

Accessible Learning Experience Design and Implementation

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Abstract. In order to create equivalent educational experiences in higher education for students with disabilities, a full integration of universal design ideas needs to be implemented into the design of websites and courses. This paper discusses the theory of an Accessible Learning Experience by looking holistically at the objectives of higher education institutions, and seeks to develop and implement strategies to ensure the accessibility of content for an organization's diverse audiences.

Keywords: Higher education · Accessibility · Universal design · Course design · Web design · Disability

1 Introduction

Organizations are increasingly acknowledging the importance of the accessibility of content offerings and systems while also expanding their missions through outreach, research, and instruction. Universities are charged with maintaining a variety of programs and with preparing students for the workforce while maintaining a brand of world-wide engagement. As the roles and goals of higher education institutions evolve [1] and increasingly rely on electronic and information technology (EIT) [2], which includes the web, software, and hardware [3, 4], it is essential to consider the experiences that we craft.

As higher education institutions work to expand their outreach, and to acknowledge and increase the diversity of their students [5], they also work to build their global brands around ideas of diversity and inclusion [6]. The university is no longer a regional source of education and empowerment, but is instead a global identity that participates in global research, service-learning that engages students and communities, and innovation by encouraging students, faculty, and staff to identify needs and to create solutions to them using interdisciplinary teams to innovate and create content that is representative of the work and learning of students and the university. The distance barriers that information once encountered are now gone, and any research that is done now can and should easily be made available to scholars around the world [7].

Due to the various roles of universities in the present day and moving forward, it is important to recognize the different processes that universities use to accomplish their unique but broadening goals. Knowledge is a primary end-product of higher education and information-delivery is frequently done using the web. As university websites hold

more and more valuable information, it is important to consider how a university's web presence is used. This web presence creates an experience that is used to offer a service, whether it be to students, employees, or external individuals who are interacting with the website to learn about the university, research, and other objectives of the university. According to Hart-Davidson et al. [8], one of the observations that content strategists are making when working with organizations is that websites are increasingly representative of an organization's overall goals, rather than just a product or one service offering.

Acknowledging the importance of an organization's websites, an accessible website for persons with disabilities is an important aspect of conveying organizational objectives and services. Accessible EIT is EIT that can be broadly used, operated, and understood by individuals with a variety of disabilities [9]. To design an accessible website, course, or piece of content, organizations should consider how individuals with disabilities use their web content, and how their content creation process and environment can work to build accessibility throughout development. For an Accessible Learning Experience to be created for students with disabilities, students need to be able to access materials in an equal amount of time. According to the first page of the Resolution Agreement between the U.S. Department of Education, Office of Civil Rights and the University of Montana:

'Accessible' means that individuals with disabilities are able to independently acquire the same information, engage in the same interactions, and enjoy the same services within the same timeframe as individuals without disabilities, with substantially equivalent ease of use [10].

This definition of accessibility is in line with other Resolution Agreements which endeavor to define the term "accessible" broadly [11–13]. This definition also reflects one of the main barriers that students with disabilities express experiencing, which is the amount of time it takes to access the same assignments and readings, or to perform the same tasks with accommodation [14]. Reacting to students with disabilities and arranging accommodation requires time and is expensive in resources [15], and is impractical and not fully beneficial to students, instructors, or support staff. Accommodation is necessary in some instances, but it is better to be proactive about providing accessibility, so that students do not have to wait for accommodation.

Accessible Learning Experiences are developed through the designing of processes, strategic objectives, and user experiences that use the principles of accessibility, Universal Design, and Universal Design for Learning. Whichever process the designer uses to build experiences, an Accessible Learning Experience is the product of good design strategies and tactics, and a point to aim for when designing new systems and content. Accessible Learning Experience design requires designers to consider functional requirements when creating new content.

2 Accessible Learning Experience Design

An Accessible Learning Experience is a user experience that provides learners with a variety of disabilities (be they students or users) an equivalent experience to learners

without disabilities, and in an equivalent amount of time. An Accessible Learning Experience is an end product for an end user that can and should be created by following best practices for accessible design as they evolve. Accessible Learning Experiences are not built solely out of principles of Universal Design, or an equivalent heuristic, but rather are built around the processes that support the development of systems (websites, courses, etc.) and ongoing organizational support.

2.1 Process Development

The support structure to develop these experiences revolves around the creation of and maintenance of processes which reinforce quality user experiences for all. As Lazar, Goldstein, and Taylor discuss on page 179, building a plan for accessibility requires specific goals and looking holistically at organizations, and that “organizational contexts” define how organizations should develop plans [16]. In order to enact ongoing plans, organizations need to build processes into existing teams and consider how to develop organizational awareness for individuals with disabilities and the varying ways that these users access and use technology. Process development for accessibility requires executive buy-in and leadership, clear communication and training, and a culture of awareness for digital accessibility [17]. Processes for building Accessible Learning Experiences vary by the goals of the organization trying to implement these experiences for their students, users, or customers.

For an educational institution, an organization may have the goals as described in the introduction, but for a corporation the goal may be to educate customers on service offerings, or to ensure that information about products can be widely accessed so that more products can be sold online. Developing processes that move towards offering an Accessible Learning Experience requires revising these goals. Providing support for the user’s ability to learn a system gives users the tools they need to make informed decisions on purchasing products.

2.2 Ongoing Organizational Support

To consistently provide Accessible Learning Experiences, organizations need to provide support to instructors and developers through training and technical expertise. Technical experts in institutions should work with various teams to provide training and instructional material that is kept up to date, and that evolves with new emerging technologies and technical guidance. Teaching accessibility can be difficult, and while there is some research about effective instructional content for accessibility [18], it can be difficult to maintain effective programs for organizational needs. There is no way to quickly mend the accessibility of an organization, or for organizations to holistically change processes which are used in research, instruction, outreach, and design of digital content without administrative support. Accessibility is a journey along defined processes rather than a destination point. As content representative of organizations is created and distributed daily, it is important to consistently follow and develop processes to protect the rights of students, consumers, and users with disabilities.

3 Functional Requirements of Accessible Learning Experiences

To create Accessible Learning Experiences, a variety of theories and implementation strategies can be followed, but there are several core pieces to an Accessible Learning Experience. Several of these requirements are developed from the settlement language referenced earlier in this paper. An Accessible Learning Experience is an experience wherein a user (whether they are a student or a customer learning how to navigate a website's interface and content) has equal access to EIT content.

Firstly, an Accessible Learning Experience requires that a user with a disability be able to interact with EIT content with the same level of independence. If a "regular" user can navigate, operate, and use robustly a system alone, then a user with a disability should be able to as well. If a user is expected to engage in peer or expert interaction to complete tasks, then a system must allow for a user with a disability to engage their peers or be assisted by an expert similarly. While many users with disabilities may use assistive technologies, certain elements of design and programmatic design will drastically affect the ways in which these technologies work. As Bouck discusses on pages 17–20, assistive technology has an impact on the accessibility of content, but the digital environments that content providers use or create plays a significant role in determining whether or not a user will be able to independently acquire information [19].

In recognizing the importance of assistive technology, it is also important to note that all users with similar disabilities will benefit from or use assistive technology [20]. Design content that can be manipulated independently by the end user, or manipulated by the user's use of assistive technology, but do not design content that presumes the user's use of assistive technology, or that forces the user to use assistive technology that they may or may not be comfortable with using. Just as the designer/content creator should build for an independently accessible experience, the designer should also respect the principle that the user plays a role in building the digital environment by choosing and personalizing the user agent used to access content and by choosing whether or not they choose to use certain assistive technologies in certain situations. In education, this is particularly critical, as the user's personalization of the ubiquitous technologies used to access contextually educational EIT does play a role in personalizing what educators may perceive to be a standardized environment for interacting with ideas [21]. Peter Blanck echoes this idea on page 39, by describing applications and content that are "universal, yet capable of individualized operation" [22].

Secondly, an Accessible Learning Experience requires that a user with a disability have access to the same information when using EIT. Information cannot be segregated, and optional information, if designed to be optionally included in a curricula (or to provide optional information to a user), should optionally be available to users with a disability. Information that is secondary to one user may be primary to another. For example, while one consumer may not need to know that your organization charges an international service fee for transactions, this piece of information may be critical to understanding and decision-making for other users.

Again, in education this is particularly important as users interact with the information they need to arrive at competencies, especially in the increasing popular Flipped Learning classrooms (flipped classrooms), where students prepare themselves for

project-based classrooms by interacting with video and written instructional material prior to each face-to-face or online class period [23]. Students have a great deal of ownership over what they perceive as optional/secondary content as they work to scaffold their competencies such that they are prepared for class.

Thirdly, an Accessible Learning Experience means that students with disabilities should be able to access the same types of interactions as students without disabilities. Alternative modes of access may change the learning experience that students receive, as learners with different learning styles may benefit differently from the types of media that they are interacting with. If you are providing multiple types of media for users to interact with, then that each iteration of that information should follow best practices for accessibility. With each redesign of information media, we are crafting separate experiences and need to consider the impact that this information will have on the user. Additionally, the way that information is structured affects how we process and interact with information [24, 25]. Ensuring that students with disabilities should have access to all interactions in courses means that the instructor will not risk the reduction of usefulness of information by changing the media, and also that the instructor will not need to maintain separate learning experiences, but instead curate one that is more beneficial to all students. If an instructor wishes to provide instructional material across multiple media, then it will likely be advantageous to do so, but the instructor should make sure that all of these interactions are as accessible as they can be made to be.

Fourthly, an Accessible Learning Experience requires that students with disabilities be able to acquire information in the same timeframe as individuals without disabilities. Time is a large barrier for students with disabilities who may need to work with University offices and to reformat content themselves in order to interact with it. Ensuring that content can be accessed in a reasonably equivalent amount of time gives students the access that they need to succeed. In the unlikely event that it is unreasonable to expect users with certain interaction strategies to be able to interact with systems in an equivalent timeframe, it is important to remove barriers as you are able and to work towards this point.

Fifth, an Accessible Learning Experience requires that students be able to interact with content in a way that the settlements refer to as “substantially equivalent ease of use”. This idea invokes that in order to fairly assess the level of accessibility of content it is necessary to understand the usability of it for persons with disabilities [26]. To measure this in practice, it is necessary to do usability testing and gather user research on both students with disabilities and students without disabilities. In order to understand whether a component of curricular content or a website offers equivalent ease of use, it is important to gather qualitative (and quantitative data, where funding permits) on student experiences. To define an Accessible Learning Experience it is essential to weave this fifth principle into the four mentioned above, and to consider time impact on students with disabilities when designing and developing websites, courses, and curricula. It is important to note that the changes in institutional engagement and the access to global information broadens the users that organizations will receive.

These five functional requirements for an Accessible Learning Experience should inform the processes that organizations design to ensure the accessibility of their EIT. It is important to note that these recommendations for can be applied and used in the

design of interfaces for websites. Usability specialists oftentimes highlight the importance of learnability in interface design [27, 28], either by suggesting that learnability is part of usability or by suggesting that there is a correlation between learnability and usability [29]. Accessible Learning Experiences are experiences that are crafted to be equivalently accessible for users with disabilities who interact with EIT including software, hardware, websites, and media.

4 Implementation

Implementing Accessible Learning Experiences requires institutional knowledge. There is no prescription to offer administrators and advocates that are looking to increase the accessibility of their offerings. Considering accessibility requires broadly considering the goals of an institution, the current processes, and the impact on users. Moving towards accessibility requires holistic institutional commitment and enough executive buy-in to be able to reach out to all aspects of the university. One way to think about accessibility in higher ed is to consider a course development process. The Quality Matters program has eight general standards that can give institutions a guide for asking questions about how to build accessibility into institutional policies and workflows: course overview and introduction, learning objectives (competencies), assessment and measurement, instructional materials, course activities and learner interaction, course technology, learner support, and accessibility and usability [30].

An example series of questions to ask about your organization is: do our learning objectives support diverse interaction strategies? How do we evaluate course technology for accessibility? Answers to these questions might be: our IT team has an expert staff of accessibility specialists who provide centralized training and support to faculty and instructors who are creating course content, and we evaluate the accessibility of EIT that we purchase.

Other questions may be: How do we convey information about accessibility services in our syllabi, and how do we ensure that faculty follow best practices for syllabus creation and course introduction? How do we ensure that our assessments don't discriminate? How do we remediate content that we have on our websites while being innovative and developing a strategy for creating content moving forward? How do we use diverse media and pedagogical strategies in an accessible way? How do we measure accessibility and usability? How do we track progress towards a more accessible university? These questions can vary, but administrators will notice key areas of overlap and areas where working groups or focused teams may be needed. Accessible Learning Experience designers will ask these questions and develop answers by working with students, faculty, and staff to gather information to meet these functional requirements.

Having teams that focus on the challenges that accessibility of EIT brings in various areas is a must. It is not enough to task someone with spending a small percentage of their time on accessibility. All individuals who create content that is representative of an organization should spend small amounts of time thinking about accessibility and in being trained in best practices for document design (with these practices including accessibility). Having a disability services unit as well as a unit in IT that focuses on

accessibility is a start, but it may also be practical to position accessibility advocates in various other units, depending on the organization.

5 Discussion

It is difficult to impossible to provide a practical checklist that can be followed to provide Accessible Learning Experiences to all students at the onset. Therefore the most important thing that organizations can do is to listen to students with disabilities, to invite students with disabilities to participate in committees on accessibility, and to continuously improve the educational experience for all by learning from the necessary accommodation of students with disabilities. The idea of an Accessible Learning Experience is not around to downplay the need for accommodation, and meeting these functional requirements for a large percentage of learners will not eliminate the need for accommodation. In proactively seeking to create Accessible Learning Experiences, designers of websites and instruction will reduce the need to react to accommodation requests that may boost the expense depending on turnaround time, such as for captioning requests. Accessible Learning Experiences always put the student first and also encourages the participation of students with disabilities in designing processes and in understanding training needs.

Prioritization is another key concept of Accessible Learning Experiences. With the wide breadth of content that organizations create, it is important to have a plan for how to prioritize content remediation and training. Theories are useful, but only as useful as the end product for the users with disabilities, and continuing to learn and understand how many people use content and gathering analytics can be useful in informing administrators on focus areas. It is also important to note varying legal obligations when creating prioritization. Additionally, consider how copyright may have an impact on your ability to provide accessible content to students with disabilities in a proactive manner [31].

6 Conclusion

Accessible Learning Experiences are experiences that are the product of process development and of tactical content creation strategies. There is no one right way to infuse accessibility into organizations, organizational awareness will dictate how administrators and advocates implement Accessible Learning Experiences. Accessible Learning Experiences are equivalent such that users with disabilities have equal access and right to information in EIT experiences. There are five key components to Accessible Learning Experiences: ensuring that students with disabilities have equal level of independence, have access to the same information, have access to the same interactions, and can complete tasks through these interactions in the same timeframe with similar usability to users without disabilities. As educators create and distribute educational content, it is increasingly important for universities to acknowledge the institution's role and responsibility in providing equal access to all, regardless of disability.

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