

Wheelchair Nation -- An online product list designed to raise awareness of product availability, performance, and quality in less resourced settings.

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BACKGROUND

There is a growing disparity between number of wheelchairs distributed and number needed by a country around the world. Less-resourced countries are facing a crisis that needs to have attention brought to it. For example, based on current estimates, in China over 13.5 Million wheelchairs are needed and less than 400,000 have been distributed. This means that over 13 million are in desperate need of a wheelchair. This problem is not limited to China alone. In India over 12 million are without wheelchairs and Mexico over 1 Million need a wheelchair. The situation is similar around the globe—in all less resourced countries. One of the major barriers to receiving wheelchairs is lack of information about the about what options are available for reliable use.

PROBLEM STATEMENT

The extreme need for wheelchairs is due to several problems, one being that these countries have less resources than other areas of the world. But another problem is a lack of awareness. In many of these areas, prescribers have only one chair available for adults and one available for children. These chairs could be inappropriate to the user's needs, but if it is the only option it is what they need to use. Some are too heavy to get up slopes near their homes, some cannot be transported easily, and some do not work on the terrain that the user has to travel over, but they cannot do anything to receive a better option because they are unaware that there are more chairs than the one they were given. To address this problem, providers and users must have information to be able to choose a chair that is available in the area, suits their needs, and they can afford.

Consumers are becoming increasingly reliant on online tools to do comparison shopping. One of the most popular tools for shopping online is amazon.com (<http://www.amazon.com/>). Consumers use this tool to become informed about quality and pricing before making decisions on purchases. Online shopping tools like this encourage competition which can drive prices down and quality up. This is the direction in which the wheelchair sector needs to be pushed. Wheelchair users need their products to function and be affordable for them to be able to live their lives. This requires an unbiased catalog to act as a platform for feedback to be developed. There is a great need for a catalog, much like Amazon, for wheelchairs in order for all people involved in wheelchair provision to make informed decisions and comparison shop before committing to the wrong chair.

METHODS AND DEVELOPMENT

To effectively fix this large issue in the world, the students in the International Society of Wheelchair Professionals (ISWP) decided to design a wheelchair product list that will provide many chairs available in all regions of the world, as well as who the chairs are intended for and where they will be most effective. The website should be easy to use for any person regardless of

familiarity with computers. It should also have the most important information available quickly upon arrival at the site. With all of this crucial information in one place, it is the hope of the ISWP student group that individuals will be able to make much more educated decisions on wheelchairs before they accept a chair that will ultimately not suit their needs and lead to abandonment of the item or breakdowns. The general data flow would hopefully work as shown in Figure 1.

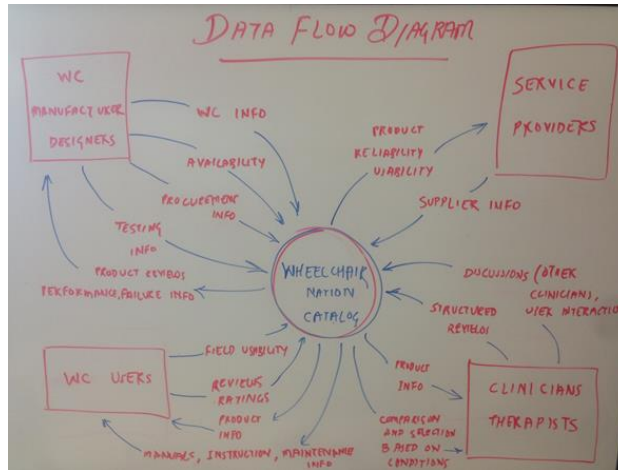


Figure 1: Data Flow Between Users of Wheelchair Nation

Different stakeholders in the wheelchair sector including users will play different roles in this process. Wheelchair users will be receiving information about different wheelchairs for comparison and selection while providing feedback about chairs that they have used. Manufactures and designers will receive information about the safety and reliability of the product when used in the field and hopefully use this information to improve their product. Clinicians will use their knowledge to answer questions and provide information about product features while learning which chairs users find to be working well. Service providers can also use this catalog to understand whether the product they buy is suitable for use in the field or not.

The design should be a basic catalog. The products provided will appear on the home screen and the user will be able to filter them according to their own personal needs. The information should be easy to access and see regardless of internet connection or location. The wireframe for the catalog was designed as shown in the sketch in Figure 2.

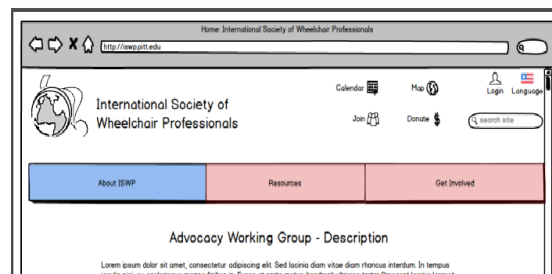


Figure 2: Original Layout Idea

A prototype catalog (Figure 3) was designed by the students to receive peer feedback on the catalog functionality, format and content. The prototype is available at <http://wheelchairnation.drupalgardens.com/>.

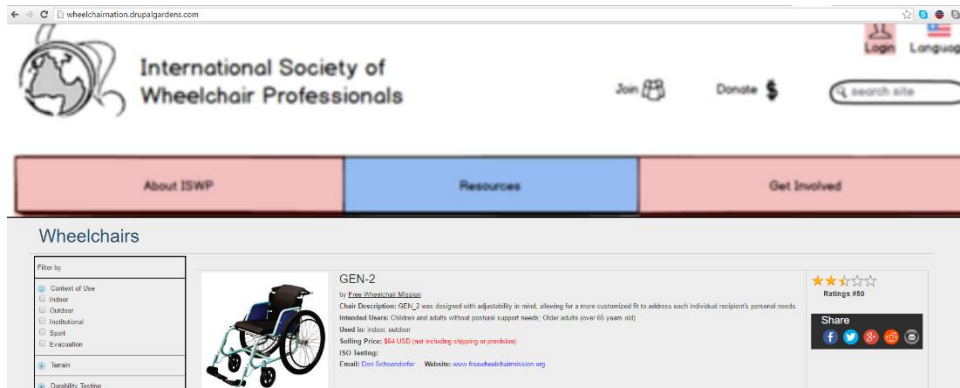


Figure 3: Drupal Garden Prototype

Adjusting to a new design for the logo and a new color scheme, the final product and layout was as shown in Figure 4:

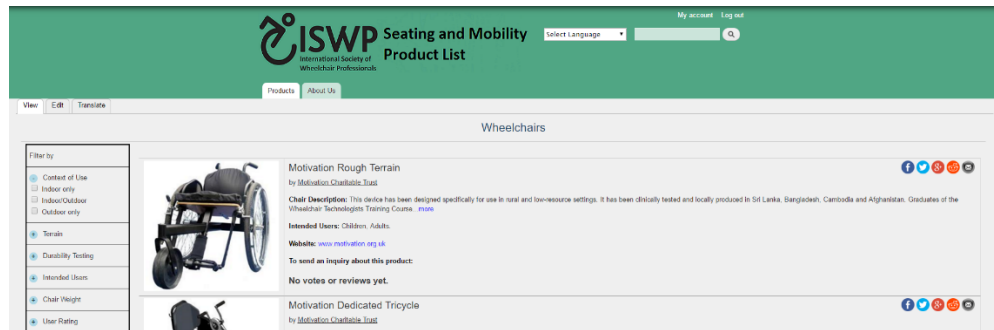


Figure 4: Catalog Design

The chairs can be filtered by various options that should help people choose the options that best suits the environment that they are in. They can see everything of important at first glance at the catalog. They can see how the chair has been ranked by other users and they can see basic information about them. An important aspect of the catalog is that it can be used all over the world. Filters for which country the chair is provided in will soon be available. The language of the page can be changed according to what the user is most comfortable with using the drop down menu on the top of the page, as shown in Figure 5.



Figure 5: Language Ability

Users all over the world will be able to use this website to make decisions on which wheelchair is best for them, and the only way they can fully understand the information provided is if it is in their own language. The website can be translated into 46 languages in the hope that most people can find their native language. Other important aspects of this website were to help people all over the world discuss their problems with the chairs and perhaps prevent others from purchasing a chair that doesn't function in their environment. This is where our functionality for providing chair reviews, shown below in Figure 6, becomes important.

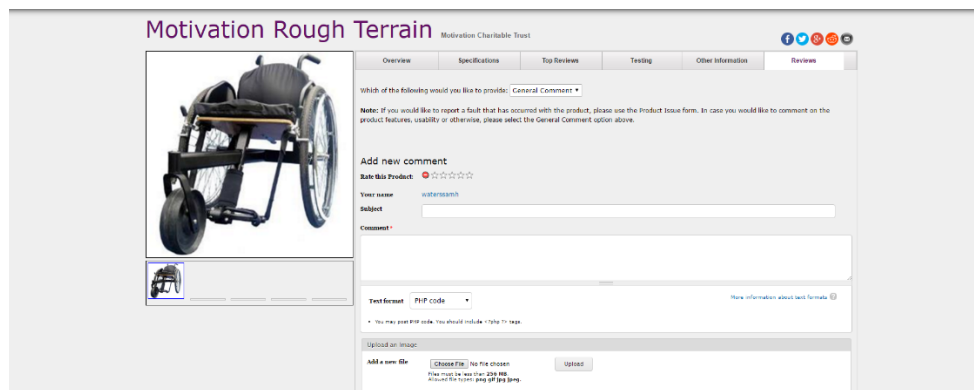


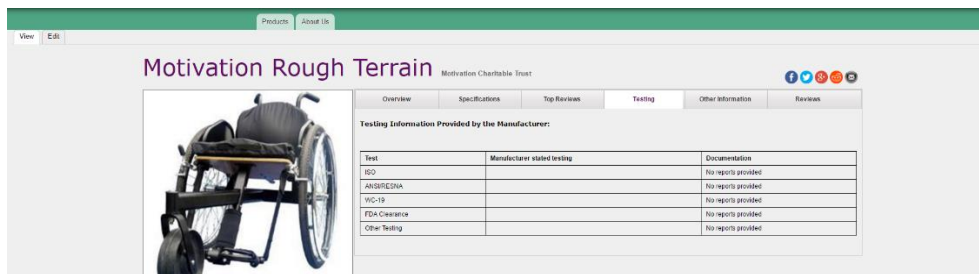
Figure 6: Chair Reviews and Comments

This area could become a place where people can easily ask their own questions or see if other people have the same questions as them in regards to their wheelchair. Each comment will be reviewed by the site admin before it is posted. If it contains negative feedback, the manufacturer will receive notification and has 48 hours to state their opinion on whether it should be posted or not. In this same area, users who already own the chair may report any product failures or issues that they have encountered.

If a user currently owns this wheelchair and it has stopped working or is causing them issues, they can fill out a detailed form so manufacturers can see exactly what sort of issues their chair has. This could inform design and be used to improve the quality of wheelchairs.

One of the most important aspects of this website is that there is a section where manufacturers state the testing that has been done and provide product reports for users to view. This aspect is unique to this site and has been substantial concern in the past with wheelchairs. We strongly

encourage these tests to be uploaded and have an entire tab on the product page dedicated to this information as shown in Figure 7 to convey the validity and reliability of the product.



This final product is currently being hosted at <http://iswpcatalogjrtrcziokw.devcloud.acquia-sites.com/>.

RESULTS AND FEEDBACK

Even in this early stage of development, users and clinicians were able to see the value in our product. They were excited to learn about the chairs offered in their region and surprised at the options that they had. Users did mention, however, that they would like to see more chairs offered in their region, which will come with the growth of the catalog. Clinicians also provided favorable feedback about the website. Some of their suggestions have already been incorporated, such as a place for users to ask questions specifically for them. Some concerns that manufacturers have, however, is that people will provide negative feedback about their chairs. But this will serve to provide accurate details about a chair and can perhaps be used by manufacturers to improve their products. Of the manufacturers we contacted, all 7 were interested and 5 provided extensive feedback.

The website has just been launched from a local server to a public website. This technology, using Drupal and Acquia Cloud Development allows us to make local changes without affecting the public website. This means that users would never see the site being down for maintenance when they need information. Furthermore, Google Analytics have been added to keep track of user traffic on the website. We hope to use this information to cater the website to the needs of our users.

DISCUSSION AND CONCLUSIONS

Users who have used the catalog have given positive feedback and great ideas for updates and ways to grow the site. Because of these positive reviews, the catalog seems to be a viable solution to the global problem of prescriptions without proper assessment of a user's particular needs.

An important aspect of this project is that it would be free to implement. The website is already online and available for people to use without any money being spent. To get a more concise URL that is more descriptive of the website and easier for user's to type would cost some money for maintenance and control over the domain. For this we could seek funding from donors or we could advertise on the site. Hopefully, this catalog would bring awareness to the lack of

wheelchair supplies in parts of the country and could actually be used to raise money for these causes in the future.

It is our hope that in the future, this catalog will be of great assistance to wheelchair providers, manufacturers, and most importantly users. The catalog should be a place where individuals can learn about their options and ask important questions to clinicians and other users. Clinicians can use this to reach out to more patients to educate them and to educate themselves about chairs that they could be providing to their patients. And finally, manufacturers can use this website to see what problems people have encountered with their product and work to make it better in the future. Everyone involved in the wheelchair community can take part and benefit from this project which will lead to a closer global community working together to solve major issues facing users.

Future Work

We hope that this list will be used for the purpose of research. The ability to fill out comments and reviews and the ratings on the chairs will provide interesting feedback for how different locations and conditions affect wheelchairs. This could be used to see why chairs fail, how much time it takes for chairs to fail, and what standards should be in place around the world to ensure that wheelchairs are effective for every user. We plan to provide SMS feedback functionality to encourage reviews.

Moving forward, we will work to encourage others to add their wheelchairs and other mobility products such as cushions and other wheelchair accessories to our list. It is our hope that the list will continue to grow and offer solutions for individuals around the world. To achieve this goal, we hope to come up with marketing ideas to promote this product and create an extensive list.

A shortcoming of this type of solution to these problems, is the differences in bandwidth experienced across the globe. Some areas will have an extremely slow connection and may be less likely to use this resource because of that.

This catalog will also be modified to suit the needs of all people. To do this will be have to accommodate braille interface for this technology for those with vision impairments. One could also add speech to text and eye gaze software for people with motor impairments who are not in a position to access via keyboard and mouse.

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