



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

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المركز الوطني محمد السادس للمعاقين
Centre National Mohammed VI des Handicapés

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

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for the degree of Bachelor of Science



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Abstract

The goal of this project was to investigate changes to improve physical navigation within the Mohammed VI Center for the Disabled, in Salé, Morocco and enhancements to the center's online website. Working in collaboration with Mr. Massou and Mr. El Mellouki of the Mohammed VI Center for the Disabled, our team utilized surveys, interviews, and a focus group to determine the center's needs for an improved signage system and an updated website. Final recommendations to facilitate center navigation include a standard for signage using pictograms and color coding throughout the center. Additionally, our team developed detailed recommendations for updating the formatting and content of the website to make it more accessible and attractive for center staff, NGOs, and other website visitors.

Executive Summary

Morocco is the home for 1.7 million disabled individuals (Maaroufi, 2014). Over the last three decades, Morocco has passed legislation to protect these citizens (Trani, Bakhshi, Myers Tlapek, Lopez, & Gall, 2015). The Mohammed VI Center for the Disabled is an initiative that strives to equally integrate the disabled population into Moroccan society. Fortunately, the center has the ability to aid over 10,000 disabled individuals per year and provide them with healthcare, education, and/or help with job placement. Though the center strives to support its disabled members, the signage within the center hinders its accessibility, making it difficult for the disabled, their families, and visitors to navigate. Additionally, the center has not updated the design of the website and it is lacking in information.

To make the facility and website of the Mohammed VI Center for the Disabled accessible to everyone, the project team researched the concept of Universal Design, which “emphasizes user-centered design by following a holistic approach to accommodate the needs of people of all ages, sizes, and abilities” (Null, 2013). This concept is especially important given the dynamic range of the team’s stakeholders, which includes the mentally and physically disabled members of the center, their caregivers, staff members, associated Non-Governmental Organizations (NGOs) and visitors. Some of these individuals may be illiterate or visually impaired, meaning that signs, maps, and any other navigational aids in the center must deliver information in more than just textual formats.

Universal Design is also applicable to websites, with the main concepts of visualization, accessibility, and usability. Visualization deals with appropriate visual displays that are aesthetically pleasing and make a website a “more efficient tool to achieve users’ goals” (Uribe, Álvarez, & Menéndez, 2017, p.2). Accessibility emphasizes the formatting of a website and maximizes functionality for everyone, including disabled people, to give all users an equal opportunity in navigating through the Internet (Chin, 2003). Usability refers to how effectively a device can process a site including load time and other factors (Schmidt, Liu, & Sridharan, 2009). With the proper use of these guidelines, a designer can develop a website that is universally accessible.

The goal of this project was to improve physical navigation and online accessibility for the members, staff and NGOs at the Mohammed VI Center for the Disabled. The staff and the project team found navigating the facility to be difficult, in addition to the center’s website

having a lack of information and images. This investigation set out to determine best practices for improving facility navigation and expand upon the website's content and structure. The team's first objective was to become familiar with the disability center and their expectations for informational accessibility and physical navigation. The second objective was to understand the unique cultural aspects of physical and online accessibility in Morocco, and lastly the final objective was to identify standards for organizational structures and efficient physical and online displays.

For the first objective, the team performed a site assessment to become familiar with common activities within the facility, and the layout of the center. Additionally, the team used a checklist developed by the Americans with Disabilities Act (ADA) to better understand how the disabled members navigate through the center on a daily basis. Next, the project team designed and created surveys that an intern at the center, Fatima, who also served as our translator, converted to French and then distributed to various associated NGOs to get their opinions about the center's website.

To complete the second objective, the WPI project team created a survey for the staff at the center. Fatima then distributed them to various staff members who were willing to complete the survey. The team used the answers from these surveys to create five big picture questions for a staff focus group. After the project team set up the focus group, a member of the administration guided the focus group conversation with the six attending responsables, or department heads. Our research then consisted of analyzing all the resultant information from the survey and the focus group to determine navigation systems that the center could implement and improvements for the website's content and format.

The usage of symbols and pictograms within the center are crucial for the project's third objective. While interviewing ten disabled members of the center, two project team members showed them 39 distinct symbols. The team selected these symbols to specifically represent a person or place within the center. During the symbol interviews, one team member would ask the interviewee what they thought the symbol represented. From the interview results, the WPI project team determined which pictograms would be most suitable to represent locations around the center.

In addition to the physical navigation of the center, the third objective focused on the center's website. An important aspect of the center's website is the text. The team created and

carried out an interview that tested various fonts and text sizes. The interviewees were students at the Center for Modern Languages in Rabat, Morocco. Each of the interviewees read three passages; after each paragraph, the team member took away the computer and asked the student a series of four questions. The team conducted these interviews in order to determine which combinations of text size and font are the easiest to understand.

Results of the staff survey determined what questions the team would prepare for the staff focus group. The project team split this survey into two parts, navigation of the center and accessibility of the website. One of the questions asked the staff “How often do you get asked for directions by disabled members, their family, or visitors?” About 62% of staff members marked that they get asked for directions, at least, more than once a week. This data showed the immediate need for a new signage system within the system.

The next section of this survey was to determine the staff’s perspective on the website. One of the most informative questions on this survey was, “Have you used the Mohammed VI Center for the Disabled’s website?” From the responses, the team uncovered that 43% of the 21 staff members surveyed had never used the center’s website. Additionally, the survey revealed that the staff viewed the website as unattractive. Generally, the staff wants an updated website that accurately represents the work done at the center through the use of pictures and information.

With the responses from the staff survey, the project team designed five big picture questions for the participants of the focus group to discuss. The team split the focus group into two sections, the first concerning navigation within the center, and the second pertaining to the accessibility of the center’s website. For the physical navigation portion, the staff members were able to explain that when visitors come to the center they typically cannot find where they are going and they need a staff member to guide them to a specific location. This is a waste of time for the staff, especially when it occurs multiple times a day. This happens daily because signage and other physical cues at the center are ineffective. Additionally, the staff talked about the need for signage for the illiterate and the visually impaired. In order to make their navigation system more straightforward and inclusive, the team suggests the center to use color coding (see Figure 0.1), clear signage, and textured flooring.

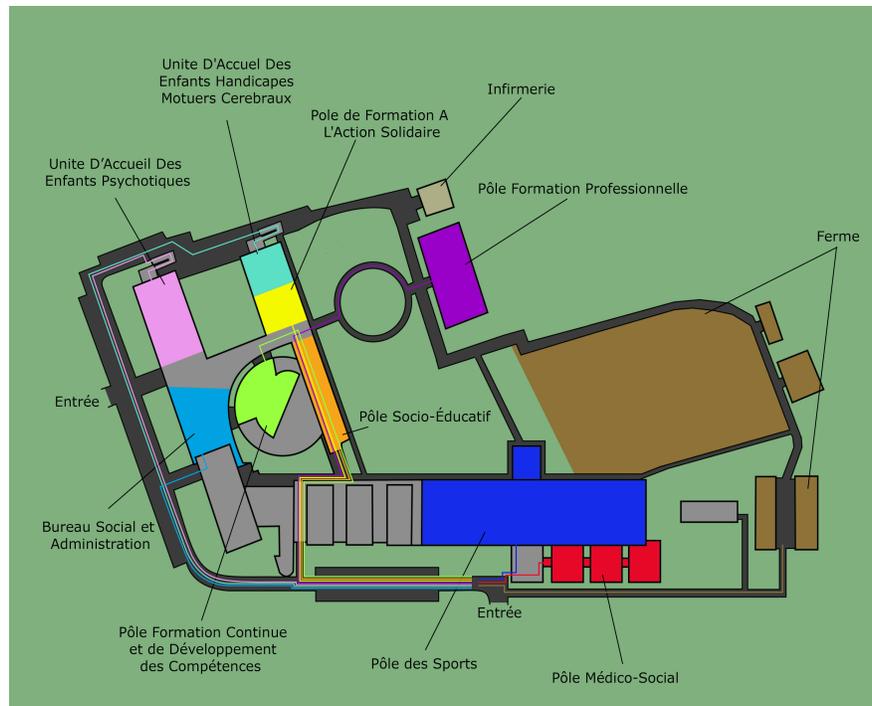


Figure 0.1. An example created by the WPI team of a possible color coded system.

The second section of the focus group gathered the responsables' views on the center's website. The responsables were aware that the website is old and not progressive. They felt strongly in favor of changing the website's format to be more modern with updated information. The responsables expressed that information on services and documentation should all be available online for the members to access before arriving at the center. This information led the team to recommend that the center update the information on the website, modernize the design, and add pictures that illustrates the important work the center does.

Since the administration indicated that the NGOs associated with the center were the main users of the website, the team used surveys to gain relevant information about the site. Of the fifteen people surveyed, seven of the people replied that they rarely use it, and six NGO personnel stated that they had never used the center's website before. The team determined that a major issue that the NGOs faced when trying to use the website was the language barrier. While many NGOs work mainly in Arabic, the center's website is only available in French. The team recommends that the center include translations on the website, specifically options for Arabic, Amazigh, and even English. Over half of the NGO personnel who completed the survey ranked the overall aesthetics of the website to be poor or very poor. They believed the website to be old,

boring, and lacking relevant images and a dynamic design. The research team suggests the addition of pictures containing members of the center. Furthermore, they recommended changing the color of the site and updating the design to better reflect the work done at the center. Overall, the center must update the website to allow everyone the opportunity to use it.

Since everyone at the center should be able to understand the signage, the team interviewed disabled members of the center about specific symbols. Many of the interviewees identified the concept or action depicted in the pictograms but not the specific location which they represent. Though these answers were not exactly what the team expected, they were still the correct concept. In addition, staff members who help illiterate individuals to find a certain location can use the pictograms to direct them toward their destination.

In general, the interview results suggest that symbols which depicted specific features or actions that take place in a given area of the center fostered a better understanding of the location they represent as opposed to symbols that only show objects. Figure 0.2 shows this pattern, where half of the respondents misinterpreted or failed to understand the dumbbell symbol but all of the respondents had the correct concept/response for the man lifting dumbbells. The center can use this trend to create additional effective pictograms in the future.

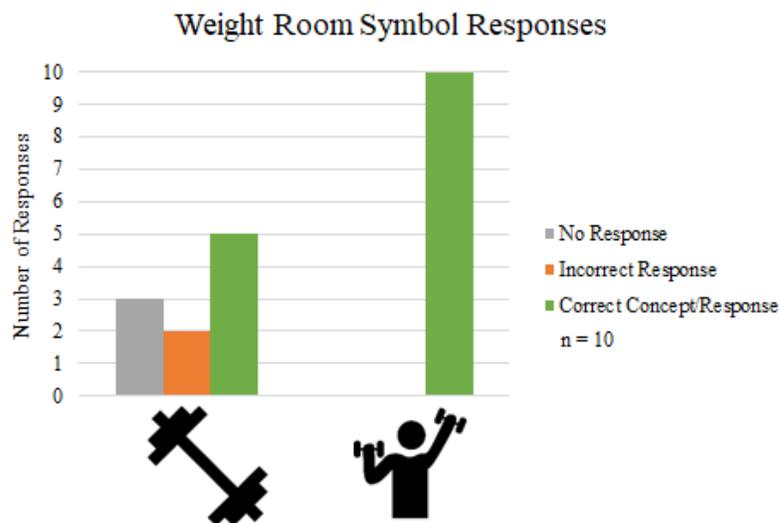


Figure 0.2. Comparison of responses weight room symbols from the symbol interview

The team collected research on text and fonts, to make recommendations for the Mohammed VI Center for the Disabled’s website. The project team carried out interviews with

twenty residents of the Center for Modern Languages. The interviews consisted of three different passages all containing different fonts and text sizes. The interviewees had to read the passages one at a time, and then answer four questions pertaining to each passage. The team found that, in general, all three fonts were readable and fairly clear. The interviewees considered Arial bland and the font size to be too small. Comfortaa was adequately sized and well received, but some considered it too “bubbly”. Times New Roman had the best results with no complaints about the readability of the font or the text size.

By analyzing the data collected from surveys, interviews, and the focus group this project team provided recommendations for the Mohammed IV Center for the Disabled to improve the navigation of their facility and their website. The WPI project team formulated standards for clear signage such as specifications on contrast, placement, and content for the center to use in the development of their navigational system. Similarly, the integration of color coding and symbols into the center’s structure will help the center be more inclusive when it comes to wayfinding. The team also developed recommendations on the formatting and organization of the website to make it more user-friendly.

Executive Summary Bibliography

Chin, W. (2003). *Federal Website Accessibility* (Rep.). Worcester, MA: Worcester Polytechnic Institute.

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

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

Null, R. (2013). *Universal design: Principles and models* CRC Press.

Trani, J., Bakhshi, P., Myers Tlapek, S., Lopez, D., & Gall, F. (2015). Disability and poverty in Morocco and Tunisia: A multidimensional approach. *Journal of Human Development and Capabilities*, 16(4), 518-548.

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*, 11(1)

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Executive Summary Chapter 1 | Introduction

According to the *World Report on Disability*, about 15% of the global population have some form of disability. The report states that such individuals face barriers in everyday life including “stigma and discrimination, lack of adequate healthcare and rehabilitation services, inaccessible information, and a lack of participation in decisions that directly affect their lives” (Officer & Shakespeare, 2013). These obstacles can cause the disabled to face limited healthcare, increased poverty, and an overall lack of educational and economic opportunities.

Countries around the world are addressing the needs of disabled individuals by developing special education programs. The Kingdom of Saudi Arabia, for example, matched the caliber of the United States’ special education programs in the 1970s. The Saudi schools evaluate each student who has a disability to categorize them and provide the necessary services and accommodations (Alquraini, 2014). These special education programs represent great progress in educational opportunity for children with disabilities.

Over the past 36 years Morocco has begun to formulate policies in the interest of its 1.7 million disabled citizens (Maaroufi, 2014). In 1982 Morocco passed their first law regarding social protection for the visually impaired. The country then moved on to pass a law covering the protection of all people with disabilities in 1993. In 2008 the Moroccan government signed and ratified the United Nations Convention on the Rights of Persons with Disabilities (Trani, Bakhshi, Myers Tlapek, Lopez, & Gall, 2015). The main purpose of the Convention was to introduce “for this first time in binding international law the right for persons with disabilities to full inclusion and participation in society” (Rasmussen & Lewis, 2007). With these laws come social programs, both governmental and non-governmental, whose goal is to integrate disabled citizens into the development of Morocco.

Our sponsor, the Mohammed VI Center for the Disabled in Sale, represents one of the largest initiatives for the integration of disabled persons into Moroccan society. The center assists over 10,000 disabled members per year by providing them with medical care, vocational training, and other services. Members are individuals who receive services from any of the centers departments (known internally as poles): from medical to sports and educational services. The medical facility supplies and fits its patients with prosthetics and provides them with physical therapy, dental care, and regular checkups. In the vocational training program, students

learn specific skills that they can translate to work outside the center. They can also graduate from the center with a certificate and use the resources of the center to obtain a job, enabling them to become self-sufficient. The center also includes classes for disabled children and a sports center. These services exist in order to aid members of the disabled community in having equal opportunities in life.

Unfortunately, the center is difficult to navigate, with many similar-looking buildings and few signs to set them apart (Burris & Velez Llorens, Nov 30, 2017). Many of these signs are in Arabic and French, but several are only written in one language or the other. In addition, the center has sporadically placed these signs which do not contain information that is accessible for the visually impaired, the illiterate members of the center, or visitors who do not speak French or Arabic. The center asked our project team to recommend a standard for universally comprehensible displays on its facility.

The center also requested an objective evaluation of its website for usability and clarity. The website features information related to the Mohammed VI Center for the Disabled and their programs. According to the administration, the main users of the website are the NGOs that receive training at the center. The website is only available in French, making it difficult for NGOs who work mainly in Arabic. Additionally, many sections of the website are blank or poorly organized. This makes it difficult to find information and understand it. (Centre National Mohammed VI des Handicapes website, 2014).

The team's goal was to improve the physical navigation system at the Mohammed VI Center for the Disabled and to increase its website's accessibility for all its users. In order to achieve this goal, the team developed three objectives each with methods that pertain to either the navigation of the center or the accessibility of the website.

The first objective was for the team to familiarize themselves with the center and its services. To reach this familiarization, the team performed a site assessment and completed the ADA checklist for Readily Achievable Barrier Removal. They found that not all walkways are accessible to individuals in wheelchairs, and that signage was insufficient and not inclusive to those who are illiterate or visually impaired. The team, with the help of the administration, conducted surveys for the NGOs that work with the center in order to get an understanding of the websites status.

The second objective was for the researchers to gain an understanding of the unique cultural aspects of accessibility in Morocco. The staff survey provided an initial view on the feelings the staff had about the navigation system in the center. This initial data helped the researchers set up a staff focus group organized around relevant topics that the administration should discuss. Both, the staff survey and focus group indicated that the faculty felt that the signage was insufficient and they showed interest in having a new navigation system with inclusive tools such as color coding and textured flooring.

The third objective is to develop standards for physical and online displays. In order to do this, the team performed two types of interviews. The team conducted symbol interviews, in which they presented thirty-nine different pictograms to members of the center to get data on what symbols were most widely understood. The symbol interviews showed that the more detailed pictograms that showed actions were easier for the members of the center to identify. In addition, this project conducted text and font interviews to determine the type of formatting that would be best to display online. The team determined that, in general, a larger font size and better organized webpage would increase the user-friendliness of the site.

Mohammed VI Center for the Disabled's utilization of this signage system and updated website has the potential to impact everyone who walks through the center's doors and visits their website. By introducing a new signage system, the center will take one step closer to becoming easily accessible for all. Updating and improving the website's quality will make information about the center readily available for anyone who needs it. Improving the navigation within the center and its website will aid the center in becoming universally accessible.

Chapter 2 | Background

This chapter presents background information on disabled individuals in Morocco and reviews the obstacles they face. Additionally, the chapter expounds on methods for making physical spaces and websites universally accessible. The project sponsor, the Mohammed VI Center for the Disabled, provides resources disabled individuals and strives to eliminate obstacles for the handicapped. In order to give informed suggestions to the sponsor, the project team explored best practices for universal design, signage, wayfinding, and web design.

2.1 Daily Challenges and Discrimination Against Disabled in Morocco

To understand the position of disabled individuals in Morocco the team uncovered the following statistics gathered during the 2014 Moroccan census. Five percent of the Moroccan population have one or more disabilities. Almost 800,000 of disabled individuals surveyed in the census (or 46.5%) are over the age of 60, however approximately 780,000 (45.6%) are of employment age, between 15 and 59. Nearly ninety percent of disabled people in Morocco are unemployed (Maaroufi, 2014).

Recognition of the needs and opportunities for disabled persons is a relatively new initiative 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, and sidewalks conditions. Adil Nidaa, a Moroccan student who travels in 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, buses are impossible to board in a wheelchair without the assistance of a fellow citizen and they 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 the employment of disabled citizens. Many disabled individuals are unable to seek an education in the normal school system. Non Governmental Organizations (NGOs) and the Mohammed VI Center for the Disabled are the main educators of disabled individuals in Morocco. Due to this lack of access to education, about 66.5% of people in Morocco with disabilities have no education at all (Maaroufi, 2014). This makes it difficult for these disabled individuals 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 biblical times when Middle Eastern society considered the disabled to be impure. While this study does not specifically confront stigmas against the disabled of Morocco, it is important to understand the potential struggles the clients of the center may face.

2.2 The Mohammed VI Center for the Disabled

The Mohammed V Foundation for Solidarity is a national organization that provides resources for the underserved populations of Morocco. The Foundation for Solidarity is the parent organization that funds centers like the Mohammed VI Center for the Disabled. 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).



***Figure 2.1. Photograph of the Mohammed VI Center for the Disabled in Salé, Morocco
(Centre National Mohammed VI des Handicapés website, 2014)***

The Mohammed VI Center for the Disabled (Figure 2.1), is a government-led organization within the Mohammed V 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 Figures 2.2 and 2.3 (Centre National Mohammed VI des Handicapés website, 2014). The Salé facility also offers 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 2.4 and 2.5 (Burriss & Velez Llorens, Nov 30, 2017).



Figures 2.2. and 2.3. Photographs of the sports facility and medical facility at the Mohammed VI Center for the Disabled in Salé, Morocco (Centre National Mohammed VI des Handicapes website, 2014)



Figures 2.4. and 2.5. Photographs of the Culinary and Farming programs at the CAT in Salé, Morocco (Centre National Mohammed VI des Handicapes website, 2014)

In total, the Sale center has eight poles:

- Pôle Médico-Social: A medical wing which provides check ups, dentistry, physical therapy, prosthetics, and much more.
- Pôle des Sports: A sports facility including a gymnasium and a pool.
- Pôle Socio-Éducatif: Educational opportunities for children with disabilities.
- Pôle Ressources et Logistiques:
- Pôle Formation Professionnelle: Classrooms and workshops for vocational training in the fields of hospitality, baking, etc.
- Bureau Social: Outreach to potential clients of the center.
- Pôle Formation Continue et de Développement des Compétences: Training for Non-Governmental organizations.
- Pôle Développement:

Each of these poles serves an integral role in providing the members of the center with resources and opportunities to participate in Moroccan society (Mohammed V Foundation for Solidarity website, 2017).

2.3 Stakeholders

This project aims to improve the accessibility of all people interacting with the center including members, their caregivers, staff, NGOs, and visitors. Each of these individuals connects with the center in a different manner, and therefore the team took a unique approach to understand the needs of each set of stakeholders. The main clientele of the center are its disabled members, who have the greatest needs when it comes to physical accessibility throughout the center. According to the centers administrators, members and their caregivers are unlikely to use the website because many are illiterate or lack Internet access. Consequently, when contemplating improvements for the website, the main population to consider is the members of NGOs associated with the center.

The Mohammed VI Center for the Disabled partners with NGOs and provides training for their personnel. This training is a key resource for organizations who seek to work with the disabled, because higher education in Morocco still does not have programs in special education. Providing information about these trainings online could help extend the center's reach to more

NGOs and potentially help build a greater network of resources for the disabled population.

Signage and navigation in the center concern all who walk through its doors, from the staff, to the members and visitors who use its resources. A special consideration here is not only those who do not speak French or Arabic, the two languages used at the center, but also those who are illiterate. The lack in clear signage makes it difficult for visitors to find the path to their destination. Good pathfinding throughout the center also benefits the staff and administrators, as they are concerned about the members safety and ease of navigating.

2.4 Universal Design

Universal Design is the idea that developers should create physical spaces or electronic systems that users can easily navigate. This strategy should include individuals with physical and mental disabilities, elderly and aging persons, and the greater population. The concept of Universal Design helps those who need assistance navigating spaces, and also can increase 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 accessible and marketable to the general population. Such products might not present any barriers to disabled individuals regardless of whether the designer takes specific disabilities into account or not. A normal potato peeler would be an example of a product in the micro tier since it is usable by most of the population.

The macro tier of Universal Design emphasizes the architect's customization of the design in order to adapt the space or object for specific needs. When products fall into the macro

tier, the designer focuses on making a product accessible to specific disabilities. (Centre for Excellence in Universal Design, 2014). An example of a product in the macro tier is a potato peeler with a thicker grip (Figure 2.6) to accommodate individuals who have difficulty gripping items.



Figure 2.6. Good Grips kitchen tools.

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 that adds a helpful function to the overall layout of an area. An example of supportive design is a ramp, as it 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 someone pushing a stroller or a person carrying a heavy item but does not hinder anyone's access to the space.

Adaptable design is the concept that a user can adjust the structure of a product to fit their needs. Tables with adjustable height or a website with an option for larger font sizes are examples of adaptable design. Unlike adaptable design which adds options to a structure, accessibility design focuses on removing physical and systematic barriers from general design (e.g., eliminating stairs or narrow doorways). Safety-oriented design takes into account any modification to spaces or objects that can either prevent injury or make it less severe. Including railings to ramps or making sure flooring is not slippery to avoid injury is one method of making a space more safety oriented (Null, 2013).

To achieve Universal Design, there are principles that fit into one of the above-mentioned designing categories. To attain an equivalent experience when navigating a space the designer

should avoid separating parts of the population by designing pathways that do not force individuals with low physical capabilities to stray from main pathways. 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 allows people of all linguistic capabilities to perceive the information. Designing a space while considering movement helps maintain low physical effort by eliminating structures that force people into awkward positions. Finally, when architects are designing structures, they should factor in the variability in sizes of people and their level of mobility (Centre for Excellence in Universal Design, 2014).

Universal Design is an important concept for this project. The disabled members of the center, NGO personnel, and international visitors need of navigation tools within the center. Keeping everyone in mind is an important notion due to the wide variety of people who navigate the center.

2.5 Signage and Wayfinding

According to the Society for Experiential Graphic Design, wayfinding is a concept which involves the infrastructure and systems “that guide people through a physical environment and enhances their understanding and experience of the space”. Those with visual, cognitive, mobility, and other impairments can have difficulty navigating a space or reading signs in certain lightings and colors. This section discusses standards for readable signage and best practices for understandable cues or maps (Harding, Bosch, Rayfield, & Florie, 2017).

2.5.1 Pictograms

Pictograms are graphic symbols that represent places, objects, directions, warnings, etc. These images are ideal for aiding illiterate individuals in everyday life, but are also helpful for all users. An optimal pictogram enables users to understand what it represents and transcends cultural boundaries. While this is the epitome of pictograms, they do not all achieve this caliber of understanding. Unfortunately, cultural differences make symbols that are standard in one part of the world practically unintelligible in another. Good examples of globally understood

pictograms are the gendered bathroom symbols. The symbols are simple but get their point across without confusion, and people around the world can understand them.

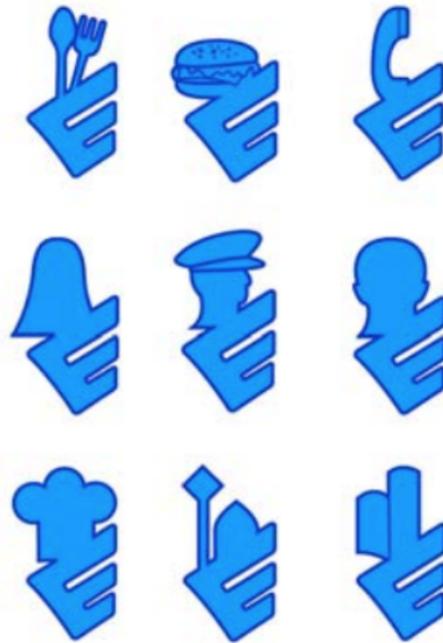


Figure 2.7. Pictograms designed for the Islamic Azad University (Keshavarzi & Mohd Adnana, 2017).

A study conducted by the faculty of the University of Malaya and the Islamic Azad University found navigation around various colleges in Tehran to be confusing for new students. The faculty members solved this problem using pictograms. Their pictograms are clear and concise visuals that allow students, faculty, and visitors to locate their destination on their own. Information booths that were previously an integral aspect in navigating the campus are now irrelevant because of the signage employed by the faculty. Their symbols consist of the school's logo, color, and a representation of the place in the school (Keshavarzi & Mohd Adnana, 2017). Figure 2.7 provides an example of the pictograms created by the faculty members for the Islamic Azad University. Blue is their school color, the "E" shape is their logo, and the top part of each pictogram depicts a respective building. While these symbols were useful for the universities, they are not universally recognizable as some are ambiguous or repetitive. Universal distinguishability is mandatory when it comes to choosing pictograms for use within the Mohammed the VI Center for the Disabled.

2.5.2 Color and Contrast

Background color and text are two of the most important considerations when designing signs. For example, most people would agree that neon, pale, and dark colors require more effort to read. The Americans with Disabilities Act (ADA) Standard requires a minimum variance of 70% between text and background colors, known as contrast. The signage commonly used in airports and public spaces meets the acceptable ADA standards but also takes aesthetics into account. (Harding et al., 2017). Figure 2.8 illustrates common background options.

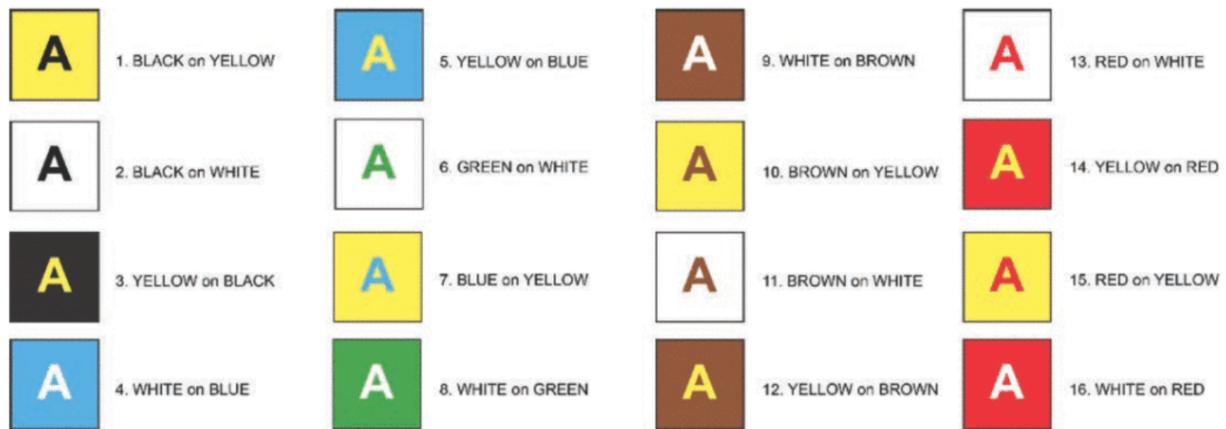


Figure 2.8. Color combinations for maximum readability.
(Adapted from “Enhancing Airport Wayfinding for Aging Travelers and Persons with Disabilities,” by Harding et. al., 2017, p. 39. Copyright 1974 by the K. E. Claus and R. J. Claus. Reprinted with permission.)

The concept of conspicuity deals with how color choices impact the readability of signage. People tend to view signs with light colors better because dark colors sink into the background. This applies to both text and background colors. Notably, lighter signs are easier for people to see compared to 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 as shown in Figure 2.9. The team included conspicuity when working with the needs of visually impaired individuals (Harding et al., 2017).

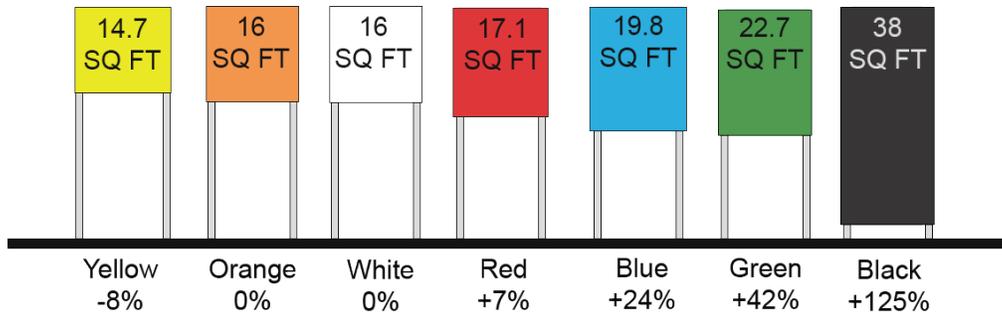


Figure 2.9. Percentage area change required for colored signs to retain the same conspicuity as a white sign. (Adapted from “Enhancing Airport Wayfinding for Aging Travelers and Persons with Disabilities,” by Harding et. al., 2017, p. 39. Copyright 1979 by the J. Follis and Dave Hammer Publishing Company. Reprinted with permission.)

2.5.3 Illumination

Effective lighting is crucial for reading signs. There are three general methods for lighting signs. The first and simplest option is to utilize existing ambient light already in the space. It is important to review whether the space is lit sufficiently in an effort to properly illuminate the sign. The suggested measurement is a minimum of 100 lux. Harding et al. state “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, this project used this rule as a guide. (Harding et al., 2017)

The second method for sign illumination is external, using a lighting fixture which shines on the sign. External illumination is economical and easily maintainable by the center. This form of illumination can be useful in low-lit areas.

The third and most complex option is internal lighting. Signs with internal lighting can be costly and require frequent maintenance, but provide superior conspicuity. Overall, the issue of proper lighting is essential for an easily readable sign.

2.5.4 Wayfinding for the Visually Impaired

While signs are an important aspect of wayfinding, they are virtually unusable for blind individuals. There are two main methods for communicating spatial and navigational information to those with low or no vision: tactile information and descriptive information.

Tactile information consists of raised representations of visual displays, including maps, lettering, and symbols. More specifically, tactile maps include raised lines to represent walls, paths, symbols, and objects, and can also incorporate an interactive component with buttons to trigger descriptive navigational directions and Braille. In addition to these visual displays, tactile information is available to the visually impaired in more subtle forms, such as changes in flooring material, which indicates passing into a new room or area. For example, carpeting in an airport can denote a waiting area, while tile flooring signals the main walking path, and a strip of carpet with different texture and pattern labels the intersection of both areas, as shown in Figure 2.10. A blind or visually impaired person can detect these differences with their feet or cane and orient themselves without the use of more complex technology (Harding et al., 2017).

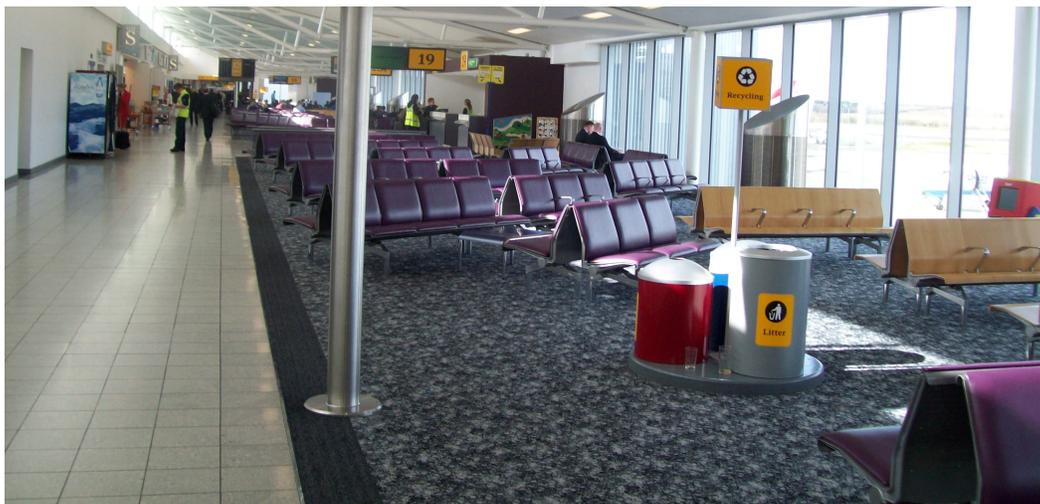


Figure 2.10. Edinburgh Airport Gate Lounge used tactile flooring differences to distinguish the waiting area from the main path. (Dbx54, 2009)

Braille, a specific form of tactile information delivery, consists of raised dots which enable the blind to read with their fingers. Six dots make up each cell, and there are 64 possible combinations of raised dots in the Braille cells, each indicating a particular letter, sound, or symbol (American Foundation for the Blind. 2018). While there is a distinct, standardized Braille code for each language, there are similarities across languages in the cell used for each sound. For example, Figures 2.11 and 2.12 display the Arabic letter “ب” and the French letter “b,” which make the same sound, and are both letters that represent the same Braille cell. There is also a truly international Braille code based on the International Phonetic Alphabet (IPA), which

describes the sounds that comprise words, as opposed to the letters that represent those sounds in a particular alphabet (World braille usage 2013). Whether using a code that can be internationally read, or one that is specific to local languages, Braille is useful when communicating textual information to the blind in all parts of the world.

Alphabet: Unified Arabic (Qatar, United Arab Emirates)									
ا	alef	a	(1)	⠠	ض	dad	ḍ	(1246)	⠠
ب	beh	b	(12)	⠠	ط	tah	ṭ	(23456)	⠠
ت	teh	t	(2345)	⠠	ظ	zah	ẓ	(123456)	⠠
ث	theh	th	(1456)	⠠	ع	ain	ʿ	(12356)	⠠
ج	jeem	j	(245)	⠠	غ	ghain	gh	(126)	⠠
ح	hah	ḥ	(156)	⠠	ف	feh	f	(124)	⠠
خ	khah	kh	(1346)	⠠	ق	qaf	q	(12345)	⠠
د	dal	d	(145)	⠠	ك	kaf	k	(13)	⠠
ذ	thal	dh	(2346)	⠠	ل	lam	l	(123)	⠠
ر	reh	r	(1235)	⠠	م	meem	m	(134)	⠠
ز	zain	z	(1356)	⠠	ن	noon	n	(1345)	⠠
س	seen	s	(234)	⠠	ه	heh	h	(125)	⠠
ش	sheen	sh	(146)	⠠	و	waw	w	(2456)	⠠
ص	sad	ṣ	(12346)	⠠	ي	yeh	y	(24)	⠠

Ligatures											
لا	La	(1236)	⠠	إ	E	(46)	⠠	ؤ	Waw	(1256)	⠠
ى	-	(135)	⠠	آ	Aa	(345)	⠠	ئ	ya	(13456)	⠠
أ	A	(34)	⠠	ء	a	(3)	⠠	ة	-	(16)	⠠

Figure 2.11. Unified Arabic Braille Code from The Conference of Developing and Unifying Arabic Braille Characters (World braille usage 2013)

Alphabet: French

a (1)	⠁	k (13)	⠅	u (136)	⠥	â (16)	⠁⠆
b (12)	⠃	l (123)	⠇	v (1236)	⠧	ê (126)	⠑⠆
c (14)	⠉	m (134)	⠍	x (1346)	⠭	î (146)	⠊⠆
d (145)	⠑	n (1345)	⠎	y (13456)	⠮	ô (1456)	⠝⠆
e (15)	⠑	o (135)	⠕	z (1356)	⠵	û (156)	⠥⠆
f (124)	⠑	p (1234)	⠏	ç (12346)	⠎	ë (1246)	⠑⠆
g (1245)	⠑	q (12345)	⠏	é (123456)	⠑	ï (12456)	⠊⠆
h (125)	⠑	r (1235)	⠗	à (12356)	⠁	ü (1256)	⠥⠆
i (24)	⠊	s (234)	⠎	è (2346)	⠑	œ (246)	⠝⠑⠆
j (245)	⠊	t (2345)	⠞	ù (23456)	⠥	w (2456)	⠧⠑⠆

Figure 2.12. Code Braille Français Uniformisé (CBFU) (World braille usage 2013)

Braille is one solution for communicating written information to the blind, but it is not the most practical. According to Harding et al., “It is estimated that only 10 to 15 percent of Americans who are blind can read Braille” (2017). Individuals who were once able to see are also less likely to learn Braille, relying instead on auditory information and tactile lettering (Harding et al., 2017). In Morocco, there is little to no public support for the blind or for the usage of braille.

Detailed audible descriptions of spatial features help blind and visually impaired individuals make a cognitive map of an area (Harding et al., 2017). However, landmarks that are descriptive to a seeing person may be difficult for a blind or visually impaired person to find. The use of multisensory landmarks is useful when someone gives directions to a blind person. A multisensory landmark is one that a person can hear, smell, or touch. When giving a visually impaired individual directions, common practice is to use sound as a marker. Since an escalator makes noise, people can hear it as they pass by making it a useful multisensory landmark (Harding et al., 2017).

Building administration and designers must make additional considerations for the safety of those who cannot clearly see their surroundings. According to the Americans with Disabilities Act, objects that protrude or hang in walkways should either be within 27 inches of the ground, where a blind person could detect them with a cane; more than 80 inches off of the ground, where the average person cannot hit their head; or protrude by no more than four inches from the wall (Adaptive Environments Center & Barrier Free Environments, 1995). These adjustments as

well as tactile and descriptive communication make spaces more safe and accessible to the blind and visually impaired.

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 presenting to the world. Research on web design revealed various standards of web page interface design and development. Visualization, accessibility, and usability are three qualities that facilitate a user's understanding of a website. Visualization deals with appropriate visual displays that are aesthetically pleasing. Accessibility emphasizes the formatting of a website and maximized functionality. Usability refers to how effectively a device can load a site (Schmidt, Liu, & Sridharan, 2009). With proper use of these guidelines, a designer can strive to develop a website that is universally accessible.

2.6.1 Visualization

Upon viewing a website for the first time, it only takes a few seconds for a viewer to form an opinion about the page. (Uribe, Álvarez, & Menéndez, 2017). If a website is not aesthetically pleasing to its viewers, it is already more difficult for the user to navigate. Though it may seem elementary, designers must consider the basics of visual design. Without even reading any content from a website, users form their own opinions from the clarity and aesthetic of the webpage.

Well-organized websites enable users to find the information they seek at a much faster rate than unorganized sites. For web pages, “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. Aesthetic factors range from font size to color.

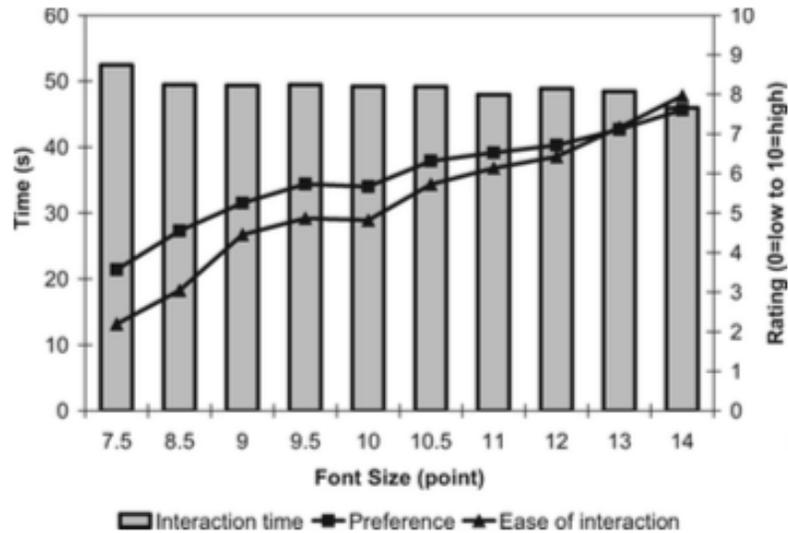


Figure 2.13. The mean interaction time per font, with the visual preference, and the ease of interaction displayed. Adapted from “Webpage aesthetics, performance and usability: Design variables and their effects” by Schmidt et al., 2009, p. 640. Copyright 2009 by Ergonomics. Reprinted with permission.

According to Figure 2.13, size 14 font is the easiest font to interact with on a website. The fonts in this study ranged from size 7.5 to size 14. As the font size increases, so does the preference and the ease of interaction, all while interaction time decreases. This data indicates that size 14 font is the preferred text size for websites.

2.6.2 Accessibility

Making a website easily readable and accessible is essential to making it successful. “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 deters visitors from using it. Websites should be easily accessible for everyone, including disabled people, to give all users an equal opportunity in navigating through the Internet (Chin, 2003). In addition to complexity, details such as color and contrast determine the accessibility of a website. Figures 2.14a and 2.14b demonstrate the importance of color and contrast on web pages. While these designs are interesting, the website user can only read the website after moving the mouse to either the blue or red section which is in the top left corner and bottom right corner respectively. This is the first visual that a user encounters on the Bolden website, which can cause confusion about the page.



Figures 2.14a. and 2.14b. Example of bad visual displays (Bolden, 2017)

In contrast, Figure 2.15 displays the Americans with Disabilities Act website, which is an example of an easy to navigate website because of design choices for color contrast and the layout of information.

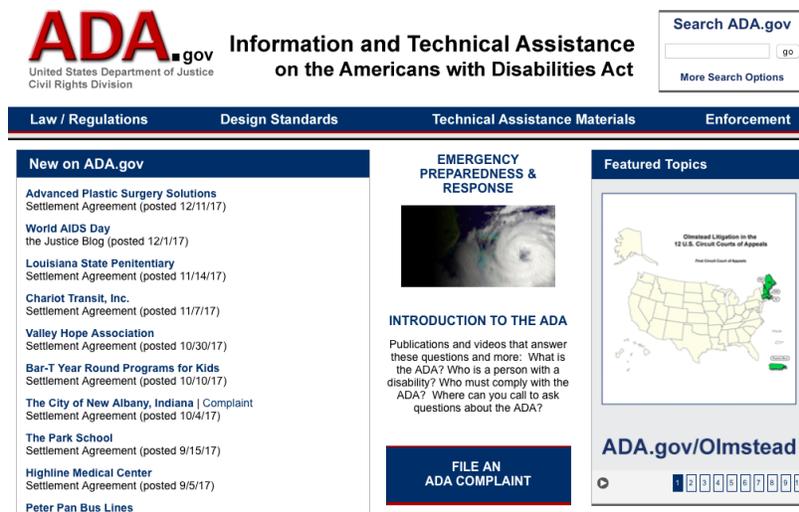


Figure 2.15. Screenshot of the Americans with Disabilities Act Website (ADA homepage.2013)

In addition to visual accessibility, the Bolden website and the ADA website differ in accessibility of content. The opening page of the Bolden website (seen in Figure 2.14a) is vague about the page’s content. Since it is already difficult to decipher the site’s title, it is even more of a struggle to determine its purpose. In contrast, the ADA website clearly states that it contains “Information and Technical Assistance on the Americans with Disabilities Act,” which obviously expresses the website’s purpose. Information must be clearly stated and easily readable such that users can obtain information as effortlessly as possible.

2.6.3 Usability

Usability specifically deals with the impact of a browser displaying objects in an efficient manner. According to a study of Nigerian university websites, “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 web page download speed (Leung, Law, & Lee, 2016). Users often become frustrated when websites take too long to load and will often leave when the page loading time is too long (Schmidt et al., 2009). Therefore, these are important variables to consider when developing a website used by a large number of people.

2.7 Navigation Case Study

Navigation at the Mohammed VI Center for the Disabled is an issue; the use of unhelpful signage or no signage at all can hinder the user-friendliness of a location (Burriss & Velez Llorens, 2017). In 2016, the University of Technology Sydney (UTS) improved the usability of their library through updated signage. This was an important undertaking for the library, 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). Signage is an effective tool to help people navigate through a building or an organization’s grounds.

To gather the necessary information to make changes to the UTS’s library signage system, the library used a few different methods. Their team observed 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 watched students and faculty using the signs to get through the library. In addition, the employees recorded questions that guests asked at the front desk to comprehend the effectiveness of the signage. Next, 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). Their investigation found that many of the signs were irrelevant, contradictory to one another, or repetitive of other signs.

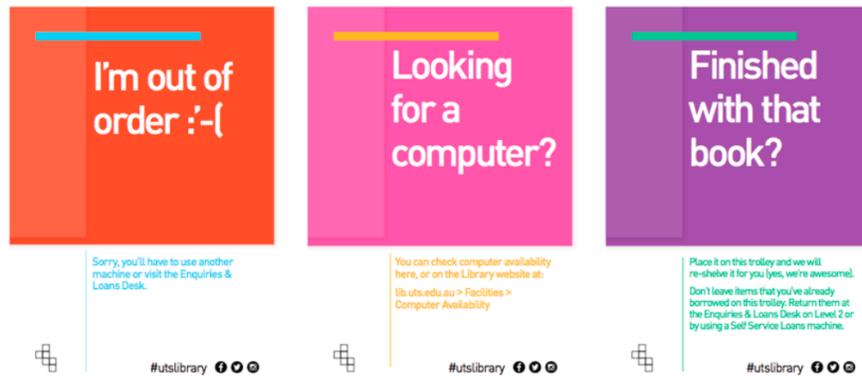


Figure 2.16. New signs implemented with a consistent visual style, brief messages, and colors corresponding to the floor (Adapted from Luca & Narayn, 2016).

To resolve this issue, their team, “developed a simple template for printed signs, with a range of complementary background colors and clear typeface” (Luca & Narayn, 2016) (see Figure 2.16). After their team created the new signage, they were able to discard outdated and confusing signs (see Figure 2.17). The new signs grab people’s attention and direct them toward the relevant information. In contrast, the old signs forced readers to study the entire sign to understand their general topic, making them ill-suited to quickly communicate information. This case study highlights the importance of effective signage through the use of colors and design (Luca & Narayn, 2016).

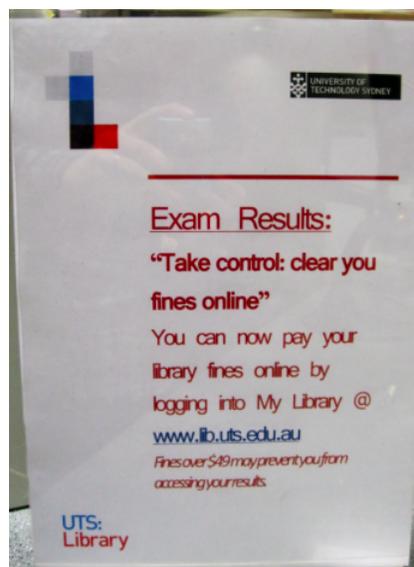


Figure 2.17. Old sign with poorly conveyed information and poor text (Adapted from Luca & Narayn, 2016).

In addition to the updated signage, their team implemented color coding within the building. The team assigned specific colors to book genres, this made it easier for library users to find certain sections of books in the library and online. Their color coding was crucial in aiding the students in finding books, ““a color-coded stack signage system has helped users orient themselves and find materials in a library with high layout complexity”” (Luca & Narayn, 2016). Color coding is a system that can simplify an otherwise complex area.

2.8 Website Case Study

William Chin’s IQP, *Federal Website Accessibility*, which he performed in 2003 has strong similarities to the website portion of our project. The study focused on accessibility to analyze and evaluate federal government websites. According to the ADA, there are guidelines businesses and the U.S. government must follow on their websites to accommodate disabled individuals. Surprisingly, at the time of his 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).

Chin gave the websites different accessibility ratings: One being the worst, and three being the best, but not perfect. In addition, he conducted interviews with various web experts, including WPI professors. This process produced a proper website following all ADA guidelines. Subsequently, he used it as a reference when judging the real sites (Chin, 2003).

Chin’s project concluded that the Legislative branch of the United States government 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. The WPI team will use this IQP’s methods as reference when carrying out our project. (Chin, 2003)

2.9 Summary

This chapter explores important previous research that influenced the team’s work while onsite. This includes background information about the sponsor and stakeholders. The project team also included research on best practices in the universal design of spaces and efficient signage to inform suggestions for improving navigation in the center. They also included topics in universal website design to assist in making the center’s website easily accessible and

aesthetically pleasing for its users. With this background understanding of physical and online accessibility, the team was able to formulate a set of methods for understanding the unique situation at the Mohammed VI Center for the Disabled.

The goal of this project was to improve physical navigation within the Mohammed VI Center for the Disabled for its members, and website accessibility for staff and Non-Governmental Organizations (NGOs). The center wants to improve their website’s structure and to design and implement aids to improve facility navigation for their members and visitors. A diagram displaying the flow of our project is in Figure 3.1. This project’s objectives are as follows:

1. Familiarization with the Mohammed VI Center for the Disabled and their expectations for informational accessibility and physical navigation.
2. Understanding the unique cultural aspects of physical and online accessibility in Morocco.
3. Identifying standards for efficient physical and online displays.

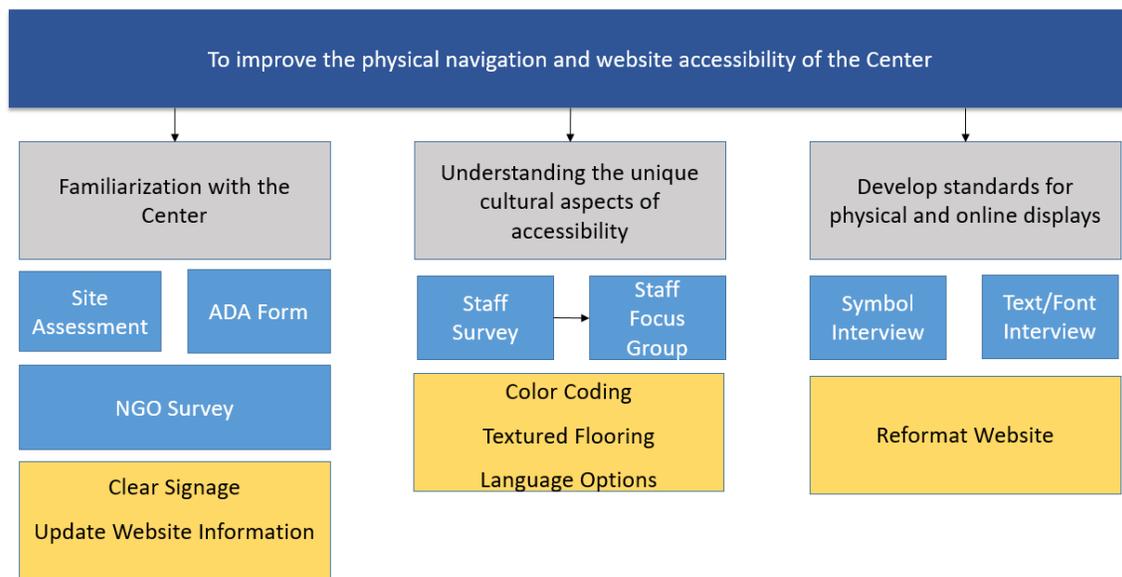


Figure 3.1. The relationship between the goal and objectives and which methods (light blue) and deliverables (yellow) fall under each objective.

3.1 Familiarization with the Mohammed VI Center for the Disabled and their expectations for informational accessibility and physical navigation.

It was necessary for the team to gain an understanding of the mission and scope of the Mohammed VI Center for the Disabled to properly research and give relevant suggestions for

their physical and online accessibility. The team performed a site assessment to familiarize themselves with common activities within the facility, and the layout of the center. Following the site assessment our team used a checklist developed by the ADA (see Appendix A contains the checklist in its entirety) to better understand how the disabled members navigate through the center on a daily basis. Subsequently, Fatima hand-delivered surveys to various associated NGOs. These surveys recorded their opinions about the center's website. The site assessment and NGO surveys were vital to gain an understanding of the center's resources, structure, and needs.

3.1.1 Site Assessment

The team completed a site assessment in order to understand the complexity of the facility and challenges in navigating the center. The site assessment simulated the experience of first-time visitors such as the team members who are additionally unfamiliar with the French and Arabic languages. Although the center's administration provided the team with a guided tour upon arrival, there were still areas of the center that they had not visited. Consequently, any difficulties they encountered in understanding the layout of the center and the signs available are a reasonable approximation of the navigational experience of other foreign visitors to the center. According to Guest et. al. (2013), this form of data collection, known as participant observation, is "the most natural and the most challenging form of qualitative data collection methods," and can provide useful insights into the interaction between the center and visitors (p. 75).

The site assessment began at the main entrance and followed signs to locate major destinations within the center. The goal of this walk through was to determine whether the current signs provide adequate information for anyone navigating the center. One team member took detailed notes of areas and signs that we encountered, while another took pictures of the signs around the center for later analysis. The researchers walked around the entire center, and entered all the buildings besides the *infirmierie* (infirmary), *unite d'accueil des enfants psychotiques* (space for children with autism), *unite d'accueil des enfants handicapes moteurs cerebraux* (space for children with impaired motor skills). The project team did not evaluate the inside of these buildings because the administration did not include them on the tour and the team believed them to be restricted areas.

3.1.2 ADA Compliance Evaluation

The next step in this investigation was a site evaluation using the ADA Checklist for Readily Achievable Barrier Removal, pictured in Figure 3.2. This checklist is a resource used in the United States to evaluate the accessibility of existing buildings and determine achievable solutions to shortcomings in accessibility.

QUESTIONS		POSSIBLE SOLUTIONS
<p>Priority 1</p> <p>1 Accessible Approach/Entrance</p> <p>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)</p> <p>Is there a route of travel that does not require the use of stairs?</p>	<p>Yes No</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.</p> <p><input type="checkbox"/> Add an alternative route on level ground.</p>
<p>Is the route of travel stable, firm and slip-resistant?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Repair uneven paving.</p> <p><input type="checkbox"/> Fill small bumps and breaks with beveled patches.</p> <p><input type="checkbox"/> Replace gravel with hard top.</p>

Figure 3.2. Excerpt from the ADA Checklist for Readily Achievable Barrier Removal. (Adaptive Environments Center & Barrier Free Environments, 1995)

The main use of the checklist was as a tool to better grasp the experience of disabled individuals who traverse the center. This evaluation assisted the team in focusing on the aspects of the center that are most important to its disabled clients.

3.1.3 NGO Survey

The center’s administration identified NGOs as the primary users of the Mohammed VI Center for the Disabled’s website. The team created a survey to assess the accessibility of the center’s website (available in Appendix B), and Fatima assisted members of several NGOs in completing the forms. Fatima collected fifteen of these surveys to allow for an accurate sample size. This method allowed this study to receive accurate information from the respondents with the least inconvenience to them.

The team initially created the survey in English and Fatima translated it into French. Through the help of Fatima, the administration, and Google Translate, the WPI team translated the survey results into English. The team created these questions to understand why the NGOs used the website and how to improve their experience, by adding information that is specifically relevant to their work.

3.2 Understanding the unique cultural aspects of physical and online accessibility in Morocco.

The team recognized the potential impact that differences between Moroccan and American culture could have on the effectiveness of their methods. This objective allowed the team the opportunity to learn about the cultural norms associated with physical and web accessibility. The project team used both a staff survey and a staff focus group to get their perspective on navigation within the center and on the website. First, Fatima distributed the surveys to the staff members. The project team used the answers from this survey to shape the discussion of the focus group. The team meant the focus group to be a place where they could learn about any cultural issues associated with this project.

3.2.1 Staff Survey

The purpose of this survey was to get the staff's perspective on the accessibility of the center and its website. The team created the survey in English, then Fatima transcribed it to French to enable the staff to understand and answer the questions. Fatima distributed surveys (available in Appendix C) to twenty-one staff members who were willing to complete it. Fatima decided who received surveys, she did this by asking random staff members if they would be willing to complete a survey until she had twenty-one responses. The absence of an interviewer for these surveys worked in the team's favor, because it, "removes a major source of potential bias in the responses, and makes it easier for respondents to be honest about sensitive subjects" (Brace, 2004). Fatima distributed these surveys on February 9, 2018 and the team received the last survey on February 14, 2018. Fatima, the administration, and Google Translate aided the research team in translating the survey responses into English to enable the team to analyze this data.

3.2.2 Staff Focus Groups

The administration of the disability center led a focus group with the staff from the center. The purpose of this focus group was to learn about the specific cultural aspects of web accessibility and physical navigation from the staff's point of view. The first step towards organizing this focus group was for the team to analyze the answers from the staff survey. The team then created five big picture questions (see Appendix D) that would be used during the focus group, these included key points that the researchers believed were important to mention throughout the discussion. The focus group consisted of two team members and six responsables, or department heads. Each of these responsables gave the team permission to use one of their phones to audio record the focus group, under the agreement that the team would delete the recording after they completed the project. The administration translated the questions from English to French, printed them out, and then distributed the list of questions to all the responsables present. During the focus group, the responsables would discuss the questions asked and they would periodically stop to allow one of the responsables to give the teammates a general idea of what had been said. After completing the focus group, the team gave Fatima a copy of the recording. She then listened to it and informed the team of any information that was not translated to them the first time. The team was then able to analyze the information from the focus group.

3.3 Identify standards for efficient physical and online displays.

The team's third objective dealt with identifying efficient forms of information delivery to assist in the navigation of the center and the website. We conducted a series of interviews to determine the best means of displaying information on signs at the center and on the website. The first of these interviews involved asking the disabled members to identify pictograms. The second asked interviewees from the Center for Modern Languages about the readability of different fonts and text sizes.

3.3.1 Symbol Interview

The symbol interview pertained to the appeal of various pictograms, and the understandability of symbols in signage. The team chose to collect this information through a face-to-face interview in order to take into account the nuances of respondents' reactions to the

pictograms, and to avoid excluding any members as interviewees due to illiteracy or difficulty communicating their answers in a non-verbal manner. According to Ian Brace in *Questionnaire Design*,

“One clear advantage of face-to-face interviewing is the ability to show prompt cards easily to respondents. These cards can be used in questions where prompted awareness or recognition of names is required, where respondents are being asked to select their answers from a scale, or where it is desirable to prompt with a list of possible responses” (Brace, 2004).

The team compiled a list of thirty-nine symbols to represent various areas within the center. Eight of these symbols came from existing signs in the *Pôle Formation Professionnelle*, as shown on the sign in Figure 3.3. The team selected the additional thirty-one symbols as common symbols with free usage rights. The full list of symbols is available in Figures E.1 through E.39 in Appendix E.

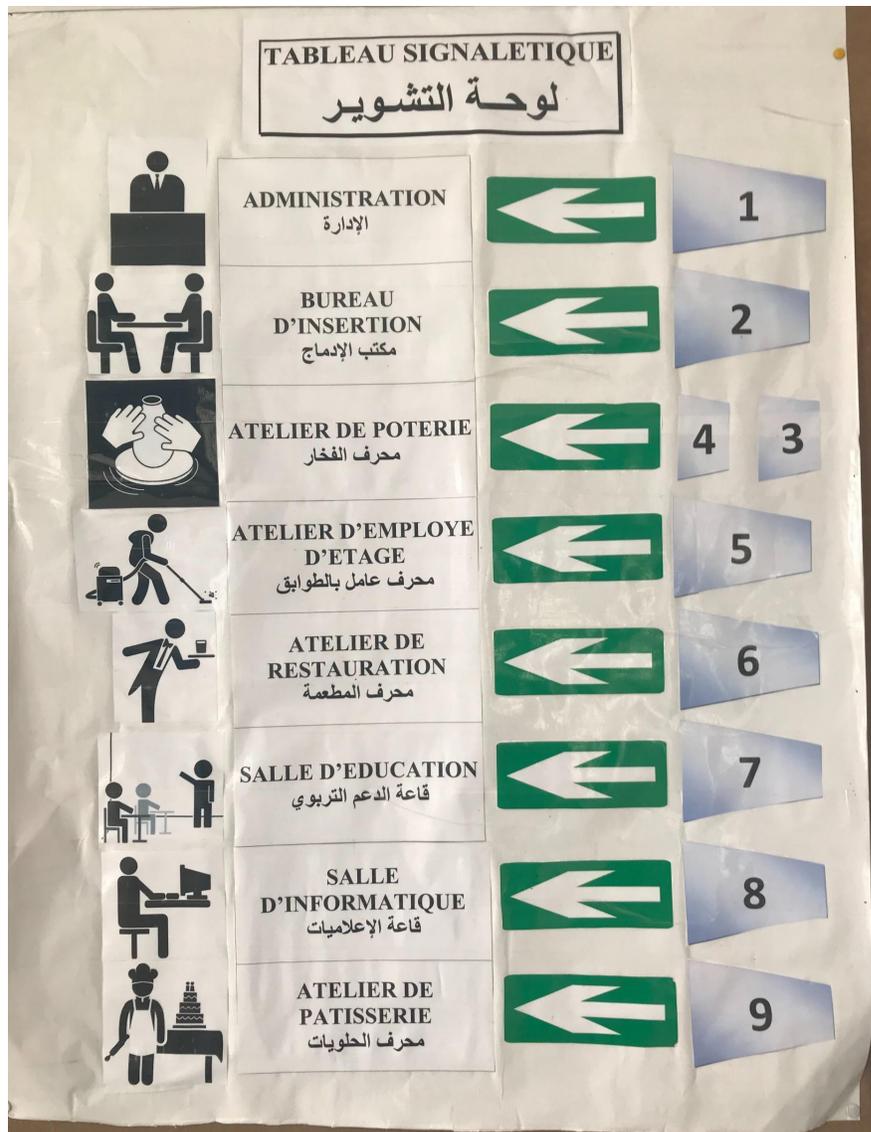


Figure 3.3. A chart in the entryway of the Pôle Formation Professionnelle which shows the pictograms representing each classroom.

Two members of the WPI team interviewed ten members of the center, with the help of a translator. Five of the members were students in the *Pôle Formation Professionnelle*, while five were from the *Pôle Médico-Social*. These individuals represented a range of mental and physical disabilities. An administrator was present and acted as a translator. The interviewer showed the members each symbol one at a time, and they responded with what they believed the image represented. The team recorded the responses and they later analyzed them to determine the effectiveness of each symbol.

3.3.2 Font and Text Size Interview

The visual aspect of a website is very important. Taking text color, background color, text size, and font into consideration are just a few characteristics that can truly impact the effectiveness of a webpage. At this time, the team was living at the Center for Modern Languages with other WPI students as well as students from all over the world. The team interviewed other students living at the Center for Modern Languages to obtain data on the visual aspect of a website. Originally, the team wanted to complete this interview with members of the NGOs that work with the center. The administration made it clear that the team would not be able to carry out this experiment. As a way to conduct this experiment, the team split up and individually interviewed students from the Center for Modern Languages. Since these are people who frequently use the Internet, the team thought they would be a good option to consider which font and text sizes were the most comprehensible on a computer screen. The interviews consisted of three paragraphs that were each created in different text and font sizes. The team member conducting the interview would use their phone to record the amount of time the student took to read the passage. After the interviewee completed the paragraph, the team member took away the computer and asked the student a series of four questions. The first three questions asked the interviewees about the content of the passage, while the last question discussed how easy or hard the passage was to read. Figure 3.4 displays an example of one of these passages.

Joe and Amy just arrived in Fes. They heard that the medina in Fes is very large and has lots of nice gifts for sale. Joe wants to buy his mother a tea kettle for her birthday. Amy doesn't like tea and instead wants to buy herself a pair of shoes. In the medina the two friends meet a girl named Imane. Imane takes them to where they can buy these items.

Figure 3.4. Passage one from Font and Text Size Interview.

The four questions accompanying this passage were:

1. What was one of the names of the two friends?
2. What does Amy not like?
3. What does Imane do after the two meet her?

4. Did you find this passage challenging to read? What made it difficult? If not, what made it easy?

During the interview the team member repeated this structure three times with three distinct sets of passages and questions. These passages and questions are available in Appendix F. Overall, the team conducted twenty of these interviews and compiled the responses for subsequent analysis.

3.4 Data Analysis

The information acquired in the site assessment and ADA evaluation centered on structure and location. During the site assessment, the WPI research group noted particularly confusing areas of the center. The team took note of any places that were in need of proper signage. The team documented these issues through pictures.

To analyze the interviews, the focus group, and the open-ended questions of the surveys the team performed inductive coding. To code any spoken content, the team highlighted common words or phrases that arose in the transcription. The investigators color coded words and phrases throughout the transcription by main idea. The WPI team then grouped the color coded words and phrases that had the same idea in order to create a proper analysis and comparison of the collected data (Fade and Smith, 2011). Appendix G, H, and I all show examples of this form of data analysis.

Chapter 4 | Results & Analysis

This chapter discusses the data collected and analyzes the results from the site assessment, surveys, and interviews. The site assessment contains an analysis of the center's current signage and the accessibility of their buildings and pathways. The team highlights the important points from the staff survey that helped set up a relevant staff focus group. The team used both the staff survey and focus group to obtain information about the center's navigation and website usability. Finally, in this chapter the team analyzed the data collected from the symbols interviews and the text and font interviews in order to determine the best online and physical displays to use.

4.1 Site Assessment and ADA Compliance Evaluation

The WPI team completed a site assessment during the first week at the Mohammed IV Center for the Disabled. The group navigated the center as best they could with the existing directional system and evaluated the signage. There are only three large signs on the grounds designating specific locations with arrows pointing in the appropriate direction in each case. The first sign, in Figure 4.1, only gives directions to the *fermette*, or the farmhouse, and the *centre d'aide par travail*, or the Center for Help through Work. This sign is not visible from the entrance and only points to places already familiar to members. The second sign, in Figure 4.2, points to places that are relevant for everyone; it includes *espace sportif*, or the sports center, and the *Pôle Médico-Social*, or the medical department. These are two poles (departments) utilized by both the members and the non-members of the center. This sign's location is in between the front entrance and the side entrance, and with the side entryway being the most widely used, there is little reason why many people would need to walk past this sign. The third sign, Figure 4.3, directs its viewers to the *unite d'accueil des enfants psychotiques* and *unite d'accueil des enfants handicapés moteurs cérébraux*, which are the spaces for children with Autism and impaired motor skills, respectively. This sign is so far away from the main entrance that people walking into the building cannot read it. Additionally, this sign is in a corner where nobody walks by, making its usefulness minimal. Though the content of this sign is more relevant to everyone, the placement leaves it viewable to only a small number of visitors.



Figure 4.1. A navigational sign located inside of the main gate to the right of the the Mohammed VI Center for the Disabled.



Figure 4.2. A navigational sign located along the driving path around the Mohammed VI Center for the Disabled.



Figure 4.3. A navigational sign located inside of the main gate to the left of the the Mohammed VI Center for the Disabled.

For building labels, the center uses shiny silver labeling. The use of reflective material makes it difficult for someone to read the labels, especially in the sun. The contrast between the buildings and their labeling is insufficient, making it hard to read. Figure 4.4 displays a building label where a tree's leaves block the sign's information from the view of people on the path. The designers of this center were not planning for the future when they planted this tree in front of the building. The combination of the lettering and the placement make the labeling of the building difficult to see, since people walking on the path cannot see it because of the tree. The lettering is inconvenient for people to read in general, and unreadable for those who are illiterate.



Figure 4.4. A sign labeling the Centre D’Aide par le Travail which is obscured from the path by a tree.

Other than the signage on buildings with the name of the department, there were smaller signs for a few areas as in Figure 4.5. In the center’s areas, such as the sports center, the signage was inconsistent. Some signs were both in French and Arabic and others were just in Arabic.



Figure 4.5. A sign for a washroom written in both French and Arabic in the stables of the Centre D’Aide par le Travail.

The administration began to implement a set of pictograms in the vocational training building in order to label the function of each classroom. Figure 4.6 shows the pictograms used to distinguish the classrooms.

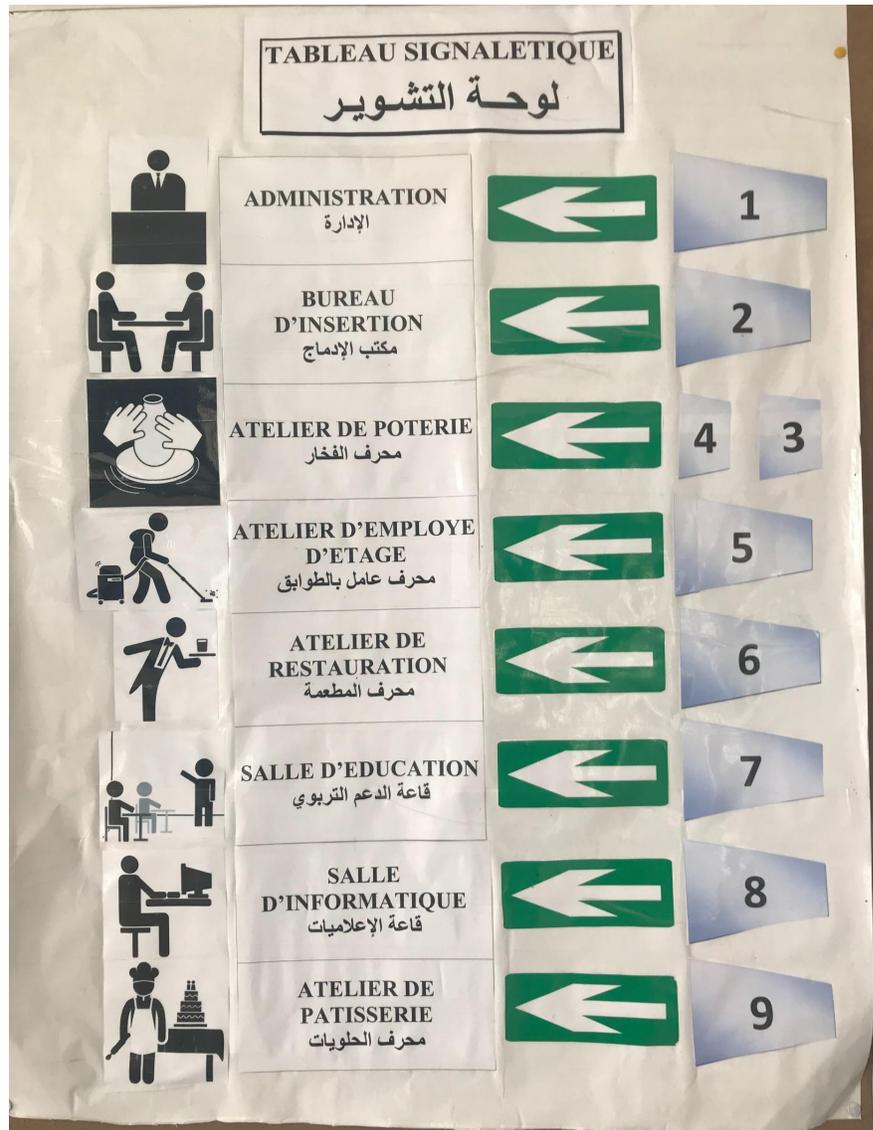


Figure 4.6. A chart in the entryway of the Pôle Formation Professionnelle which shows the pictograms representing each classroom.

The team completed the Americans with Disabilities Act Checklist for Readily Achievable Barrier Removal in order to gain a better understanding of how disabled individuals use the center. From this exercise, the team discovered complications with the center's design

that they otherwise would not have noticed. For example, if a person cannot open a door with a closed fist, then that door is not accessible for everyone. When trying to open the doors, such as the one shown in Figure 4.7, with closed fists, it was nearly impossible. There was not sufficient space between the handle and the door to fit an object the size of a fist, and the door was far too heavy to move without a proper grip.



Figure 4.7. A door in the entrance of the Pôle Formation Professionnelle.

Additionally, the checklist specifically asks, “Are pictograms or symbols used to identify restrooms, and, if used, are raised characters and braille included below them?” (Adaptive Environments Center & Barrier Free Environments, 1995). The center uses symbols to label restrooms, though they are printed on copy paper with no raised texture to aid the visually impaired. In addition, the team found raised walkways (Figure 4.8) at the center which pose a hazard to the members in wheelchairs or who have difficulty walking.



Figure 4.8. A raised pathway outside of the Pôle Formation Professionnelle.

The site evaluation and the ADA checklist were two approaches the team used to understand the center, its signage, and structural deficiencies. These methods yielded base knowledge of the center that allowed the project to move forward.

4.2 Staff Survey

The center's administration distributed surveys to staff members from the various poles to discern the state of wayfinding in the center and the role of the website. The survey responses also helped the team formulate the questions for the Staff Focus Group described in section 4.3.

4.2.1 Navigation Responses

To gain knowledge about the signage conditions within the Mohammed VI Center for the Disabled and the usage of the center's website, the team surveyed the center's staff. The first question on the survey addressed where each staff member worked.

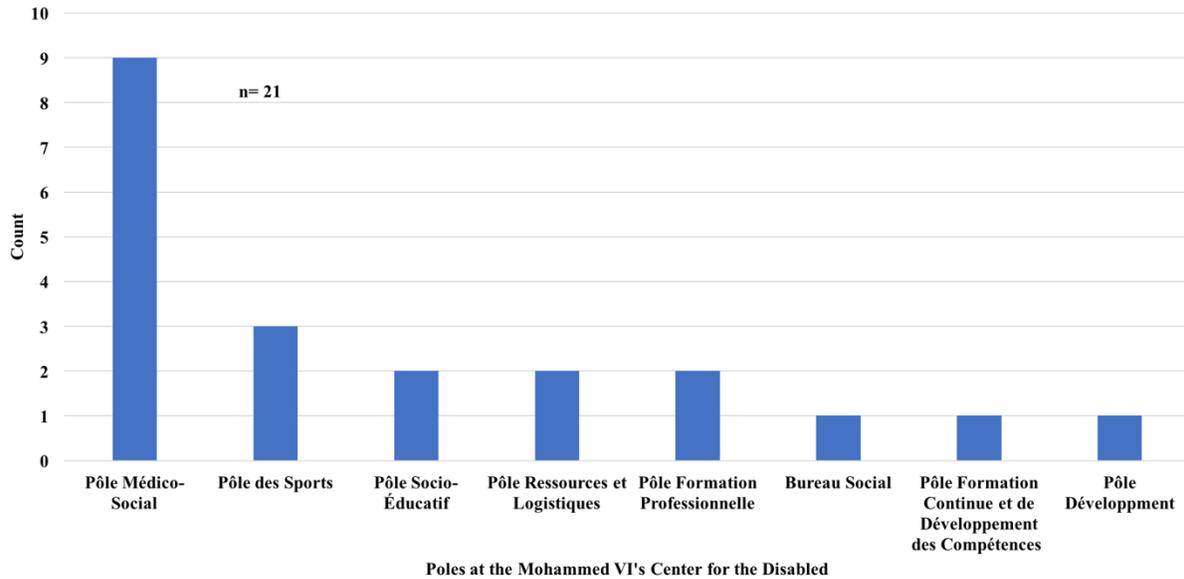


Figure 4.9. Bar graph of the number of staff members who completed the survey from each pole.

The team received surveys from all eight poles at the Mohammed VI Center for the Disabled. The *Pôle Médico-Social*, provided the most surveys because it employs the greatest amount of staff members, twenty-four (see Figure 4.9). Other poles, such as the *Pôle Formation Continue et de Développement des Compétences* and the *Pôle Développement* only have one employee per pole and the team received surveys from both of them. Receiving data from every pole provided a wide range of information.

The next survey question asked staff members if their work involved direct interaction with the disabled members of the center. The majority of the surveyed individuals worked with the disabled directly. Figure 4.10 displays the data that only two people out of the twenty-one surveyed did not work directly with the members. This is most likely due to the nature of the work that they do at the center. This information was necessary in determining whether working directly with the members affected the staff's decision regarding how easy it is to navigate the center. With a majority of the staff working directly with the disabled individuals, the team determined that this information was not pertinent.

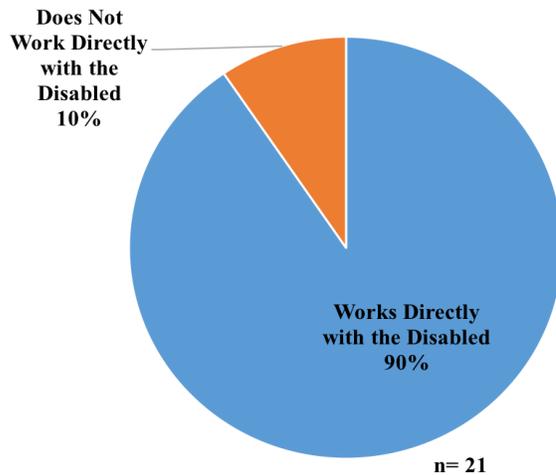


Figure 4.10. Pie chart with the staff answers to the question “Does your work involve direct interaction with the disabled members of the center?”

The next step was to determine how well the center’s signage could aid newcomers in finding their way around the center. Namely, the survey asked, “Do you find that the current signage at the center provides helpful information for those who don’t know the center?” Figure 4.11 paints a comprehensive picture of the information in that 30% of the twenty-one staff members surveyed believed the signage to be effective, while 70% of the staff thought it was ineffective.

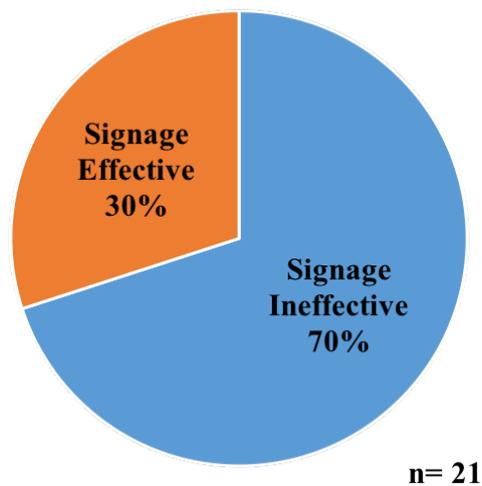


Figure 4.11. Pie chart with the staff answers to the question, “Do you find that the current signage at the center provides helpful information for those who don’t know the center?”

This result could be due to the distribution of the poles that the staff work in or even the location of their offices. After reviewing the pole distribution of the staff surveyed and how that correlated with how effective they rated the signage, further analysis revealed that 8 of the 14 people who said the signage was ineffective came from *Pôle Médico-Social*. This data is available in Figure 4.12.

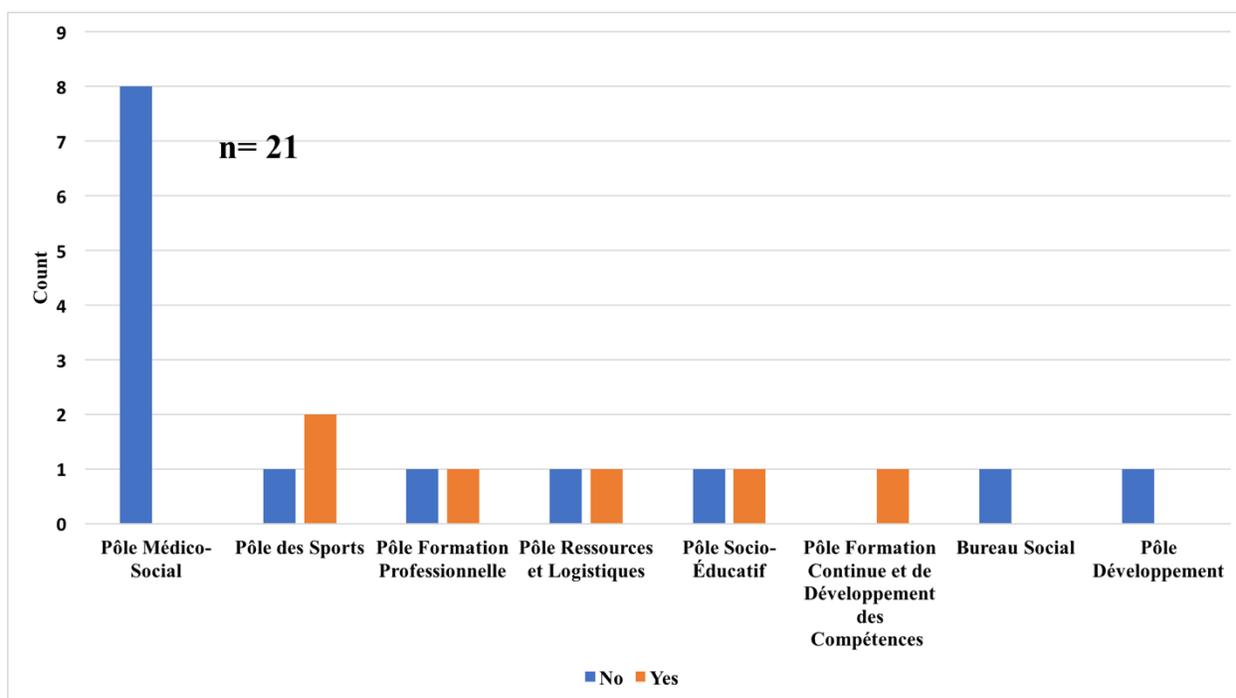


Figure 4.12. Bar graph displaying the staff answers, by pole, to the question, “Do you find that the signage at the center provides helpful information for those who do not know the center?”

Along with the *Pôle des Sports* (sports department), the *Pôle Médico-Social* is the first building that visitors encounter when entering the side entrance, which, according to the administration, is the most frequently used entrance. Moreover, the *Pôle Médico-Social* serviced 9,905 patients in 2017, making it the busiest pole in the center. Due to both its location and the number of patients they service, the *Pôle Médico-Social* is likely to get many people entering the facility. During the site assessment, the team found that there was only one sign in this area and it was not visible from the pathway on the route into the center. The sign only gave directions to

the *fermette* and the *centre d'aide par travail*. These are places that are only relevant for those who are already members of the center. Not only is the sign hidden from view, but it is only available in Arabic and French, leaving people who cannot read, see, or comprehend one of those two languages with no information. With the lack of directional information at the center, it is understandable why many people must ask for directions.

The open-ended portion of this question provided more reasons why the staff members believed that the signage was ineffective. After coding the responses, the team determined the main reasons (Appendix G). The most prominent answer was “lack of signage”. The lack of signage within the center causes confusion for visitors because the layout of the buildings is unique and many buildings look similar. Additionally, many of the concerned staff wanted more signs to accommodate the illiterate people who visit the center. Currently, the only signage the center displays is in Arabic and French, with a few symbols only available in one building. By not having signage to accommodate the illiterate, the center is creating an environment that is not accessible for everyone. In general, the surveyed employees believe that the current signage is insufficient. With little signage around the center and signage that is not visible, it is difficult for most anyone to find where they are going without asking for directions.

The staff members who thought the signage was effective came from five distinct poles within the center (see Figure 4.12). Only six of the twenty people who answered this question believed the signage was effective. This is a relatively low percentage (30%) of the staff members surveyed. Though the *Pôle des Sports* is one of the first buildings that visitors encounter at the side entrance, two of the staff there believe the signage to be effective. This is different from what the staff members of the *Pôle Médico-Social* experienced. This is likely because the *Pôle des Sports* does not have as many visitors as the medical building; the sports center only had 800 users in 2017.

Though not all staff members agree that the signage at the Mohammed VI Center for the Disabled is ineffective, about 62% of the staff get asked for directions more than once a week. Figure 4.13 indicates that the majority of the surveyed staff members get asked for directions daily, more than once a day, or more than once a week. This implies that the current signage at the center is not functioning properly. Since people ask multiple workers for directions more than once a day, there is a definite need for a new and improved signage system. Additionally, all eight surveyed staff members from the *Pôle Médico-Social* noted that they were either asked

daily, more than once a day, or more than once a week. This illustrates a great need for proper signage within the center, especially at the side entrance which is also the location of the medical pole. With the lack of signage at the entrances, people become lost and confused and ask for help in finding their way.

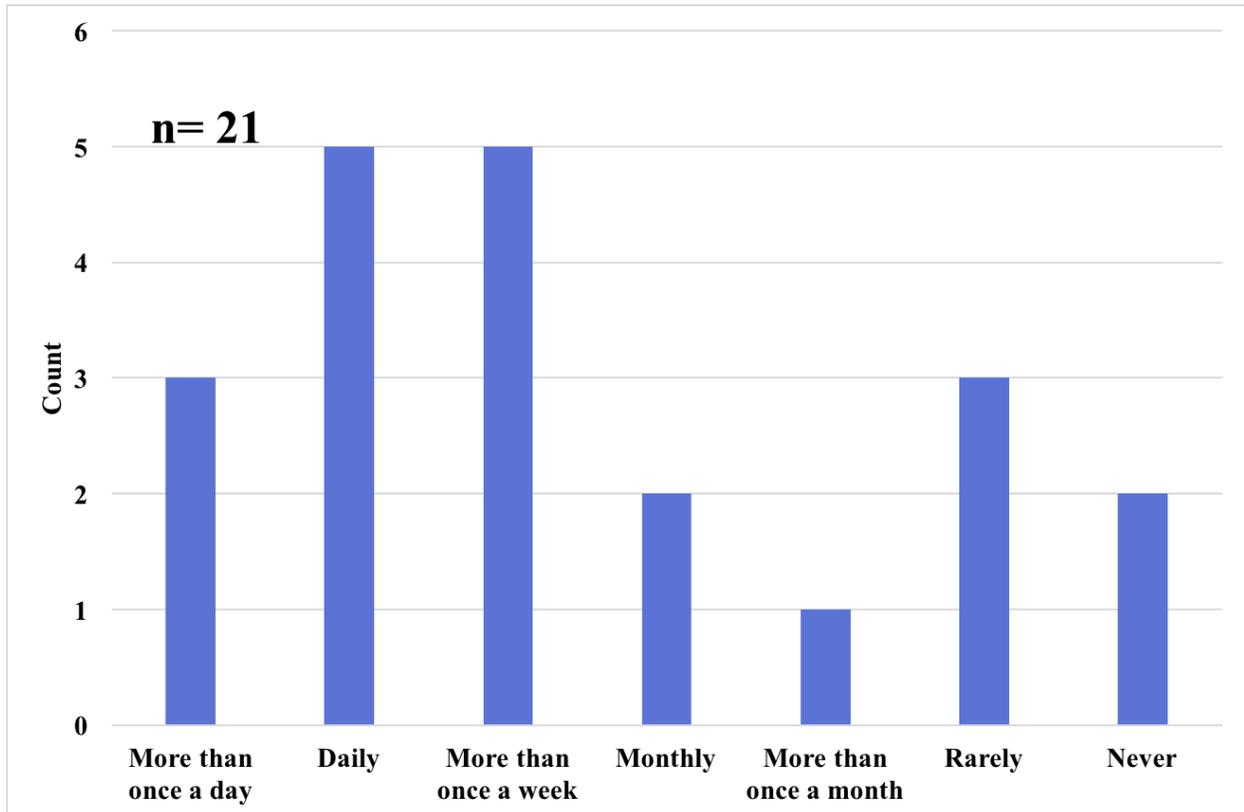


Figure 4.13. Bar graph displaying the staff answers to the question, “How often do you get asked for directions by disabled members, their family, or visitors?”

The administration wanted general information on strategies to make their center more accessible. Consequently, the team included the question: “Do you find it easy for the physically disabled members of the center to move between buildings?” Only nineteen of the twenty-one staff members surveyed answered this question. Figure 4.14 shows that 37% of these people answered no, it is not easy for the physically disabled to get from place to place.

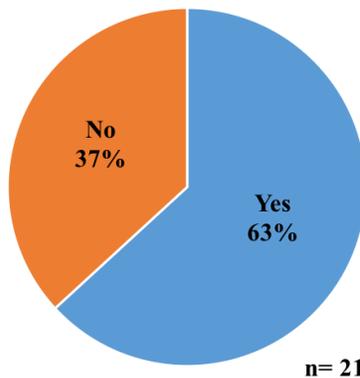


Figure 4.14. Pie chart displaying if staff answers to the question, “Do you find it easy for the physically disabled members of the center to move between buildings?”

Only two different poles answered no to this question, *Pôle Médico-Social* and *Pôle Socio-Éducatif* (see Figure 4.15). The *Pôle Médico-Social* deals with the most disabled members of the center per year, implying they have a better understanding as to how accessible the center is for them. There could be conflicting answers because not all the staff members will see the disabled navigate every section of the center.

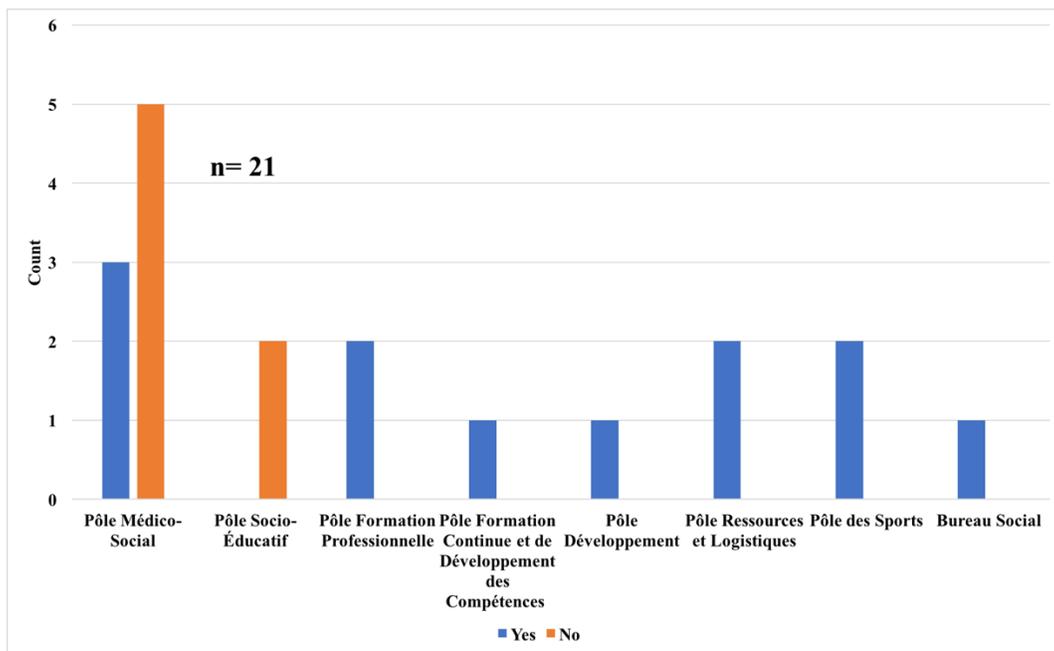


Figure 4.15. Bar graph displaying the staff answers, by pole, to the question, “Do you find it easy for the physically disabled members of the center to move between buildings?”

To comprehend why people thought the accessibility was insufficient for those who have physical disabilities, the researchers looked at the open-ended section of the question (Appendix G). The two top comments were that there is sometimes a long distance from where the disabled individual is to where they are trying to go and that the ground and paths are, in some places, dangerous for people in wheelchairs. At the center, the scattered buildings have pathways that are not direct trails to each pole, making maneuvering the center in a wheelchair more difficult. The center has a few raised walkways with nothing to prevent someone from falling off the edge onto the grass. Additionally, there are areas that are only marked with gravel (see Figure 4.16). This section of the survey illuminated some of the issues concerning accessibility that the staff may overlook on a daily basis.



Figure 4.16. Gravel pathway that is not accessible for everyone.

Next, the survey asked the staff, “Do you have any recommendations to aid the center in navigation?” After the project team coded this information, they determined that top response was to add signage within the center. Currently, there are only three directional signs within the center.

To end the navigation section of the staff interview, the team asked if there were any suggestions or concerns pertaining to signage, accessibility, and general navigation of the center. The leading comments expressed the need for adequate signage and the importance of accessibility for all. These comments reinforced the responses from the earlier survey questions, namely, that signage must improve and the center needs to make changes in order to make it more accessible for all its members, including the illiterate.

4.2.2 Website Responses

For the second portion of the staff survey, the project team asked specific questions about the center’s website and their interactions with it. The first question in the website section was, “Have you used the Mohammed VI Center for the Disabled’s website?” Only nine of the twenty-one staff members the team surveyed had ever used the website (see Figure 4.17).

Figure 4.18 exhibits no direct correlation between the center’s poles and website usage.

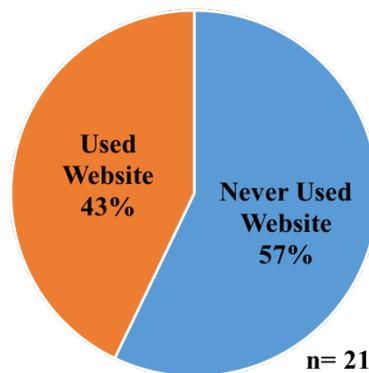


Figure 4.17. Pie chart displaying the staff answers to the question, “Have you used the Mohammed VI Center for the Disabled’s website?”

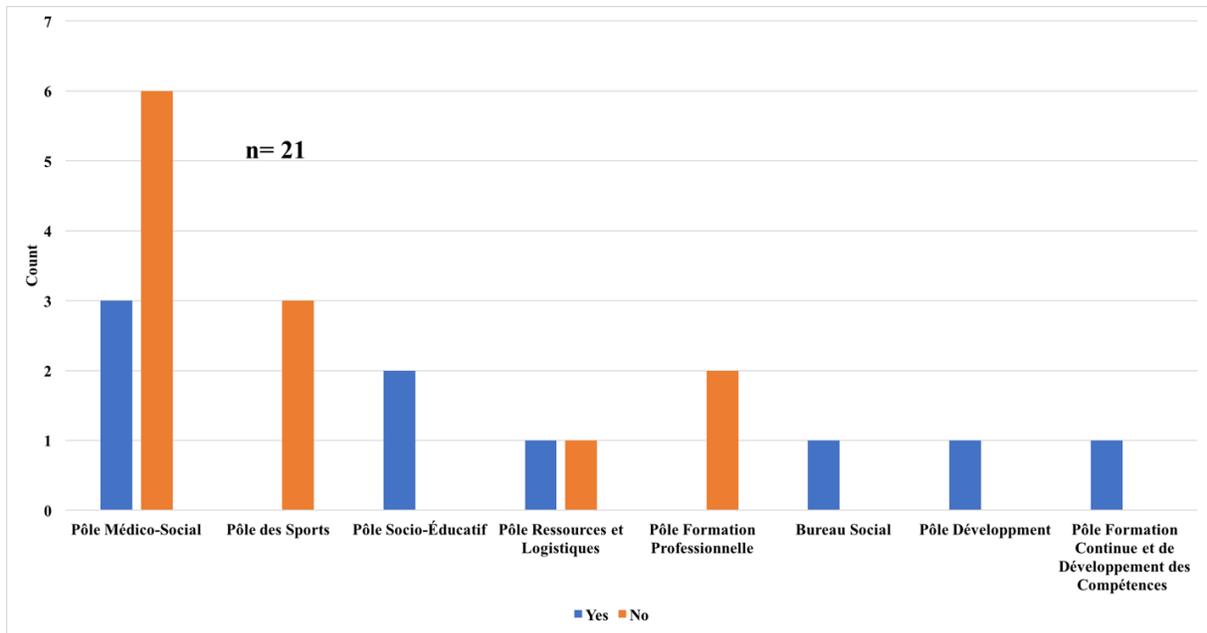


Figure 4.18. Bar graph displaying the staff answers, per pole, to the question, “Have you used the Mohammed VI Center for the Disabled’s Website?”

The next question in the staff survey was “What information do you look for on the website?” To determine the most frequent staff response, the team used the coding technique which yielded only two response themes activities/events, and information about the center (Appendix G). The team assumed that these responses were all referring to events and activities that occurred at the center (specifically functions such as conferences and NGO trainings). The team surmised that the staff use this website mainly to gain information about the center and the activities that occur there.

The survey progressed to ask the staff, “What information would be helpful to have on the website?” After coding (Appendix G), the team discovered, that in general, the staff were looking for more information about the disabled, information about the center, and to update the website. Currently, the website has information about the center and disabilities, but it is currently lacking since there is only partial information available. Many pages of the current center website are incomplete, leaving the website with a shortage of information that should be available to its viewers.

Only those that staff members that use the website completed the remainder of the survey. The survey queried whether the website was difficult to use. From eleven responses to

this question only one of them answered yes (see Figure 4.19). Next, the investigators inquired about the readability of the website. Only eight of the eleven people answered this question, meaning that three people chose to not answer this question. These eight staff members agreed that the website was easily readable (Figure 4.20). The next question was, “Were the website’s qualities (ex. color, format) aesthetically pleasing?” Figure 4.21 reveals that seven staff members thought that the website was not aesthetically pleasing. They mentioned specifics such as the color and the design of the website as current aspects that hindered the website’s appeal. Though they believed the site to not be difficult to use and easily readable, the surveyed staff did indicate that it was an unattractive site.

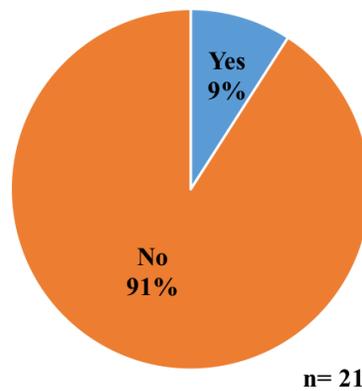


Figure 4.19. Pie chart displaying the staff answers to the question, “Have you had any difficulties using the website?”

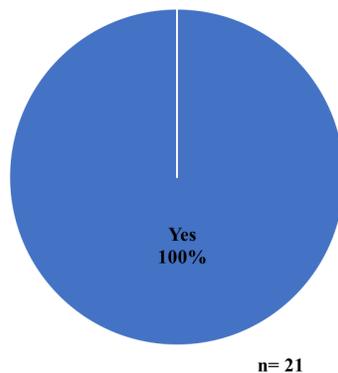


Figure 4.20. Pie chart displaying the staff answers to the question, “Was the website easily readable?”

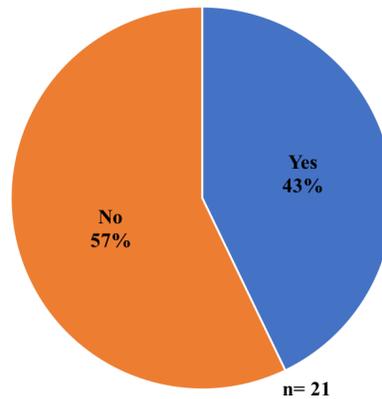


Figure 4.21. Pie chart displaying the staff answers to the question, “Were the website’s qualities (ex: color, format) aesthetically pleasing?”

The next question the team included on the survey was “Would you make any changes to the website? If so what?” The coded answers revealed that the staff want the center to update and improve the design of the website (Appendix G). This includes the headings, colors, and information on the website. Staff members stated that there is room for improvement since, other than adding newsletters every few months, the center has not updated their website since launching it in 2014. While the field of website development has advanced in the last five years, the center’s website does not reflect these changes.

The final survey question provided space for any comments or suggestions on how the signage and the accessibility of the center could improve. The team coded these answers and recognized the most prevalent comments (see Appendix G). In general the staff members want the center to update and redesign their website. They seek a better representation of the center, one that the administration keeps fully updated and correctly displays the current work done at the center.

4.3 Staff Focus Group

The project team divided the staff focus group into two sections of questioning. While the team intended for the administration to read questions to the focus group, the administration printed the questions in French and English and distributed them to all participants, a copy of the English version is in Appendix D. Six responsables (department heads) attended the focus group,

two of whom had already been working closely with the WPI project team and had a good understanding of this project. The first part of the focus group concentrated on the responsables' opinions on the center's navigation system. The questions centered on how the staff members of the center direct their clients through the facility and how they can improve their current navigation system. The second section of the focus group gathered the responsables' views on the center's website. These questions were more open-ended about the current role of the website and the type of information that would be useful to have online.

One of the administrators went through each question and explained, in English, the direction of the discussion to the two project team members who attended the focus group. This enabled the team members to take detailed notes on the translation of the discussion and record any body language or emotions witnessed from the French discourse. The administration permitted the two team members to record audio from the focus group so the translator could listen to the tape later and inform the team of any information they had not received during the meeting. Later, the team used the transcription and observation notes to extract four underlying themes from the focus group: the center's objective for navigation, suggestions to improve navigation, website quality, and information availability.

4.3.1 Navigation Discussion

The focus group started off by exploring the issues and consequences of the navigation system currently in place. The staff survey indicated that the staff consensus is that signage and navigation in the center are lacking. The participants of the focus group explained that the staff members regularly walk clients through the center because of the ineffectiveness of the current signage. One member of the focus group went into further detail stating, "It's very difficult, it's more difficult to give direction for the visitors and it gets a lot of waste time, it's a waste time when somebody go out and show the direction, its a waste of time. Really, a waste of time." The staff emphasized the amount of time wasted showing the clients from department to department and how they would like to eliminate the need for staff to leave their post to assist confused visitors. One of the responsables participating in the focus group said, "Our objective for the center is to have easy circulation for visitors even for their first time". This remark suggests that the staff understands their need for a new system that everyone can effectively use, even for the first-time visitor.

In addition to wanting an efficient navigation system, the participants indicated their hope for it to be inclusive for all. They expressed concern for equal experience for those with low literacy and the visually impaired. The following quote is a powerful statement about the illiterate experience at the center, “Visitors when they are showed the name [of the department] even though they do not know how to read, it’s a shame for them to say ‘I don’t know how to read’ and they will go along.” The responsables opined that they want to serve everyone equally and that their current navigation system does not accommodate the illiterate or the visually impaired. The participants then gave suggestions to help improve the center’s navigation to make it more straightforward and inclusive. The three main suggestions to reach their objective were: to use color coding, clear signage, and textured flooring. Color coding was a well-accepted approach for all the participants yet the team is unsure whether the participants arrived at this topic from genuine interest or because the administrator running the focus group had printed and handed out the leading questions for the focus group.

Regardless, the staff members in attendance agreed that color coding throughout the center was an acceptable strategic change. The responsables expressed that colored lines that lead from the entrance of the facility to its correspondingly colored building was an improvement they would like to see implemented. The center would ideally use these colors throughout and in synchrony with the actual signage and symbols used to indicate directions to locations in the center. The center would need to use color coding alongside signage which was the next topic discussed during the focus group.

Clear signage was another topic the staff stressed during the focus group. The participants expressed that the center should place clear signage in all intersections and other confusing areas. The focus group suggested a large panel at the entrance with a map and symbols of different locations in the center as well. At this point in the discussion the team members mentioned the lack of inclusion of the visually impaired in signage and color coding. In response, the participants mentioned that outside certain buildings the center had already implemented textured walkways and that extending this concept to the rest of the center could be easily done.

4.3.2 Website Discussion

The focus group discussed website navigation, emphasizing the current quality of the website. The participants all agreed that the website was “static”. The responsables were aware that the website was old and out-of-date. In addition, they also disliked the color scheme and

aesthetic of the website. The staff described the current color scheme as “boring” and felt strongly about changing it to be “more lively”. More specifically, the participants suggested that if the center’s buildings were to be color-coded then the website theme should match accordingly.

Outside of aesthetics, the participants were concerned that the website’s users had no mechanism to contact the center with questions. The focus group moved on to stress information availability. One responsible believed, “All information needed should be available to them [the members] before they arrive at the center.” The responsables expressed the desire that important information on services and documentation be available online. By adding these elements to the website, online clients could fill out forms online and be ready for services by the time they arrive at the center.

The focus group discussion revealed that the participants did not have a clear idea of who the current users of the website are. Unfortunately, illiteracy and lack of Internet access renders the website limited to the number users it can reach.

4.4 NGO Survey

The administration determined that the NGOs were the main users of the Mohammed VI Center for the Disabled. To determine their thoughts and ideas about the current state of the website, Fatima distributed website surveys on behalf of the project team to fifteen people from various NGOs that work with the center.

The first question on the NGO survey was, “Have you visited the Mohammed the VI Center for the Disabled’s website?” Six people responded never, seven responded rarely and one person said more than once a month (see Figure 4.22). Prior to sending out the surveys, the administration informed the team that the NGOs do their work mainly in Arabic, and it was likely that the center would need to translate the surveys or someone would need to sit with the NGO representatives. Fatima sat with the NGO employees. One of the first issues that came up was that the website was only available in French; this was not helpful for the NGOs employees who can only read Arabic. The language barrier is likely the reason so many of the NGOs never or only rarely use the website. Another reason might be that the information that the NGOs seek is not present on the website.

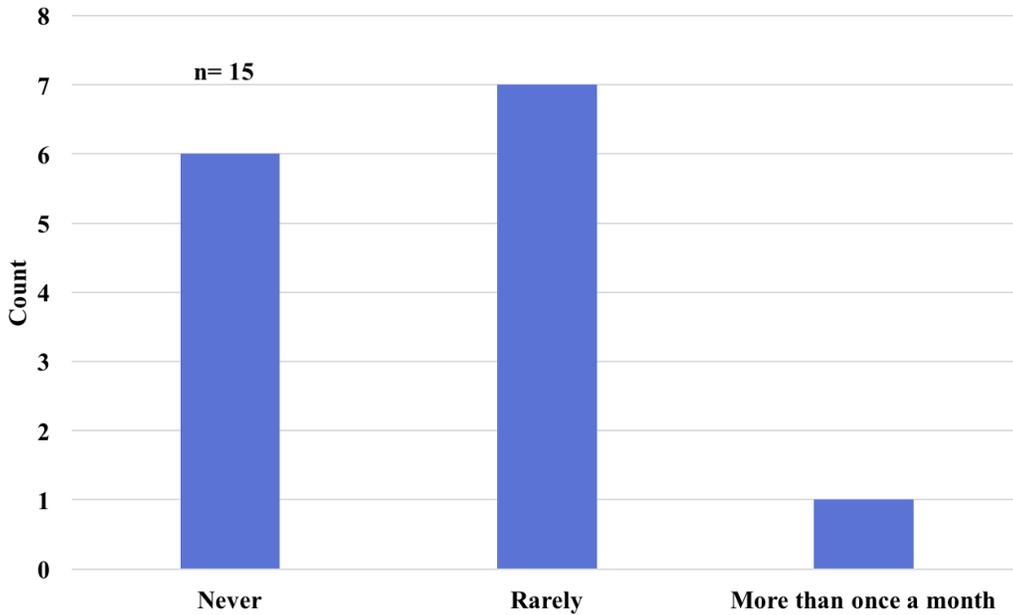


Figure 4.22. Bar graph displaying the NGO employee answers to the question, “Have you visited the Mohammed VI Center for the Disabled’s Website?”

Next, the survey questioned NGOs about which parts of the website are most helpful. After going through the responses, the majority of the answers were “activities”. The only place where information on the activities of the center are present is on the website, so it makes sense that many people would look for this information there.

To get more of an idea of the qualities of the website, the WPI team asked a series of three questions. The first question was: “How easy is it to find information on the Mohammed the VI Center for the Disabled’s website compared to other websites?” Possible answers were very easy, easy, neutral, difficult, and very difficult (see Figure 4.23). The second and third questions respectively were: “How would you rate the readability of the text on the Mohammed the VI Center for the Disabled’s website compared to other websites?” and “How would you rate the color scheme, visuals, and overall aesthetics on the Mohammed the VI Center for the Disabled’s website compared to other websites?” Possible answers were very good, good, neutral, poor, and very poor (see Figures 4.24 and 4.25). The majority of the staff members rated the information as easy to find. This is possibly because the information is present in named sections of the website. The information on the website is clearly labeled, making locating specific details simple. There were only nine responses to this question because only eight

people indicated that they had used the website and one person did not answer that question but continued to answer the rest of the survey.

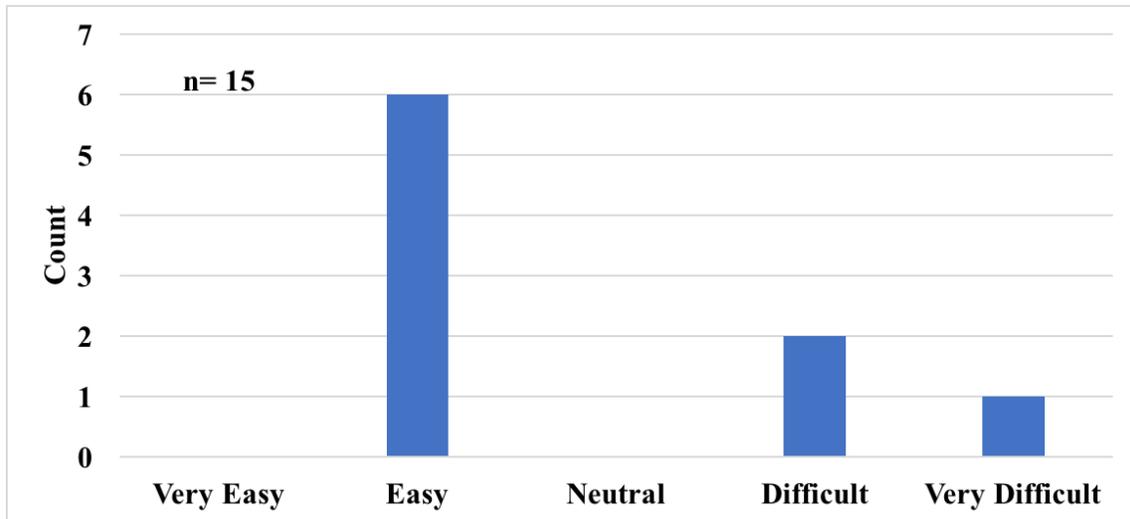


Figure 4.23. Bar graph displaying the NGO employee answers to the question, “How easy is it to find information on the Mohammed VI Center for the Disabled’s website compared to other website?”

The website users were then asked to rate the readability of the text compared to other websites, as shown in Figure 4.24. The majority of the survey respondents considered the readability of the website to be good. Many people do not realize the impact of text and font size until they view passages that are of different text and font sizes, like those the team presented in the text and font size interviews (see Appendix F).

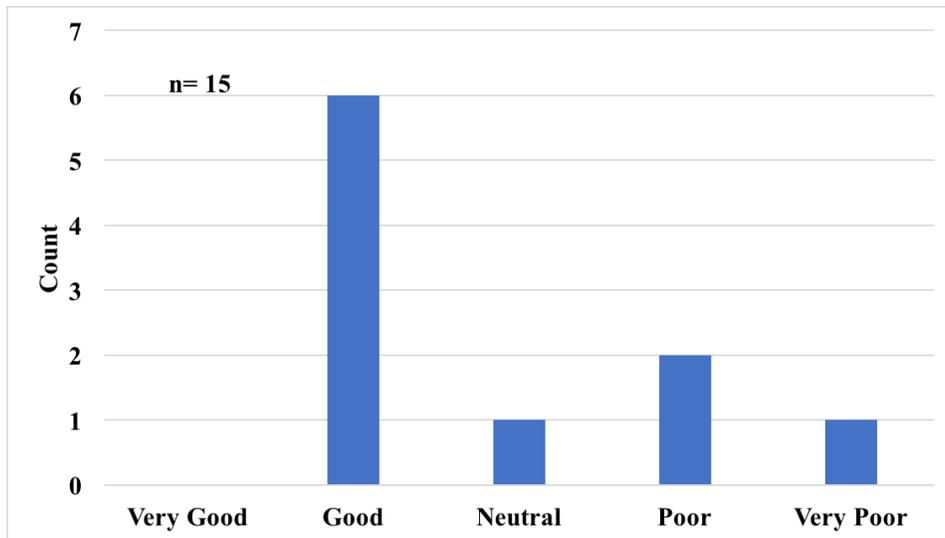


Figure 4.24. Bar graph displaying the NGO employee answers to the question, “How would you rate the readability of the text on the Mohammed VI Center for the Disabled’s website compared to other websites?”

Figure 4.25 illustrates that the majority of the employees who took the survey said that compared to other websites, the center’s website was poor in terms of visual aesthetics. The website is very plain, with dull colors, and static and seemingly irrelevant images.

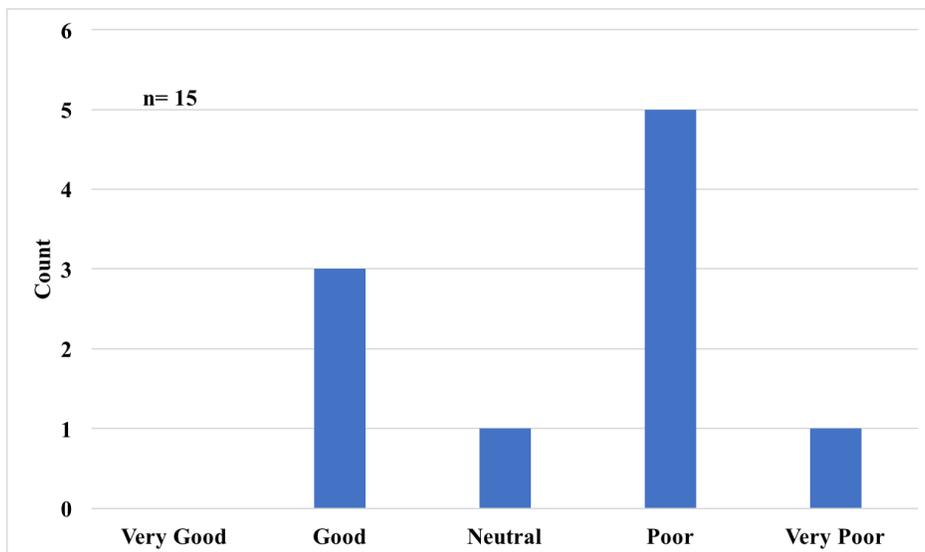


Figure 4.25. Bar graph displaying the NGO employee answers to the question, “How would you rate the color scheme, visuals, and overall aesthetics on the Mohammed VI Center for the Disabled’s website?”

When going through the website, the team discovered empty pages on the website. They asked the NGOs if the blank pages affected their search for information on the site. As shown in Figure 4.26, only one person out of nine answered yes to this question. While some of the pages are blank, the website still contains some information about the center and its activities, which might be the reason the NGOs sometimes use the website.

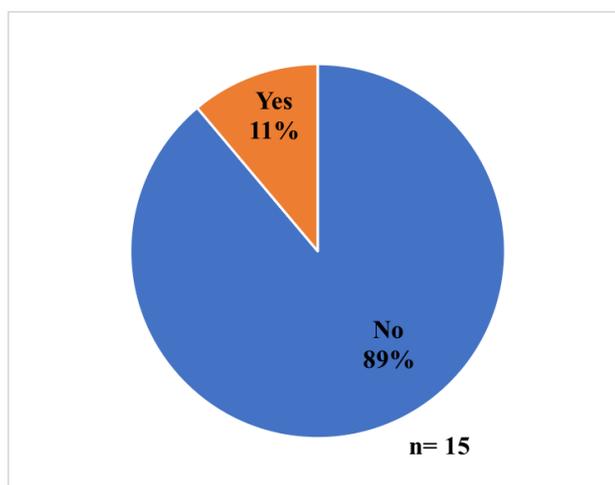


Figure 4.26. Pie chart displaying the NGO employee answers to the question, “There are some pages on the website that are incomplete/blank. Have any of these pages affected your search for information on the site?”

At the end of the survey, the researchers included a question asking respondents to add any comments or suggestions about the Mohammed VI Center for the Disabled’s website. The team coded the answers to extract the most relevant answers (Appendix H). The most frequently mentioned response was information about the center, specifically the action plan of the center. This information, at this time, cannot be located on the website but it is something that other organizations should be aware of when working with the center. One of the major comments made was that the center should make the website available in Arabic. This is extremely relevant for the NGO employees because they work in Arabic so it would be better if the website had an Arabic option. Many people suggested the addition of photos pertaining to the disabled members of the center. Currently, there are no pictures of the members on the opening page of the site, just pictures of the building and landmarks around Rabat, Morocco. Additionally, the members of the NGOs wanted a space specifically for these organizations on the website where the different

NGOs would be listed, including pictures and work done. This would allow the NGOs to be publically-associated with the center and have information about training and events with these organizations all in the same place. The lack of pictures of the disabled on the website is not an accurate representation of the work done at the Mohammed VI Center for the Disabled.

4.5 Symbol Interview

The team conducted interviews with ten disabled members of the center from the *Pôle Formation Professionnelle* (vocational training branch) and the *Pôle Médico-Social*. The researchers did not record these individuals' names in order to maintain anonymity. The interviewees explained how they interpreted each symbol, giving us important insight into which symbols may be most understandable for disabled individuals in Morocco, but was in never designed to test the comprehension level of the interviewees. The project team broke down the responses into four categories:

1. Correct Response: The interviewee identified the specific location or item which the symbol represents.
2. Correct Concept: The interviewee understood what was in the photo but could not connect it to a location or item which it represents.
3. Incorrect Response: The interviewee identified a concept not related to the intended meaning of the symbol and did not indicate understanding of the symbol.
4. No Response: The interviewee could not identify a concept from the symbol.

4.5.1 Comparative Analysis of Proposed Pictograms

The interview purposely included multiple symbols designed to represent specific locations within the center to determine the most effective pictograms for the center and provide alternatives to any symbol that the member did not understand. The team compared the responses to these symbols in order to recommend more effective choices for the center.

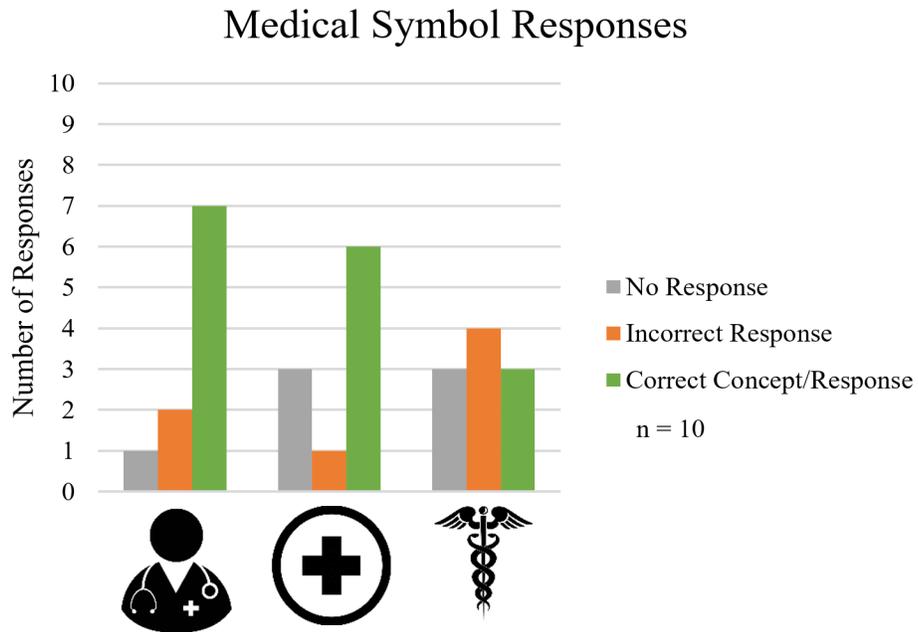


Figure 4.27. Bar graph displaying the effectiveness of symbols related to the *Pôle Médico-Social*.

Figure 4.27 shows the three symbol choices which could represent the medical wing of the center. The majority of the interviewees understood the leftmost pictogram to represent a doctor. On the other hand, most interviewees did not recognize the rightmost pictogram as medically related. Therefore, the symbol with the doctor is the best choice for representing the *Pôle Médico-Social*.

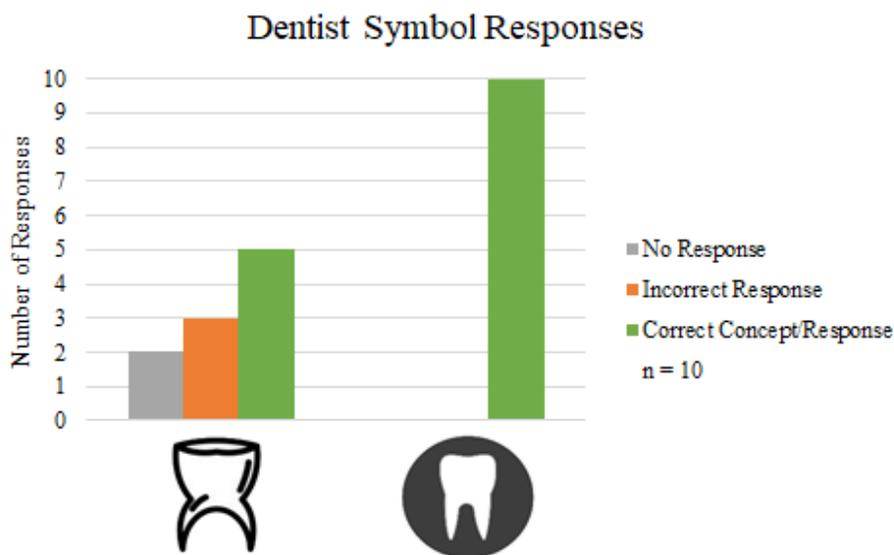


Figure 4.28. Bar graph displaying the effectiveness of symbols related to dentistry

Figure 4.28 shows two different pictograms of a tooth. Incorrect responses mentioned things such as vases and horns, indicating that this symbol is too anatomically unrealistic to be recognized as a tooth. It was easier for interviewees to recognize the second symbol as a tooth, making it the better choice for representing dentistry at the center.

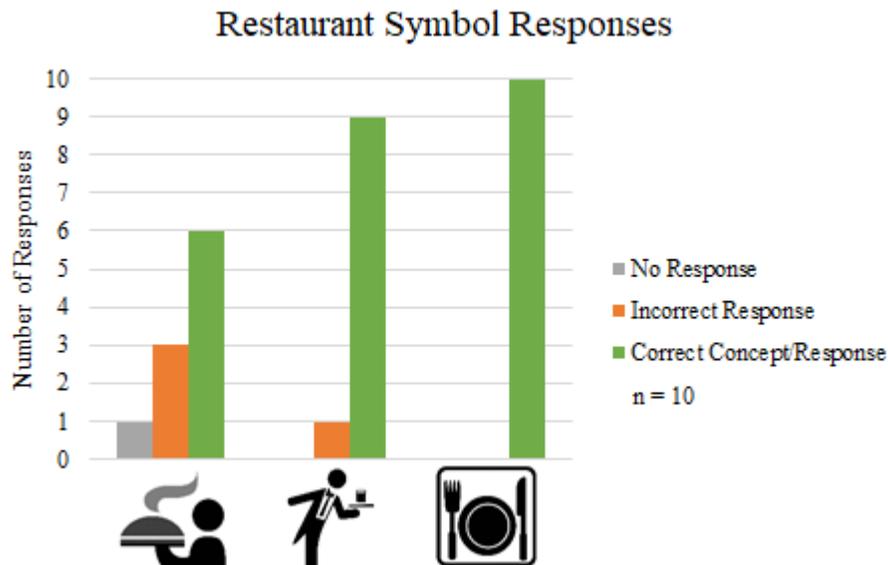


Figure 4.29. Bar graph displaying the effectiveness of symbols related to the restaurant.

Figure 4.29 shows three symbols that could represent a restaurant. The leftmost symbol was not widely understood, and therefore would not be an effective option for use in the center. The other two symbols were equally understood as related to eating. This is convenient given there are two rooms in the center which resemble restaurants: the main restaurant and the room in the *Pôle Formation Professionnelle* which is set up like a restaurant and used to teach serving skills. Luckily, the rightmost symbol also resembles the trays given out at lunch in the restaurant, and the *Pôle Formation Professionnelle* already uses the middle icon to indicate the serving classroom, meaning the center can use both of these pictograms effectively to represent the two rooms.

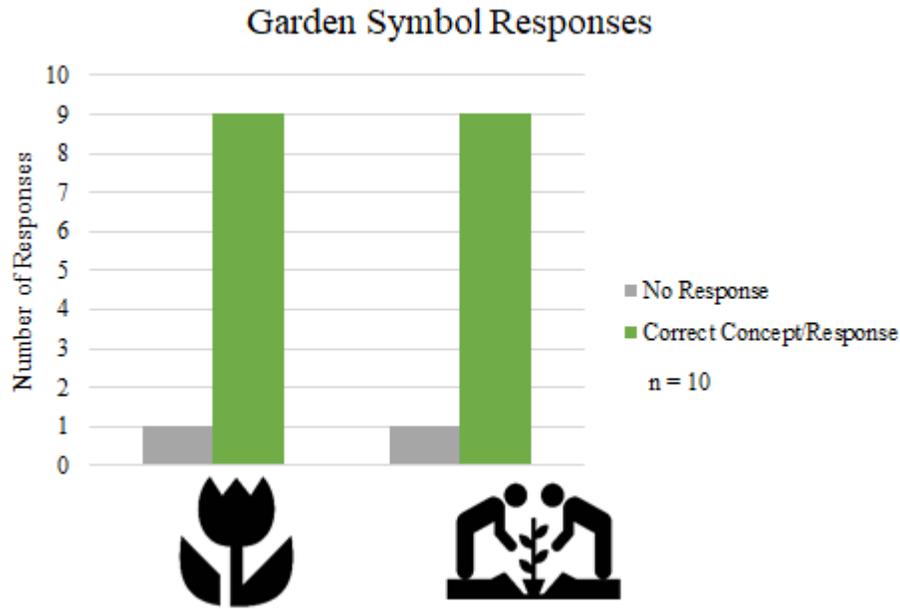


Figure 4.30. Bar graph displaying the effectiveness of symbols related to the garden or farm.

Figure 4.30 displays two options for representing the garden or farming area of the center. Responses to the rightmost pictogram included “cultivation” and “gardening” due to the clear action which is happening, while they recognized the leftmost only as a “flower.” While the reception of these two symbols was very similar, the cultivation icon will better communicate the use and purpose of the farm area while also maintaining the standard of figures in pictograms.

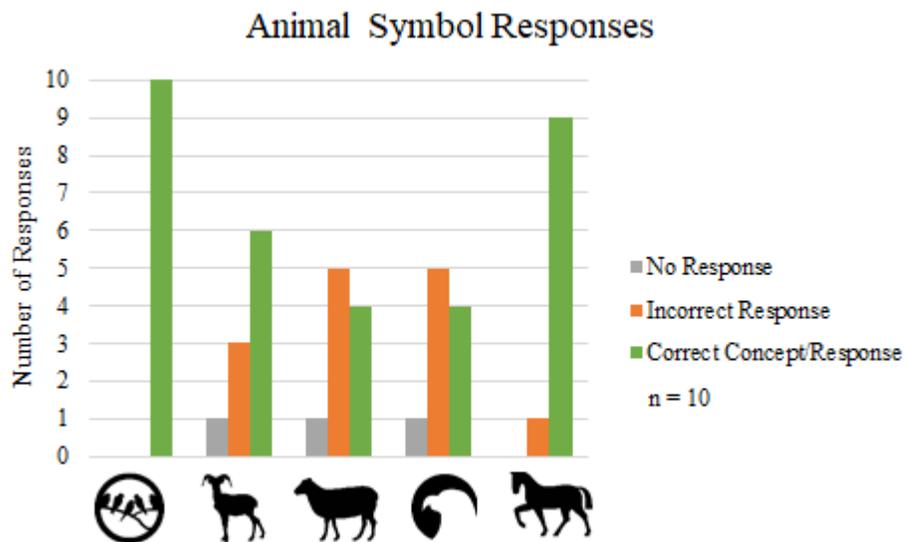


Figure 4.31. Bar graph displaying the effectiveness of symbols related to animals.

The team showed several pictures of animals during the interview. Between the two symbols representing birds, the first was the only icon in the survey which the members recognized perfectly (see Figure 4.31). The respondents also understood the horse symbol well. Many of the interviewees recognized the sheep as a cow, therefore this symbol may cause some confusion if the center placed them on the stalls for the animals in the stable.

Choosing a symbol to represent the animal area of the farm in general is slightly more difficult. One method is to utilize multiple symbols that the members easily recognized, which was the horse, birds, and goats.

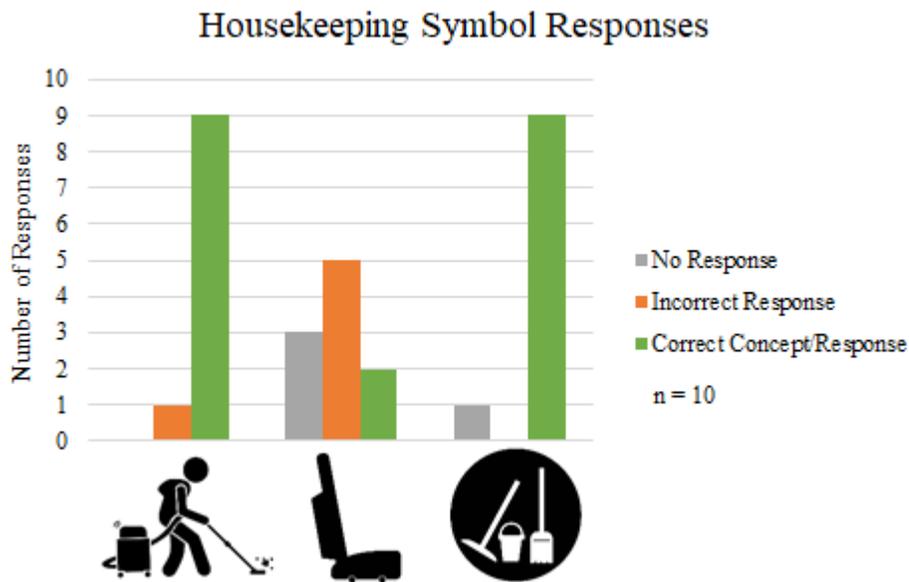


Figure 4.32. Bar graph displaying the effectiveness of symbols related to hospitality.

The interviewees interpreted the symbols above as cleaning supplies. In Figure 4.32 the leftmost and rightmost pictograms were equally recognized therefore these would be the two best symbols to use at the center. In the other pictograms the team presented at the interviews, the team noticed that pictograms in action were easier to recognize than those of objects. Even though in this case the participants recognized both equally the leftmost showing an action might be a better choice.

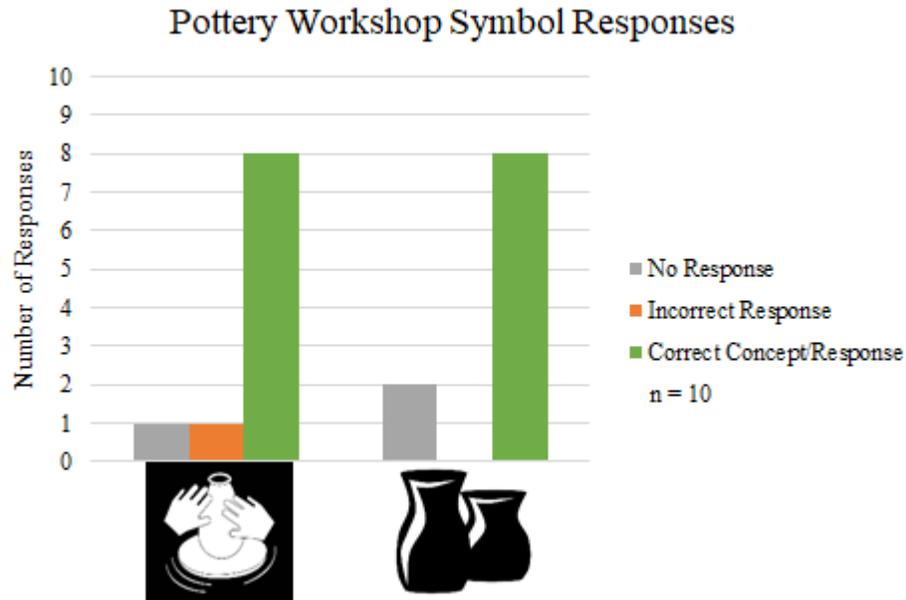


Figure 4.33. Bar graph displaying the effectiveness of symbols related to pottery.

The participants recognized both pottery pictograms equally. In Figure 4.33, the leftmost symbol is also the symbol currently present in the *Pôle Formation Professionnelle* which means some of the members are already familiar with it. The team noticed that pictograms with greater detail and showing an action instead of an object were easier for the participants to understand. The center can continue to use the leftmost pictogram effectively.

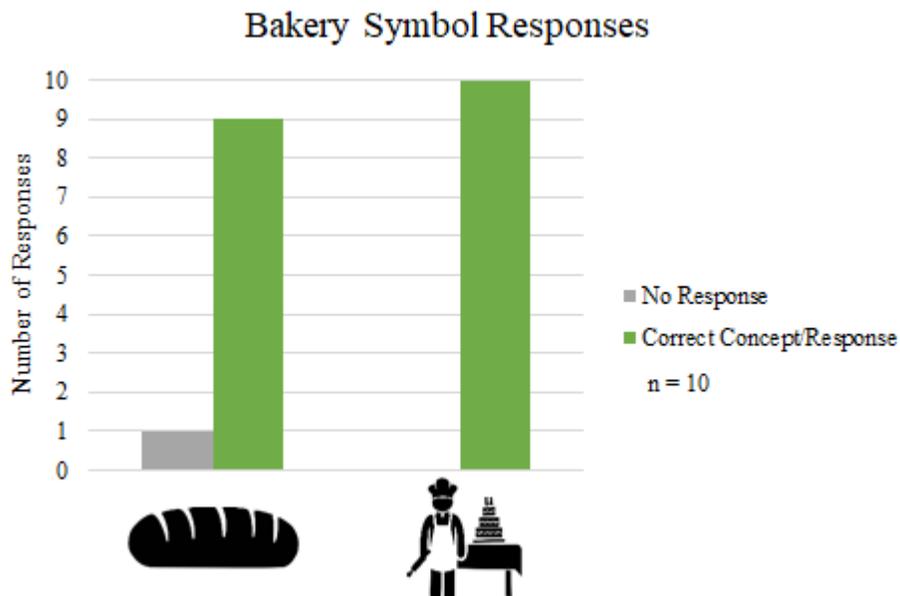


Figure 4.34. Bar graph displaying the effectiveness of symbols related to the bakery.

The first symbol in Figure 4.34, for the bakery, was a piece of bread, and most responses identified the correct concept. However, the interviewees had a better understanding of the symbol on the right, with almost half identifying the act of baking a cake. Therefore, the second symbol would be an overall better choice for the center.

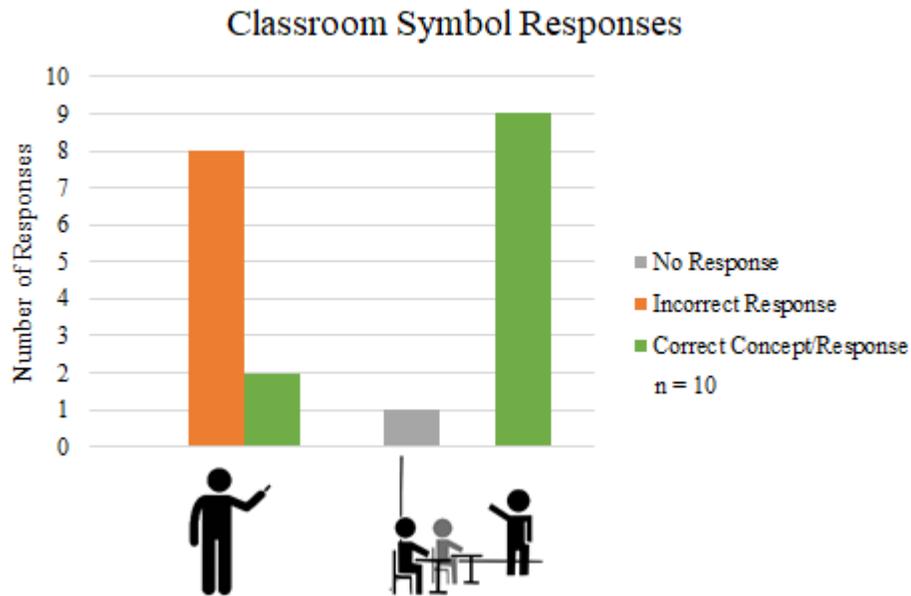


Figure 4.35. Bar graph displaying the effectiveness of symbols related to classrooms.

A classroom is especially difficult to represent in a small pictogram, given the variety of different classroom structures present at the center. Still, the participants recognized the symbol already present in the *Pôle Formation Professionnelle* (pictured on the right side of Figure 4.35), to represent a classroom or a teacher teaching. It is an effective choice for labeling classrooms in the center. However, there are many classrooms in the center, and it may become necessary for the center to differentiate between them with additional pictograms.

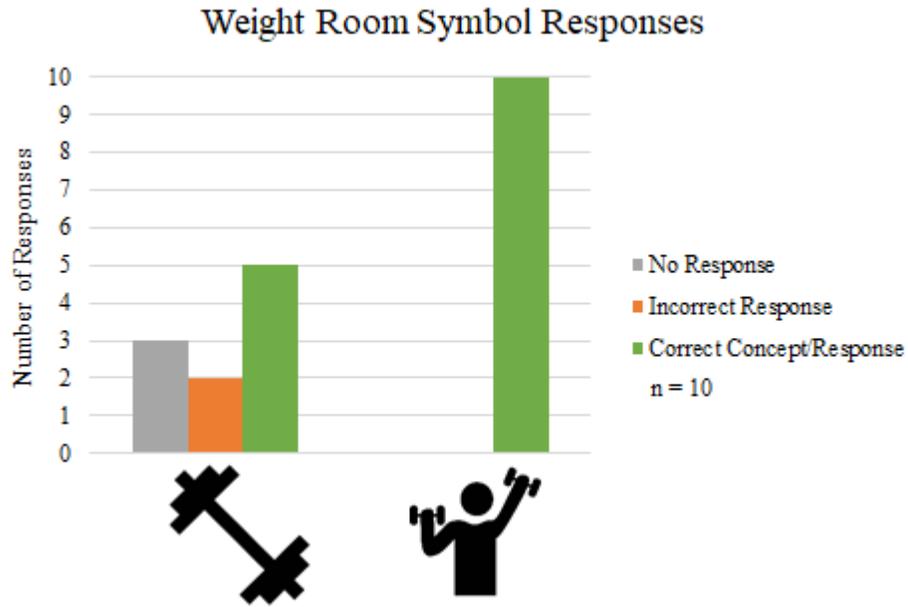


Figure 4.36. Bar graph displaying the effectiveness of symbols related to the weight room.

All interviewees recognized the symbol on the right of Figure 4.36 to represent “material for bodybuilding,” making it an effective choice for labeling the weight room. This finding is consistent with what the team found in most cases of comparison: the members better understood a pictogram representing an action rather than one which displays an object.

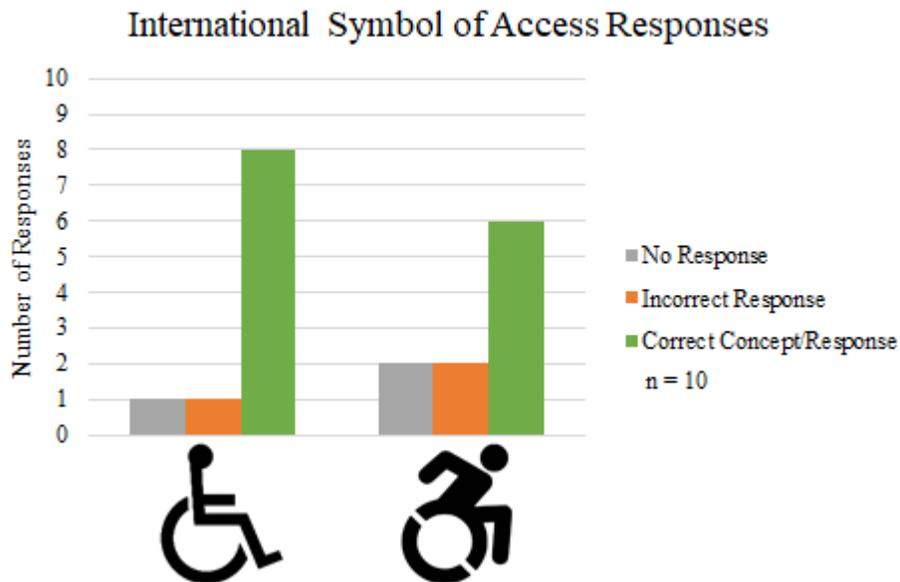


Figure 4.37. Bar graph displaying the effectiveness of the standard and modified International Symbols of Access.

The team included both the standard (leftmost pictogram) and the modified (rightmost pictogram) International Symbols of Access to gauge whether the members recognized them as symbols for accessible structures and accommodations (see Figure 4.37). The majority of responses to the standard symbol involved wheelchairs, while two responses involved persons with disabilities in general. The modified symbol, on the other hand, evoked the idea of sports based on the motion visible in its design. Given this misinterpretation, it would be more effective for the center to maintain the standard symbol as opposed to adopting the modified icon.

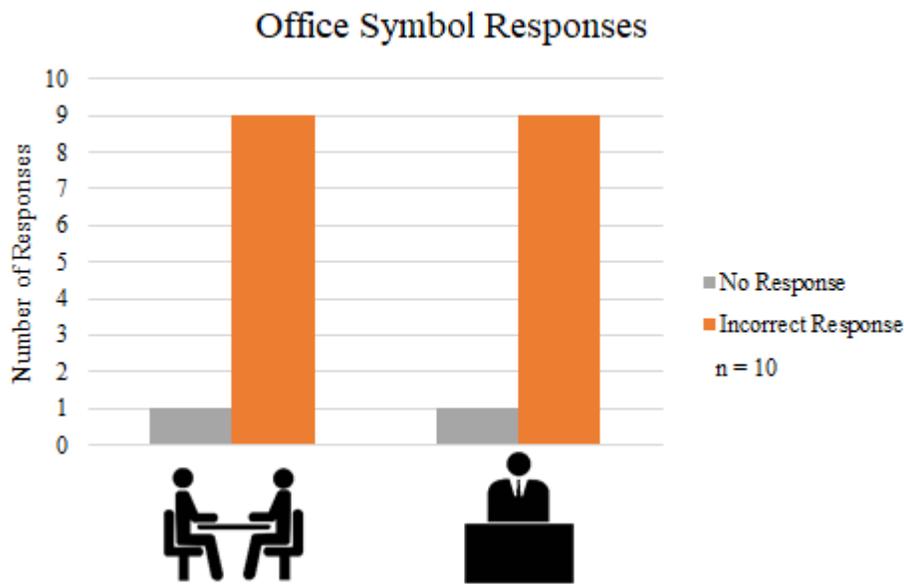


Figure 4.38. Bar graph displaying the effectiveness of symbols related to offices.

The majority of interviewees did not understand the symbols representing the Office of Employment and the Administrative Office (see Figure 4.38). These icons, which the center already uses, were vague as they picture figures doing unspecific actions. For example, multiple respondents mistook the first image for a scene from a restaurant. Specific symbols which take into account the actions which occur within these offices would be more effective visual aids for the center.

4.5.2 Individual Symbol Analysis

This section goes through the responses to pictograms that did not have duplicates in the survey. The team analyzes each symbol based on the responses, similarly to the last section.



Figure 4.39a. *The visually impaired symbol as shown in the symbol interview.*

Visually Impaired Symbol Responses

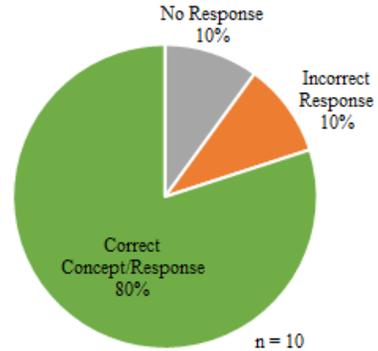


Figure 4.39b. *Pie chart displaying the responses to the visually impaired symbol.*

The participants generally understood the symbol of a visually impaired person (Figure 4.39a). Seventy percent of respondents were correctly able to identify the symbol as being someone who was visually impaired (see Figure 4.39b). Most even identified the cane in the pictogram. One interviewee cited this as a “man with disabilities,” which is the correct concept, however, the team recognizes that this symbol is specific to visual impairments.

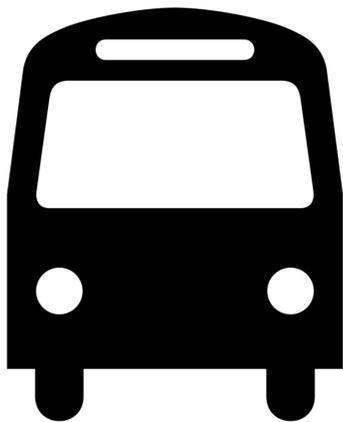


Figure 4.40a. *The parking lot symbol as shown in the symbol interview.*

Parking Lot Symbol Responses

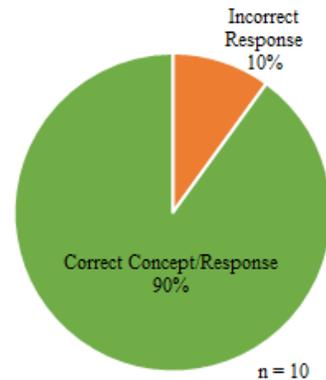


Figure 4.40b. *Pie chart displaying the responses to the parking lot symbol.*

The team meant for this symbol to represent the parking lot where members of the center get picked up and dropped off by buses and vans. Of the respondents, 90% of them related it to

either a bus or car (see Figure 4.40b). One participant even identified this symbol to represent a bus station, which indicates that this symbol (see Figure 4.40a) could be used to represent the area where members board. Though the disabled individuals did not specifically state that the symbol represented the parking lot, it was the only area where vehicles were located at the center.



Figure 4.41a. The trash can symbol as shown in the symbol interview.

Trash Can Symbol Responses

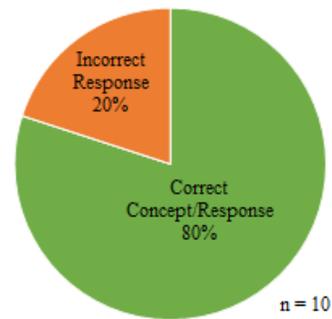


Figure 4.41b. Pie chart displaying the responses to the trash can symbol.

Around the world, many public spaces use the symbol in Figure 4.41a to identify trash receptacles and most interviewees' responses reflected this interpretation. Still, two gave answers indicating that they did not understand the pictogram, which might be due to lack of encounters with this symbol in the past (see Figure 4.41b).



Figure 4.42a. *The computer room symbol as shown in the symbol interview.*

Computer Room Symbol Responses

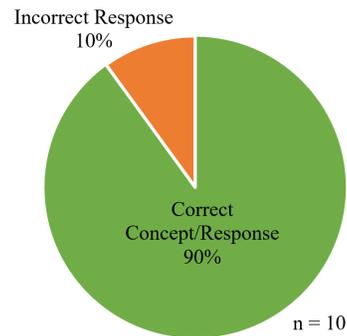


Figure 4.42b. *Pie chart displaying the responses to the computer room symbol.*

The symbol in Figure 4.42a represents the *Salle D’Informatique*, or computer room. Most responses had to do with computers or the Internet (see Figure 4.42b). However, this symbol is still rather clear, and someone looking for a computer would likely be able to follow it. The participants widely recognized this pictogram therefore this symbol is an effective choice for the center.

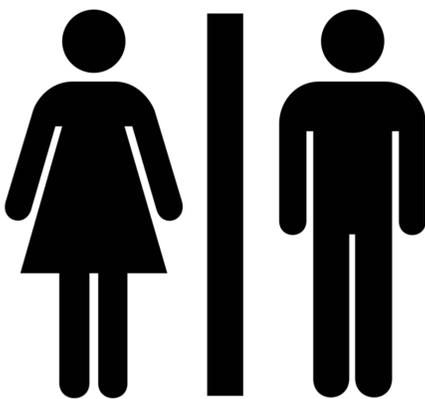


Figure 4.43a. *The gendered area symbol as shown in the symbol interview.*

Gendered Area Symbol Response

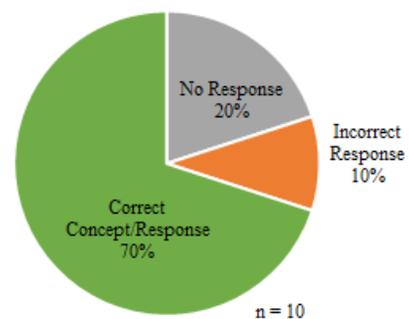


Figure 4.43b. *Pie chart displaying the responses to the gendered area symbol.*

The figures in Figure 4.43a represent gendered bathrooms across the globe. However, many establishments also use these symbols to distinguish gendered areas such as locker rooms.

Therefore, correct responses had to do with separation of genders. About 70% of the interviewees were able to identify the correct concept or response (see Figure 4.43b). Twenty percent, however, identified only the female figure. These symbols are still rather universal, and already present on bathrooms in the center, so the center should not make any changes to them.

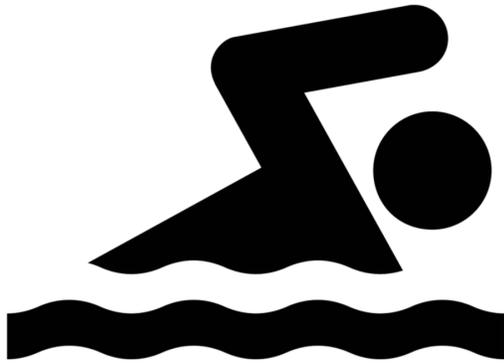


Figure 4.44a. The swimming pool symbol as shown in the symbol interview.

Swimming Pool Responses

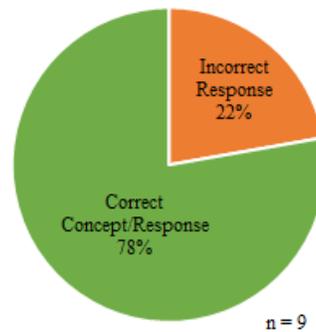


Figure 4.44b. Pie chart displaying the responses to the swimming pool symbol.

Most interviewees could identify this symbol (see Figure 4.44a) as having to do with swimming. A few respondents had difficulty recognizing the figure given the water obscures half of the body, but the overall understanding indicates that the center can use this pictogram to represent the pool effectively (Figure 4.44b).



Figure 4.45a. The sports field as shown in the symbol interview.

Sports Field Symbol Responses

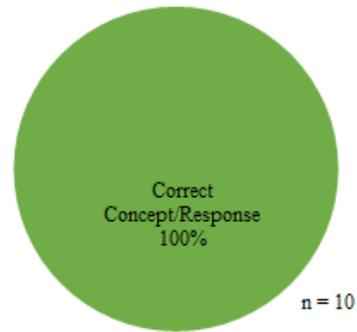


Figure 4.45b. Pie chart displaying the responses to the sports field symbol.

This pictogram, in Figure 4.45a, depicts a figure kicking a ball. All of the interviewees were able to recognize that the figure was playing soccer (see Figure 4.45b). If this symbol labels a field or area where games of soccer take place, then this pictogram could effectively communicate the purpose of the area. However, if the center used this symbol to label a multi-purpose gymnasium, such as the one in the *Pôle des Sports*, it would be better for them to use multiple sports pictograms to represent the area.

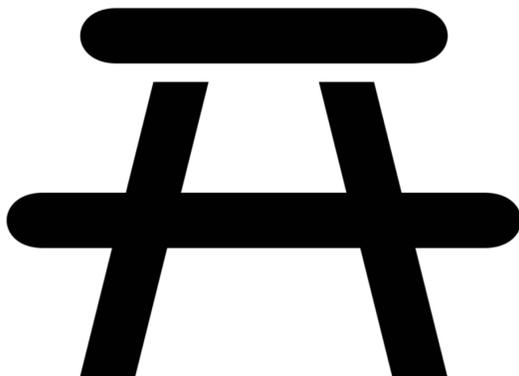


Figure 4.46a. The picnic area as shown in the symbol interview.

Picnic Area Symbol Responses

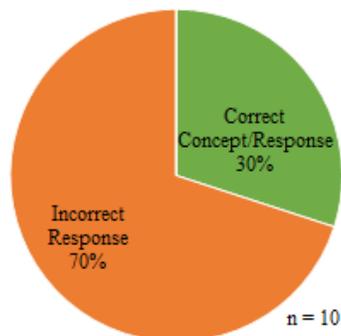


Figure 4.46b. Pie chart displaying the responses to the picnic area symbol.

The project team meant for this symbol, in Figure 4.46a, to represent the picnic areas outside of the *Pôle Formation Professionnelle*. Although three interviewees identified the table in the pictogram, the team is unsure that this symbol would be a useful visual aid for most members (see Figure 4.46b). If the center believes this area needs a label, they should consider a more descriptive symbol, perhaps with figures which are clearly sitting outside at one of these picnic tables.



Figure 4.47a. The hand washing as shown in the symbol interview.

Handwashing Symbol Responses

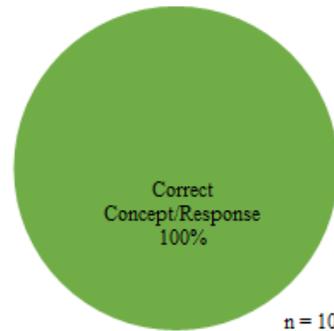


Figure 4.47b. Pie chart displaying the responses to the hand washing symbol.

All respondents expressed some understanding of the hand washing symbol, in figure 4.47a, indicating that it would be a useful visual aid for the center (see Figure 4.47b).

4.6 Font and Text Size Interview

In order to collect information on text and font readability, the project team carried out interviews with twenty residents of the Center for Modern Languages. The interviews consisted of three different passages each containing three different fonts and text sizes. The interviewees read the passages one at a time, then answered three questions about events that took place within the passages and one question that asked about the difficulty of the passage. The team's intent with this interview was to acquire data about font and text size to give the administration of the Mohammed VI Center for the Disabled recommendations for their website.

Unfortunately, the experimental form of testing contained flaws, rendering a portion of the collected data unusable. There were too many independent variables within the experiment, meaning that any data collected could not back up any claims. To fix this issue, the project group should have made sure each passage and question existed in all three fonts and then randomly ordered the passages and randomly ordered which interviewee got the three passages using variable fonts.

The investigators were still able to use the information collected from the question they asked at the end of each passage: “Did you find this passage challenging to read? What made it difficult? If not, what made it easy?” Due to the ambiguous nature of this question, many respondents commented on the structure and content of the paragraphs, as opposed to the text and font size. However, other interviewees commented on both the font and text size.

In order to properly organize the responses acquired from the above question, the WPI project team used inductive coding (see Appendix I) (Fade and Swift, 2011). The researchers created four categories that responses could fall under: sentence structure/grammar/content, font, text size, and general comments that did not fall into any of the relevant categories. Within each category, the team created two sub-categories, those who found it difficult to read or dissatisfactory, and those who found it easy to read or satisfactory. For example, comments on font would fall into two different sections, those who found it difficult to read or dissatisfactory and those who found it easy to read or satisfactory. Each category has a color to highlight keywords and phrases within the responses. Figure 4.48 illustrates the key used by the team of researchers.

Comments based on:	People who Found it Easy to Read or Satisfactory	People who Found it Difficult to Read or Dissatisfactory
Sentence structure/ grammer/ content	Blue	Red
font	Magenta	Orange
text size	Purple	Dark Red
general	Green	Brown

Figure 4.48. The key used by the WPI team to code words and phrases within the responses from interviewees.

The investigators looked for keywords and phrases like “easy” “not difficult” and “hard” and then analyzed the context and determined which category the word/phrase fit in. In some cases, a respondent commented on sentence structure, font, and text size at the same time. In

other cases, the respondent may have just commented on one of these categories. The team interpreted responses that did not criticize a particular category as satisfactory.

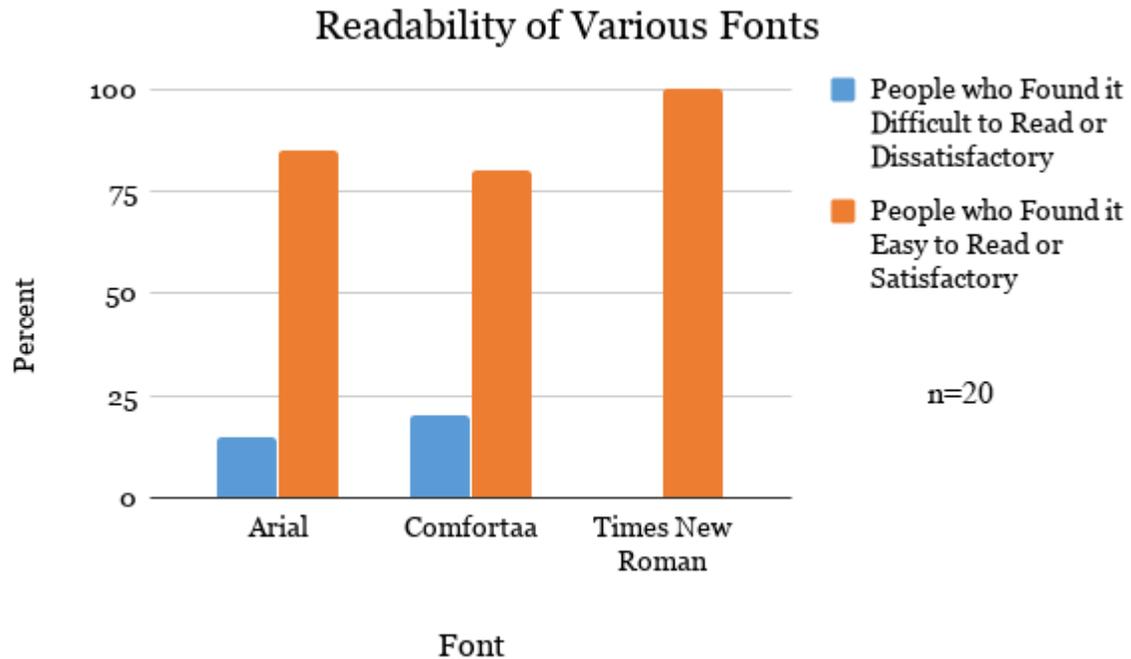


Figure 4.49. A graph that represents the percent of people who found the fonts used in the three passages unsatisfactory or dissatisfactory.

Figure 4.49 pertains to the ease of readability of the three font choices. All of the font choices satisfied most of the interviewees. However, Arial and Comfortaa faced some criticism. These results imply that the people interviewed perceived Arial to be uniform and boring. On the other hand, respondents described Comfortaa as too “bubbly” and “spread out.” Interestingly, the participants praised and criticized both fonts for these traits. The interviewees gave Times New Roman no negative feedback, they considered it an easy read, and well-rounded font choice.

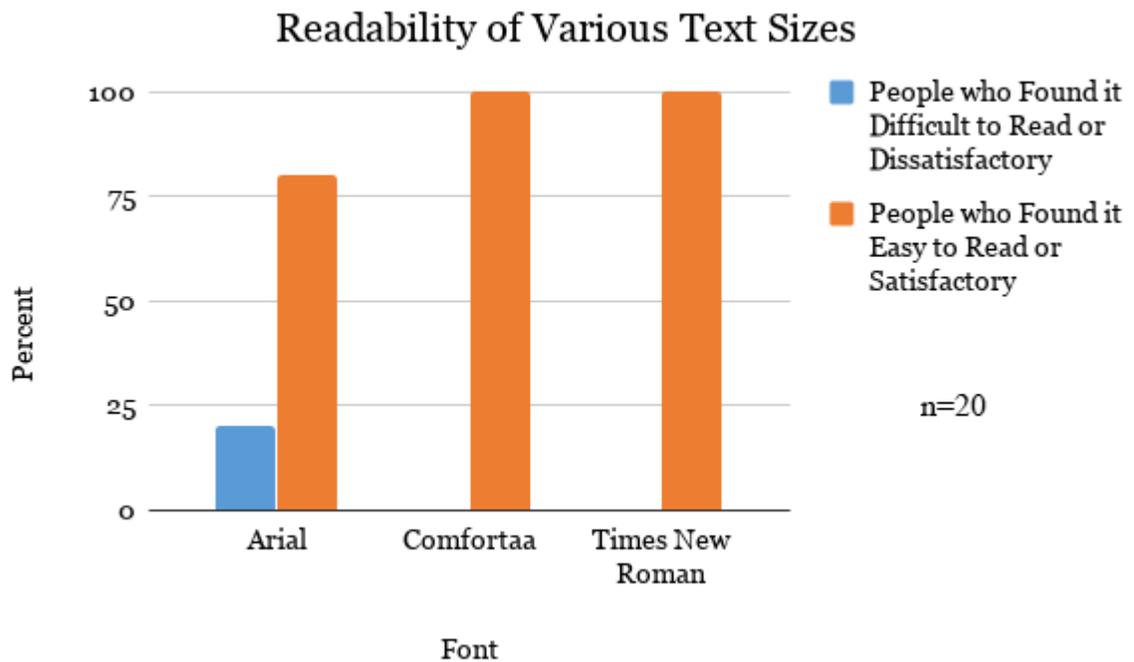


Figure 4.50 A graph that represents the percent of people who found the text sizes used in the three passages unsatisfactory or dissatisfactory.

The bar graph in Figure 4.50 represents the percentages of interviewees who found the passages either easy or difficult to read due to text size. Arial received a fair amount of criticism for being size nine, which is the font size on the Mohammed the VI Center for the Disabled’s website. One person even stated that they “had to lean in” in order to read the passage. Otherwise, the respondents found Comfortaa at size eleven and Times New Roman at twelve, to be appealing. It is also worth noting that Comfortaa is a larger font than Times New Roman so the researchers used a smaller text size so the characters of both fonts would have the same height.

In general, all three fonts were considered relatively successful, but their combination with a text size determines their impact on a page. In terms of the center’s website, stepping away from the Arial font would most likely be beneficial. The font comes across as bland and is not aesthetically pleasing. Although relatively successful, Comfortaa received the most negative feedback, for being to “bubbly” and containing large amounts of space between letters. Times New Roman is a standard for good font usage and is generally a safe choice when deciding on a

readable text style. However, the team noted that Times New Roman is an extremely popular font choice and website users could find it boring from overuse. A font similar to Times New Roman may prove beneficial.

Chapter 5 | Recommendations and Conclusion

This chapter provides the Mohammed VI Center for the Disabled with recommendations to improve the accessibility of their facility and website. The team drew these conclusions based on the surveys, interviews, and evaluations which they conducted at the center. The team would like to state that they did not formulate these recommendations with cost in mind. The team believes that these recommendations will help to improve the efficiency of information delivery for members, staff, and visitors to the center.

5.1 Navigation Recommendations

This study found the Mohammed the VI Center for the Disabled's facility to be lacking in signage and other navigational aids. The group has devised recommendations based on their research to improve the center's navigation and wayfinding. The project team separated the recommendations into four categories: sign placement, sign content and pictograms, sign format and color, and physical accessibility of the center.

5.1.1 Sign Placement

It is important that the center place signs in strategic locations to display clear information for the clients and visitors of the center. The team recommends placing signs at each main entrance and at all decisions points. Decision points are any location where one could change direction. An intersection, for example, is a decision point where having a sign would be helpful. The center should position signs at these decision points such that arrows facing left, right or forward can indicate relevant locations. Signs should not include diagonal arrows as they can cause confusion in navigation (Harding et al., 2017). Figure 5.1 exhibits a map of the center with the team's recommended sign placements. The center should also take into account trees, parked cars, and other structures which could obscure the sign in the future. It is important that signs are easy to see from walkways.

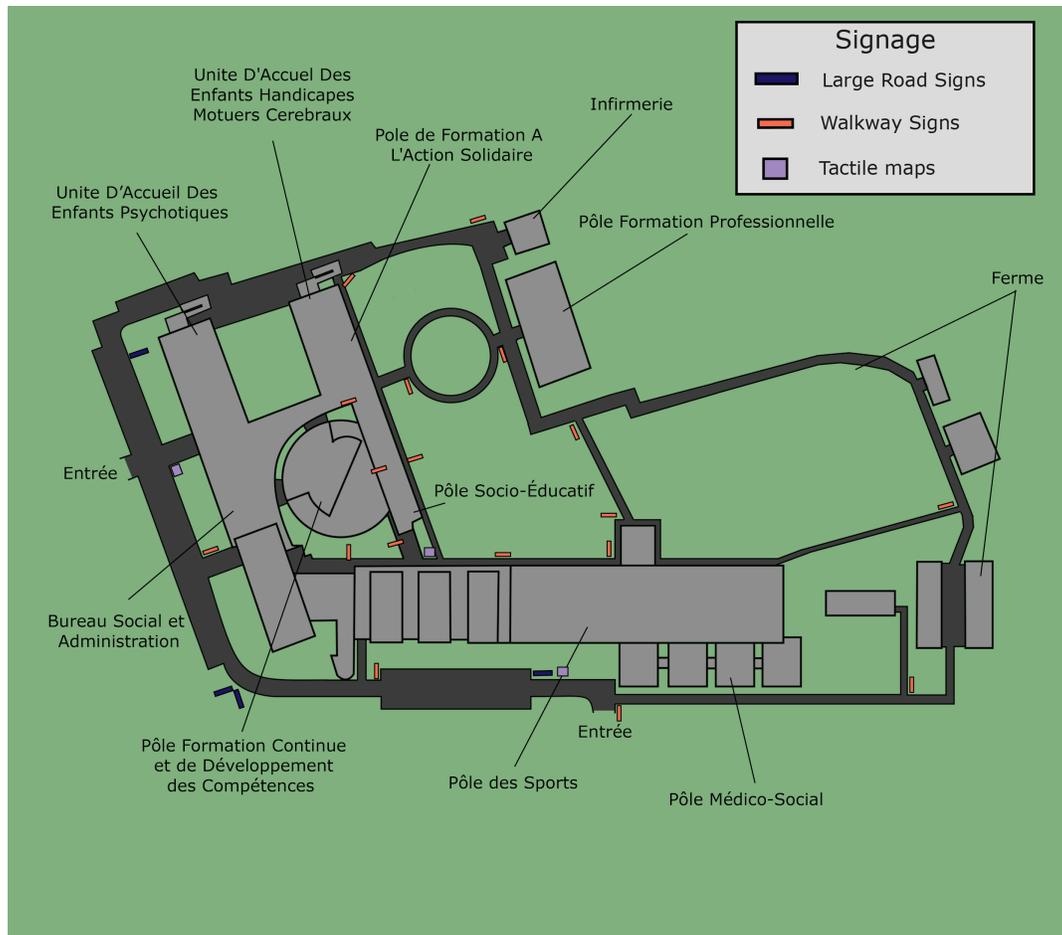


Figure 5.1. Recommended sign placement at the Mohammed VI Center for the Disabled.

The center should list locations on signs according to the proximity of the space. For example, if a user walked away from a sign and encountered the sports center before any other location listed on the sign, then the sign should list the sports center first. Locations listed in this manner will allow the navigator to gauge the proximity of their destination as they move toward it based on its position on each sign they pass.

The language present on the signs also affects the variety of people that visit the center. Currently, the signage at the center is mostly in Arabic and French but it is inconsistent in various location. All signs should have both languages and the center should consider adding Amazigh. Unfortunately, language is not adequate for all of the stakeholders, and symbols need to be added to the signage in order to make it accessible to the illiterate.

5.1.2 Sign Content and Pictograms

In order to effectively guide users to their destination, signs and maps must be thorough and easy for the majority of the population to use. This includes those who are visually impaired, illiterate, or do not speak French or Arabic. Methods for communicating directions to these groups include tactile information in the forms of Braille, raised text or maps, and symbolic information such as pictograms.

Raised text, symbols, and maps are necessary in order to make information accessible to visually impaired and blind individuals. In addition, the text on signs should be in sans-serif fonts which are easier for those with visual impairments to distinguish (Harding et. al.. 2017). These displays may also include Arabic and French Braille to account for the potential growth of Braille understanding in Morocco.

Maps should also contain tactile information, with buildings, pathways, and raised or Braille labels for the visually impaired. These maps should be color coded, as the team discusses in section 5.1.3. In addition, each map should display its own location, and a list of all marked areas of the center along with their color and symbol(s).

Consistency is essential for the clarity and presentation of navigational information. For this reason, the order and format on each sign must be the same. In addition to maintaining the closest location as the first entry on the signs, the format of each line should be identical. For example, the arrow can be on the left, the text in the middle, and the pictogram(s) on the right, as Figure 5.3 illustrates. Since the signs will be in Arabic and French, they should be in the same order on every line. The symbols should also remain similar in their structure with the standard figure and similar dimensions. Table 5.2 contains the list of the symbols which the team currently recommends for the center. These standards should make signs easier for users to follow.

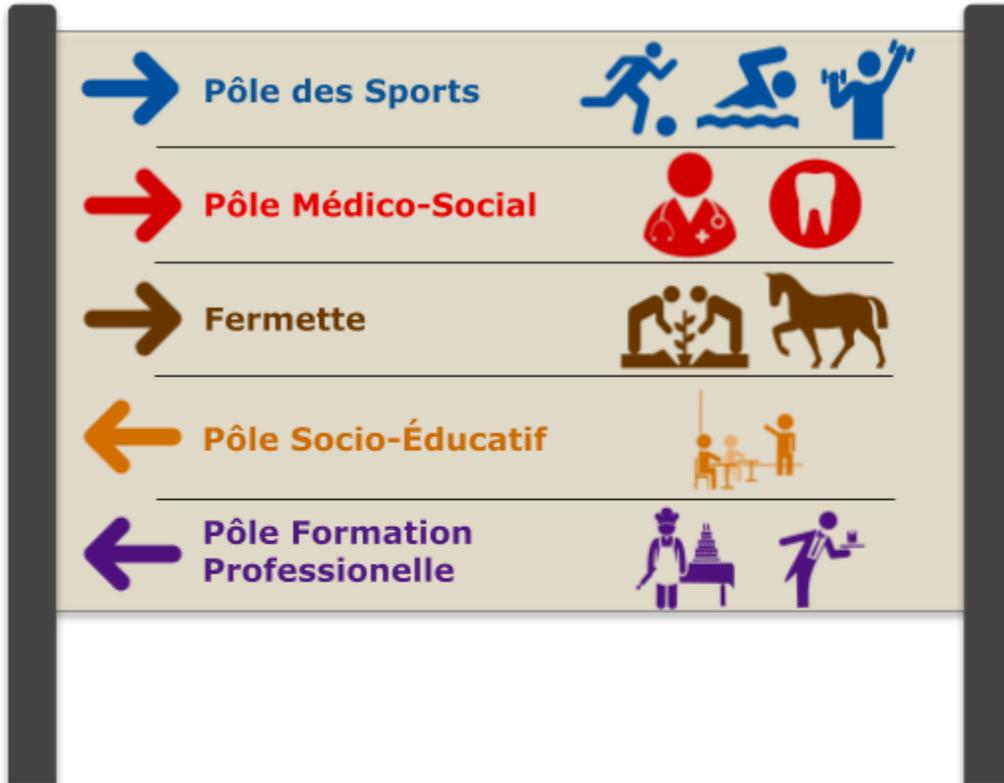
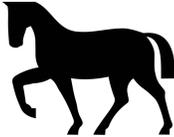


Figure 5.2. An example of one option for a color coded sign with a standard layout and pictograms. Example lacks Arabic translation of location names.

Table 5.1. Suggested pictograms for locations within the Mohammed VI Center for the Disabled.

Location	Suggested Pictogram	Additional Suggestions
Doctor's office		Standardize pictogram to reflect the same body shape as all other pictograms.
Dentist's Office		
Picnic Area	The interviewees did not understand the symbol depicting one table.	A symbol with more tables or figures eating food may be effective.

Restaurant		
Serving Classroom in the Pôle Formation Professionnelle		
Hospitality Workshop in the Pôle Formation Professionnelle	None of the pictograms in the interview conveyed the desired message.	A new symbol which includes, for example, a bed and a person making it would more effectively represent the room.
Pottery Workshop in the Pôle Formation Professionnelle		
Bakery Workshop in the Pôle Formation Professionnelle		
Classroom		Standardize pictogram to reflect the same body shape as all other pictograms
Computer Room		
Offices	The interviewees did not recognize the symbols currently used in the center to represent the Office of Employment and the Administration (Figure 4.38).	Pictograms which show the actions that occur in these offices without suggesting any alternative meaning would be more effective.

Farm (garden)		
Bird Area		
Horse		
Goat		
Sheep	<p>The interviewees misinterpreted the pictogram of a sheep (Figure 51) as a cow.</p>	<p>A pictogram which more clearly represents a sheep, for example, one with wool, would be more effective.</p>
Weight Room		
Swimming Pool		
Sports Area		<p>The most common sport that occurs in the area should be depicted in the pictogram.</p>
Parking Lot		

Gendered Area (ex. Restroom)		
Hand Washing		
Trash Can		
Visually Impaired		
Symbol of Access		

Larger areas of the center such as the various poles include multiple destinations, making them difficult to represent in just one pictogram. For this reason, the team recommends using symbols which represent between one and three of the locations within the area. Though the team did not test the idea of using more than one symbol to represent a pole within the center, they believe it is the best option. Many of the disabled interviewees were not able to associate a place with a symbol. The team decided the best method to represent a pole was to use multiple symbols that are utilized within that pole. Table 2 displays the suggested set of icons for each greater area of the center.

Table 5.2. Suggested pictograms for the main areas of the Mohammed VI Center for the Disabled.

Pole or Area	Suggested Pictograms
Pôle Médico-Social	
Pôle des Sports	
Centre D'Aide par Travail / Fermette	
Pôle Socio-Éducatif	
Pôle Formation Professionnelle	

5.1.3 Sign Format and Color

Aspects of a signs design such as font and color impact how easily a user can read it, especially if the user is visually impaired. Optimal fonts include sans-serif fonts such as Helvetica and Verdana, as their letters are easier for those with certain visual impairments to read. The color of the text needs to be either significantly darker or lighter than the background in order to create a sufficient contrast. In addition, neither the lettering nor the background should have shiny finishes, as they are difficult to read in certain light conditions and do not contrast well with most colors. Therefore, the team recommends replacing the existing overhead signs on buildings with solid, non-shiny lettering, in black or a color that provides similar contrast. (Harding et al., 2017)

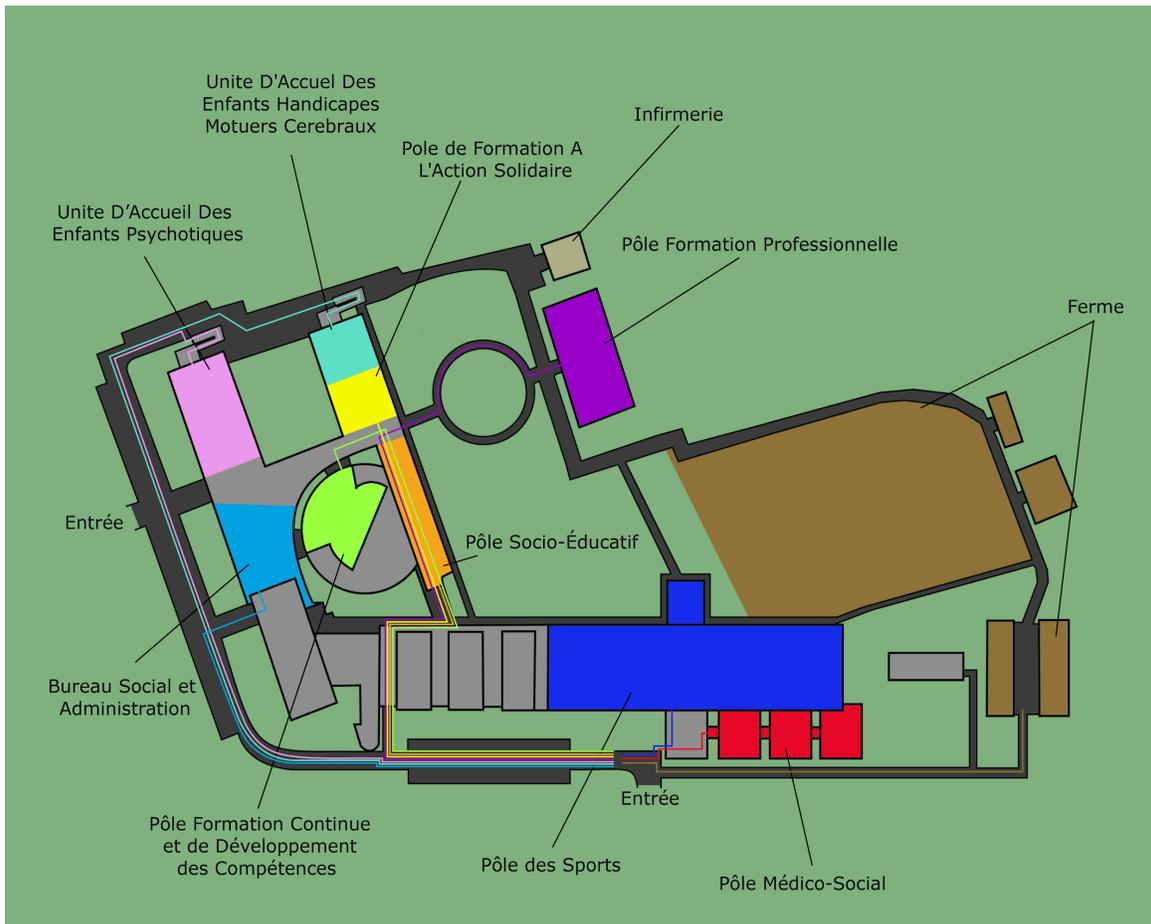


Figure 5.3 An example created by the WPI team of a possible color-coded system.

The research team also recommends the use of color coding throughout the center. Each building should have its own color and the color of the symbols used in that building should match accordingly. Additionally, the team suggests the use of lines, on the walkways, to guide people through the center to each of the buildings. The lines should start at the main entrance and have the same color coding as the signs. These lines should take the most direct and accessible path. Figure 5.3 shows an example of the colors that the center could use for the buildings and the paths that the directional lines could take.

5.1.4 Physical Accessibility of the Center

Though the main clientele of the Mohammed VI Center for the Disabled are people with disabilities, there are some aspects of the facility that are not accessible for everyone. The team recommends that the center pave all of their walkways to allow access for individuals of any

disability. The team also recommends that all raised walkways have curbs along with railings. The curbs and railings are a safety precaution that will keep people in wheelchairs from rolling off the path and getting stuck. These curbs would also be beneficial for the blind, since these individuals would be able to detect the curbs with a cane and keep on the right track. Additionally, the team suggests that every door in the center has a door handle which allows a person without a mobility impairment to open the door with a closed fist, which should make it easier for individuals with any sort of disability to open the door on their own (Adaptive Environments Center & Barrier Free Environments, 1995).

5.2 Website Recommendations

The project team and the faculty of the Mohammed VI Center for the Disabled found their website to be insufficient and out of date. The investigators made recommendations about for updating the website and working on its formatting.

5.2.1 Website Format

First, a larger text size, or the option to change the size of the font based on the user's liking is necessary. Additionally, the center should change the font to be more aesthetically pleasing. According to the research gathered by the project group, the font should be clear and simple. Arial and Times New Roman are very common and easily understood fonts. Specifically, the interviewees liked when the font size was at least size 12. Although there is not sufficient evidence to say these are the best choices, these could be two potential options.

Currently the website is only accessible in French. The center should include an option to change the language of the website to French, Arabic, English, and potentially Amazigh. The team recommends changing the heading of the website from Moroccan landmarks to include pictures of the center and its members. The heading and logo should also be links which take the user back to the homepage.

The front page of the website contains too much text. The team recommends condensing this information to make it more pleasing to the eye and easier to comprehend. The bullet points on the front page are also small and over-used. Small paragraphs would provide a more effective layout to express the information.

The pages on the website should reflect the color coding system and the symbols which the team recommended for the physical spaces in the center. For example, the Vocational

training section of the website should be in purple and show the symbols associated with the building. Figure 5.4 shows an example of this formatting standard.

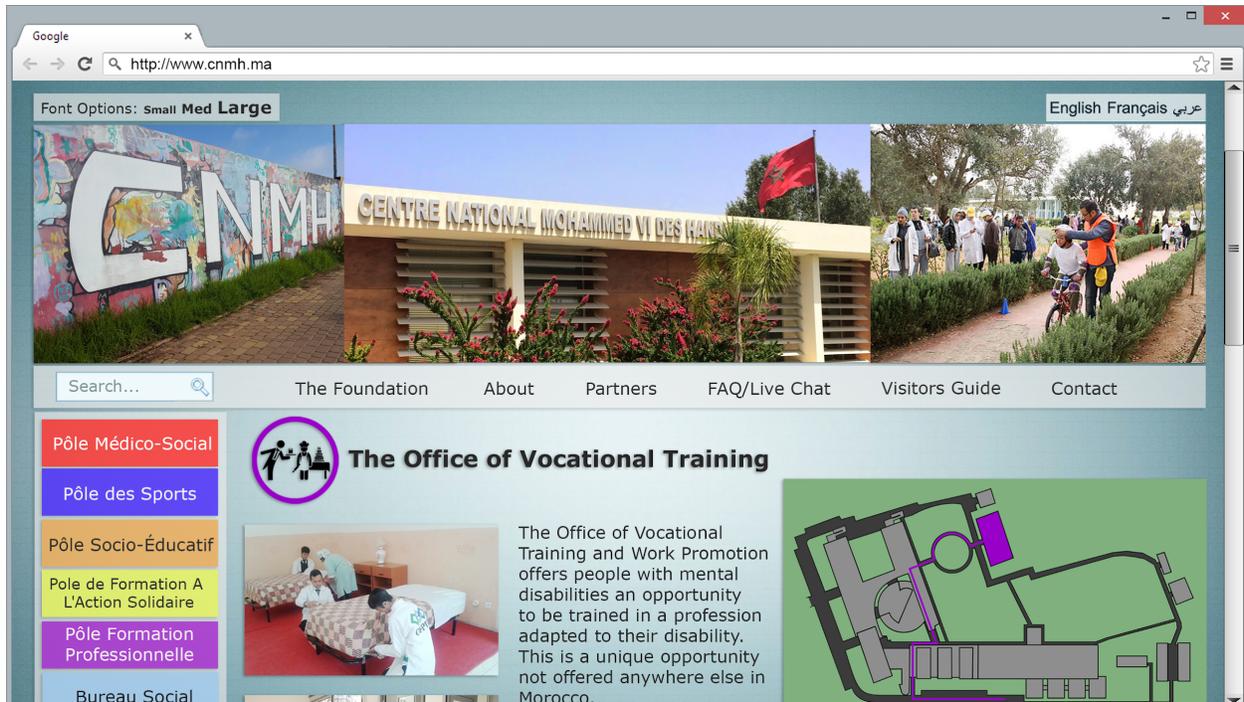


Figure 5.4. An example of a page from the potential new website format.

The center should consider changing the web site domain name to better represent itself. For example, CNMH.ma would be an easy title for users to access and remember. Adding a hit counter which tracks the number of visitors to the website would allow the center to see who is using their site and how often someone is accessing a web page. This will be helpful for future development to the site.

5.2.2 Website Content

The website lacks information for the parents and caretakers of the members. A Frequently Asked Questions (FAQ) page would help solve this problem. In addition, a live chat where a website user could send a message and get a response from an employee of the center would be extremely beneficial. There should be a section of the website where all paperwork for members or caregivers is available for them to download and complete before entering the center. Lastly there should be a contact page with an address, an embedded Google Map, and

contact information consisting of a phone number, and email. A gallery with photos of the center, its members, teachers, administration, and classrooms should also have its own page.

The center occasionally holds large conferences with individuals and organizations from outside the facility, there should be a page on the website where people can sign up to attend these conferences. There should also be a section where NGOs can find information about working with the center, training, special education, and sign up for training classes at the center. Additionally, the website should have a page that lists all NGOs associated with the center, along with activities and events they have done.

The center needs to update new information into the various blank pages on the website and pages with little information need additional material. The staff expressed that they wanted more information about each of the poles and what their specific role in the center. Furthermore, images of the members of the center on each of these pages would enhance the aesthetic.

5.3 Future Direction

This report has discussed signage and website design to facilitate the accessibility of the Mohammed VI Center for the Disabled. Though the purpose of this study was to give the center direction on these two topics, further research is necessary to complete certain aspects of this project in more depth.

This investigation focused on the general design and information that was present on the website at the center, but did not look into adding training videos to the website. Training videos on the website would enable people to access many of the resources of the center without actually having to visit it. Physical therapy, general hygiene, cooking, and gardening are all tasks that a team could potentially film to use on the website. A team would have to research the effectiveness of certain kinds of training videos to determine which would be the best fit for the center. This would also require the researchers to gain knowledge on the center and which specific types of physical therapy and other videos would be most necessary to have.

While this current project focuses on signage within the center, it neglects to discuss the use of emergency signage. This would require extensive research into signs such as exit signs and signs that direct people where to go in case of a fire. The new team would need to determine best routes that are accessible for everyone and how to portray this information for people who are blind or illiterate. The team would need to complete this for every room, in each building. These signs would make the center safer for its members, staff, and everyone who visits.

With the new signage system that this project team recommended, other research groups could develop plans to implement these signs in other disability centers around Morocco. Since the Mohammed VI Center for the Disabled has centers in Fès, Oujda, Safi, and Marrakech, there is a further need for the implementation of a similar signage system. Though the system could use the symbols the team identified in this report, it would have to be center specific. The new team would have to design each specific sign and determine its placement within the center. This includes developing new signs to fit specific poles at certain centers.

The center also expressed interest in an information system to track members in every pole of the centers. The next steps in accomplishing this task would be to obtain more knowledge about information systems in general, and specifically about those used for medical charts and the systems teachers use in schools. With this research, a new project team could model an information system which combines aspects of several existing systems into one, which could accommodate the needs of the center.

5.4 Conclusion

The goal of this project was to improve physical navigation within the Mohammed VI Center for the Disabled for its members, and online accessibility on the center's website. Based on their evaluation of the current signage system at the center, the team believes that the use of pictograms and color coding are useful tools to aid navigation around the center. By assessing the center's website, the project team established that an updated design, including content, images, color, and even font and text size were necessary to create a comprehensible and visually pleasing website. The results of this project take the first steps in allowing disabled members of the center, their families, staff members, and visitors to navigate the center with ease, and to have the ability to easily operate the website and find necessary information.

Bibliography

- ADA homepage. (2013). Retrieved from <https://ada.gov>
- Alquraini, T. A. (2014). Special education today in the kingdom of Saudi Arabia. *Advances in Special Education*, 28, 505-528.
- Adaptive Environments Center, I., & Barrier Free Environments, I. (1995). *Checklist for readily achievable barrier removal*.
- Bolden. (2017). Retrieved from <http://www.bolden.nl>
- Brace, I. (2004). *Questionnaire Design: How to Plan, Structure and Write Survey Material for Effective Market Research* (2nd ed.). Sterling, VA: Kogan Page.
- Burris, K., & Velez Llorens, M. (Nov 30, 2017). 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* (Rep.). Worcester, MA: Worcester Polytechnic Institute.
- Dbx54. (2009). Edinburgh airport gate lounge
- Fade, S. A. and Swift, J. A. (2011). Qualitative research in nutrition and dietetics: data analysis issues. *Journal of Human Nutrition and Dietetics*, 24: 106–114. doi:10.1111/j.1365-277X.2010.01118.x
- Guest, G., Namey, E. E., & Mitchell, M. L. (2013). Participant observation. *Collecting qualitative data: A field manual for applied research* (pp. 75). 55 City Road: SAGE Publications, Ltd.
- 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.
- 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.
- Keshavarzi, F., & Mohd Adnana, H. (2017). Designing and implication of pictograms in universities of tehran (IRAN). *SHS Web of Conferences*, 33, 46.
- 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., & Narayan, B. (2016). Signage by design: A design-thinking approach to library user experience. *Weave: Journal of Library User Experience*, 1(5)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 website. Retrieved from <http://www.fm5.ma/en/fondation>
- Null, R. (2013). *Universal design: Principles and models* CRC Press.
- Officer, A., & Shakespeare, T. (2013). The world report on disability and people with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities*, 10(2), 86-88.
- Schmidt, K. E., Liu, Y., & Sridharan, S. (2009). Website aesthetics, performance and usability: Design variables and their effects. *Ergonomics*.
- Rasmussen, M., & Lewis, O. (2007). United Nations convention on the rights of persons with disabilities. *International Legal Materials*, 46(3), 441-466.
- Trani, J., Bakhshi, P., Myers Tlapek, S., Lopez, D., & Gall, F. (2015). Disability and poverty in Morocco and Tunisia: A multidimensional approach. *Journal of Human Development and Capabilities*, 16(4), 518-548.
- 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*, 11(1)
- American Foundation for the Blind. (2018). What is braille? Retrieved from www.afb.org
- World braille usage (2013). (Third edition. ed.). Toronto, Ontario: Perkins School for the Blind.
- Zahidi, K., & Wardi, S. (2016, -02-16T10:17:35+00:00). Morocco and the rights of people with disabilities. Retrieved from <https://www.morocoworldnews.com/2016/02/179970/morocco-and-the-rights-of-people-with-disabilities/>

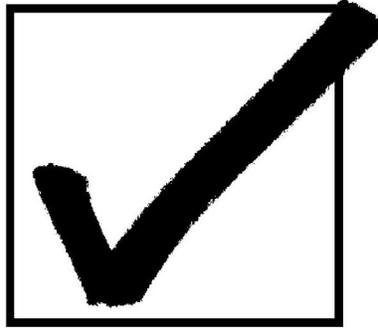
Checklist for Existing Facilities version 2.1



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**The Americans with Disabilities Act
Checklist for Readily Achievable Barrier Removal**
August 1995

Checklist for Existing Facilities version 2.1

Introduction

Title III of the **Americans with Disabilities Act** requires public accommodations to provide goods and services to people with disabilities on an equal basis with the rest of the general public. The goal is to afford every individual the opportunity to benefit from our country's businesses and services, and to afford our businesses and services the opportunity to benefit from the patronage of all Americans.

The regulations require that architectural and communication barriers that are structural must be removed in public areas of **existing facilities** when their removal is **readily achievable**—in other words, easily accomplished and able to be carried out without much difficulty or expense. **Public accommodations** that must meet the barrier removal requirement include a broad range of establishments (both for-profit and nonprofit)—such as hotels, restaurants, theaters, museums, retail stores, private schools, banks, doctors' offices, and other places that serve the public. People who own, lease, lease out, or operate places of public accommodation in existing buildings are responsible for complying with the barrier removal requirement.

The removal of barriers can often be achieved by making simple changes to the physical environment. However, the regulations do not define exactly how much effort and expense are required for a facility to meet its obligation. This judgment must be made on a case-by-case basis, taking into consideration such factors as the size, type, and overall financial resources of the facility, and the nature and cost of the access improvements needed. These factors are described in more detail in the ADA regulations issued by the Department of Justice.

The process of determining what changes are readily achievable is not a one-time effort; access should be re-evaluated annually. Barrier removal that might be difficult to carry out now may be readily achievable later. Tax incentives are available to help absorb costs over several years.

Purpose of This Checklist

This checklist will help you identify accessibility problems and solutions in existing facilities in order to meet your obligations under the ADA.

The goal of the survey process is to plan how to make an existing facility more usable for people with disabilities. The Department of Justice (DOJ) recommends the development of an Implementation Plan, specifying what improvements you will make to remove barriers and when each solution will be carried out: "...Such a plan...could serve as evidence of a good faith effort to comply...."

Technical Requirements

This checklist details some of the requirements found in the ADA Standards for Accessible Design (Standards). The ADA Accessibility Guidelines (ADAAG), when adopted by DOJ, became the Standards. The Standards are part of the Department of Justice Title III Regulations, 28 CFR Part 36 (*Nondiscrimination on the basis of disability... Final Rule*). Section 36.304 of this regulation, which covers barrier removal, should be reviewed before this survey is conducted.

However, keep in mind that full compliance with the Standards is required only for new construction and alterations. The requirements are presented here as a guide to help you determine what may be readily achievable barrier removal for existing facilities. The Standards should be followed for all barrier removal unless doing so is not readily achievable. If complying with the Standards is not readily achievable, you may undertake a modification that does not fully comply, as long as it poses no health or safety risk.

In addition to the technical specifications, each item has a scoping provision, which can be found under Section 4.1 in the Standards. This section clarifies when access is required and what the exceptions may be.

Each state has its own regulations regarding accessibility. To ensure compliance with all codes, know your state and local codes and use the more stringent technical requirement for every modification you make; that is, the requirement that provides greater access for individuals with disabilities. The barrier removal requirement for existing facilities is new under the ADA and supersedes less stringent local or state codes.

What This Checklist is Not

This checklist does not cover all of the requirements of the Standards; therefore, it is **not** for facilities undergoing new construction or alterations. In addition, it does not attempt to illustrate all possible barriers or propose all possible barrier removal solutions. The Standards should be consulted for guidance in situations not covered here.

The Title III regulation covers more than barrier removal, but this checklist does **not** cover Title III's requirements for nondiscriminatory policies and practices and for the provision of auxiliary communication aids and services. The communication features covered are those that are **structural** in nature.

Priorities

This checklist is based on the four priorities recommended by the Title III regulations for planning readily achievable barrier removal projects:

Priority 1: Accessible **approach and entrance**

Priority 2: Access to **goods and services**

Priority 3: Access to **rest rooms**

Priority 4: Any **other measures** necessary

Note that the references to ADAAG throughout the checklist refer to the Standards for Accessible Design.

How to Use This Checklist

✓ **Get Organized:** Establish a time frame for completing the survey. Determine how many copies of the checklist you will need to survey the whole facility. Decide who will conduct the survey. It is strongly recommended that you invite two or three additional people, including people with various disabilities and accessibility expertise, to assist in identifying barriers, developing solutions for removing these barriers, and setting priorities for implementing improvements.

✓ **Obtain Floor Plans:** It is very helpful to have the building floor plans with you while you survey. If plans are not available, use graph paper to sketch the layout of all interior and exterior spaces used by your organization. Make notes on the sketch or plan while you are surveying.

✓ **Conduct the Survey:** Bring copies of this checklist, a clipboard, a pencil or pen, and a flexible steel

tape measure. With three people surveying, one person numbers key items on the floor plan to match with the field notes, taken by a second person, while the third takes measurements. **Be sure to record all dimensions!** As a reminder, questions that require a dimension to be measured and recorded are marked with the ruler symbol. Think about each space from the perspective of people with physical, hearing, visual, and cognitive disabilities, noting areas that need improvement.

✓ **Summarize Barriers and Solutions:** List barriers found and ideas for their removal. Consider the solutions listed beside each question, and add your own ideas. Consult with building contractors and equipment suppliers to estimate the costs for making the proposed modifications.

✓ **Make Decisions and Set Priorities:** Review the summary with decision makers and advisors. Decide which solutions will best eliminate barriers at a reasonable cost. Prioritize the items you decide upon and make a timeline for carrying them out. Where the removal of barriers is not readily achievable, you must consider whether there are **alternative methods** for providing access that *are* readily achievable.

✓ **Maintain Documentation:** Keep your survey, notes, summary, record of work completed, and plans for alternative methods on file.

✓ **Make Changes:** Implement changes as planned. Always refer directly to the Standards and your state and local codes for complete technical requirements before making any access improvement. References to the applicable sections of the Standards are listed at the beginning of each group of questions. If you need help understanding the federal, state, or local requirements, contact your Disability and Business Technical Assistance Center.

✓ **Follow Up:** Review your Implementation Plan each year to re-evaluate whether more improvements have become readily achievable.

To obtain a copy of the Title III regulations and the Standards or other technical information, call the U.S. Dept. of Justice ADA Information Line at (800) 514-0301 Voice, (202) 514-0381 TDD, or (800) 514-0383 TDD. For questions about ADAAG, contact the Architectural and Transportation Barriers Compliance Board at (800) USA-ABLE.

QUESTIONS

POSSIBLE SOLUTIONS

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.

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?

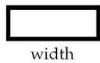
Yes No

- Add a ramp if the route of travel is interrupted by stairs.
- Add an alternative route on level ground.

Is the route of travel stable, firm and slip-resistant?

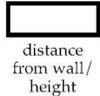
- Repair uneven paving.
- Fill small bumps and breaks with beveled patches.
- Replace gravel with hard top.

 Is the route at least 36 inches wide?



- Change or move landscaping, furnishings, or other features that narrow the route of travel.
- Widen route.

 Can all objects protruding into the circulation paths be detected by a person with a visual disability using a cane?



- Move or remove protruding objects.
- Add a cane-detectable base that extends to the ground.
- Place a cane-detectable object on the ground underneath as a warning barrier.

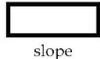
In order to be detected using a cane, an object must be within 27 inches of the ground. Objects hanging or mounted overhead must be higher than 80 inches to provide clear head room. It is not necessary to remove objects that protrude less than 4 inches from the wall.

Do curbs on the route have curb cuts at drives, parking, and drop-offs?

- Install curb cut.
- Add small ramp up to curb.

Ramps (ADAAG 4.8)

 Are the slopes of ramps no greater than 1:12?



- Lengthen ramp to decrease slope.
- Relocate ramp.
- If available space is limited, reconfigure ramp to include switchbacks.

Slope is given as a ratio of the height to the length. 1:12 means for every 12 inches along the base of the ramp, the height increases one inch. For a 1:12 maximum slope, **at least** one foot of ramp length is needed for each inch of height.

4 Checklist for Existing Facilities version 2.1 © revised August 1995, Adaptive Environments Center, Inc. for the National Institute on Disability and Rehabilitation Research. For technical assistance, call 1-800-949-4ADA (voice/TDD).

QUESTIONS	POSSIBLE SOLUTIONS
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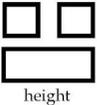
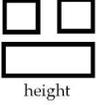
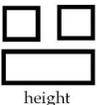
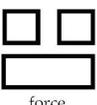
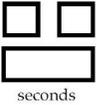
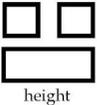
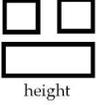
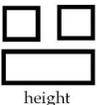
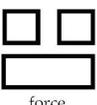
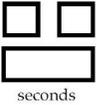
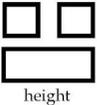
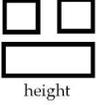
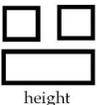
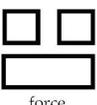
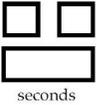
	Yes	No	
<p>Ramps, continued</p> <p>Do all ramps longer than 6 feet have railings on both sides?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Add railings.
<p> Are railings sturdy, and between 34 and 38 inches high?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Adjust height of railing if not between 30 and 38 inches. <input type="checkbox"/> Secure handrails in fixtures.
<p> Is the width between railings or curbs at least 36 inches?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Relocate the railings. <input type="checkbox"/> Widen the ramp.
<p>Are ramps non-slip?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Add non-slip surface material.
<p> Is there a 5-foot-long level landing at every 30-foot horizontal length of ramp, at the top and bottom of ramps and at switchbacks?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Remodel or relocate ramp.
<p> Does the ramp rise no more than 30 inches between landings?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Remodel or relocate ramp.

<p>Parking and Drop-Off Areas (ADAAG 4.6)</p> <p> Are an adequate number of accessible parking spaces available (8 feet wide for car plus 5-foot access aisle)? For guidance in determining the appropriate number to designate, the table below gives the ADAAG requirements for new construction and alterations (for lots with more than 100 spaces, refer to ADAAG):</p> <table style="margin-left: 20px; border: none;"> <thead> <tr> <th style="text-align: left;">Total spaces</th> <th style="text-align: left;">Accessible</th> </tr> </thead> <tbody> <tr> <td>1 to 25</td> <td>1 space</td> </tr> <tr> <td>26 to 50</td> <td>2 spaces</td> </tr> <tr> <td>51 to 75</td> <td>3 spaces</td> </tr> <tr> <td>76 to 100</td> <td>4 spaces</td> </tr> </tbody> </table>	Total spaces	Accessible	1 to 25	1 space	26 to 50	2 spaces	51 to 75	3 spaces	76 to 100	4 spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Reconfigure a reasonable number of spaces by repainting stripes.
Total spaces	Accessible												
1 to 25	1 space												
26 to 50	2 spaces												
51 to 75	3 spaces												
76 to 100	4 spaces												
<p> Are 8-foot-wide spaces, with minimum 8-foot-wide access aisles, and 98 inches of vertical clearance, available for lift-equipped vans?</p> <p>At least one of every 8 accessible spaces must be van-accessible (with a minimum of one van-accessible space in all cases).</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Reconfigure to provide van-accessible space(s).										

QUESTIONS	POSSIBLE SOLUTIONS
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	Yes	No	
<p>Parking and Drop-Off Areas, continued</p> <p>Are the access aisles part of the accessible route to the accessible entrance?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Add curb ramps. <input type="checkbox"/> Reconstruct sidewalk. <input type="checkbox"/> Reconfigure spaces. <input type="checkbox"/> Add signs, placed so that they are not obstructed by cars. <input type="checkbox"/> Implement a policy to check periodically for violators and report them to the proper authorities.
<p>Are the accessible spaces closest to the accessible entrance?</p>	<input type="checkbox"/>	<input type="checkbox"/>	
<p>Are accessible spaces marked with the International Symbol of Accessibility? Are there signs reading "Van Accessible" at van spaces?</p>	<input type="checkbox"/>	<input type="checkbox"/>	
<p>Is there an enforcement procedure to ensure that accessible parking is used only by those who need it?</p>	<input type="checkbox"/>	<input type="checkbox"/>	

<p>Entrance (ADAAG 4.13, 4.14, 4.5)</p> <p>If there are stairs at the main entrance, is there also a ramp or lift, or is there an alternative accessible entrance?</p> <p style="text-align: center;">Do not use a service entrance as the accessible entrance unless there is no other option.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> If it is not possible to make the main entrance accessible, create a dignified alternate accessible entrance. If parking is provided, make sure there is accessible parking near all accessible entrances.
<p>Do all inaccessible entrances have signs indicating the location of the nearest accessible entrance?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Install signs before inaccessible entrances so that people do not have to retrace the approach.
<p>Can the alternate accessible entrance be used independently?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Eliminate as much as possible the need for assistance—to answer a doorbell, to operate a lift, or to put down a temporary ramp, for example.
<p> Does the entrance door have at least 32 inches clear opening (for a double door, at least one 32-inch leaf)?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Widen the door to 32 inches clear. <input type="checkbox"/> If technically infeasible, widen to 31-3/8 inches minimum. <input type="checkbox"/> Install offset (swing-clear) hinges.
<p> Is there at least 18 inches of clear wall space on the pull side of the door, next to the handle?</p> <p>A person using a wheelchair or crutches needs this space to get close enough to open the door.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Remove or relocate furnishings, partitions, or other obstructions. <input type="checkbox"/> Move door. <input type="checkbox"/> Add power-assisted or automatic door opener.

QUESTIONS	POSSIBLE SOLUTIONS																												
<p>Entrance, continued</p> <p> Is the threshold edge 1/4-inch high or less, or if beveled edge, no more than 3/4-inch high?</p> <p> If provided, are carpeting or mats a maximum of 1/2-inch high?</p> <p>Are edges securely installed to minimize tripping hazards?</p> <p> Is the door handle no higher than 48 inches and operable with a closed fist?</p> <p>The "closed fist" test for handles and controls: Try opening the door or operating the control using only one hand, held in a fist. If you can do it, so can a person who has limited use of his or her hands.</p> <p> Can doors be opened without too much force (exterior doors reserved; maximum is 5 lbf for interior doors)?</p> <p>You can use an inexpensive force meter or a fish scale to measure the force required to open a door. Attach the hook end to the doorknob or handle. Pull on the ring end until the door opens, and read off the amount of force required. If you do not have a force meter or a fish scale, you will need to judge subjectively whether the door is easy enough to open.</p> <p> If the door has a closer, does it take at least 3 seconds to close?</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 10%; text-align: center;">Yes</th> <th style="width: 10%; text-align: center;">No</th> <th style="width: 70%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">  height </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> If there is a single step with a rise of 6 inches or less, add a short ramp. <input type="checkbox"/> If there is a threshold greater than 3/4-inch high, remove it or modify it to be a ramp. </td> </tr> <tr> <td style="text-align: center;">  height </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> Replace or remove mats. </td> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> Secure carpeting or mats at edges. </td> </tr> <tr> <td style="text-align: center;">  height </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> Lower handle. <input type="checkbox"/> Replace inaccessible knob with a lever or loop handle. <input type="checkbox"/> Retrofit with an add-on lever extension. </td> </tr> <tr> <td style="text-align: center;">  force </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> Adjust the door closers and oil the hinges. <input type="checkbox"/> Install power-assisted or automatic door openers. <input type="checkbox"/> Install lighter doors. </td> </tr> <tr> <td style="text-align: center;">  seconds </td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td> <input type="checkbox"/> Adjust door closer. </td> </tr> </tbody> </table>		Yes	No		 height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> If there is a single step with a rise of 6 inches or less, add a short ramp. <input type="checkbox"/> If there is a threshold greater than 3/4-inch high, remove it or modify it to be a ramp.	 height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Replace or remove mats.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Secure carpeting or mats at edges.	 height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Lower handle. <input type="checkbox"/> Replace inaccessible knob with a lever or loop handle. <input type="checkbox"/> Retrofit with an add-on lever extension.	 force	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Adjust the door closers and oil the hinges. <input type="checkbox"/> Install power-assisted or automatic door openers. <input type="checkbox"/> Install lighter doors.	 seconds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Adjust door closer.
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QUESTIONS	POSSIBLE SOLUTIONS
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Priority

2 Access to Goods and Services

Ideally, the layout of the building should allow people with disabilities to obtain materials or services without assistance.

Yes No

Horizontal Circulation (ADAAG 4.3)

Does the accessible entrance provide direct access to the main floor, lobby, or elevator?

Yes No

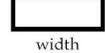
- Add ramps or lifts.
- Make another entrance accessible.

Are all public spaces on an accessible route of travel?

Yes No

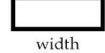
- Provide access to all public spaces along an accessible route of travel.

Is the accessible route to all public spaces at least 36 inches wide?

Yes No


- Move furnishings such as tables, chairs, display racks, vending machines, and counters to make more room.

Is there a 5-foot circle or a T-shaped space for a person using a wheelchair to reverse direction?

Yes No


- Rearrange furnishings, displays, and equipment.

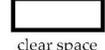
Doors (ADAAG 4.13)

Do doors into public spaces have at least a 32-inch clear opening?

Yes No

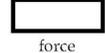

- Install offset (swing-clear) hinges.
- Widen doors.

On the pull side of doors, next to the handle, is there at least 18 inches of clear wall space so that a person using a wheelchair or crutches can get near to open the door?

Yes No


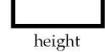
- Reverse the door swing if it is safe to do so.
- Move or remove obstructing partitions.

Can doors be opened without too much force (5 lbf maximum for interior doors)?

Yes No


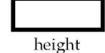
- Adjust or replace closers.
- Install lighter doors.
- Install power-assisted or automatic door openers.

Are door handles 48 inches high or less and operable with a closed fist?

Yes No


- Lower handles.
- Replace inaccessible knobs or latches with lever or loop handles.
- Retrofit with add-on levers.
- Install power-assisted or automatic door openers.

Are all threshold edges 1/4-inch high or less, or if beveled edge, no more than 3/4-inch high?

Yes No


- If there is a threshold greater than 3/4-inch high, remove it or modify it to be a ramp.
- If between 1/4- and 3/4-inch high, add bevels to both sides.

QUESTIONS	POSSIBLE SOLUTIONS
<p>Rooms and Spaces (ADAAG 4.2, 4.4, 4.5)</p> <p> Are all aisles and pathways to materials and services at least 36 inches wide?</p> <p style="text-align: center;">Yes No</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> width </p> <p> Is there a 5-foot circle or T-shaped space for turning a wheelchair completely?</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> width </p> <p>Is carpeting low-pile, tightly woven, and securely attached along edges?</p> <p> In circulation paths through public areas, are all obstacles cane-detectable (located within 27 inches of the floor or higher than 80 inches, or protruding less than 4 inches from the wall)?</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> height/ protrusion </p>	<p><input type="checkbox"/> Rearrange furnishings and fixtures to clear aisles.</p> <p><input type="checkbox"/> Rearrange furnishings to clear more room.</p> <p><input type="checkbox"/> Secure edges on all sides. <input type="checkbox"/> Replace carpeting.</p> <p><input type="checkbox"/> Remove obstacles. <input type="checkbox"/> Install furnishings, planters, or other cane-detectable barriers underneath.</p>
<p>Emergency Egress (ADAAG 4.28)</p> <p>If emergency systems are provided, do they have both flashing lights and audible signals?</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> </p>	<p><input type="checkbox"/> Install visible and audible alarms. <input type="checkbox"/> Provide portable devices.</p>
<p>Signage for Goods and Services (ADAAG 4.30)</p> <p>Different requirements apply to different types of signs.</p> <p> If provided, do signs and room numbers designating permanent rooms and spaces where goods and services are provided comply with the appropriate requirements for such signage?</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> </p> <p style="text-align: center;">Y N</p> <ul style="list-style-type: none"> • Signs mounted with centerline 60 inches from floor. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> height • Mounted on wall adjacent to latch side of door, or as close as possible. <input type="checkbox"/> <input type="checkbox"/> • Raised characters, sized between 5/8 and 2 inches high, with high contrast (for room numbers, rest rooms, exits). <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> character height • Brailled text of the same information. <input type="checkbox"/> <input type="checkbox"/> • If pictogram is used, it must be accompanied by raised characters and braille. <input type="checkbox"/> <input type="checkbox"/> 	<p><input type="checkbox"/> Provide signs that have raised letters, Grade II Braille, and that meet all other requirements for permanent room or space signage. (See ADAAG 4.1.3(16) and 4.30.)</p>

Rooms and Spaces (ADAAG 4.2, 4.4, 4.5)

Are all aisles and pathways to materials and services at least 36 inches wide?

Yes No

width

Is there a 5-foot circle or T-shaped space for turning a wheelchair completely?

width

Is carpeting low-pile, tightly woven, and securely attached along edges?

In circulation paths through public areas, are all obstacles cane-detectable (located within 27 inches of the floor or higher than 80 inches, or protruding less than 4 inches from the wall)?

height/
protrusion

Rearrange furnishings and fixtures to clear aisles.

Rearrange furnishings to clear more room.

Secure edges on all sides.
 Replace carpeting.

Remove obstacles.
 Install furnishings, planters, or other cane-detectable barriers underneath.

Emergency Egress (ADAAG 4.28)

If emergency systems are provided, do they have both flashing lights and audible signals?

Install visible and audible alarms.
 Provide portable devices.

Signage for Goods and Services (ADAAG 4.30)

Different requirements apply to different types of signs.

If provided, do signs and room numbers designating permanent rooms and spaces where goods and services are provided comply with the appropriate requirements for such signage?

Y N

- Signs mounted with centerline 60 inches from floor. height
- Mounted on wall adjacent to latch side of door, or as close as possible.
- Raised characters, sized between 5/8 and 2 inches high, with high contrast (for room numbers, rest rooms, exits). character height
- Brailled text of the same information.
- If pictogram is used, it must be accompanied by raised characters and braille.

Provide signs that have raised letters, Grade II Braille, and that meet all other requirements for permanent room or space signage. (See ADAAG 4.1.3(16) and 4.30.)

QUESTIONS	POSSIBLE SOLUTIONS
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	Yes	No	
<p>Directional and Informational Signage The following questions apply to directional and informational signs that fall under Priority 2.</p>			
<p> If mounted above 80 inches, do they have letters at least 3 inches high, with high contrast, and non-glare finish?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Review requirements and replace signs as needed, meeting the requirements for character size, contrast, and finish.
		<input type="checkbox"/>	
<p>Do directional and informational signs comply with legibility requirements? (Building directories or temporary signs need not comply.)</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Review requirements and replace signs as needed.
<p>Controls (ADAAG 4.27)</p>			
<p> Are all controls that are available for use by the public (including electrical, mechanical, cabinet, game, and self-service controls) located at an accessible height?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Relocate controls.
<p>Reach ranges: The maximum height for a side reach is 54 inches; for a forward reach, 48 inches. The minimum reachable height is 15 inches for a front approach and 9 inches for a side approach.</p>		<input type="checkbox"/>	
<p>Are they operable with a closed fist?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Replace controls.
<p>Seats, Tables, and Counters (ADAAG 4.2, 4.32, 7.2)</p>			
<p> Are the aisles between fixed seating (other than assembly area seating) at least 36 inches wide?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Rearrange chairs or tables to provide 36-inch aisles.
		<input type="checkbox"/>	
<p>Are the spaces for wheelchair seating distributed throughout?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Rearrange tables to allow room for wheelchairs in seating areas throughout the area. <input type="checkbox"/> Remove some fixed seating.
<p> Are the tops of tables or counters between 28 and 34 inches high?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Lower part or all of high surface. <input type="checkbox"/> Provide auxiliary table or counter.
		<input type="checkbox"/>	
<p> Are knee spaces at accessible tables at least 27 inches high, 30 inches wide, and 19 inches deep?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Replace or raise tables.
		<input type="checkbox"/>	

QUESTIONS		POSSIBLE SOLUTIONS
<p>Seats, Tables, and Counters, continued</p> <p> At each type of cashier counter, is there a portion of the main counter that is no more than 36 inches high?</p>	<p>Yes No</p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p> height</p>	<p><input type="checkbox"/> Provide a lower auxiliary counter or folding shelf.</p> <p><input type="checkbox"/> Arrange the counter and surrounding furnishings to create a space to hand items back and forth.</p>
<p> Is there a portion of food-ordering counters that is no more than 36 inches high, or is there space at the side for passing items to customers who have difficulty reaching over a high counter?</p>	<p>Yes No</p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p> height</p>	<p><input type="checkbox"/> Lower section of counter.</p> <p><input type="checkbox"/> Arrange the counter and surrounding furnishings to create a space to pass items.</p>
<p>Vertical Circulation (ADAAG 4.1.3(5), 4.3)</p> <p>Are there ramps, lifts, or elevators to all public levels?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Install ramps or lifts.</p> <p><input type="checkbox"/> Modify a service elevator.</p> <p><input type="checkbox"/> Relocate goods or services to an accessible area.</p>
<p>On each level, if there are stairs between the entrance and /or elevator and essential public areas, is there an accessible alternate route?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Post clear signs directing people along an accessible route to ramps, lifts, or elevators.</p>
<p>Stairs (ADAAG 4.9)</p> <p>The following questions apply to stairs connecting levels <i>not</i> serviced by an elevator, ramp, or lift.</p>		
<p>Do treads have a non-slip surface?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Add non-slip surface to treads.</p>
<p>Do stairs have continuous rails on both sides, with extensions beyond the top and bottom stairs?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Add or replace handrails if possible within existing floor plan.</p>
<p>Elevators (ADAAG 4.10)</p> <p>Are there both visible and verbal or audible door opening/closing and floor indicators (one tone = up, two tones = down)?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Install visible and verbal or audible signals.</p>
<p> Are the call buttons in the hallway no higher than 42 inches?</p>	<p>Yes No</p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p> height</p>	<p><input type="checkbox"/> Lower call buttons.</p> <p><input type="checkbox"/> Provide a permanently attached reach stick.</p>
<p>Do the controls inside the cab have raised and braille lettering?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Install raised lettering and braille next to buttons.</p>

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QUESTIONS	POSSIBLE SOLUTIONS
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	Yes	No	
Elevators, continued			
Is there a sign on both door jambs at every floor identifying the floor in raised and braille letters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Install tactile signs to identify floor numbers, at a height of 60 inches from floor.
If an emergency intercom is provided, is it usable without voice communication?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Modify communication system.
Is the emergency intercom identified by braille and raised letters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Add tactile identification.
Lifts (ADAAG 4.2, 4.11)			
Can the lift be used without assistance? If not, is a call button provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> At each stopping level, post clear instructions for use of the lift. <input type="checkbox"/> Provide a call button.
Is there at least 30 by 48 inches of clear space for a person in a wheelchair to approach to reach the controls and use the lift?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Rearrange furnishings and equipment to clear more space.
Are controls between 15 and 48 inches high (up to 54 inches if a side approach is possible)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Move controls.

Priority

3 Usability of Rest Rooms

When rest rooms are open to the public, they should be accessible to people with disabilities.

Getting to the Rest Rooms (ADAAG 4.1)

If rest rooms are available to the public, is at least one rest room (either one for each sex, or unisex) fully accessible?

- Reconfigure rest room.
- Combine rest rooms to create one unisex accessible rest room.

Are there signs at inaccessible rest rooms that give directions to accessible ones?

- Install accessible signs.

Doorways and Passages (ADAAG 4.2, 4.13, 4.30)

Is there tactile signage identifying rest rooms?

Mount signs on the wall, on the latch side of the door, complying with the requirements for permanent signage. Avoid using ambiguous symbols in place of text to identify rest rooms.

- Add accessible signage, placed to the side of the door, 60 inches to centerline (not on the door itself).

QUESTIONS	POSSIBLE SOLUTIONS
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Doorways and Passages, continued
 Are pictograms or symbols used to identify rest rooms, and, if used, are raised characters and braille included below them?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

- If symbols are used, add supplementary verbal signage with raised characters and braille below pictogram symbol.

MINI Is the doorway at least 32 inches clear?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
clear width	

- Install offset (swing-clear) hinges.
- Widen the doorway.

MINI Are doors equipped with accessible handles (operable with a closed fist), 48 inches high or less?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
height	

- Lower handles.
- Replace knobs or latches with lever or loop handles.
- Add lever extensions.
- Install power-assisted or automatic door openers.

MINI Can doors be opened easily (5 lbf maximum force)?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
force	

- Adjust or replace closers.
- Install lighter doors.
- Install power-assisted or automatic door openers.

MINI Does the entry configuration provide adequate maneuvering space for a person using a wheelchair?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
clear width	

- Rearrange furnishings such as chairs and trash cans.
- Remove inner door if there is a vestibule with two doors.
- Move or remove obstructing partitions.

A person in a wheelchair needs 36 inches of clear width for forward movement, and a 5-foot diameter or T-shaped clear space to make turns. A minimum distance of 48 inches clear of the door swing is needed between the two doors of an entry vestibule.

MINI Is there a 36-inch-wide path to all fixtures?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
width	

- Remove obstructions.

Stalls (ADAAG 4.17)

Is the stall door operable with a closed fist, inside and out?

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

- Replace inaccessible knobs with lever or loop handles.
- Add lever extensions.

MINI Is there a wheelchair-accessible stall that has an area of at least 5 feet by 5 feet, clear of the door swing, OR is there a stall that is less accessible but that provides greater access than a typical stall (either 36 by 69 inches or 48 by 69 inches)?

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	
length/ width	

- Move or remove partitions.
- Reverse the door swing if it is safe to do so.

QUESTIONS	POSSIBLE SOLUTIONS
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<p>Stalls, continued</p> <p>In the accessible stall, are there grab bars behind and on the side wall nearest to the toilet?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>	<p><input type="checkbox"/> Add grab bars.</p>
<p>MINI Is the toilet seat 17 to 19 inches high?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p> <p><input style="width: 50px; height: 15px;" type="text"/></p> <p style="text-align: center; font-size: small;">height</p>	<p><input type="checkbox"/> Add raised seat.</p>

<p>Lavatories (ADAAG 4.19, 4.24)</p> <p>MINI Does one lavatory have a 30-inch-wide by 48-inch-deep clear space in front?</p> <p style="padding-left: 40px;">A maximum of 19 inches of the required depth may be under the lavatory.</p>	<p><input type="checkbox"/> <input type="checkbox"/></p> <p><input style="width: 50px; height: 15px;" type="text"/></p> <p style="text-align: center; font-size: small;">clear space</p>	<p><input type="checkbox"/> Rearrange furnishings.</p> <p><input type="checkbox"/> Replace lavatory.</p> <p><input type="checkbox"/> Remove or alter cabinetry to provide space underneath.</p> <p><input type="checkbox"/> Make sure hot pipes are covered.</p> <p><input type="checkbox"/> Move a partition or wall.</p>
<p>MINI Is the lavatory rim no higher than 34 inches?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p> <p><input style="width: 50px; height: 15px;" type="text"/></p> <p style="text-align: center; font-size: small;">height</p>	<p><input type="checkbox"/> Adjust or replace lavatory.</p>
<p>MINI Is there at least 29 inches from the floor to the bottom of the lavatory apron (excluding pipes)?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p> <p><input style="width: 50px; height: 15px;" type="text"/></p> <p style="text-align: center; font-size: small;">height</p>	<p><input type="checkbox"/> Adjust or replace lavatory.</p>
<p>Can the faucet be operated with one closed fist?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Replace with paddle handles.</p>
<p>Are soap and other dispensers and hand dryers within reach ranges (see page 7) and usable with one closed fist?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> Lower dispensers.</p> <p><input type="checkbox"/> Replace with or provide additional accessible dispensers.</p>
<p>MINI Is the mirror mounted with the bottom edge of the reflecting surface 40 inches high or lower?</p>	<p><input type="checkbox"/> <input type="checkbox"/></p> <p><input style="width: 50px; height: 15px;" type="text"/></p> <p style="text-align: center; font-size: small;">height</p>	<p><input type="checkbox"/> Lower or tilt down the mirror.</p> <p><input type="checkbox"/> Add a larger mirror anywhere in the room.</p>

Priority

4 Additional Access

Note that this priority is for items not required for basic access in the first three priorities.

When amenities such as drinking fountains and public telephones are provided, they should also be accessible to people with disabilities.

Drinking Fountains (ADAAG 4.15)

MINI Is there at least one fountain with clear floor space of at least 30 by 48 inches in front?

Clear more room by rearranging or removing furnishings.

QUESTIONS	POSSIBLE SOLUTIONS
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	Yes	No	
Drinking Fountains, continued			
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F101</div> <div> <p>Is there one fountain with its spout no higher than 36 inches from the ground, and another with a standard height spout (or a single "hi-lo" fountain)?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/> <div style="border: 1px solid black; width: 50px; height: 15px; margin: 5px auto;"></div> <p style="text-align: center; font-size: small;">height</p>		<input type="checkbox"/> Provide cup dispensers for fountains with spouts that are too high. <input type="checkbox"/> Provide accessible cooler.
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F102</div> <div> <p>Are controls mounted on the front or on the side near the front edge, and operable with one closed fist?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Replace the controls.
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F103</div> <div> <p>Is each water fountain cane-detectable (located within 27 inches of the floor or protruding into the circulation space less than 4 inches from the wall)?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/> <div style="border: 1px solid black; width: 50px; height: 15px; margin: 5px auto;"></div> <p style="text-align: center; font-size: small;">height/ protrusion</p>		<input type="checkbox"/> Place a planter or other cane-detectable barrier on each side at floor level.
<hr/>			
Telephones (ADAAG 4.31)			
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F104</div> <div> <p>If pay or public use phones are provided, is there clear floor space of at least 30 by 48 inches in front of at least one?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/> <div style="border: 1px solid black; width: 50px; height: 15px; margin: 5px auto;"></div> <p style="text-align: center; font-size: small;">clear space</p>		<input type="checkbox"/> Move furnishings. <input type="checkbox"/> Replace booth with open station.
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F105</div> <div> <p>Is the highest operable part of the phone no higher than 48 inches (up to 54 inches if a side approach is possible)?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/> <div style="border: 1px solid black; width: 50px; height: 15px; margin: 5px auto;"></div> <p style="text-align: center; font-size: small;">height</p>		<input type="checkbox"/> Lower telephone.
<div style="display: flex; align-items: flex-start;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">F106</div> <div> <p>Does the phone protrude no more than 4 inches into the circulation space?</p> </div> </div>	<input type="checkbox"/> <input type="checkbox"/> <div style="border: 1px solid black; width: 50px; height: 15px; margin: 5px auto;"></div> <p style="text-align: center; font-size: small;">protrusion</p>		<input type="checkbox"/> Place a cane-detectable barrier on each side at floor level.
<p>Does the phone have push-button controls?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Contact phone company to install push-buttons.
<p>Is the phone hearing-aid compatible?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Have phone replaced with a hearing-aid compatible one.
<p>Is the phone adapted with volume control?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Have volume control added.
<p>Is the phone with volume control identified with appropriate signage?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Add signage.
<p>If there are four or more public phones in the building, is one of the phones equipped with a text telephone (TT or TDD)?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Install a text telephone. <input type="checkbox"/> Have a portable TT available. <input type="checkbox"/> Provide a shelf and outlet next to phone.
<p>Is the location of the text telephone identified by accessible signage bearing the International TDD Symbol?</p>	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> Add signage.

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Appendix B | NGO Survey

We are studying accessibility in the Mohammed VI Center for the Disabled. We want to gain an understanding of the difficulties in day to day life for disabled people in Morocco. We will be specifically focusing on any difficulties found in this center's physical facility and their website. We will use information from this survey to write a report that will be published online and to make suggestions to the administration of the Mohammed VI Center for the Disabled.

Any information you provide will be anonymous. We will use numbers and general demographic information to label each survey or interview for filing purposes but will not identify any participants. We will not include your name in our report. We will only include the data collected from this survey in the report. If you do not feel comfortable answering a question, you are not obliged to complete that question.

1. Have you visited the Mohammed the VI Center for the Disabled's website?

- | | |
|----------------------------------|---|
| <input type="checkbox"/> Daily | <input type="checkbox"/> More than once a day |
| <input type="checkbox"/> Weekly | <input type="checkbox"/> More than once a week |
| <input type="checkbox"/> Monthly | <input type="checkbox"/> More than once a month |
| <input type="checkbox"/> Rarely | <input type="checkbox"/> Never |

2. What parts of the website are most helpful and/or useful to you?

3. How easy is it to find information on the Mohammed the VI Center for the Disabled's website compared to other websites?

- Very easy
- Easy
- Neutral
- Difficult
- Very difficult

4. How would you rate the readability of the text on the Mohammed the VI Center for the Disabled's website compared to other websites?

- Very good
- Good
- Neutral
- Poor
- Very Poor

5. How would you rate the color scheme, visuals, and overall aesthetics on the Mohammed the VI Center for the Disabled's website compared to other websites?

- Very good
- Good
- Neutral
- Poor
- Very Poor

6. There are some pages on the websites that are incomplete/blank. Have any of these pages affected your search for information on the site?

- Yes; What information were you searching for and how did this affect your search?

- No

Thank you for taking the time to fill out this survey. If you have any additional suggestions or concerns pertaining to the center's website please feel free to add your thoughts below.

Appendix C | Staff Survey

We are studying accessibility in the Mohammed VI Center for the Disabled. We want to gain an understanding of the difficulties in day to day life for disabled people in Morocco. We will be specifically focusing on any difficulties found in this center's physical facility and their website. We will use information from this survey to write a report that will be published online and to make suggestions to the administration of the Mohammed VI Center for the Disabled.

Any information you provide will be anonymous. We will use numbers and general demographic information to label each survey or interview for filing purposes but will not identify any participants. We will not include your name in our report. We will only include the data collected from this survey in the report. If you do not feel comfortable answering a question, you are not obliged to complete that question.

1. What Pole do you work in?

- Pôle ressources et logistiques
- Pôle médico-social
- Pôle socio-éducatif
- Pôle des sports
- Pôle formation professionnelle
- Bureau social
- Cellule de communication
- CDI
- Other: _____

2. Does your work involve direct interaction with the disabled members of the center?

- Yes
- No

Questions 3-6 are about the accessibility of the Mohammed VI Center for the Disabled.

3. Do you find that the current signage at the center provides helpful information for those who don't know the center?

- Yes
 - No; Why?
-

4. How often do you get asked for directions by disabled members, their family, or visitors?

- Daily
- More than once a day
- Weekly
- More than once a week
- Monthly
- More than once a month
- Rarely
- Never

5. Do you find it easy for the physically disabled members of the center to move between buildings?

- Yes
 - No; What would make the center more accessible?
-

6. Do you have any recommendations to aid the center in navigation?

If you have any other suggestions or concerns pertaining to signage, accessibility, and general navigation feel free to add your thoughts below.

Questions 7-13 are about the Mohammed the VI Center for the Disabled's website.

7. Have you used the Mohammed VI Center for the Disabled's website? If you answer no, you do not have to complete the rest of this survey.

- Yes
- No

8. What information do you look for on the website?

9. Have you had any difficulties using the website?

- Yes
- No

10. What information would be helpful to have on the website?

11. Was the website easily readable?

- Yes
 - No; What made it difficult to read?
-

12. Were the website's qualities (ex. color, format) aesthetically pleasing?

- Yes
 - No; What was wrong with it?
-

13. Would you make any changes to the website? If so what?

Thank you for taking the time to fill out this survey. If you have any other suggestions or concerns pertaining to the Mohammed the IV Center for the Disabled’s website feel free to add your thoughts below.

Appendix D | Staff Focus Group Question Outline

Navigation

- When giving directions, how do you distinguish between buildings?
- What could be added to the center to facilitate navigation?
 - If not mentioned, bring up color coding
 - If not mentioned, how could accessibility for the visually impaired be improved within the center?

Website

- What do you think of the website?
 - Would you change anything about the website given the opportunity?
- What do you see as the role of the website?
- What information would be beneficial to have on the website?
 - Take all users into account: Parents, NGO's, Visitors, and Staff

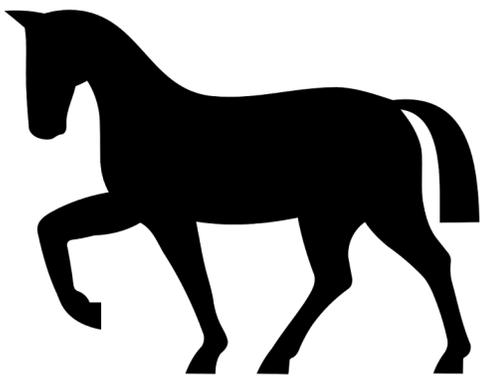
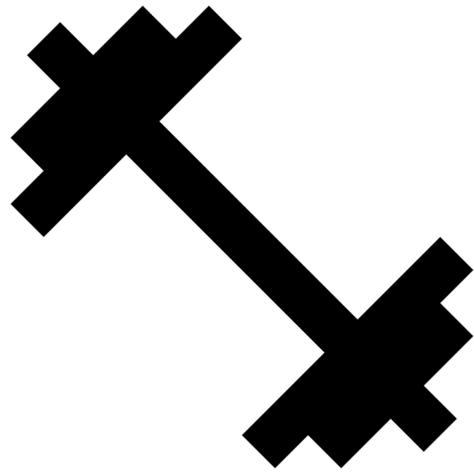
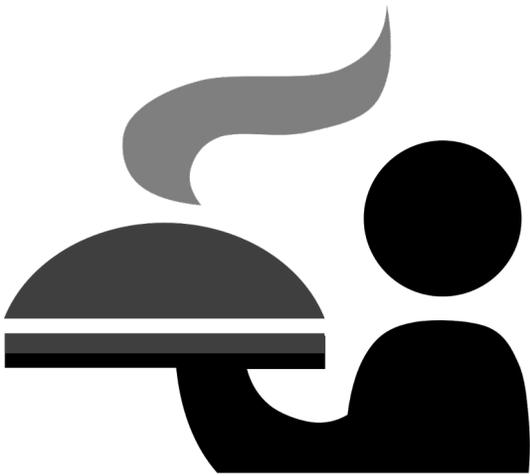
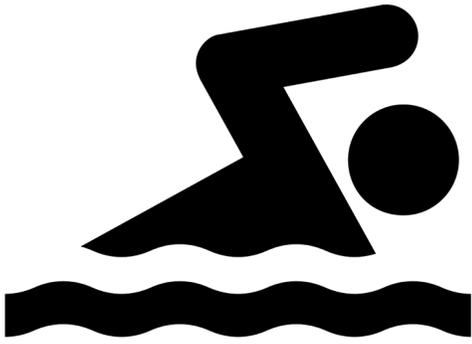
Appendix E | Symbol Interview

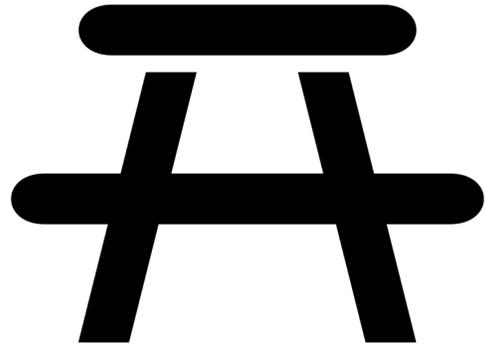
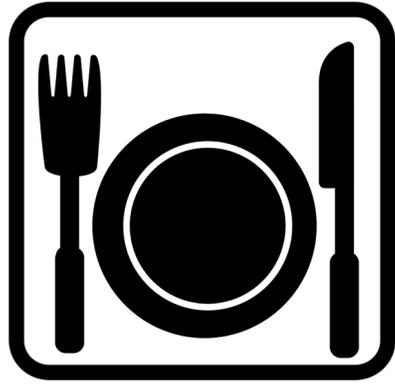
We are studying accessibility in the Mohammed VI Center for the Disabled. We want to gain an understanding of the difficulties in day to day life that are brought upon by disabilities. We will be specifically focusing on any difficulties found in this center's physical facility and their website. We will use information from this interview to write up a report that will be published online and to make suggestions to the administration of the Mohammed VI Center for the Disabled.

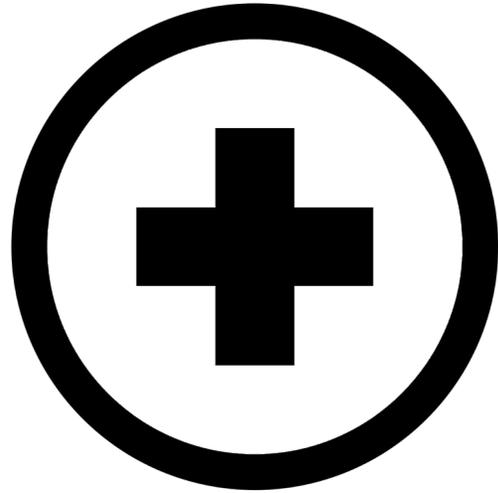
Any information provided by staff, clients, or family of clients of the center in this interview will be anonymous. We will use numbers and general demographic information to label each interview for filing purposes but will not identify interviewees. Your name will not be mentioned in our paper. This study will only include the data collected from this interview. We will be using translators during these interviews, if required. Would you like to participate as an interviewee? May we make an audio recording of this interview?

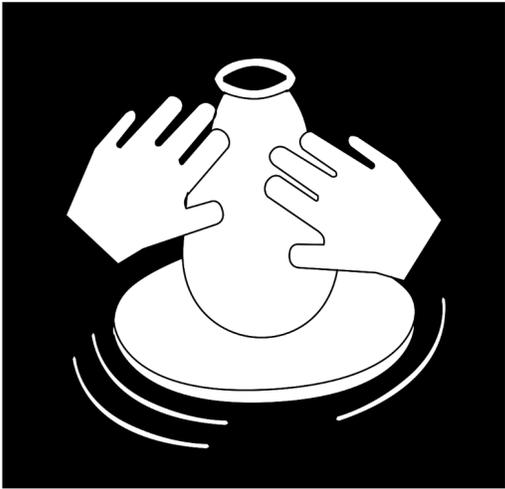
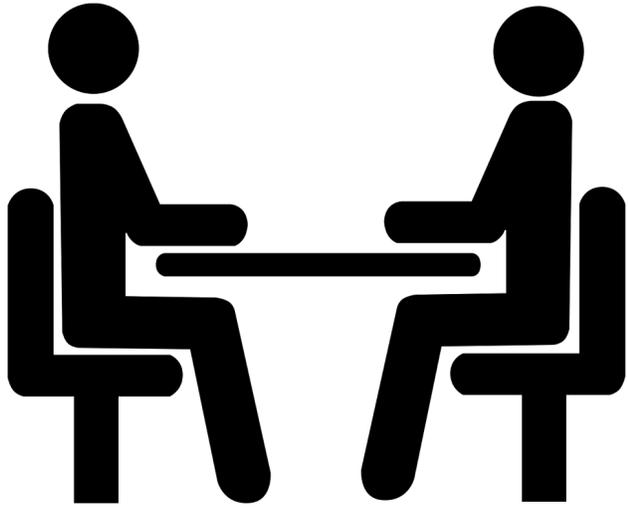
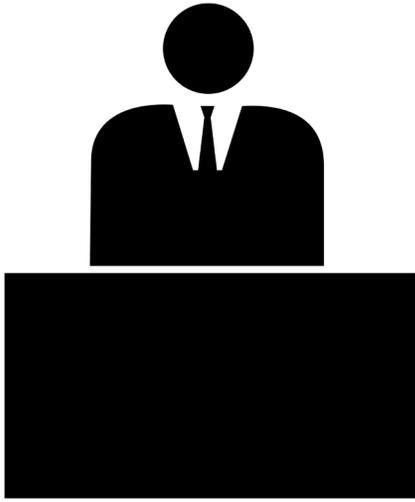
The following images are meant to represent a specific building, room, or area within the center. The interviewer will show each symbol one by one to the interviewee. When being introduced to a new symbol the interviewee should say which building, room, or area within the center they believe it to represent. This is NOT a test to determine the interviewee's skills in deciphering symbols but instead an experiment to determine the quality in which the symbols represent their respective place.

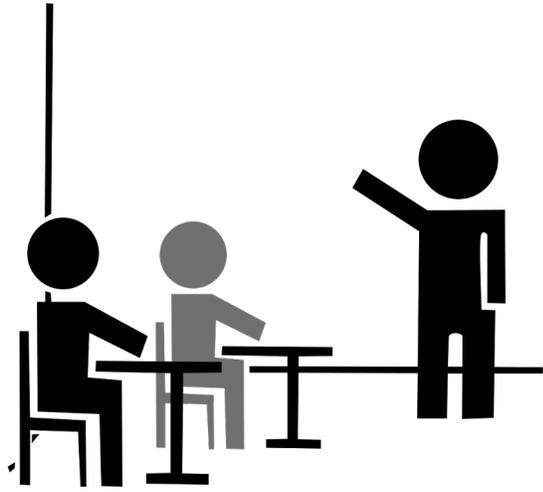
Note: Multiple symbols may intend to represent the same place.

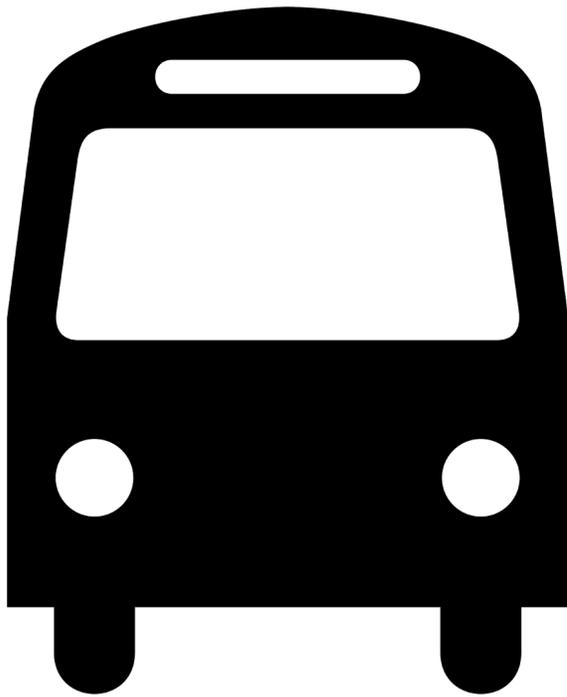
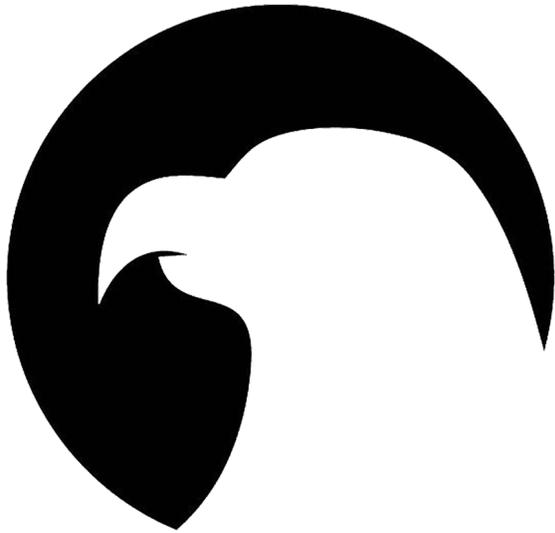


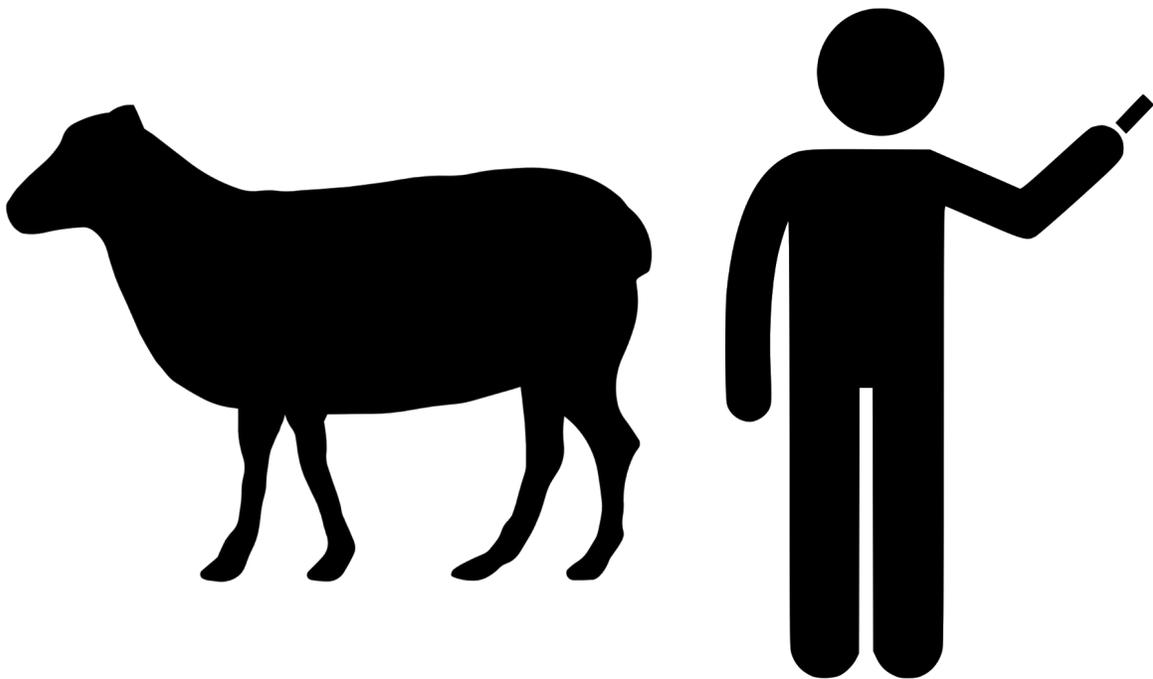
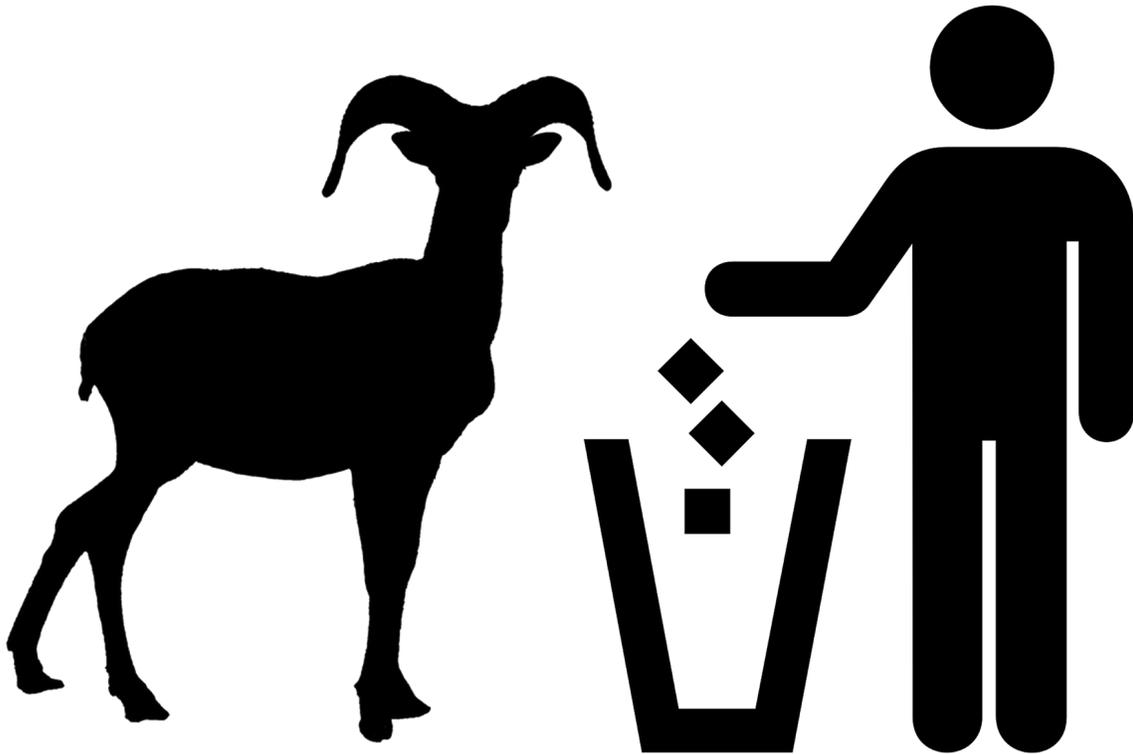












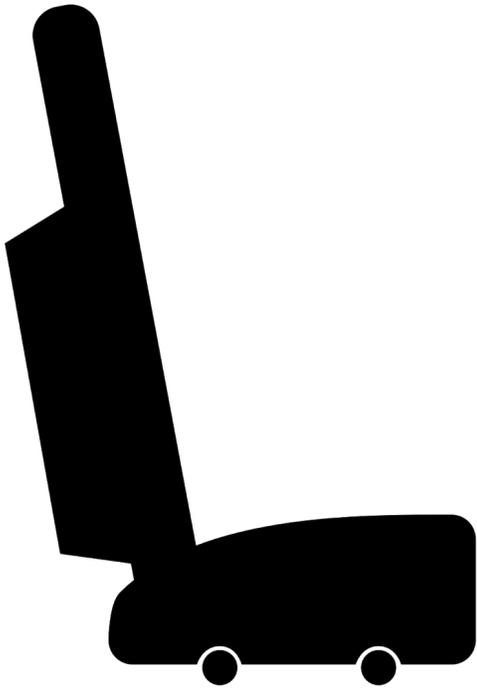
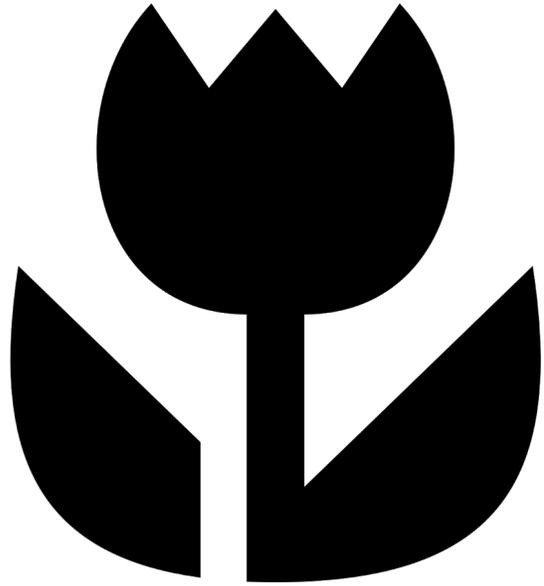




Figure E.1.-E.39. Symbols used for symbol interview (read left to right)

Appendix F | Text and Color Interview

We are studying accessibility in the Mohammed VI Center for the Disabled. We want to gain an understanding of the difficulties in day to day life that are brought upon by disabilities. We will be specifically focusing on any difficulties found in this center's physical facility and their website. We will use information from this interview to write up a report that will be published online and to make suggestions to the administration of the Mohammed VI Center for the Disabled.

Any information provided by staff, clients, or family of clients of the center in this interview will be anonymous. We will use numbers and general demographic information to label each interview for filing purposes but will not identify interviewees. Your name will not be mentioned in our paper. This study will only include the data collected from this interview. We will be using translators during these interviews, if required. Would you like to participate as an interviewee? May we make an audio recording of this interview?

The following passages and questions are being used to test readability of various different fonts and text sizes. This is NOT a test of a person's intelligence or memorization skills. The reader will be timed in order to search for common patterns between text variation and reading time. The reader should not feel pressured to rush, and should read at their own pace. Once the reader is done reading the passage they should let the interviewer know, so they can end the timer and begin asking questions.

(All questions will only be visible to the interviewer)

A.

Joe and Amy just arrived in Fes. They heard that the medina in Fes is very large and has lots of nice gifts for sale. Joe wants to buy his mother a tea kettle for her birthday. Amy doesn't like tea and instead wants to buy herself a pair of shoes. In the medina the two friends meet a girl named Imane. Imane takes them to where they can buy these items.

1. What was one of the names of the two friends?
2. What doesn't Amy like?
3. What does Imane do after the two meet her?
4. Did you find this passage challenging to read? What made it difficult? If not, what made it easy?

B.

After the two buy their gifts, Imane asks if they would like to go to a cafe. Imane takes them to her favorite cafe, Cafe Clock. The group orders tea and tajine. Joe orders the tajine with chicken and Amy orders the tajine with beef. Joe asks Imane if she works in the medina. She explains that she makes blankets and carpets with her mother and grandmother.

1. What was the name of the cafe the group went to?
2. What type of tajine did Joe order?
3. What is one of the items Imane makes with her family?
4. Did you find this passage challenging to read? What made it difficult? If not what made it easy

C.

After lunch the group walks around Fes. First the group visits a Mosque. Afterward they visit the tannery, Amy likes a bag with blue stripes on it. Joe doesn't like the smell the leather so he asks if they can go meet Imane's family. Imane takes them to her house where they meet Imane's grandparents. Imane's grandfather asks where the friends are from. They tell him they are from New York.

1. Where does the group go to first?
2. What color are the stripes of the bag Imane likes?
3. Where are the friends from?
4. Did you find this passage challenging to read? What made it difficult? If not, what made it easy?

Appendix G | Coding for Staff Survey

Question #3: Do you find that the current signage at the center provides helpful information for those who don't know the center?

Concepts
Lack of signage
Illiterate
Inefficient
Distance between poles

Survey Number	Response
1	Yes
2	No; For those who do not know the center, it is difficult to navigate.
3	No; Lack of signage.
4	
5	No; Lack of signage; Long journey between poles.
6	No
7	No; Lack of panels of signalization; The current signs are inefficient.
8	No; Absence of a sign with arrows showing the different doors at the entrance of the center.
9	No; The offices are scattered and certain locations look similar.
10	No; Parents are illiterate.
11	Yes
12	Yes
13	No
14	No; The signage is not everywhere.
15	No; It's inefficient for people who are illiterate
16	No; It's inefficient.
17	Yes
18	Yes
19	Yes
20	No; It is necessary to put more signage.
21	No; Lack of panels of signalization.

Question #5: Do you find it easy for the physically disabled members of the center to move between buildings?

Concepts
Distance between poles
Accessibility
Safety precautions/ something is dangerous

Survey Number	Response
1	Yes
2	Yes
3	Yes
4	Yes
5	No; Long journey between poles.
6	
7	No; Build access to different poles and services.
8	No; Panel showing the path that a person in a wheelchair can follow to access the different poles.
9	Yes; But sometimes the service request is not near the main reception.
10	No; Some doors are small and paths are dangerous for people in wheelchairs can lose their balance.
11	No; Installation of railings.
12	Yes
13	No
14	Yes
15	No; The ground is not easy for the accessibility of wheelchairs.
16	Yes
17	Yes
18	Yes
19	
20	Yes
21	Yes

Question #6: Do you have any recommendations to aid the center in navigation?

Concept
Add signage

Survey Number	Response
1	
2	
3	Provides adequate mobility for the mobility of persons with motor disabilities.
4	
5	
6	
7	
8	Sign at the entrance of the center showing with arrows the different poles and a sign in each pole with arrows showing the different services at each pole.
9	Group the services, have a reception and administration service at the gate of the center, take inspiration from one-stop shop.
10	
11	The mosaic in the aisles.
12	
13	You must add more features.
14	
15	
16	
17	No
18	
19	
20	
21	Panels of signalization with a design that is suitable for visitors.

Open Response Question: If you have any other suggestions or concerns pertaining to signage, accessibility, and general navigation feel free to add your thoughts below.

Concepts
New signage
Signage for the illiterate

Survey Number	Response
1	
2	
3	
4	
5	
6	
7	
8	
9	To have a reception service. To structure the reception of the medico-social pole (reception and information office & consulting office & archive & photocopy) in case of problem contact a single person who can take care of it.
10	Adapt signage to be visible and understandable.
11	
12	
13	
14	I suggest to put more panels of signalization, mostly panels suitable for people who are illiterate.
15	Signs in the form of pictograms and images.
16	
17	
18	
19	
20	
21	

Question #8: What information do you look for on the website?

Concepts
Activities/events
Information about the center

Survey Number	Response
1	The events and activities of the center.
2	The activities and events linked to the handicapped.
3	
4	
5	The activities
6	
7	News and activities about the center.
8	Organization information.
9	
10	
11	The activities, the services, the presentations, and the archive of conferences.
12	Before going to the job interview, I wanted to learn about the different activities at the center
13	Activities and the information.
14	Activities, personnel of the center, and description of the poles.
15	
16	Objective, mission, and history of CNMH
17	
18	
19	
20	
21	New reco.

Question #10: What information would be helpful to have on the website?

Concepts
Information about disabilities
Information about the center
Update website

Survey Number	Response
1	All the information concerning the handicapped.
2	The field of disability in general.
3	
4	
5	All information on the services of the center.
6	
7	It is necessary to update and energize the site to avoid stagnation in general.
8	
9	
10	
11	The activities, the services, the presentations, and the archive of conferences.
12	It must be updated (a site must often be updated).
13	New information and activities.
14	Documentation on the projects of the center.
15	
16	
17	
18	
19	
20	
21	The activities, the activities of the center and the poles.

Question #13: Would you make any changes to the website? If so what?

Concept
Design

Survey Number	Response
1	
2	
3	
4	
5	
6	
7	Beautiful design and more information on activities for medical and social poles.
8	
9	
10	
11	Design the headings so they are more dynamic.
12	
13	
14	Make the colors welcoming, enrich the design of the services on the center.
15	
16	
17	
18	
19	
20	
21	

Appendix H | Coding for NGO Survey

Question #2: What parts of the website are most helpful and/or useful to you?

Concepts
Activities
News

Survey Number	Response
1	
2	
3	
4	
5	
6	Means of transport in the center
7	
8	
9	Activities
10	Activities
11	Activities
12	Activities
13	Activities
14	News
15	News

Open Response Question: If you have any additional suggestions or concerns pertaining to the center’s website please feel free to add your thoughts below.

Concepts
Language options
Information about the center
Information about NGOs
Website access/ navigation
Add photos

Survey Number	Response
1	
2	
3	
4	
5	
6	
7	
8	Facilitate the navigation of the website.
9	Site in Arabic. Simple access for the disabled. More pictures. Simplified computer course for children with disabilities.
10	Colors dark; Action plan of CNMH. Process of selection and criteria for CIAT.
11	Action plan of CNMH. Clarification on future projects.
12	Forum suggestion box.
13	Have options for the website to be in Arabic or Darija
14	Add photos of the association, partners, and the members. Classify the associations and intervention planning.
15	Add photos of associations, partners, and their number of completed activities. Publish the work schedule of the associations of CNMH. Classify associations according to their area of use.

Appendix I | Coding for Text & Font Interviews

Question: Did you find this passage challenging to read? What made it difficult? If not, what made it easy?

Comments based on:	People who Found it Easy to Read or Satisfactory	People who Found it Difficult to Read or Dissatisfactory
Sentence structure/ grammar/ content		
font		
text size		
general		

Interviewee	Arial
1	Easy to read
2	Easy, short sentences. Slightly difficult with many characters.
3	Easy - simplistic sentences, lack of advanced vocab
4	Not difficult, clear font, not fancy
5	Not difficult - simple sentences, repetition
6	Little small but easy to read
7	No difficulty; they were short sentences
8	Not difficult because of the way it was worded
9	Not difficult; sentences were not complex
10	Not difficult; the sentences were simple
11	The font was small, had to lean in
12	clear short sentences, pretty easy
13	not difficult. One idea in each sentence
14	pretty straight forward. easy words
15	It was fine
16	small, spaces between lines bigger paragraphs will be difficult to read
17	easy to read, short sentences, story line
18	slightly difficult to read. many names, similar sentence structures, many items, small text
19	easy to read. sentences were short, no long complicated words
20	text too small, font size small. spend lots of time focusing on text. sentence structure was fine

Interviewee	Comfortaa
1	Not hard
2	Listing made it harder, continuation made it easier
3	same (easy)
4	Didn't like that it was a bubbly font and ran together, but it was nice that it was bigger
5	Not difficult, normal/easy
6	Easier, don't like the font, good size
7	Not difficult; the sentences were short
8	Not difficult because of the words used
9	It was a bigger font size which she liked, but the font ran together and the letters looked similar
10	Not difficult; The sentences were simple and it was easier because the font was bigger than the last passage
11	It was bigger and easier to read. Didn't have to stress
12	Font was bigger and the shape was more appealing
13	was difficult because there were multiple parts in each sentence
14	easy, straight forward
15	the font and size was larger and spread out which I did not like
16	bigger but easier to read. font is curvy and easier to read
17	fact based, choppy but clear
18	easy to read because it's similar to first story. knows names. font is good.
19	easy, text was larger made it easier. sentences were short and simple words
20	not difficult, font easy to look at. text was large. combination made it easy on the eyes
Interviewee	Times New Roman
1	No (not difficult)
2	Not challenging, explanation of why things happened in the passage made them easier to remember
3	same (easy)
4	easier- space between letters/words, didn't get lost in the text
5	Difficult - details
6	Favorite passage font & size wise, easiest to read
7	Not difficult; Likes the font because it's her usual font, Times New Roman
8	Not difficult because of the words used
9	It was present tense and the others were in past which made it confusing but the font was good.
10	Not difficult because it was the easiest one to read because this font was the least harsh on the eyes
11	Sort of difficult. Lot's of statements, hard to understand each one
12	Harder and longer sentences. could have stopped earlier.
13	easy because sentences involved cause & effect
14	easiest of the three. standard font and larger size
15	easier to read than the second one
16	sentences were short, different topic sentences made it difficult to remember story
17	grammar issue "afterwords" fine
18	generally easy, to many details
19	more challenging because the grammar was "whack". run on sentence
20	similar to 2. text was easy to read and follow. difficult to memorize facts. short sentences with lots of detail.