications. The first of these arrows would be relatively small and “live” at the bottom of the screen while the second would...
be optional for those who needed or preferred something much larger. In order to make sure that this large arrow was helpful rather than obtrusive, we decided that it would need to fade in and out of the user’s screen so that they could still see all of the information provided by Clio and their camera.

Digital Access During a Pandemic: Creating a Basic Virtual Museum Tour Platform:

During this period, our team participated in six webinars and conducted over fifty Zoom calls with museums, historical societies, educators, and community groups. In addition to offering demos of the new features that were possible thanks to the NEH, we requested feedback and their ideas for how a digital platform like Clio might offer in the future. We were able to support some of these requests, including the development of a digital story map platform and the option to add “contributing entries” that offered context beyond major landmarks. The option of adding contributing entries made the digital story map a possibility, and it also expanded the interpretive potential of walking tours, virtual museum and site tours, and heritage trails. For example, authors can now create multiple Clio entries for the same landmark, with each of those contributing entries “living” within a thematic trail. That landmark’s stand-alone entry can include elements of each of those thematic histories and then include a link to the respective thematic trail. In this way, someone who is curious about the architecture of a downtown theater could learn about its connection to segregation in ways that lead them to discover the city’s African American history trail.

COVID-19: Challenges and Opportunities for Accessibility

COVID-19 led to increased demand for the services of AFBs consultants, and that resulted in frequent personnel changes and sometimes delayed communication as all of the AFB staff we had originally worked with found new positions. However, thanks to the team of talented developers and their eagerness to leverage AFB’s feedback using a Trello Board, Zoom calls, and email, we were able to achieve our original objectives in building accessibility. Thanks also to the graduate students at Marshall University who worked to edit entries, including the addition of alt-text for images and their work testing various versions of new features, together with our team of humanities professionals, we were also able to develop new videos and written guides.

These new accessibility features, platform updates, improvement to content, and updated guides and videos were developed and written during a two-year period when the number of humanities organizations using Clio nearly tripled. As of October 2021, there are over 1300 walking tours, heritage trails, virtual museum tours, and digital story maps in Clio.
This chart shows Clio’s growth in terms of daily users in July 2019, demonstrating the project’s increased use during the pandemic. At the time of this white paper’s publication (October 2021), Clio had reached the top 50,000 websites for global traffic and was ranked in the top 12,000 websites in the United States by Alexa, a company that measures website traffic.

User Survey and Webinars:
Recognizing the unique challenges facing museums, libraries, universities, historical societies, and general Clio users, we are thankful to the people and organizations who responded to our request for feedback about planned and potential accessibility features in the fall of 2020. Thanks to AASLH, OAH, and the NCPH, we offered two webinars and two conference presentations that discussed the new virtual museum tour feature as well as the new accessibility features. We also sent a survey via a new platform built into Clio but used sparingly that allows Clio users to opt-in to updates and user surveys.

The project was highlighted by local media, including this story on the front page of the Herald-Dispatch and a news broadcast that included footage of a meeting between AFB consultants, our software engineers, and our PI.

The most requested features and services were clearly shaped by the needs of public-facing humanities organizations and educators as they pivoted to remote programming. Many smaller organizations appreciated the basic virtual museum and site tour platform we created, while larger museums and sites requested additional features. We hope to incorporate these requests into future grant applications, including the desire for ways to replicate the functionality of headsets and touchscreen kiosks in a post-pandemic world where personal devices are safer than offering shared devices. Our capacity to meet this request, along with others such as hosting interactive 360-degree galleries, have the potential to increase the reach of thousands of museums and sites while lowering costs for those who are utilizing paid services for these options.
Tour Conversion to Accessible PDFs
Our team built a system that offers the option of converting any virtual museum tour, walking tour, driving tour, digital story map, interpretive nature trail, and heritage trail into a PDF. This format provides more options for users, making Clio accessible for those who do not own or prefer using a mobile device. Any tour can be saved, sent digitally, or printed, making Clio a better option for educators who need to be able to offer educational content offline. This has also helped make Clio accessible as well as those who prefer print media.

Audio Library, Alt-Text, Image Optimization, Captions, and Working with Students
Working with AFB and our developers, we added an alt-text field for all images. We also built a new image library that offers a larger display and facilitates scrolling, longer captions, and the option to add up to two audio files in addition to text-to-speech within every entry. The new gallery supports more file types to offer more options for authors, and we worked with MU students to edit thousands of entries to improve captions and offer alt-text for a growing number of Clio entries. Recognizing that hiring students to add alt-text for the entire Clio library was both impractical and thankless work, we used the services of a leading software company to auto-generate alt-text. In order to maximize our resources, Clio will utilize the free tier of this service, allowing for a small number of auto-generated alt-text descriptions each week.

Model Tour and New Guides and Videos that Emphasize Accessibility
While student-created or computer-generated alt-text offers one solution for accessibility, we believe that one of the most important outcomes of this grant will be our capacity to use these new features to communicate the value of accessibility. As a result, a key element of this project was the creation of a model tour as well as a new suite of guides and instructional videos that show how to add alt-text to images and along with the new image library and other accessibility features for users.

Survey of Users Leads to Interactive Birds-Eye Map
Conversations about accessibility soon led to discussions about how Clio could be more helpful for older users. We made it our mission to build a platform that would guide anyone who would like to use the mobile application to enjoy a walking tour, including those with limited vision and those with limited experiences with mobile applications and technology. After sending out a survey, one of the many wonderful ideas we received was the suggestion that we build a birds-eye map that shows each point of interest along with the user’s present location. While our original hope was that this new option would make Clio more accessible, we soon realized that it opened new possibilities for users. In short, they could easily “choose their own adventure.”
rather than having to follow a preset tour route. By making each point of interest a clickable entry, and by showing their location in real time, users were able to simply walk around a downtown area, park, cemetery, or campus and learn about the points of interest nearest their location. In addition to offering a new way to interact and learn about one’s surroundings, this new accessibility feature has the potential to allow users to modify tours as they need, potentially limiting the need to travel longer distances.

Accessible AR Navigation
Our biggest challenge was building something truly unique that could always point users the way to the next stop on a walking tour, heritage trail, or virtual museum/site tour. Recognizing the small size of streets and “dots” available in most GPS-based directional systems in 2019, we wanted to build something new-- the option for an oversized arrow that could assist those with limited vision by recognizing their present location and orientation, and the number of feet they would need to travel to reach the next landmark. We also wanted all users to be able to create custom walking tours using the growing database of individual Clio entries, and then offer real time, point-to-point directions via the AR arrow.

With the support of AFB, we built two arrows that integrated with location services and the gyroscope within most mobile devices. The first AR arrow is relatively small and located at the bottom of the screen. The second arrow is available as an accessibility feature. When users turn this feature on, a very large AR arrow will appear on the user’s screen, always pointing users to their next stop. Users can click a large button to hear audio (either text-to-speech or one of up to two original audio recordings if present in the entry) and they will also see the approximate number of feet they need to travel to reach the next landmark on their tour.

The image above shows a November 2020 test of the large blue arrow designed with AFB to guide users with limited vision. Owing to the rapid rise of COVID-19 at this time, our team created and tested walking tours near their homes.

Continued Work:
During the grant period, we have been working with a few of the leading video creation platforms with the goal of creating a text file for videos that are linked within Clio entries. After the pandemic, we found that nearly all leading video providers offer transcription within their platforms, and since video files in Clio are linked rather than embedded, (this is essential to preventing Clio’s mobile application from taking up too much space on a user’s device) our best path towards accessibility is to communicate with more video creators. In addition to strongly encouraging video creators to enable accessibility features when they upload their videos to Vimeo, YouTube, and others, we hope to encourage them to allow third-party websites to
display these videos. While Clio users can easily open videos regardless of this setting, we have found that this extra step is a barrier.

While availability and awareness of the need to enable transcription within leading video platforms is growing, transcription for audio files remains a challenge beyond a few leading commercial platforms. In the past year, we have been working with Descript, an audio editing platform that grew from a now-defunct commercial walking tour platform called Detour that we held as a model in our grant application’s environmental scan. While Detour was not commercially successful, that effort led to the recognition that museums and other organizations that offer walking tours need to have a simple way to create and edit audio files. That recognition led to the creation of Descript, and in the past year, their engineers have developed one of the most advanced automated transcription programs. While this software is commercial and the cost of building a plug-in with a commercial provider may not be sustainable, we hope to find open access platforms that will approach the accuracy and simplicity of Descript by creating an editable (and embeddable) text file for audio content in Clio.

While finding an automated, no-cost, and sustainable solution for creating accurate transcriptions of audio files has been a challenge, we believe that one of the few positive outcomes of the global pandemic will be an increased awareness of the value of accessibility. We look forward to building a simple, accurate, and no-cost solution to offer speech to text for those who cannot access the growing number of original audio files in Clio and other public-facing humanities platforms. We have enjoyed several fruitful conversations with the team at Descript, and we are optimistic that our goal of providing text versions of original audio tracks in Clio will become a reality in 2022.

During the grant period, student workers added alt-text for images and helped to edit entries. Those training to become teachers also created several guides and lesson plans under the mentorship of project leaders.

**Conclusion**

We are thankful to the NEH for supporting the development of new features that are making Clio accessible to more people and in more ways. We hope that our experience and these new features will serve as a model for other public-facing digital humanities platforms, and we hope that we can continue to make accessibility a cornerstone of Clio as we build new features that help hundreds of organizations and scholars reach the public. We also hope to share our experience in building accessible location-aware technology with others who are building websites and other digital project in the arts, sciences, and humanities. Finally, we hope that this project’s success helps to demonstrate that advancements in digital humanities demonstrate that innovation happens across academic disciplines.