



TEXAS A&M
UNIVERSITY *at* QATAR

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Customer Needs Assignment

Project Title:

Gesture Guide

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Introduction

The purpose of this report is to help different members of the Qatari community and medical professionals for physical disabilities in different areas such as (hospitals, medical centers and associations) or these results to enhance the design, components and functions and make life as comfortable as possible based on the needs and requirements of the Qatari physical disabilities category collaboratively to help them live their lives normally. When our community is attracted to our projects, we ensure that governments and private groups and groups of individuals are attracted to invest their money to promote our projects that care about helping the disabled category in cooperation to help them live a normal life. It's a good idea. Therefore, in addition to the questionnaires necessary to conduct surveys, we used a list of written interview questions for experts in this field, especially to understand the opinions of communities living in this category and the opinions of society in general, and to use the results to help achieve our goals. The expert opinion is no less important to our research than the Qatari community poll because it has the necessary experience to guide us towards creating an ideal product that is inexpensive, durable, effective and meets the needs of the category of physical disabilities.

Methods

Online Survey:

The methods used were online survey questions sent to the public and interview questions asked to experts. To identify the needs of the mobility impaired population, an online survey was created. To reach the largest possible number of community members, this survey was written in English. When the respondent launches the Qualtrics page created, they are asked to

answer the questions presented to them. In this survey, we wanted to know the identity of the respondents as information such as age group, and gender. All the questions were intentionally made easy to solve so that everyone can participate and based on this data we can study their needs to satisfy them. Questions were asked about the respondents' knowledge of assistive technology that is used for people with disabilities. In addition, there are more detailed questions related to disability cases as the main focus of our project revolves around them because they are considered one of the most influential factors affecting a person's life to live normally and we intend to change that.

Expert Interview:

The second method used was to interview medical and therapeutic experts. In this case, we were able to reach out to several doctors to get their opinion on questions that would help us determine what could be done to enhance our project's capabilities. The opinion of the doctor is as important as the opinion of the public, if not more so. This is because the public will tell you what they want, but the doctor will guide you on the methods you should use to give the public what they want. Therefore, the opinion of the public and the doctors will be combined to achieve the best possible results. The opinion of the doctors was consulted on methods of asking more detailed questions that are directly related to our project, similar products used and how they affect it. Such an opinion cannot be obtained from the general public because they do not gain sufficient knowledge regarding the subject, unlike the experts. Four technical questions were carefully thought out and written for the expert to use his answers to achieve the best results.

Customer need analysis:

Online Survey:

The online survey consisted of 10 different questions. All participants were required to answer 10 of the questions and the form could not be submitted without completing them. One question depends on the answer to another question, so only people who put a certain answer to this question should answer the next question as well, and others were not asked to do so. All these questions were written in English and printed in separate sections (using the same link) in Qualtrics to be attractive to the respondents. After creating the form, the survey link was distributed by all members using the different social media platforms available to us for use. We mainly used WhatsApp, Snapchat and Instagram to share the form link with the public.

The questionnaires were distributed to:

- University of Texas students
- Al Noor Center for the Blind
- MS Association
- Al Shafallah
- Family members, relatives, friends and classmates

To complete the survey and contribute to sharing the link to reach the largest number of people to get their results.

Q1 - What is your gender?

195 Responses

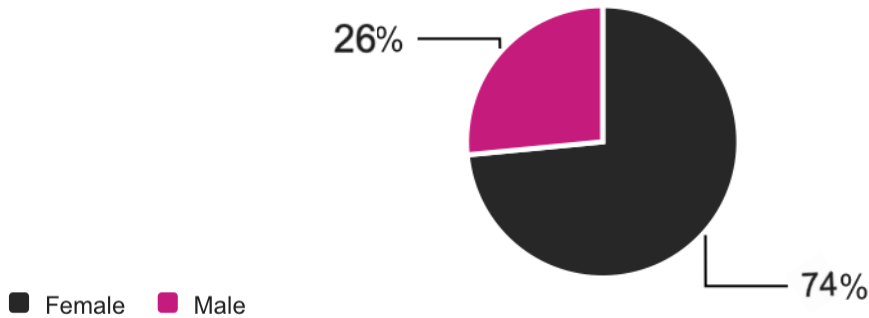


Figure 1: shows the gender of the participant.

The survey was conducted and showed that the total number of those who answered the first question, which was to survey the person's gender and included the choice between male or female to determine the nature of the number of participants from females and males, 195 people answered this question, with a percentage of 26% males and 74% females. This means that the female element responded more than the males and their great interest in conducting this survey to help us collect the largest possible sample.

Q2 - What is your age?

199 Responses

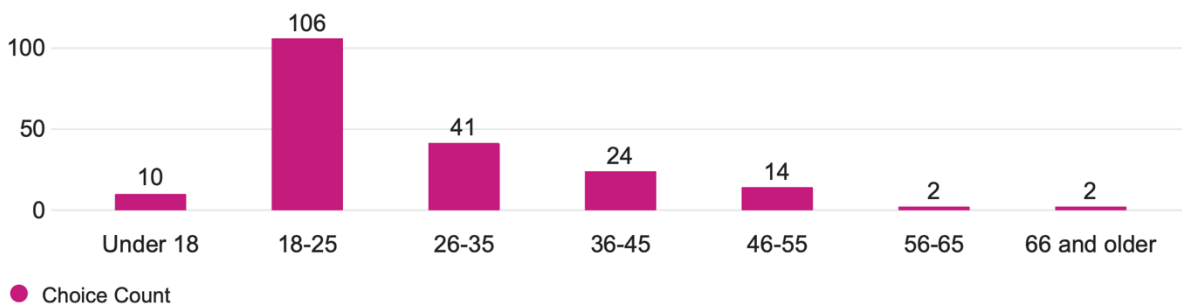


Figure 2: shows the age range of the participant.

The second question in the questionnaire asked about the age of each participant in the questionnaire. We identified a group of age groups with an average age period of approximately 10 years for each age group. The results showed that the largest group of participants in this question is the age group ranging from 18 to 25 years with 106 participants in the questionnaire, followed by 41 participants in the questionnaire whose ages ranged from 26 to 35 years. This age group is considered one of the most effective groups in dealing with people with disabilities.

Q3 - Do you know anyone who is disabled?

196 Responses

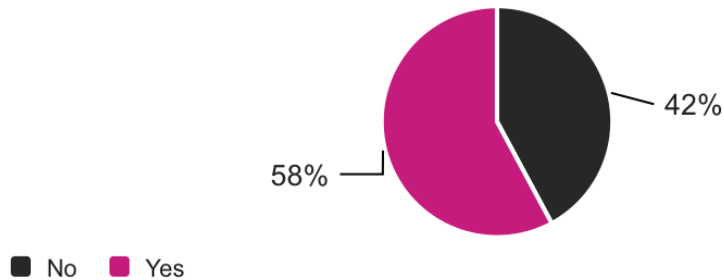


Figure 3: shows if the participant is connected to someone disabled.

The third question in the questionnaire addressed the participant's knowledge of having a person with a disability with whom he/she deals in general or in particular, such as family, relatives, friends, and work colleagues. The answer was yes or no. We gathered from the questionnaire results that 58% of the participants know people with disabilities and 42% do not know people with disabilities. We conclude that most of us know people with disabilities.

Q4 - Do you have a nurse or caregiver?

199 Responses

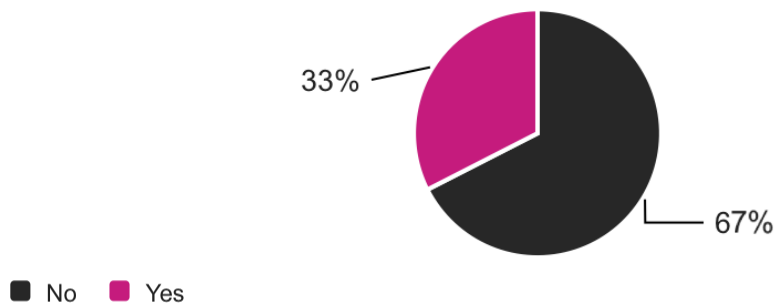


Figure 4: shows if the participant has a caregiver.

In the fourth question, we talked about the cases of people with disabilities by asking them about the availability of a caregiver or a nurse to help them spend their daily lives normally. Since we are talking in the questionnaire about society as a whole and not a specific category, the percentage of "no" answers was 67% and the "yes" answer was 33%. We conclude from the results of this question that two-thirds of society in general does not have a personal assistant to spend their daily lives normally.

Q5 - Would you like to see an invention to help replace some tasks done by nurses?

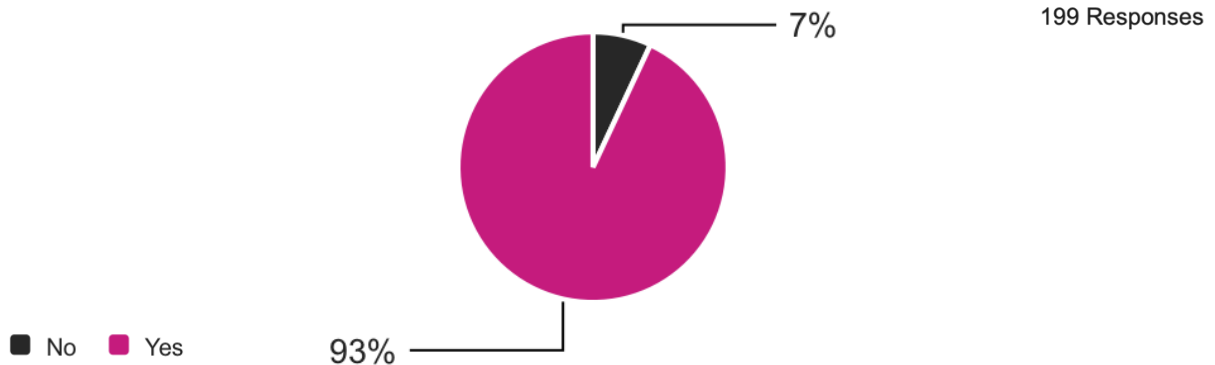


Figure 5: shows if the participants are open to see new inventions.

The fifth question was to show whether the participants were open to seeing new inventions that would benefit people with disabilities in particular and our Qatari society in general. The choices included a yes or no answer. “Yes” was chosen by a very large percentage, reaching 93%, and the results of those who do not prefer to see new inventions were only 7%.

Q6 - Which kind of disability do you think our device would be helpful for?

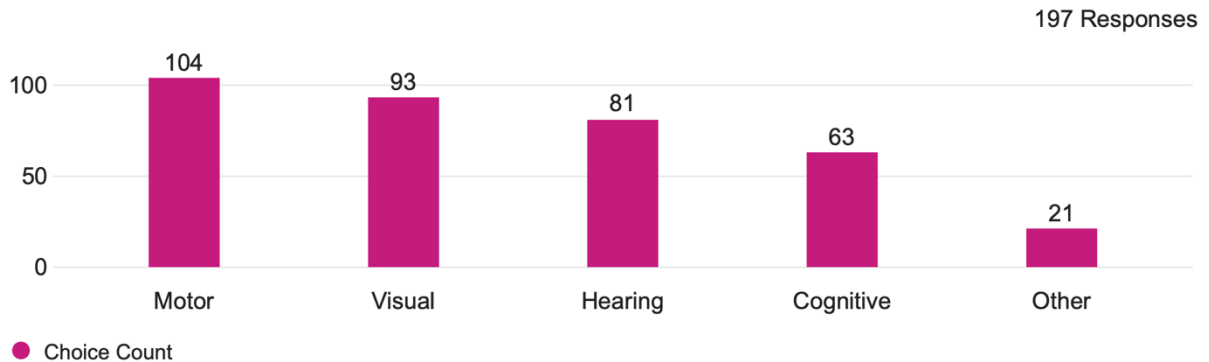


Figure 6: shows the opinion of the participants on which targeted disabled people we are aiming for.

The sixth question in the questionnaire asked participants about their opinion about the targeted persons with disabilities we are targeting. The choices included motor, hearing, visual, mental and finally any other disabilities. The results show a slight difference between the types of disabilities for the target group. The largest percentage was the motor disability category with 104 people preferring to target this category, followed by visual disability with 93 people. These results are very satisfactory to us and are evidence of the importance of our project.

Q7 - Have you used any assistive technology devices before? For example (smart home devices, GPS, etc.)

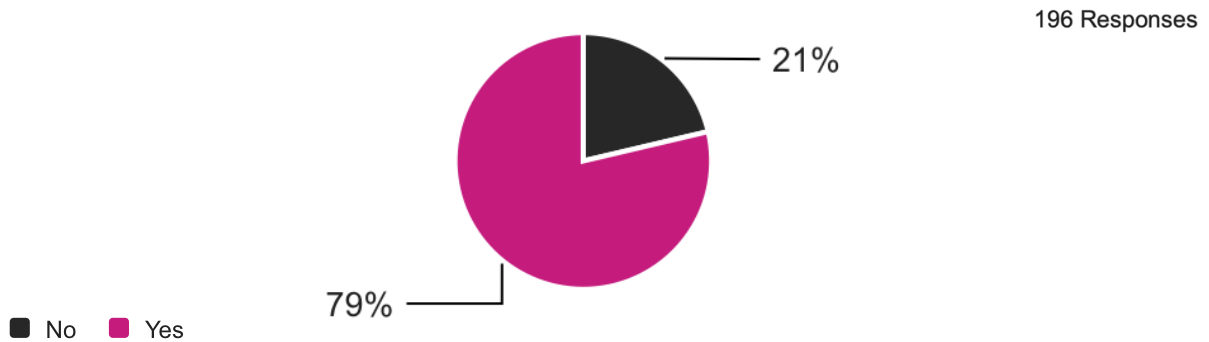


Figure 7: shows if the participant has used any assistive technology devices.

The seventh question in the questionnaire was to show whether the participant had used any assistive technology devices. The answer included two options, yes or no. The results showed that 79% answered yes and 21% answered no. This indicates that most of the participants are sufficiently familiar with the technology present in our society, which means that they can deal with our project naturally and smoothly.

Q8 - How important is it for the device to be easy to use?

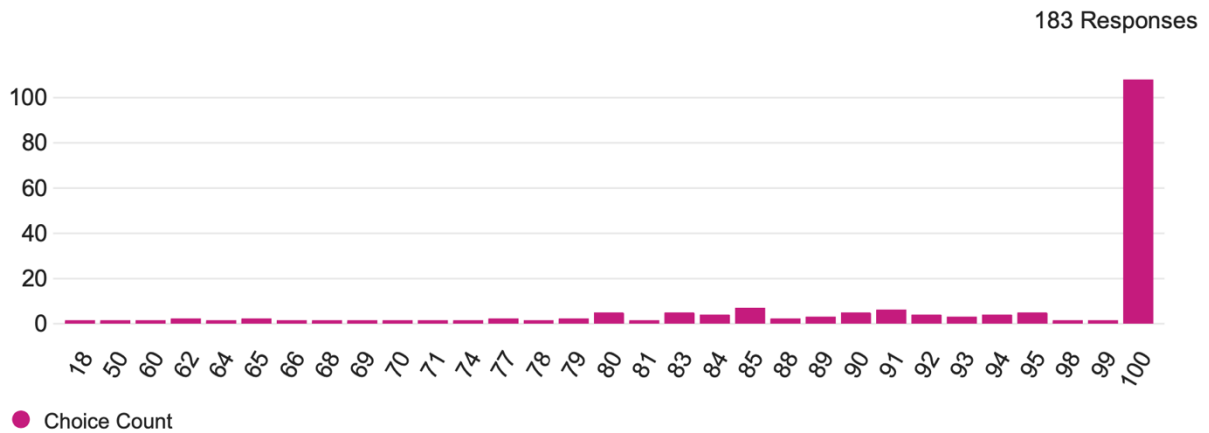


Figure 8: shows the range of the importance of how easy the device needs to be.

The eighth question came to show the extent of the importance of the ease of use of the device by the participants. Most of the 183 participants who answered this question confirmed that the device should be easy to use, and this for us is a very satisfactory answer that makes us work hard to make its use easy.

Q9 - How important is it for the device to respond quickly to the gestures?

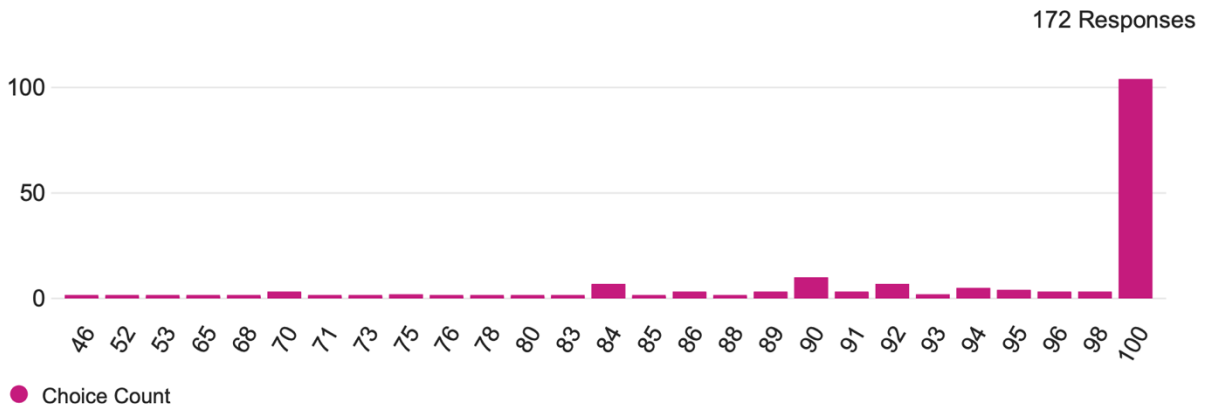


Figure 9: shows the importance of the hand gestures response.

The question came before the good in the questionnaire presented to show the importance of responding to hand signals. 172 people answered this question and the results show that the majority chose a very fast response rate.

Q10 - What kind of tasks would you like a gesture-controlled device to do?

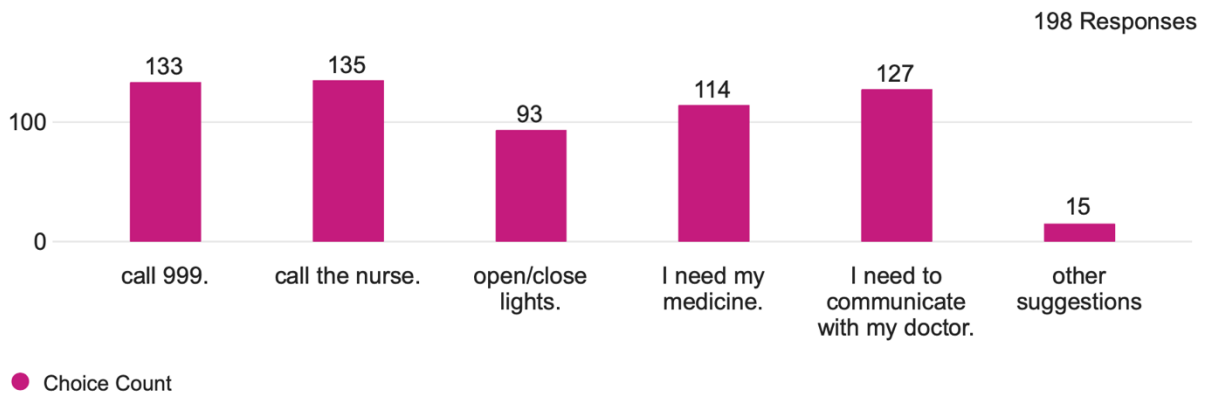


Figure 10: shows a recommendation for the commands used.

The last question in the survey comes to show a recommendation for the commands used. In this question, the participant can answer this question with several answers. The results of the survey showed that they chose to call the emergency services 133 times. 135 people chose to call the nurse, 93 people chose to turn the lights on and off, 114 people chose to order medication, 127 people chose to contact the doctor, and finally 15 people chose to set their own commands. With all this interaction, we find that we are presenting a project of practical and vital importance to people's lives.

Expert Interview:

To get the best possible feedback while considering both sides of the spectrum, we conducted survey-style questions with doctors in the field alongside our general survey. We were able to conduct survey questions with doctors whose expertise was ideal for us to guide us and give us feedback that would improve our product. Below you can see the questions asked and the answers given which we then used to discuss.

a) Mr. Mamoun Alkhoub – Director of Seating and mobility service center -HMC

1. What difficulties do individuals with disabilities face when trying to communicate with their community and seeking assistance?

“Well, there are a lot of difficulties especially in communication. Personal disability has a lot of limitation, especially when is it coming to articulation in the mouth, spoken language and perseverance or coherence inside the brain. Different difficulties on different levels. Sometimes so we have the different conditions that contributes to these difficulties for example, patients with the strokes, have something called aphasia. Aphasia is an inability to communicate through either expressive language or even receptive language. It depends on the affected area of the of the brain. People disability have a very big diversity of communication difficulties. This is based on their medical condition and their physical limitation or mental limitation.”

2. Can you identify the top five commands that would be most essential for patients using a hand gesture controller?

“It depends on the situation and on the setting of that person with disability. If the person on disability is living in the community his commands will be a bit different than the person that’s living in a nursing home or at home. But overall, I think the five top gestures is YES or NO, OPEN or CLOSE, and ADJUST.”

3. Are there any considerations to take into account when developing and deploying hand gesture controller technology in healthcare settings?

“Well, considerations yes, if you want to categorize this consideration, we can categorize it into 2-3 sections. The first one is functional ability of the patient. So basically, I’m telling you from my experience, when I deal with a patient who has functional limitation and mobility limitation, I can see his movement. This is the first category which is the functional ability of the patient. The other one is operational, the simplicity. You have to go for a very simple basic conditioning device. it doesn’t have too many steps, so it is ON-OFF ON-OFF, 1-2 1-2. Because a lot of patients with disability have minimal and mental capabilities. So basically, I believe hand gestures should meet the range of IQ and mental ability for these patients. The third category is the financial part. So cost is a very important element that we really need to look at. with the cost you want to have it available for a lot of people, so that’s why we have to manage the cost to be in the middle.”

4. What are the potential costs associated with home medical care, and could a hand gesture controller device help reduce these costs?

“To tell you the truth it’s not about the cost, It’s about the quality of life. The quality of life is very important and here we are serving people with disabilities and a lot of people with disability are dependent on outside services. If we are able to provide the patient with the privilege to be independent as much as possible you cannot imagine what a life-changing thing that we are providing the patient with. independency is a very important thing in our life. This independency is really deprived from people with disabilities. So, if we will be able to provide them with even a glimpse of this independency, this is priceless. I believe it will make a big difference, cost wise, and the quality of life wise.”

b) Mr. Salah Adarbeh – Assistive Technology specialist and coordinator -HMC

1. What specific goals or tasks do disabled individuals typically aim to achieve during rehabilitation sessions?

“In general, the main goal of the rehabilitation we have to two main goals. The first one is to make the patient independent as much as possible and to re-engage them in their community. In the assistive technology also, it has big role with a patient with distorting roles. The first one is about the communication. If the patient has a communicational

problem, like patient with autism. So, we try to give them something different; to communicate, we call it AAEC which is Augmentative Alternative Communication. This way it helps them to communicate with the family and in the school. The other goal is the accessibility. As you know some patients have a problem with accessibility, computer access, Mobile access, tablet access, and accessibility is very important is at these days, because we are using the mobile, we are using the tablet and PC in schools, so we need this tool to be reachable for the patient. So, we trying to facilitate this, we have different techniques with the facilitation for the accessibility, like using the switches, using the Eye-gaze and also using that the mountains. It is according to the patient needs and level of skills. Also, we have now the service of a smart home or the environmental control, like control the AC. We have this one technique and the way how to make is accessible for the patient”.

2. How do you foresee the device impacting the need for support personnel such as nurses, caregivers, or guardians in rehabilitation settings?

“I think that the communication problem is a big challenge for the patient, caregiver, and the family and one of the solutions is the assistive technology or some solution for the patient to express the pain and to express the basic needs. So, I think both caregiver and the patient they cannot communicate the will face some frustration. So, the assistive technology trying to find alternative augmentative communication solution for this problem”.

3. What do you consider to be a reasonable price range for patients purchasing a hand gesture controller device?

“Prices, I think we have big range of devices we have low-tech devices and high-tech devices. Hand Gesture Controller, I think it’s from the high-tech devices so I think the prices will be high, it is high technology and if you want it integrated with artificial intelligence it will be more expensive. I think from 1000\$ to 2000\$ for the simple and basic device, it will be reasonable price for this one”.

4. How would you view a command feature that connects a home nurse with the rehabilitation center in case of emergencies?

“I think it’s a great idea as long as the patient safety it is our priority in rehabilitation and to educate the caregiver and the home nurse how to use this idea to communicate with emergency or with the medical staff. I think this will help the patient to be safe in his environment”.

Evaluation of assignment

Through the methods we used, such as online surveys and interviews with experts, we made many improvements to what we were planning for the project. The first thing the online surveys did for us was to make sure we had in mind the needs of our patients. They also found some surprising results that allowed them to understand their perceptions. For example, we were looking to find more residents of Qatar to complete the survey, but we have a really high percentage of Qatari respondents who treat patients, meet all the needs of the target group based on their answers and the answers of residents, as well as the project to know the number of people suffering from movement disorders. As for the opinions of the two doctors, their opinions were very important to us because they guide us on how we implement the project and what we should focus on. The opinions of the two doctors about our project were not positive at first, but when they described the idea and its costs compared to the global costs of this project, they were convinced, and their opinions became positive. Their response to our questions confirms that focusing on the tasks our project performs has a small impact, not a big impact. Next, we needed to make sure that the project did not pose a threat to the user, as it was always a priority, and that it did not pose a safety issue or harm to the user.

Conclusion:

We believe that using different methods to ask the people of Qatari society, citizens, residents of different sectors and their lives what our target group is experiencing in the project and their opinions to doctors is at the heart of any sector of the project. For us, all the results obtained are very useful and certainly the suggestions we have given doctors and specialists to make all the necessary adjustments to our current proposed project led us to further technical improvements that can be made. One expert's opinion is important, but we are confident that we can get quite different opinions as seen in the general survey, so we will fathom more experts. In addition, the survey will continue to achieve the best results that will achieve our goals. The project to meet the needs of the target group without collision with the environment is our main goal, and we believe this is an affordable, safe, durable and efficient project.

Appendix:



What is your gender?

Male

Female

What is your age?

Under 18

18-25

26-35

36-45

46-55

56-65

66 and older

Do you know anyone who is disabled?

Yes

No

Do you have a nurse or caregiver?

Yes

No

Would you like to see an invention to help replace some tasks done by nurses?

Yes

No

Would you like to see an invention to help replace some tasks done by nurses?

Yes

No

Which kind of disability do you think our device would be helpful for?

Motor

Visual

Hearing

Cognitive

Other

Have you used any assistive technology devices before? For example (smart home devices, GPS, etc.)

Yes

No

How important is it for the device to be easy to use?

Definitely not 0 10 20 30 40 50 60 70 80 90 100
Probably not
Might or might not
Probably yes
Definitely yes



How important is it for the device to respond quickly to gestures?

Definitely not 0 10 20 30 40 50 60 70 80 90 100
Probably not
Might or might not
Probably yes
Definitely yes



What kind of tasks would you like a gesture-controlled device to do?

call 999.

call the nurse.

open/close lights.

I need my medicine.

I need to communicate with my doctor.

other suggestions

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