



Physical & Web Accessibility for the Mohammed VI Center for the Disabled

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Chapter 1 | Introduction

There are more than 1.7 million disabled Moroccan citizens, or about 5% of the population according to the 2014 Moroccan census (Maaroufi, 2014). This community faces a number of challenges unique to their disabilities. Steps or crowds are obvious barriers to those with physical handicaps, however the conscious and unconscious biases formed by social stigmas and lack of access to everyday activities can also act as a stumbling block, especially for those with developmental disabilities. Combined, these obstacles can exclude individuals with a variety of disabilities and render them dependent on others (Zahidi & Wardi, 2016).

The Mohammed VI Center for the Disabled assists approximately 5,000 disabled individuals per year by providing them with medical care, vocational training, and many other services. In spite of its mission, their center is difficult to navigate, with many similar-looking buildings and few signs to set them apart. The center needs interactive and universally accessible displays for navigating the grounds (Burris & Velez Llorens, 2017).

Similarly, the center hosts a website which features information related to the Mohammed VI Center for the Disabled, their leaders, and their programs. However, this site is difficult to navigate and is not complete. A website designed with accessibility in mind could be more useful for visitors, whether disabled clients themselves, or their caregivers (Centre National Mohammed VI Des Handicapes, 2014).

Our goal as a team is to improve physical and online accessibility for the members, staff, and visitors of the Mohammed VI Center. To meet our goal we have identified three main objectives:

1. Familiarization with the center and their expectations for accessibility.
2. Understanding the physical, developmental, and social barriers for the disabled members of the center.
3. Identify and develop standards for clear and concise signs and online displays.

Our objectives outline three general ideas in order to accomplish our goal. The objectives create sections in our project that are general enough that we have space to be more detailed yet isn't so broad that we will lose sight of our goal.

Chapter 2 | Literature Review

Disabled individuals face very specific obstacles that can hinder their ability to navigate and communicate. This chapter presents background information on the Mohammed VI Center for the Disabled. We explore general barriers for the disabled, and present best practices in ideas for universal design, signage, and web design. This background information gives insight on the challenges people with disabilities encounter in their day to day life.

2.1 Daily Challenges and Discrimination Against Disabled in Morocco

Before delving further into our proposal, we believe it to be important to define who we are talking about when we use the word ‘disabled.’ As previously noted, 5% of the Moroccan population have one or more disabilities. Almost 800,000 of those surveyed (or 46.5%) are over the age of 60, however approximately 780,000 (45.6%) are of employment age, between 15 and 59. Out of all the individuals considered disabled in Morocco, 89.3% are unemployed (Maaroufi, 2014).

Recognition of the needs of and opportunities for disabled persons is relatively new in Morocco. Thus, much of the country’s architecture and infrastructure is still not accessible for those with physical handicaps. This includes availability of public transportation, building access, sidewalks conditions, and so forth. Adil Nidae, a Moroccan student confined to a wheelchair, recounts his difficulty in getting to class on time due to the lack of accessibility. The fastest way to school is by bus, however busses are impossible to board in a wheelchair without the assistance of a fellow citizen, and are often too crowded to fit his wheelchair (Zahidi & Wardi, 2016).

The lack of education and vocational training is an important factor when it comes to disabled citizens acquiring work. Unfortunately, about 66.5% of people in Morocco with disabilities have no education at all (Maaroufi, 2014). This makes it more difficult to gain even basic employment or the training necessary to become employable within specialized fields.

Furthermore, social stigma about the mentally and physically disabled still exists in Morocco. According to Karimova et al., the Moroccan public often portrays disabled individuals in a negative manner, even to be “devilish” (Karimova et al, 2015). This stems back to when Middle Eastern society considered the disabled to be impure in biblical times. In today's Moroccan society, some still view a disability as a punishment from God (Karimova et al, 2015).

Even though our project will not specifically confront stigmas against the disabled of Morocco, we believe it is important to understand the potential confrontations the clients of the center may face.

2.2 The Mohammed VI Center for the Disabled



Figure 1. Photographs of the Mohammed VI Center for the Disabled in Salé, Morocco (Centre National Mohammed VI Des Handicapes Website, 2014)

The Mohammed V Foundation for Solidarity is a national organization that provides resources for underserved Moroccan populations. Individuals who participate in the foundation's programs receive services ranging from physical and developmental support, to housing and vocational training with the goal of enabling them to become integrated into “the country’s developmental process” (Mohammed V Foundation for Solidarity, 2017).

The Mohammed VI Center for the Disabled is an organization within the Foundation for Solidarity that further focuses on the social and occupational integration of their clients. The center has five locations throughout the country, where disabled individuals can use sports facilities, seek medical services including physical therapy, and access many other resources as shown in Figure 1 (Centre National Mohammed VI Des Handicapes, 2014). The Salé facility also offers members a vocational training program called the Center for Help Through Work (CAT or CIAT) (Centre National Mohammed VI des Handicapes Website, 2014). CAT exposes members to the responsibilities and interactions that they will face in their prospective field of employment, and assists them in obtaining jobs outside of the center (National Center Mohammed VI of the Handicapped). The center offers training for woodworking, sewing,

hospitality, agriculture, and many other fields, as pictured in Figures 2-5 (Burriss & Velez Llorens, Nov 30, 2017).



Figure 2.3. Photographs of the sports facilities and medical resources at the Mohammed VI Center for the Disabled in Salé, Morocco (Centre National Mohammed VI Des Handicapes Website, 2014)



Figure 4.5. Photographs of the Culinary and Farming programs at the CAT in Salé, Morocco (Centre National Mohammed VI Des Handicapes Website, 2014)

The goal of these programs is to provide this specific subset of the Moroccan population with resources and opportunities to participate in Moroccan society (Mohammed V Foundation for Solidarity Website, 2017).

2.3 Stakeholders

The disabled members of the center are our main stakeholders; they are the population the center is trying to reach the most. With improved navigation in the center and a more user-friendly website, the more efficient the center's reach and services will be. Similarly, the

caregivers of the disabled members of the center are also an important stakeholder. An easily navigated facility and website will improve the lives of both the disabled persons and their caregivers. Navigation in the center, even though beneficial mostly to the people receiving services there, will also be useful for any visitors the center receives. Anyone trying to get around in the center or in need of information from the website is a stakeholder but we will be focusing on the disabled members, their caregivers, and visitors.

The administration and staff of the center are also important in our project. The goal of improving accessibility for the center is to be able to maximize the work done in the center by the staff and administration. An easy-to use website, users of the center will be better able to access information about the services and programs offered there. Navigation systems and wayfinding aids will help the center to be more efficient and better serve its members.

2.4 Universal Design

One way to change the consciousness of a community is to think about the experience of shared space for all users. Universal Design is the idea that physical spaces or electronic systems should be designed for all users to easily navigate, both for the broader population and for those with physical and mental disabilities. The concept of Universal Design helps those who need assistance getting around, and also increases the quality of spaces for the general population. The definition given by the Committee of Ministers of the Council of Europe in 2001, is as follows:

Universal design is a strategy that aims to make the design and composition of different environments and products usable for everyone. It attempts to do this in the most independent and natural manner possible, without the need for adaptation or specialized design solutions. The intent of the universal design concept is to simplify life for everyone by making the built environment, products, and communications equally accessible, usable, and understandable at little or no extra cost. The universal design concept emphasizes user-centered design by following a holistic approach to accommodate the needs of people of all ages, sizes, and abilities. It provides for the changes that all people experience throughout their lives. Consequently, universal design is becoming an integral part of the architecture, design, and planning of the built environment (Null, 2013).

Universal Design is two tiered. The micro tier focuses on making the general design as accessible to everyone as possible and the macro tier emphasizes making the design customizable so that adaptations are easy for those who need them (Centre for Excellence in

Universal Design, 2014). The authors of *Universal Design: Principles and Models* split universal design into additional categories: supportive design, adaptable design, accessible design, and safety-oriented design. Supportive design is a component designed to add a helpful function to the overall design without complicating the area or making it difficult for any persons to participate in that area. Adaptable design is the ability of a designed structure to be made adjustable in a number of ways (height, detachable surfaces, text size). Accessibility design focuses on removing physical and systematic barriers in general design. Safety-oriented design takes into account any modification to spaces or objects that can either prevent injury or make it less severe (Null, 2013). A ramp (Figure 6) is an example of Universal Design; a ramp is essential for someone in a wheelchair but does not take any value away from the space. As a feature the ramp is still useful for abled bodied people like a person pushing a stroller or any person carrying a heavy item.

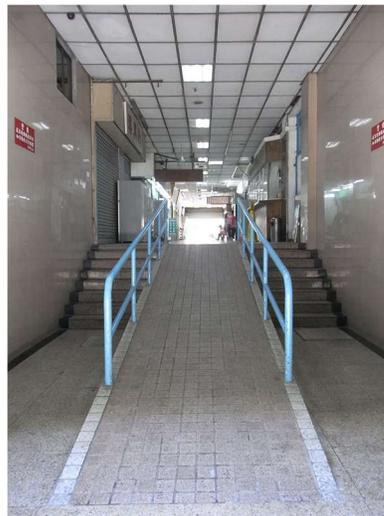


Figure 6. A ramp is an example of Universal Design (Imaouoclus, 2010)

To achieve Universal Design, there are principles that fit into one of the above mentioned designing categories. To achieve an equal experience when navigating an area or using an object the designer should avoid segregating parts of the population. To make this space flexible the design should accommodate common inclinations and capabilities. Making a consistent standard of navigation in the general area and keeping it uncomplicated makes the area simple and its use intuitive. Giving information through colors, language, and symbols makes information perceptible by people of all capabilities. Making hazards obvious increases tolerance for error, which makes the general area safer for use. Designing a space while considering movement

helps maintain low physical effort by eliminating structures that force people into awkward positions. Finally, designers should design spaces thinking of different sized people and their mobility (Centre for Excellence in Universal Design, 2014). Figure 7, below further clarifies how to operationalize these ideas.

<i>Categories</i>	Supportive	Adaptable	Accessibility	Safety-Oriented
<i>Principles</i>	Equitable use Simple and Intuitive use Perceptible Information	Flexibility in use	Size and Space approach and use	Tolerance for Error

Figure 7. Relationship between Principles of Universal Design and Categories of Universal Design. (Centre for Excellence in Universal Design, 2014; Null, 2013)

Universal Design is an important concept to understand in this project. We will be working with both physical and online spaces. Having this notion of having everyone in mind is applicable due to the wide variety of people that will be navigating the center and its website. Apart from the disabled members of the center, their caregivers, and international visitors will also be in need of navigation tools within the center and online. Universal design will be a very useful idea to keep in mind when constructing our deliverables for the center.

2.5 Signage and Wayfinding

Wayfinding leverages “information systems that guide people through a physical environment and enhance their understanding and experience of the space”, according to the Society for Experiential Graphic Design. Those with visual, cognitive, mobility, and other impairments can have difficulty reading and seeing signs in certain lightings and colors. This section discusses standards for readable signage, as well as best practices for understandable cues or maps (Harding, Bosch, Rayfield, & Florie, 2017).

Color and Contrast

The background color and text on signs is one of the most important considerations in designing signs. Most people can recognize that neon colors, pale colors, and dark colors will require more effort to read. The difference between background and text color is contrast. The

Americans with Disabilities Act (ADA) Standard requires a minimum contrast of 70% between text and background colors. While there are many acceptable and readable color combinations, certain combinations are both readable and pleasing to the eye, and are therefore used most commonly in airports and other public places (Harding et al., 2017). Figure 8, below, illustrates common background options.

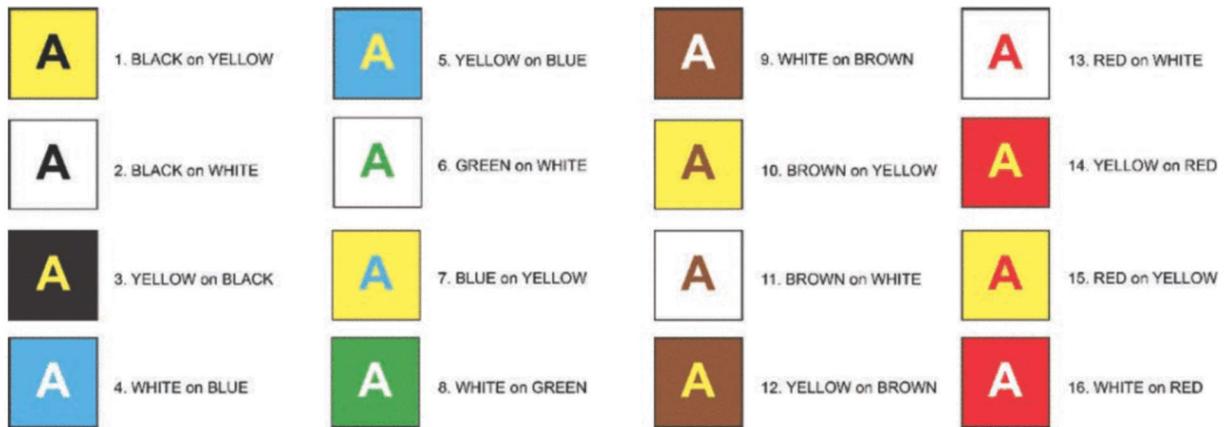


Figure 8. Color combinations for maximum readability.

(Adapted from “Enhancing Airport Wayfinding for Aging Travelers and Persons with Disabilities,” by Harding et. al., 2017, p. 39. Copyright 1974 by the K. E. Claus and R. J. Claus. Reprinted with permission.)

Conspicuity is how easily a sign can be seen, based on color. Light colors tend to be more easily seen, whereas darker colors tend to sink into backgrounds. This applies to both text and background colors, granted the two contrast properly. Notably, lighter signs are more likely to be seen than darker signs of the same size. For example, a black sign must be 125% larger than a white sign to maintain the same level of conspicuity. We will take conspicuity into consideration when working with the needs of visually impaired individuals (Harding et al., 2017). Figure 9, below, indicates the difference in conspicuity between different background colors in signs.

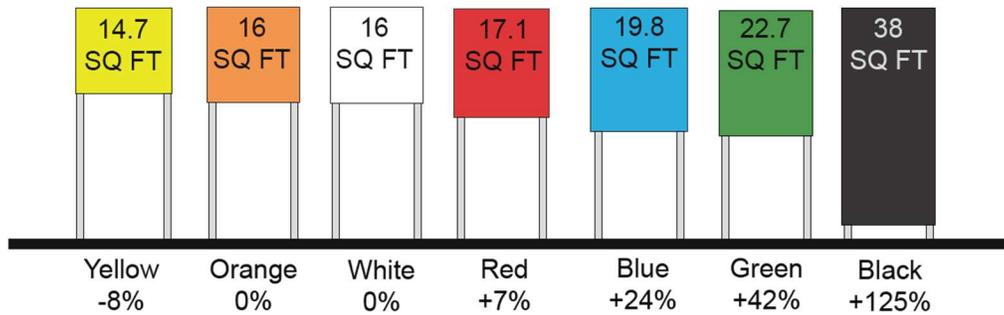


Figure 9. Percentage area change required for colored signs to retain the same conspicuity as a white sign. (Adapted from “Enhancing Airport Wayfinding for Aging Travelers and Persons with Disabilities,” by Harding et. al., 2017, p. 39. Copyright 1979 by the J. Follis and Dave Hammer Publishing Company. Reprinted with permission.)

Illumination

Effective lighting is crucial for reading signs. There are three general methods utilized for lighting signs. The first and simplest option is to utilize ambient lighting already present in the space. It is important to consider whether the space is lit sufficiently well to properly illuminate the sign. The suggested measurement is a minimum of 100 lux. Harding et al. tell us, “A good rule of thumb is that if a person with normal vision can’t read a newspaper next to the sign, then a person with low vision cannot read the sign” (2017, p. 39). When considering unlit signs for the center, we will use this rule of thumb as a guide. (Harding, Bosch, Rayfield, & Florie, 2017)

The second method for sign illumination is external lighting. External illumination is economical and would be easily maintainable by the center. This form of illumination can be useful in low light area, providing readability that is not dependent on external lighting. The third and most complex option is internal lighting. Signs with internal lighting can be costly and require frequent maintenance, but provide superior conspicuity.

2.6 Universal Design for Website Users

A website is an important aspect of any business or organization. It is the professional image they are making available to the world. Research on web design revealed various principles of web page interface design and development. The principles are as follows: usability, visualization, and accessibility. Usability refers to how easily a site can be processed and navigated. Visualization deals with appropriate visual displays that are aesthetically pleasing. Accessibility emphasizes the formatting of a website and maximized functionality (Schmidt, Liu, & Sridharan, 2009).

Usability

The usability of a website is determined by its user's ease in navigating the website. Features such as "images and other graphics should be created with care as pertaining to their heights and sizes so as to reduce the loading time" (Kiyea & Yusuf, 2014). If there is an increase in the number of images, videos, and users, there is a risk of slower webpage download speed (Leung, Law, & Lee, 2016). These are important variables to take into consideration when developing a website used by a large number of people. Users often become frustrated when websites take too long to load and will often leave if the wait doesn't seem worth it (Schmidt et al., 2009).

Visualization

Upon seeing a website for the first time it only takes viewers a few seconds to form an opinion about it (Uribe, Álvarez, & Menéndez, 2017). If a website is not aesthetically pleasing to its viewers, then it is already difficult for the user to navigate a webpage. Though it may seem elementary, designers must consider the basics of visual design. This is because, "Within this short amount of time, the user is more capable of perceiving low-level information related to the color, texture, and luminance than of considering complexity layouts" (Uribe et al., 2017). Without even reading any content from a website, users form their own opinions based on the clarity and aesthetic of the webpage.

Organized websites allow people to find the information they are looking for at a much faster rate of an unorganized site. For webpages, "an optimal visually appealing solution leads to a more usable product, which means a more efficient tool to achieve users' goals in a simpler and faster way" (Uribe et al., 2017, p. 2). Simply creating a visually attractive page can make it easier for users to extract relevant information. This can be referring to anything from font size to color. According to the graph shown below in Figure 10, size 14 font is both the most preferred and the easiest font to interact with on a website. The fonts range from size 7.5 font to size 14 font. As the font increases so does the preference and the ease of interaction, all while interaction time decreases. This data displays that size 14 font is the easiest to read and most preferred text size for websites.

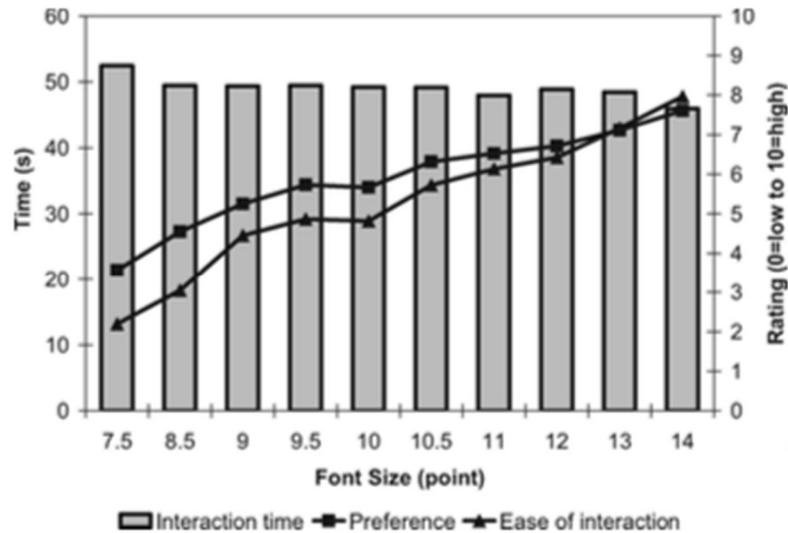


Figure 10. The mean interaction time per font, with the visual preference, and the ease of interaction displayed. Adapted from “Webpage aesthetics, performance and usability: Design variables and their effects” by Schmidt et al., 2009, p. 640. Copyright 2009 by Ergonomics. Reprinted with permission.

Accessibility

Making a website easily readable and accessible is essential in making it successful. This is because, “If users are unable to find what they need from a given webpage due to the lack of information or the complexity of navigation they will become frustrated and move on to another site” (Schmidt et al., 2009). A website with poor accessibility will deter visitors from using it. Websites should be easily accessible for everyone, including disabled people, to allow all users to have an equal opportunity in navigating through the internet (Chin, 2003). Furthermore, details such as color and contrast determine the accessibility of a website. An example of the importance of color and contrast is demonstrated in Figures 11 and 12 below. While these designs are interesting, the website user is unable to read the website until moving the mouse to either the blue or red section which can be found in the top left corner and bottom right corner respectively. This is the first visual that is encountered while on the Bolden website, which can cause for confusion about what can be found on this page.

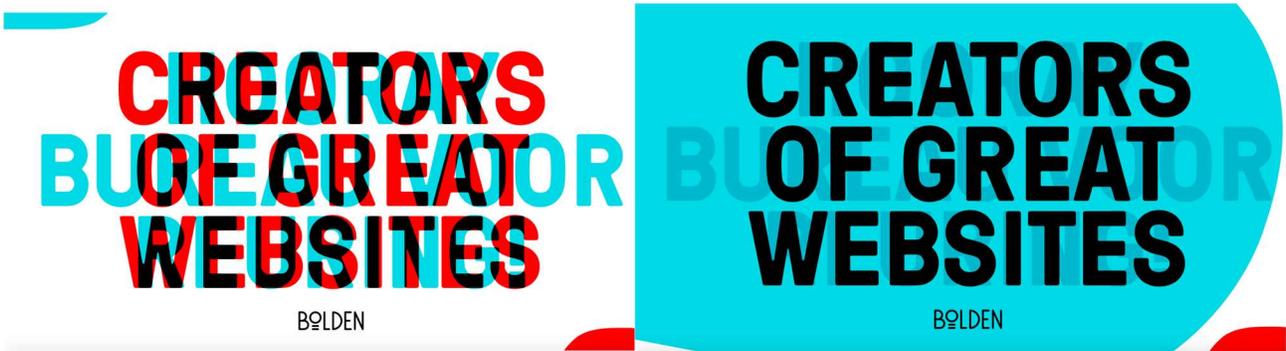


Figure 11, 12. Example of bad visual displays (Adapted from (Bolden.2017))

Figure 13 displays the Americans with Disabilities Act website, which is an example of a website that is easy to navigate. This is due to the color contrast as well as the organization of information. The ADA website is easily readable which allows users to find information with ease.

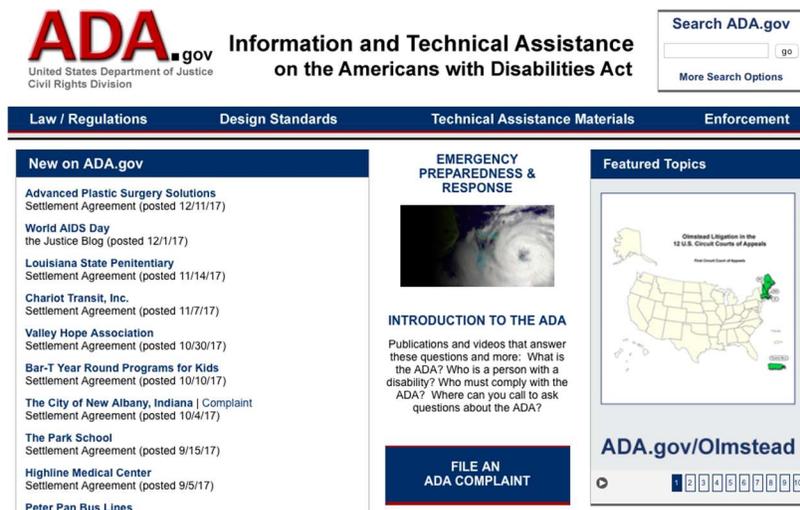


Figure 13. Screenshot of the Americans with Disabilities Act Website (Adapted from (ADA homepage.2013))

2.7 Navigation Case Study

Navigation at the facility is an issue, the use of bad signage or no signage at all can hinder the user-friendliness of a location. The University of Technology Sydney (UTS) used the approach of design-thinking to improve the usability of their library. UTS went through the process of creating new and updated signage to make for a better library experience. This

establishment went through this sign modernization process because, “effective signage contributes to a user-friendly environment, and can ‘help users move throughout buildings more efficiently and accurately and may reduce questions at service points’” (Luca & Narayn, 2016). Though some people can ask questions with ease, other users could be afraid of being viewed as ignorant which would prevent them from seeking the help they need to get where they are going.

To gather the necessary information to make changes to the UTS’s library signage system the library used a few different methods. The team was able to observe people as they walked through the library, allowing researchers to get a first-hand account of the library users interacting with the signage. Over the course of a few months the library employees were able to observe the students and faculty as they used the signs to get through the library, as well as record the questions that were asked at the circulation desk that the staff believed were already addressed in the signs. Then, the team went through the library and took pictures of all of the signs in order, “to evaluate ‘a multitude of issues relating to language, design, branding, and overall aesthetic’” (Luca & Narayn, 2016). The team found that many of the signs were irrelevant, contradictory to one another, or repetitive of other signs.

To resolve this issue, the team, “developed a simple template for printed signs, with a range of complementary background colors and clear typeface” which can be seen in Figure 14 below.

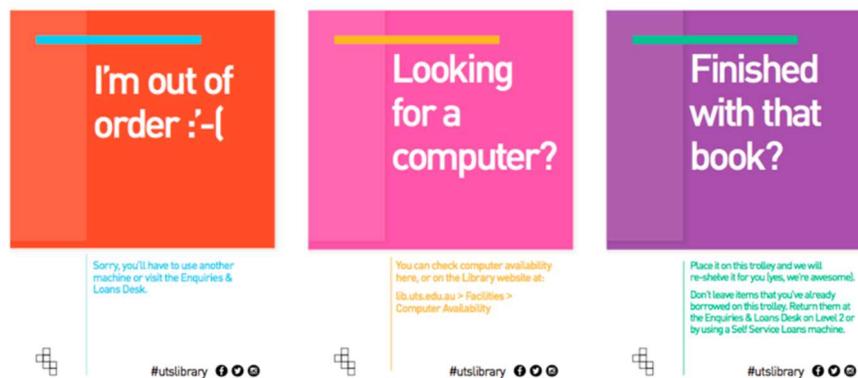


Figure 14. New signs implemented with a consistent visual style, brief messages, and colors corresponding to the floor (Adapted from Luca & Narayn, 2016).

These signs made it possible to get rid of signs such as the one found in Figure 15. The new signs are able to grab people’s attention and direct them toward the the relevant information. In

contrast, the old signs had to be read all the way through in order to understand their general topic, making them ill-suited to quickly communicate information.

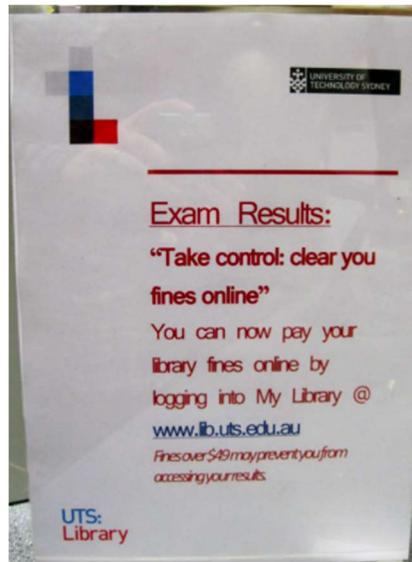


Figure 15. Old sign with poorly conveyed information and poor text (Adapted from Luca & Narayn, 2016).

This case study displays the importance of effective signage through the use of colors and design.

2.8 Website Case Study

The IQP performed by William Chin in 2003 has strong similarities to the website portion of our project. According to the ADA, there are guidelines businesses and the government must follow on their websites to accommodate disabled individuals. Surprisingly, at the time of this IQP many government sites were not meeting the standard. Chin’s task was “to assess a number of federal and federally sponsored contractors’ websites to determine if the sites met federal regulations governing disabled website accessibility” (Chin, 2003).

The study analyzed and evaluated federal government websites on accessibility. Chin gave the websites different ratings: 1 being the worst, and three being the best, but not perfect. He also conducted interviews with various web experts, many of whom were professors at WPI. In this process he created a proper website following all ADA guidelines and used it as a reference when judging the real sites (Chin, 2003).

The project concluded that the Legislative branch contained the most problematic web displays, and the Executive the least. The most common fault was that the websites did not

provide alternative text sizes. Although the data collected by Chin is not necessarily directly related to our project, the issues the websites faced are very similar to the Mohammed VI center's problems. We will use this IQP's methods as reference when carrying out our project (Chin, 2003).

2.9 Summary

The literature review revealed three points that will influence our work while onsite. First, Universal Design will not only make the center more appealing to its clients but to any visitor. We learned that the use of this design technique allows for a space to be accessible to everyone no matter their age, size, or ability. Second, research in efficient signage gives us background information on ways to improve navigation in general. This will give us a technical perspective when walking around the center and considering possible signage details and locations. Third, taking website design into consideration when creating a web page can help in creating an easily accessible and aesthetically pleasing site for its users. From this, we were able to learn that every aspect of a website is important in making it successful.

Chapter 3 | Methodology

The goal of this project is to improve physical and online accessibility for the members, staff, and visitors of the Mohammed VI Center for the Disabled. The center would like to improve the website and implement aids in order to improve navigation for their members and visitors, the outline of this can be seen in Figure 16. Our objectives are as follows:

1. Familiarization with the Mohammed VI Center for the Disabled and their expectations for accessibility.
2. Understanding the physical, developmental, and social barriers for the disabled members of the center.
3. Identify and develop standards for clear and concise physical and online displays.

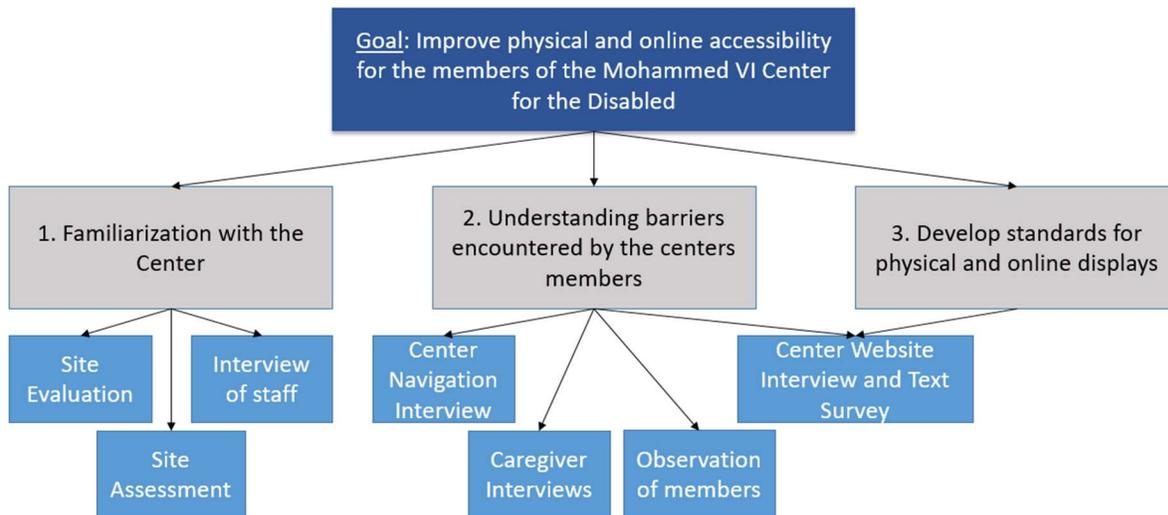


Figure 16. This diagram shows the relationships between our goals, objectives, and methods.

3.1 Translators and Interview Protocol

We will need translators for our written and spoken interviews and focus groups. We will calibrate the translators before we conduct any interviews or focus groups in languages other than English. To do this we will thoroughly explain our project to the translators so they have a deep understanding of the type of tone and nuances of the language that they should use. We will have our written materials translated, revised, and ideally cross-checked so that the translation is unbiased.

Our methodology for understanding the work of the center and the experience of our stakeholders involves a sequence of interviews, outlined in the sections below. During each

interview we will ask demographic questions of the interviewee and record information about the location, interviewer, etc. to distinguish interviews from one another and provide baseline demographics for use in later data analysis. We have outlined these in Appendix A. We will also record audio of each interview, granted the interviewee is comfortable with the recording. Each interview aside from the administrators will be anonymous, which is clearly stated at the beginning of each interview guide.

3.2 Familiarization with the Mohammed VI Center for the Disabled and their expectations for accessibility.

Understanding the mission and goals of the Mohammed the VI Center for the Disabled is necessary to set the tone for our project. We will perform a site assessment to familiarize ourselves with common activities within the facility, as well as the layout of the center. We need to develop this understanding of the functionality and relationship between the various spaces in the center before we can consider methods for assisting in navigation at the center. Next, we will interview individual staff members recommended by the administration. These meetings will be vital in order for us to move forward and approach the center's clients.

Site Assessment

In order to understand the challenges involved in getting around the center our team will split into two groups of two and perform a site assessment. Each group will begin at a designated starting point, and locate several important areas and features of the center as dictated by the site assessment guide in Appendix B. One group will utilize the labeled map provided by the center, and the other group will use the blank map in Figure 17. Both groups will take note of areas that are difficult to navigate and any features that aid or hinder mobility like ramps and stairs. If the groups find helpful or unhelpful structures around the center they will record locations by taking photos.



Figure 17. Basic outline of the ground floor of the Mohammed VI Center for the Disabled. (Mohammed VI national center of disabled persons 2012).

This assessment will simulate the experience of first-time visitors to the center who are unfamiliar with the French and Arabic languages. According to Guest et. al. (2013), this form of data collection can provide useful insight due to the complexity of individual perspectives.

The interaction between the center and such visitors is sufficiently complex to warrant participant observation, described by Guest et. al (2013) as “the most natural and the most challenging of qualitative data collection methods” (p. 75).

While we developed the list of destinations in Appendix B, we would like to have a better idea of the locations which visitors and members seek on a daily basis. To do this, we will ask gatekeepers or security guards at the entrance of the center to record the locations that they provide directions to each day for one week. This will give us quantitative data related to in-demand destinations upon entering the center.

ADA Compliance Evaluation

Once we have completed our site assessment as visitors, we will complete a site evaluation using the ADA Checklist for Readily Achievable Barrier Removal, pictured below. A link to the full checklist is provided in Appendix C.

QUESTIONS	POSSIBLE SOLUTIONS
<p>Priority 1 Accessible Approach/Entrance People with disabilities should be able to arrive on the site, approach the building, and enter as freely as everyone else. At least one route of travel should be safe and accessible for everyone, including people with disabilities.</p> <p>Route of Travel (ADAAG 4.3, 4.4, 4.5, 4.7) Is there a route of travel that does not require the use of stairs?</p> <p>Is the route of travel stable, firm and slip-resistant?</p>	<p style="text-align: center;">Yes No</p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> Add a ramp if the route of travel is interrupted by stairs. <input type="checkbox"/> Add an alternative route on level ground.</p> <p><input type="checkbox"/> Repair uneven paving. <input type="checkbox"/> Fill small bumps and breaks with beveled patches. <input type="checkbox"/> Replace gravel with hard top.</p>

Figure 18. Excerpt from the ADA Checklist for Readily Achievable Barrier Removal. (Adaptive Environments Center & Barrier Free Environments, 1995)

While the general ADA standards dictate requirements for new construction, this checklist is a resource to evaluate the accessibility of existing buildings, and determine achievable solutions to shortcomings in accessibility. We will add the features that we note in this evaluation to those we encountered in the site assessment. We can later use this data to assess best routes for individuals with specific disabilities and provide recommendations to the center.

Interviews of Staff

We will conduct open-ended interviews with staff members as recommended by the administration (Ward, 2014). This method will allow us to get the staff’s perspective on both the website and navigation of the center. The purpose of these interviews is to determine information about the clients and other users of the center such as their linguistic abilities and language preferences. In order to get a variety of different perspectives, our team will interview five staff members from five different sectors of the center. This interview gives our team an opportunity to ask questions about the center’s website as well as the staff’s perspective on navigating the center. We will conduct these interviews first to allow for our team to ask the staff members about which disabled members of the center would be willing to participate in our research. Our questions for this interview can be found in Appendix D.

3.3 Understanding the physical, developmental, and social barriers for the disabled members of the center.

While the disabled are not our only stakeholders, alterations that make the website and center more accessible to them will also make navigation easier for everyone. In order to gain a general understanding of the struggles faced by the disabled in Morocco, we intend to conduct two sets of interviews. The first will be about the general complications of daily life as a handicapped person and navigation around the center. The second interview will discuss the experience of navigating the internet as a disabled person. These interviews will help us to acquire a better understanding of the people we will interact with over the course of the project and the issues they face.

General Experiences and Navigation in the Center

To improve our understanding of our disabled stakeholders, we will conduct open-ended interviews with members of the center (Ward, 2014). This will allow our team to gain a better understanding of the difficulties that the disabled members of the center face on a day to day basis. We will select these members based on recommendations from the interviewed staff. Our team will be splitting up into two groups of two. Within each group, one team member will ask questions and both will take notes. We will be interviewing ten members of the center, five with mental disabilities and five with physical disabilities. We will take our recognition of social stigmas into consideration when approaching the disabled for interviews, and other one on one or group interactions. We understand that there is potential for sensitive topics to come up in conversation and wish to approach these situations in the most delicate of ways. For members who have difficulty communicating, we will ask their caretaker to participate in the interview. With the permission of the participants, we will take an audio or video recording of the meeting.

These interviews will be two-on-one and open ended and “are largely concerned with understanding and exploring the meanings given by people to the lives that they lead and the relationships of which they are a part” as suggested by Kevin Ward in *Researching the City* (Ward, 2014). For this reason, the beginning of these interviews will focus on gaining a general understanding of the interviewed individual and how they experience the world in accordance with their disability. We will ask about their daily experiences related to travel, employment,

education, and so forth. If they mention any programs or activities that they participate in outside of the center, we will ask them to elaborate.

The second half of this interview will discuss the layout and navigation of the center. Our goal with this interview is to learn about aspects that either help or hinder navigation of the center (Ward, 2014, p. 45). The interview guide for both portions of this interview can be found in Appendix E.

Separate from these interviews we will observe the disabled members of the center as they navigate through the center. We will do this to get an unbiased perspective on what it is like for the clients to go about their day to day lives. As a way to stay inconspicuous, our team will split up and observe on our own. While observing, our team will take notes about any specific complications any of the members have while getting around the center. The goal of this method is to observe the behavior of our stakeholders when it is unaffected by our presence (Ward, 2014).

Website Navigation

Shortly after our interviews focused on navigation and daily life we will conduct interviews concerning user experience on the center's website and general internet access. These interviews will be open-ended like those mentioned previously (Ward, 2014, p. 43). We will select these members based on recommendations from the interviewed staff. Our team will be splitting up into two groups of two. Within each group, one team member will ask questions and both will take notes. We will be interviewing ten members of the center, five with mental disabilities and five with physical disabilities. The first set of questions will be pertaining to accessibility and the experience of using the internet as a disabled person.

In an effort to determine the accessibility of the Mohammed VI Center for the Disabled's website, we will ask the disabled to navigate through the website. We will provide them with a list of pieces of information to find on the website, found in Appendix F. We will take notes during this time on how the members navigate through the website and what seems to be difficult and easy. We will also follow up these exercises by asking about their experience on the website. This part of the interviews will determine what people think about the center's website and what they would like to improve; we will make suggestions for improvements according to their responses. Our team will record audio or video of the individual with their permission, this will

allow us to go back and go over information more than just once. The second part of the interviews will have to do with text and other methods of visual communication, and is described below in section 3.3.

Interviews of Caregivers

We will interview the caregivers of members of the center to get their views on the accessibility of the center and its website. We will determine these participants by asking the disabled members of the center if their caregiver would be willing to be interviewed, we are looking to conduct five of these interviews. These interviews are necessary for getting the perspective of a stakeholder who likely does not enter the center as often as the members and the employees (Ward, 2014, p. 43). The questions for this interview can be found in Appendix G.

3.4 Identify and develop standards for understandable, readable, and strategically placed displays and signs.

In order to improve the navigation of the center our team must have a grasp on the needs of members with regard to visual and spatial needs. Our team will need to take into account to the literacy, languages, and needs of the center's members, employees, and visitors with regard to visual understanding. We will ask about the literacy and languages of the center's members when interviewing the center's administration, as mentioned in Section 3.1.

To focus on what type of text would be more beneficial for the center's signs and website we want to have data on which types of text the members prefer. This will be done in the second half of the Website Experience Interview, which can be found in Appendix F, and is detailed in section 3.2. To do this we will have a page of different types of text and ask people with different disabilities to see which is easiest for them to read. This will include a sheet with titles and body text in different fonts, colors, background colors, and size. We will have these sheets in a number of different languages which will give us additional data on what type of text is better read in specific languages. We will translate our English sheet into French and Arabic when we arrive. This information can be used for both the signage around the center and the text used on the website.

3.5 Data Analysis

The information acquired in the site assessment and evaluation is going to be structural and location based. We will also bring in specific structural information from the member observation and the navigation interviews. Information in these sections will include any structural issue like lack of equitable use for the members, for example stairs. We will also note confusing spots to find your way and strategic places with sufficient lighting that may need signage. We will document these through pictures and checklists and pinpoint these spots on a map of the center.

We will transcribe the translation of the interviews word by word and later use coding to extract quantifiable data. We will use different colored highlighters to recognize any frustrations, facts about the center, feelings, and opinions. Using this coding method we will be able to group similar thoughts together in order to get some quantifiable data from these qualitative methods.

3.6 Estimated Timeline

We have created an estimated timeline to represent what we will be doing over the course of our time in Morocco which can be seen in Figure 19 below.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Site Assessment	■	■						
ADA Compliance Evaluation	■	■						
Staff Interviews		■	■	■				
Center Navigation Interviews			■	■	■	■		
Client Observation					■	■		
Website Experience Interviews					■	■	■	
Caregiver Interviews						■	■	
Data Analysis						■	■	■

Figure 19. Estimated timeline for our time in Morocco

We will begin our first and second weeks in Morocco with the site assessment as well as the ADA compliance evaluation. Our second week and potentially some of our third will be

spent interviewing the staff to get a better understanding of the center and its members. Week three and four will be spent performing our center navigation interviews with the disabled members of the center. We will also spend week four doing our client observations. With the navigation interviews and client observations coming to an end we will begin our website navigation interviews with the clients in the latter half of week four and five. We will then move on to our interviews with the caregivers of the centers clients during weeks five and six. After initial analysis of our data we will hold another interview with the administration of the center to discuss potential areas of improvement that we have identified from the aforementioned interviews and observation. In weeks five through seven we will analyze data and finalize our project.

Chapter 4 | Conclusion

Our project will aid the Mohammed VI Center for the Disabled in making more accessible design decisions for both their center and their website. Improvement in the center's accessibility will facilitate the center's services and mission to their members.

Improvement upon the navigation of the center is important to maximize the center's services. For the members of the center it's important to be able to move around the center and find their way easily so that they can take advantage of all resources that are available to them in the center. The center also receives many visitors from Morocco and other countries; for these visitors to be able to see and appreciate the center, the navigation system needs to be efficient and clear. Similarly, the more user friendly the website the farther the reach of the center will be. Information and resources will be more efficiently accessible to the Moroccan public with an easily navigated website.

We hope that our project will help update the centers website and navigation system in order to increase outreach throughout Morocco. We are looking forward to discussing our project and are very excited to arrive at the Mohammed VI Center for the Disabled.

Bibliography

- ADA homepage. (2013). Retrieved from <https://ada.gov>
- Bolden. (2017). Retrieved from <http://www.bolden.nl>
- Burris, K., & Velez Llorens, M. (November 30, 2017). Personal communication: project update meeting notes.
- Centre for Excellence in Universal Design. (2014). What is universal design? Retrieved from <http://universaldesign.ie/What-is-Universal-Design/>
- Centre National Mohammed VI Des Handicapes. (2014). Centre National Mohammed VI des handicapes website. Retrieved from fhandicap.ma
- Chin, W. (2003). *Federal website accessibility & nbsp.*
- Claus, K. E., & Claus, J. (1974). Visual Communication through Signage Signs of the Times Publishing Company.
- El-Korchi, T. (2017). In DaSilva K. (Ed.), Pictures from the Mohammed VI center for the disabled in Sale
- Harding, J. R. J., Bosch, S. J., Rayfield, P. P. J., & Florie, J. (2017). Enhancing airport wayfinding for aging travelers and persons with disabilities. Nashville, TN: Gresham, Smith and Partners. doi:10.17226/24930
- Imaouoclus. (2010). *Interior ramp* Retrieved from https://commons.wikimedia.org/wiki/File:HK_Sai_Ying_Pun_Des_Voeux_Road_West_%E5%D%87%E7%9B%8A%E5%A4%A7%E5%BB%88_Kwan_Yick_Building_Phase_2_interior_Rmp.JPG
- Karimova, G. Z., Sauers, D. A., & Dakka, F. (2015). The portrayal of people with disabilities in Moroccan proverbs and jokes. *Journal of Arab & Muslim Media Research*, 8(3), 239-254. doi:10.1386/jammr.8.3.239_1
- Kiyea, C., & Yusuf, A. B. (2014). Usability evaluation of some selected Nigerian universities' websites. *International Journal of Computer Applications*, 104(3)
- Leung, D., Law, R., & Lee, H. (2016). A modified model for hotel website functionality evaluation. *Journal of Travel & Tourism Marketing*, (33)
- Luca, E., & Narayn, B. (2016). Signage by design: A design-thinking approach to library user experience. *Weave: Journal of Library User Experience*, 1(5) doi://dx.doi.org/10.3998/weave.12535642.0001.501
- Maaroufi, Y. (2014). Persons with special needs in Morocco according to data from the general

census of population and housing 2014. Retrieved from http://www.hcp.ma/Les-personnes-a-besoins-specifiques-au-Maroc-d-apres-les-donnees-du-Recensement-General-de-la-Population-et-de-l-Habitat_a1801.html

Mohammed V Foundation for Solidarity. (2017). Mohammed V foundation for solidarity webpage. Retrieved from <http://www.fm5.ma/en/fondation>

National center Mohammed VI of the handicapped (J. Vicens Trans.). Sale, Morocco.

Null, R. (2013). Universal design: Principles and models CRC Press.
[doi://doi.org/10.1201/b15580](https://doi.org/10.1201/b15580)

Schmidt, K. E., Liu, Y., & Sridharan, S. (2009). Website aesthetics, performance and usability: Design variables and their effects. *Ergonomics*.

Uribe, S., Álvarez, F., & Menéndez, J. M. (2017). User's web page aesthetics opinion: A matter of low-level image descriptors based on MPEG-7. *ACM Transactions*.

Ward, K. (2014). *Researching the city*. SAGE Publications Ltd.

Zahidi, K., & Wardi, S. (2016, -02-16T10:17:35+00:00). Morocco and the rights of people with disabilities. Retrieved from <https://www.moroccoworldnews.com/2016/02/179970/morocco-and-the-rights-of-people-with-disabilities/>

Appendix A | General Interview Initial Questions

Any information collected in this interview will be anonymous. We will use numbers and general demographic information to label each interview. Your name will not be mentioned in our paper. Only the data collected from this interview will be included. We will be using translators during these interviews, if required.

*This anonymity will not include professionals and the administration. We will instead ask them for permission to mention their name and opinions on our paper. Do you have a disability? If so what is it?

Date:	
Location:	
Team Member(s):	
Translator(s):	
Language:	
Gender:	

The following questions will be asked after filling out the above information.

1. How old are you?
2. Do you have a disability? If so what is it?
3. Do you have an occupation? If so what is your job title?

Appendix B | Site Assessment Guide

Note: We have included some locations within the center whose existence we haven't been able to confirm. These theoretical locations will be updated upon receiving a map of the center or meeting with the administration.

Group 1:

Origin: Main Entrance

Destinations:

1. Greeter, Secretary, or Main Office
2. Administrative Office
3. Swimming pool
4. Locker Room
5. Physical Therapy Center
6. Restaurant
7. Greenhouse
8. Residences

Origin: Classroom

Destinations:

1. Administrative Office
2. Physical Therapy Center
3. Restaurant
4. Restroom
5. Residences

Group 2:

Origin: Secondary Entrance

Destinations:

1. Greeter, Secretary, or Main Office
2. Administrative Office
3. Swimming pool
4. Locker Room
5. Physical Therapy Center
6. Restaurant
7. Greenhouse
8. Residences

Origin: Gymnasium

Destinations:

1. Swimming pool
2. Locker Room
3. Physical Therapy Center
4. Restaurant
5. Restroom
6. Residence

Appendix C | Link to ADA Checklist for Readily Accessible Barrier Removal

<https://www.ada.gov/racheck.pdf>

Appendix D | Staff Interview Guide

We will be going through Appendix A before beginning this interview in order to collect baseline information for data management purposes

1. How long have you been working at the center?
2. What is your job title?
3. How closely do you work with the members at the center?
4. How would you describe the communication skills of most of the members at the center?
5. Does any particular member of the center's story stand out to you?
 - a. If so who? And what is their story?
6. How would you describe navigating around the center?
7. Does the building have signs or maps to help find the facilities in the center?
 - a. If so how would you describe them? Are they helpful?
8. Would you recommend adding anything to the facility to aid in navigation?
9. Have you used this centers webpage? What are your opinions on it? How do you feel about the information available there?
10. Can you recommend any members that would potentially be interested in working with us?
11. Can you recommend any other staff members that may be interested in working with us?
12. Any additional comments?

Appendix E | Day to Day and Center Navigation Interview Guide for the Disabled

We will be going through Appendix A before beginning this interview in order to collect baseline information for data management purposes

Society

1. What modes of transportation do you use to get to the center?
2. Do you go places like work, the store, or school regularly?
3. Do you need a companion to go places?
4. Do you have trouble interacting with people?
5. Does your disability impact your daily life?
6. Any additional comments about navigation in day to day life?

Center

1. What do you think about the center's accessibility?
2. Do you find it particularly difficult to get around or to find certain places within the center?
3. Do you ever need assistance getting around the center?
4. What facilities within the center do you use?
5. Is there any place in the center that you specifically avoid because it is difficult to navigate?
6. What facilities (restrooms, gym, ramps, elevators, etc.) are difficult for you to find and/or use?
7. Can you recommend any other members that would potentially be interested in working with us?
8. Do you have a caretaker? If so, would they be interested in working with us?
9. Do you have any additional comments about the navigation of the center?

Appendix F | Website Experience Interview Guide for the Disabled

We will be going through Appendix A before beginning this interview in order to collect baseline information for data management purposes

Internet Access

1. Do you have access to the internet at home?
2. How often do you use the internet? A few times a day? Once a day? A few times a week? Once a week? A few times a month? Once a month? Never?
3. Do you ever use the internet to obtain information regarding your disability?
4. Have you ever visited the Mohammed VI Center for the Disabled's Website?
5. On the computer provided and using the Mohammed VI Center for the Disabled's Website please do your best to go through and find the answers to the following questions:
 - a. Is Taza a town that has associations for the handicapped?
 - b. List of the partners involved with the center.
 - c. How can education be continued at the center?
 - d. Is there a guided tour about the Marrakech center?
 - e. Who is the director for the Mohammed VI Center for the Disabled?
 - f. Who is the Professor of Psychiatry at the center?
6. What is your experience like when navigating this website?
7. What would you like there to be available on this website?
8. What aspects of this exercise did you find difficult? Which did you find helpful?
9. Can you recommend any other members that would potentially be interested in working with us?
10. Do you have a caretaker? If so, would they be interested in working with us?
11. Any additional comments?

Appendix F | Continued

Hello, how are you?
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Appendix G | Caregiver Interview Guide

We will be going through Appendix A before beginning this interview in order to collect baseline information for data management purposes

Internet Access

1. Do you or the person you're taking care of have regular access to the internet?
2. Do you use the internet to obtain information about disabilities? If yes, where do you find this information?
3. Have you ever used the center's website?
4. If yes, what did you think of the website? Was it easy to use? Was the information easily accessible? Is there anything you wish was on the website that is not?
5. Any additional comments?

Navigation

1. How often do you visit the center? Once a day? Once a week? A few times a week? Once a month? A few times a month? Once a year? A few times a year?
2. When you come to the center is it difficult to find where you are going without asking for directions?
3. When you visit the center, where do you usually go?
4. When you visit the center do you come with your charge? If so, are there any difficulties faced in moving through the center?
5. Are there any improvements you would like to see made to the center to make it more accessible for both you and your charge?
6. Any additional comments?