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# Development of a Mobile Navigation Smartphone Application for Seniors in Urban Areas

## Urban Connector

August 2019



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## **Development of a Mobile Navigation Smartphone Application for Seniors in Urban Areas**

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## Executive Summary

Many seniors face mobility issues and lifestyle changes. Switching from driving alone to carpooling, taking a taxi or public transportation are some common examples. Seniors need information about traffic congestion and available alternative means of transportation to keep attending their daily activities. However, there are not enough tools to assist seniors with their specific mobility constraints. Smartphones are potentially useful tools. While there are many navigation apps on the market, very few cater to the specific mobility needs of seniors (such as incorporating information on ADA compliant infrastructure), and the few that exist have limited functions. This study aims to understand the lifestyle and mobility needs of seniors and to develop a prototype smartphone application that caters needs. The main focus is on the development of a mobile smartphone application, named Urban Connector. As a first step, to identify the senior needs, a survey was conducted (in English and Spanish) at various senior centers across El Paso, Texas. Questions were asked to 458 seniors to gain a better understanding of their lifestyle, mobility needs, and technological literacy (especially the use of smartphones). A similar survey of 61 seniors was conducted in New York, New York. It was discovered from the survey that the greatest mobility need of the seniors is avoiding traffic congestion. Although there exist some navigation applications and there is a market for developers (i.e. many seniors own a smartphone), existing tools are not being preferred by seniors to avoid such traffic congestion. Therefore, the primary focus of the Urban Connector was decided as navigation. The survey results provided guidelines on the functions and user interface designs. After the initial version of the Urban Connector had been developed in the Android platform, a pilot survey was conducted in which 65 seniors were asked to comment on the suitability of the functions and ease of use (user interface and menu). Pilot survey findings were used to improve and refine the Urban Connector application. A follow-up usability survey was implemented as the third effort to collect user feedback. In this usability survey, 40 seniors were recruited and they installed the Urban Connector application on their smartphones to field test the application for one month. At the end of one month, 38 participants completed this survey. Most of the questions in this survey asked the participants to state the level of agreement with a given statement related to the ease of use of the application. The survey results revealed that more than half the participants strongly agreed or agreed with statements about the application being easy to use or beneficial. The participants gave the Urban Connector application an average rating of 3.47 out of 5.00. Sixty-eight percent (68%) of the participants said that they would like to recommend the Urban Connector application to their friends.

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## SECTION 1. Introduction

### 1.1. Motivation

Many seniors face mobility issues and lifestyle changes. Switching from driving alone to carpooling, taking a taxi or public transportation are some common examples. Seniors need information about traffic congestion and available alternative means of transportation to keep attending their daily activities. However, there are not enough tools to assist seniors with their specific mobility constraints. Smartphones are potentially useful tools. While there are many navigation apps on the market, very few cater to the specific mobility needs of seniors (such as incorporating information on ADA compliant infrastructure), and the few that exist have limited functions. This research covers the initial steps of developing a smartphone application that is customized to the mobility and other needs of seniors.

### 1.2. Objective

The objectives of this project are: (a) to understand the lifestyle and mobility needs of the seniors; (b) to develop a prototype smartphone smart mobility application that caters to the needs identified; and (c) to conduct a usability survey to obtain feedback on the prototype.

### 1.3. Outline of Report

This report is outlined as follows. The next section reviews background materials. Section 3 presents the work plan for this research. The fourth section provides information regarding the seniors surveyed in El Paso and New York City and the findings. The fifth section describes the development of the smartphone application. The following sections (Sections 6 and 7) report on the pilot survey and usability survey respectively.



## SECTION 2. Review of Background Materials

This section reviews the background materials related to this project. First, the concept of smart mobility, which is the domain problem this project addresses, is introduced. Next, the mobility issues faced by seniors, as found in the literature, are discussed. Then, technologies that enable our solution approach, namely smartphone technology (the hardware) and smartphone applications (the software) are reviewed. The last portion of this section highlights the recommended design features that should be considered when designing smartphone applications for seniors.

### 2.1. Smart Mobility

[Faria et al. \(2017\)](#) state that “as world's population concentrated in cities, mobility in urban environments is becoming one of the most prominent and interesting research fields in the Smart City context.” According to the [IEEE Smart Cities Technical Community \(2017\)](#) “A smart city brings together technology, government, and society to enable the following characteristics: a smart economy, smart mobility, a smart environment, smart people, smart living, and smart governance.” [Griffinger and Gudrun \(2010\)](#) describe a Smart City as “a city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decise, independent and aware citizens.” [Bowerman et al. \(2000\)](#) state that a Smart City is “a city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rail/subways, airports, seaports, communications, water, power, even major buildings, so that it can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens.” [Harrison et al. \(2010\)](#) mention that “Smarter Cities are urban areas that exploit operational data, such as that arising from traffic congestion, power consumption statistics, and public safety events, to optimize the operation of city services. The foundational concepts are instrumented, interconnected, and intelligent. Instrumented refers to sources of near-real-time real-world data from both physical and virtual sensors. Interconnected means the integration of those data into an enterprise-computing platform and the communication of such information among the various city services. Intelligent refers to the inclusion of complex analytics, modeling, optimization, and visualization in the operational business processes to make better operational decisions.”

[Faria et al. \(2017\)](#) describe Smart Mobility as a key concept to transform urban transportation and change the way our cities move. Smart Mobility is, among others, one of the main components of a Smart City; and as such, “Smart Mobility helps cities to reduce gridlocks, lower accident rates, improve air quality, shrink the urban footprint required for parking, and be a tool to achieve sustainable city's development” ([Faria et al., 2017](#)).

[Albino et al. \(2015\)](#) describe Smart Mobility as “the use of Information and Communication Technology in modern transport technologies to improve urban traffic.” [Chun and Lee \(2015\)](#) state that Smart Mobility “is a concept of comprehensive and smarter future traffic services in combination with smart technology. A Smart Mobility society is realized by means of the current intelligent traffic systems.” [Vanolo \(2014\)](#) refers to Smart Mobility as “local and supra-local accessibility, availability of ICTs, modern, sustainable and safe transport systems.”

In summary, a smart city is a city that integrates people, technology, and information to create a sustainable and resilient infrastructure that provides high-quality services for residents. Smart mobility refers to the ability of travelers to acquire, share and use information and resources to make transportation systems more accessible, sustainable and resilient.

## 2.2. Issues Faced by Seniors

The issues faced by seniors depends on what the definition of seniors is. In spite of the fact that seniors’ needs may change based on physical wellbeing or mental health, they are legally recognized from the rest by their age. Indeed, different agencies organizations report different age ranges in characterizing seniors. These are some examples of senior definitions:

- The [United States Census Bureau \(2017\)](#) definition for a senior is a person who is older than the age of 65. There were around 47.8 million seniors in 2015 which was around 14.9% of United States population.
- According to the [United States Department of Health and Human Services \(n.d.\)](#), every day more than 10,000 individuals become seniors. In this study, the defined age is 65.
- The [United States Department of Labor \(2017\)](#) Senior Community Service Employment Program was designed to provide work based training for seniors. Minimum age to participate in the program was identified as 55.
- The age defined by social security benefits was 65 after Congress passed legislation in 1983 ([National Academy of Social Insurance, n.d.](#)).
- In El Paso, Texas, Sun Metro Bus Service offers a reduced fare program for eligible passengers. Sun Metro’s reduced fare program provides discounts off the standard fares for, among others, persons 65 years of age or older ([Sun Metro, n.d.](#)).

Based on the findings the age definition for the seniors ranges from 55 to 65. Since the majority of them preferred to use 65, this project considered an individual as a senior with an age of 65 or older.

Seniors’ limited access to different transportation alternatives has always been an issue. ([BTS, 2016](#)). The [American Association of Retired Persons Public Policy Institute \(2011\)](#) estimated that in 2009 seniors took 12% of all trips and 10% of all miles traveled in the United States. From 2001 to 2009, the share of seniors among transit users had increased by 40%. 2009 findings also reported that seniors used public transportation for more than 1 billion trips. With the increase in the use of public transit by seniors,

transportation agencies efforts to provide senior-friendly services become more important. Being unable to access transportation causes seniors feeling of isolation from the community that does not develop solutions to fix their problems (McDonnal et al., 2016). It is very difficult for older adults to access transportation alternatives due to proximity issues, long waits, crime, uneven or unsafe sidewalks, urban congestion, and mobility issues which are all associated with depression, social isolation, and health problems (Turner et al., 2017).

Individuals' movability and mobility may reduce due to aging. Health in Aging Foundation listed some of the mobility problems of older adults (2017). Joint problems, weakness of muscles, pain, disease, and some other neurological disorders cause falls which is the number one issue that older seniors experience.

In addition to falls, many seniors are affected by visual and/or hearing impairments, as well as rheumatism (arthritis) (March et al., 1998). Arthritis greatly affects typing on a keyboard, tablet, or phone in a negative way. These physical impairments not only restrict their mobility options but also limit their ability to use certain tools (e.g., desktop computers, tablets, smartphones).

In addition to the biological and biomechanical issues, many seniors face cognitive decline and dementia (Geerlings et al., 1999). Due to cognitive decline and memory loss, disorientation may subsequently follow (Hanley, 1981). Some seniors can easily become disoriented during a commute and have difficulties understanding where they are as well as how to return home or to their original destination.

However, the majority of older adults prefer driving as their preferred transportation because it symbolizes independence that seniors value deeply (Turner et al., 2017). A smartphone, if used with the right applications, is one solution to the mobility problems faced by the seniors. Smartphones are not only communication devices, but they can also be programmed with applications to help with estimation choices, route planning, navigation, transportation services scheduling, reminding appointments, and some other functions may assist the seniors with mobility and other issues. There should be some focus on dealing with older people who have communication or sensory ailments in order to find a solution.

It is very important for older adults to go out. In fact, going outside has a positive effect on their physical and cognitive health and social activities, whereas older adults who do not go outside frequently have higher mortality, cognitive impairments, and poorer psychological well-being than those who do (Harada et al., 2018). Research shows that regular interactions with peers and leisure engagement contributed to their sense of self-determination, which further encouraged them to implement such strategies and participate in meaningful and enjoyable activities while promoting independence (Dattilo et al., 2015).

Technology is evolving at such a rapid pace, therefore, accessibility to applications for seniors is becoming more important. Applications can help improve care support, safety, social connectivity, and engagement (Czaja, 2019). Having this type of technology can help guide many to new doctor's appointments, senior centers, and engaging activities in the community. In fact, research has demonstrated that technology features that improve one's ability to complete a task are appealing to users (Li & Luximon, 2018), meaning that the user interface and usability are correlated to the usage of technology for older people. This can be achieved with better and more accessible technology for older adults to maintain contact with and travel to their friends and family members and providing support for engagement in social activities. Technology can combat social isolation and increase social participation for older adults (Baker et al., 2018).

### 2.3. Smartphone Technology

A smartphone may be defined as a handheld device with the computing power of a personal computer, mobile operating system, and mobile broadband cellular network connection for internet data communication (Smith, 2013). The term 'smartphone' refers to "a new class of mobile phones that provided integrated services from communication, computing, and mobile sectors including voice communication, messaging, personal information management (PIM) applications and wireless communication capability." (Sarwar and Soomro, 2013).

In 1999, the Japanese firm NTT DoCoMo released the first smartphones to achieve mass adoption within a country (Rose, 2001). These phones provided data transmission speeds up to 9.6 kbit/s. However, smartphones were rare outside of Japan at that time and began moderately increasing until the release of the Apple iPhone in 2007. Before the introduction of the iPhone to the mass consumer market, many smartphones had a physical keypad or keyboard (Jobs et al., n.d.). Some differences between a smartphone and a traditional cell phone, other than the computing power, are: (i) the ability to run a variety of third-party software components (called "applications" or simply "apps") purchased and downloaded from servers like the Google Play Store or Apple App Store; (ii) the ability to receive bug fixes and gain additional functionality through operating system updates; (iii) have a touchscreen color display; and (iv) high speed wireless communication capabilities.

One of the main characteristics of a smartphone is its screen. Smartphones are almost entirely comprised of a full-color touchscreen, through which the user may enter data, command, and control the phone by touching the screen, as opposed to a numerical keypad. The interface is designed such that the users may input commands or data by the use of their fingers. Smartphones may also have a return button to navigate back to the main screen or when held, restart the smartphone in the event it freezes. In the past several years, voice/speech has emerged as the secondary source of data entry to smartphones, and to command and control the phone.

In 2014, half of Americans over the age of 65 owned a smartphone or tablet ([Medical Alert Advice, 2014](#)). Furthermore, approximately 75% owned some kind of cell phone. Likewise, [Rainie and Perrin \(2017\)](#) from the Pew Research Center affirmed that 77% of U.S. adults said they owned a smartphone. This number was a dramatic increase from 35% in 2011, making the smartphone one of the most quickly adopted consumer technologies by seniors in recent history. In 2017, 42% of those over the age of 65 (i.e. seniors) reported that they owned a smartphone.

The two major mobile operating systems used by smartphones are Android and iOS (formerly iPhone OS). The Android operating system is used by many smartphone manufacturers (such as Samsung, LG, Google) while iOS is used only in Apple's iPhones (and other Apple mobile devices). In 2013, Android-operated phone owners represented 28% of the cell phone owning population, while iOS OR iPhone owners represented 25% of the cell phone owning population. Phones that operate with Blackberry and Windows systems only make up 4% and 1% of the cell phone owning population, respectively. The remaining 31% is comprised of traditional flip-phone users [Smith \(2013\)](#).

Some similarities between the two platforms (i.e. Android and iOS) are the simplicity and commands made by the user's fingers. Users typically choose one platform over the other simply due to personal preference more than functionality, as the user interfaces of the two platforms are very similar. The differences are primarily for application developers. In order to have an application available in Apple's App Store, the application developer must pay \$99 per year and must update the application accordingly based on Apple's newest operating software requirements. The Google Play Store, on the other hand, charges Android application developers a one-time fee of \$25 to have one's application available in the store. For this reason, the Android platform was selected as the initial mobile operating system platform to develop the smartphone application in this research.

## 2.4. Smartphone Applications

This sub-section focuses on smartphone applications. An application may be defined as a program designed to run on a mobile device such as a smartphone or tablet.

### 2.4.1. Functional Characteristics

To create an application for the Android operating system, the Android Studio software is required ([Android, n.d.](#)). To create an application for the iOS operating system, the XCode software is required ([Apple, n.d.](#)). It should be noted that each software (application development tool) is free to download; however, Apple charges application developers \$99 per year to have an application available in the Apple App Store for iPhone or iPad users to purchase or download, whereas Android charges developers a one-time fee of \$25 to have an application available in the Google Play Store.

To best illustrate how an application works, a popular mobility application, Uber, is used as an example. Uber is a rideshare service by which a rider may use the Uber application to request a driver (who drives his/her private vehicle to serve the rider), track the progress of the trip, make a payment, etc. The following steps describe how a rider can use the Uber application to improve his/her mobility. First, if the rider does not have the Uber application installed on their smartphone, he/she may access Apple's App Store or Google Play Store, for iPhone and Android users, respectively. Then, the rider searches for Uber and downloads the Uber application. Once the Uber application has been downloaded and installed on the rider's smartphone, the rider accesses or "opens" the Uber application. When the rider uses the Uber application for the first time, the rider is prompted to create a username and password, enter his/her profile as well as payment information. Once an account is created, the rider may request a ride to a specific destination. At this point, the Uber application, on the backend, accesses the global positioning system (GPS) location of the smartphone and subsequently searches for surrounding drivers. The nearest driver who meets the criteria set forth by the rider is then directed to the rider based on the GPS location of the rider's smartphone. While waiting for the ride, the rider is shown the name and photograph of the driver and the vehicle model and license plate. The rider can also see the real-time location of the driver by a map displayed on his/her smartphone screen. The driver then picks up the rider and transports him/her to their desired location. During the trip, the rider can use the Uber application's map to track his/her real-time location. Once the driver confirms that the trip is complete, the Uber application will charge the rider's payment account directly from the application and credit the driver. The above steps are the operations of the application from the rider's perspective. There is another version of the Uber application that is developed for the drivers.

#### 2.4.2. Review of Existing Applications for Mobility

There are currently many smartphone applications available for smart mobility for users of all ages. Some examples of these applications are Google Maps, Waze, and Metropia.

Google Maps may be downloaded for free from Apple's App Store or Google Play Store. Google Maps does not require an account. When the user opens the application, a map is displayed centered at the GPS location of the smartphone (i.e. the user's current location). The user then inputs a destination and mode of travel, based on traffic condition the application decides the best route and provides directions accordingly.

Waze is another navigation software owned by Google that provides turn-by-turn navigation information. Unlike Google Maps, which acquires its real-time traffic condition data from commercial vendors, Waze relies on the travel time data provided by the user's smartphone and user-submitted incident details.







[Metropia](#) (n.d.) is another application aims to cater to mobility needs. Once the Metropia application has been activated, the user may input a destination, similar to Google Maps. Metropia, however, has a different way of encouraging the app use by providing incentives for the selection of the alternative mode of transportation (i.e. through in-app game points). For example, a user would like to drive to work during the morning peak hour. A certain number of points are awarded for this commute; however, more points are awarded if the user carpools, uses the bus, or travels outside the morning peak hour to work. The application's algorithm determines the number of points for each alternative based on how well the alternative benefits the network's traffic conditions as a whole. The points may be redeemed for prizes such as gift cards.

There are a few popular applications available for senior users. Some of these applications are Pill Boxie, MedCoach, and Medisafe. Some of the most popular applications are described in detail in the next section. In general, most of these applications are very intuitive and user-friendly, but limited functions for the seniors.

Many, if not all, of the existing applications for mobility are not designed specifically for seniors. The tech-savviness of the seniors is not considered with current mobility applications (e.g. large font, use of fingers, etc.). In fact, research shows that older adults would like to use technology more when barriers to use including lack of knowledge, vision, hearing, and fine motor difficulties are handled. ([Gitlow, 2014](#)). On the other hand, many of the applications designed specifically for seniors are not related to mobility. The applications are primarily related to the medical needs of the seniors (e.g. medicine reminders, emergency buttons for when falls occur, etc.). [Czaja \(2019\)](#) research findings demonstrated that seniors would like to learn more about the technology related to their needs to live independently. An application that integrates both functions to serve the mobility, social, medical, and other needs of the seniors is potentially very valuable for this segment of the population. This is the objective of this research.

#### 2.4.3. Review of Existing Applications for the Seniors

After researching some of the most popular smartphone application for seniors (as described in the next sections), some of the applications were downloaded by the research team and tested. **Table 1** presents a general description and the authors' remarks about each downloaded application.

Name	Logo/Icon	Description	Remarks
AARP		General news, events, and deals based on your location, specifically for those who are AARP members.	The user interface is intuitive, but the application is designed for those who recently retired.
Mag. Light		Uses the smartphone's camera as a magnifying glass.	The application can use the smartphone's flash for additional light and can even freeze frame.
MedCoach		An application that has a very intuitive user interface (i.e. a 3 x 3 application grid layout) for medicine, doctors, pharmacies, etc.	One key feature is "urgent care" which serves as a panic button while the user is making a trip.
Medisafe		An application that tracks pill usage throughout the day and can track when missing or taken.	Tracks what pills look like to create virtual pillbox, not just the name, which is key to memory loss.
My Pain Diary		Award winning application, which allows users to track the type of pain and location for doctors to better diagnose prior to a patient visiting the doctor.	Very intuitive application and currently used by many seniors.
Koala Phone		Application in which the user interface was designed based on research (large text and keyboard, but very limited features).	This application was designed for seniors who are still relatively independent, and as such, want an easy-to-use smartphone to maintain their social status (e.g. taking pictures while traveling).

**Table 1. Downloaded and tested smartphone applications.**

[Salter \(2015\)](#) released an article regarding the top six smartphone applications for seniors. The list is summarized below.

1. Magnifying Glass with Light. This application illuminates and magnifies books, magazines, newspapers, and restaurant menus.
2. Skype. This application allows users to "see" each other by video conferencing.



3. Pill Boxie. This application allows the user to set-up reminders with visual pillboxes within the mobile application.
4. MedCoach. This application has quick access to lists of medications, pill reminders with easy set-up, and access to the pharmacy's website to fill prescriptions.
5. Games. These applications (e.g. crosswords, Sudoku, and Lumosity) keep seniors' brains active.
6. Red Panic Button. This application allows the user to input a relative's contact information should an emergency occur. In the event of an emergency or a need for assistance, seniors open the application and hit the red button in the middle of the screen.

Additionally, [Belval \(2015\)](#) also released a list of the top seven smartphone applications for seniors.

1. Lumosity. This application keeps the minds of the seniors engaged to facilitate the prevention of Alzheimer's.
2. Prismatic. This application provides an intuitive user interface for viewing current news.
3. Medisafe. This application provides reminders pertaining to medication.
4. Mint Bills & Money. This application manages bills and finances and can be used by anyone, especially seniors.
5. WebMD. This application allows any user to ask a medical question and receive an answer without visiting a doctor.
6. Kindle. This application may be used by anyone who loves to read; however, there are advantages for senior users such as controls over text size, brightness, and a built-in dictionary.
7. Audible. This application provides audiobooks, which can be helpful for anyone with a visual or literacy impairment, including seniors.

[Medical Alert Advice \(2014\)](#) developed a list of the top smartphone applications for seniors that were related to their medical needs. They are listed below, in no particular order.

- Fade. This application detects falls and can send a text or email to a predefined person.
- iPB Blood Pressure. This application requires a separate monitor but can track blood pressure of the user over time.
- Pill Boxie. This application provides reminders of which medication to take and at what time during the day.
- Viz Wiz. This application aids a visually impaired user in taking pictures and asking a question by which the user will receive an answer through the application.
- Motion Doctor. This application searches for physical therapy videos to help the user when an actual physical therapist is unavailable.

#### 2.4.4. Design Considerations for Senior Users

In the literature, very few studies focused on the design considerations for senior users. In their study [Guo and Koronios \(2010\)](#) advised developers five features considering senior users:

- Visual aids,
- Haptic aids,
- Memory aids,
- Minimizing user error, and
- Safety features.

In another study, [Lorenz & Oppermann \(2008\)](#) focused on many desirable features of the mobile application interface for seniors. Some of the features are listed below:

- Speed of animations needs to be adjusted and be slow;
- Interface font size needs to be above 36 points;
- One-level navigation need to be provided;
- The selected color needs to be proper for visually impaired users; and
- Buttons need to be located at the bottom.

[Campbell \(2015\)](#) provides recommendations to consider when developing a smartphone application.

- The first recommendation was related to the hearing and visual loss of the seniors (i.e. users). It is recommended that font sizes smaller than 16 pixels should be avoided, or to even allow the user to adjust the text size themselves. With respect to visual impairments, Campbell suggested avoiding the blue color, especially in text.
- The second suggestion was related to motor control. Interface elements that are likely to be used in the sequence should be close to each other, as long as they are at least two millimeters apart. Furthermore, buttons on touch interfaces should be at least 9.6 millimeters apart diagonally and form fields should be at least 11 millimeters apart diagonally.
- Memory is another key factor to consider when designing an application for seniors. Currently, many seniors rely on hard copy materials such as notes in wallets, calendars, and diaries to supplement their memory loss. An application for the seniors should be designed to introduce features gradually over time to prevent cognitive overload, and avoid splitting tasks across multiple screens if the seniors require memory of previous actions.

A slump in tablet sales in recent years has shown that seniors have longer upgrade cycles. In addition, seniors do not rely on text messages to convey important information. In social networking, many seniors connect with a smaller, more important group of people rather than a large, undifferentiated social network as many younger users do.

One important assumption in the application development is the user's familiarity with the device. It is important that smartphone application developers do not assume seniors have any prior knowledge or experience with smartphones. In fact, many seniors are unaware of how to use a scrollbar and some have never used a search field before ([Campbell, 2015](#)).

When marketing smartphones to seniors who are not existing owners or users, it may be difficult to persuade them to want a "complicated" phone that is not actually designed for them. One suggestion is to consider an Android phone with a senior-friendly "launcher app" which is only one application but serves as the entire user interface for the senior user ([Miller, 2015](#)). This allows the senior to use a smartphone with the common features (e.g. phone, text messaging, contacts, etc.) with no excess clutter. There are "launcher apps" currently available including Necta Launcher, Wiser, Seniors Phone, Fontrillo, and Big Launcher, which are for Android devices only. Once a senior begins to use the "launcher app" and become more familiar with a smartphone, they can be introduced to the actual smartphone user interface.

## 2.5 Summary

A smart city is a city that integrates people, technology, and information to create a sustainable and resilient infrastructure that provides high-quality services for residents. Smart mobility refers to the ability of travelers to acquire, share and use information and resources to make transportation systems more accessible, sustainable and resilient.

Seniors are defined by their ages. The minimum ages of seniors vary from 55 to 65, with a majority of definitions using 65 as the minimum. For this project, an individual with an age of 65 or older is considered as a senior. Seniors are often challenged by mobility issues related to physical, visual and hearing impairments. Such impairments necessitate transportation services to be designed according to their needs. The impairments also require that electronic devices and their software, such as smartphones and mobile applications, be designed for ease of use by the seniors.

Smartphone refers to a new class of mobile phones that integrates services from communication, computing, and mobile sectors including voice communication, messaging, personal information management applications and wireless communication capability. In 2017, 42% of those over the age of 65 (i.e. seniors) reported that they owned a smartphone. Smartphone technology can potentially help the seniors to improve their mobility. However, very few smartphone applications are designed specifically for the seniors and even less so to meet the mobility needs of the seniors.

An application may be defined as a program designed to run on a mobile device such as a smartphone or tablet. Smartphone applications for the seniors need to be designed with the following considerations in mind: large font size, simple navigation menu, strategic placement of large buttons,

color-coded for the visually impaired. The applications should also come with memory aids, visual aids, haptic aids, and an emergency help button. They should also be designed to minimize user input errors.

The Android platform was selected as the platform by which to develop this smartphone application.

## SECTION 3. Research Work Plan

This section describes the work plan performed to meet the objective and deliver the products of this project. The work plan for this research consisted of the following tasks:

**Task 1:** Review of existing smartphone applications for mobility and for seniors, and the lifestyle of the seniors. [months 1 to 3]

In this task, issues with seniors' mobility and existing smartphone applications for mobility and for seniors were reviewed.

**Task 2:** Preliminary design and programming of the prototype application. [months 4 to 7]

In this task, the tools and the devices for the application were determined. The initial prototype of the application was designed and programmed.

**Task 3:** Conduct the mobility needs survey in El Paso, TX. [months 8 to 10]

After getting approval from IRB, a survey was conducted to understand the lifestyle and mobility needs of seniors in El Paso, TX.

**Task 4:** Conduct the mobility needs survey in New York, NY. [month 11]

After getting approval from IRB, a survey was conducted to understand the lifestyle and mobility needs of seniors in New York, NY.

**Task 5:** Analyze the survey data [months 12 to 13]

Data obtained from the surveys in El Paso, TX and New York, NY were analyzed to understand the lifestyle and mobility needs of the seniors.

**Task 6:** Incorporating the needs of seniors in the prototype application. [months 13 to 14]

The application prototype was programmed to incorporate the needs of seniors.

**Task 7:** Conduct a pilot survey in El Paso [months 15 to 16]

With approval from IRB, a pilot survey in El Paso was conducted. Participating seniors were given a demonstration of the application and were asked to provide feedback on the user interface and functions.

**Task 8:** Analyze the pilot survey data. [months 17 to 18]

The data obtained from the pilot survey in Task 7 were analyzed to identify the improvements that were needed for the application.

**Task 9:** Refine the prototype application. [months 19 to 24]

According to the findings of the pilot survey, the prototype application was refined with improved user interface and functions.

**Task 10:** Conduct a usability survey in El Paso. [months 25 to 26]

After the prototype application had been refined, a usability survey was performed in which participating seniors were asked to install this application on their smartphones and use it for one month, before providing feedback via interviews.

**Task 11:** Analyze the usability test data. [months 26-27]

The comments and feedback collected from the usability survey in Task 10 were compiled.

**Task 12:** Write report. [months 1 to 27]

All the research findings were documented in a final report in this task. The report was written as the tasks were in progress throughout the duration of this project.

## SECTION 4. Mobility Needs Surveys

### 4.1. Background and Purpose

A survey was conducted to better understand the mobility needs and to identify common challenges faced by seniors. The authors met with officials from the City of El Paso Parks and Recreation Department to gather information about the seniors and senior centers in El Paso. Seniors from senior centers were considered as the potential users of the application since they participate in daily events at senior centers. The authors and the El Paso Parks and Recreation Department discussed the details of the surveys and agreed on the instrument, incentives, venues, and the schedule.

### 4.2. Survey Instrument

It was determined that all seniors at the senior centers are potential survey subjects. A survey instrument was created which incorporated a consent form and questions about the subject's demographics, daily activities, physical limitations, and open-ended questions. The draft version was shared with the El Paso Parks and Recreation Department and was then approved. Survey instrument translated into Spanish to recruit Spanish speaking seniors. English and Spanish versions of the consent form and the questions were reviewed and approved by the UTEP Institutional Review Board (IRB). The final version of the survey instrument consisted of 17 questions and survey duration was estimated as 7 minutes. 17 questions were designed into four different parts:

Part 1: Demographics of the responder (6 questions)

Part 2: Lifestyle of the responder (3 questions)

Part 3: Mobility needs of the responder (5 questions)

Part 4: About smartphones and smartphone applications (3 questions)

### 4.3. Survey Implementation

Overall El Paso has eleven senior centers which are located across the city. City of El Paso Parks and Recreation Department owns and manages all of the senior centers. After approval of the City of El Paso Parks and Recreation Department, the authors organized the surveys with coordination of the staff in each senior center. The survey dates, times, and venues are presented below in **Table 2**. Flyers (such as the one shown in Appendix A) were posted at the senior centers to advertise the survey.

Date	Time	Venue
November 6, 2017	9:00 AM – 12:00 PM	Hilos de Plata Senior Center
November 6, 2017	10:00 – 11:00 AM	East Side Senior Center
November 7, 2017	9:00 AM – 12:00 PM	Hilos de Plata Senior Center
November 8, 2017	9:00 AM – 12:30 PM	Hilos de Plata Senior Center
November 8, 2017	9:00 AM – 12:00 PM	Wellington Senior Center
November 9, 2017	10:00 AM – 12:45 PM	Grandview Senior Center
November 10, 2017	10:00 – 11:00 AM	East Side Senior Center
November 13, 2017	9:00 – 11:00 AM	San Juan Senior Center
November 14, 2017	9:30 AM – 12:30 PM	Pavo Real Senior Center
November 15, 2017	9:30 AM – 12:30 PM	Happiness Senior Center
November 15, 2017	9:00 AM – 12:00 PM	Pavo Real Senior Center
November 15, 2017	9:00 – 11:30 AM	Polly Senior Center
November 16, 2017	9:00 – 11:00 AM	San Juan Senior Center
November 16, 2017	9:00 – 11:30 AM	Polly Senior Center
November 16, 2017	9:00 – 11:30 AM	Polly Senior Center
November 17, 2017	9:00 – 11:30 AM	Polly Senior Center
November 20, 2017	9:30 AM – 12:30 PM	Pavo Real Senior Center
November 27, 2017	11:00 AM – 12:00 PM	South El Paso Senior Center
November 27, 2017	9:00 – 11:30 AM	Memorial Senior Center
November 28, 2017	9:30 – 10:00 AM	Friendly Senior Center
November 29, 2017	9:30 AM – 12:30 PM	Happiness Senior Center
November 29, 2017	11:00 AM – 12:00 PM	South El Paso Senior Center
November 30, 2017	9:30 AM – 12:30 PM	Happiness Senior Center
December 1, 2017	9:00 – 11:30 AM	Grandview Senior Center

**Table 2. Survey dates, times, and venues – El Paso.**

The authors recruited student volunteers to assist in the implementation of the surveys from the Anthropology Department at The University of Texas at El Paso (UTEP). Twenty student volunteers received proper training and acquired certifications that met the IRB requirement to conduct the survey.

Hard copies of both the English and Spanish versions of the survey instrument were brought to each senior center at the time of survey implementation. A table was set up with the incentives and UTEP logos to attract potential survey participants. **Figure 1** presents a photo taken at the Grandview Senior Center.





**Figure 1. Survey booth at Grandview Senior Center, El Paso.**

The seniors at the recreation centers were recruited and guided to complete the surveys as follows. A pollster first asked if a senior would like to participate in the survey, and if so, in English or Spanish. The pollster then asked if this senior participant would like to take the survey independently or if he/she needs help to fill out the survey form. The pollster then provided the participant with the information and consent form, followed by the actual survey instrument. Once the survey was completed, the pollster handed the incentives to the participant. At the end of each survey day, the collected responses were then manually entered into Qualtrics for post-survey analysis.

Concurrent to the survey conducted in El Paso, Texas, an identical survey was conducted in New York, New York. The purpose of this survey was to see the differences and for quality control and quality assurance.

In order to conduct the survey in New York City, New York, two students from New York University (both of whom had the proper IRB certification to survey human subjects) volunteered to conduct the survey at the senior centers. There are several senior centers in New York City, all of which are sponsored by different agencies. They are geographically located throughout all areas of the city. Five senior centers gave permission to the surveyors to conduct the survey at their venues. With the Institutional Review Board (IRB) approval on January 4, 2018 surveys conducted from February 5 to February 16, 2018. The survey dates, times, and venues are presented in **Table 3**.

Date	Time	Venue
February 5, 2018	1:30 PM	PSS King Towers Center
February 8, 2018	1:00 PM	Fort Washington Ave. Rehab
February 9, 2018	3:00 PM	Taft Houses Senior Center
February 12, 2018	10:00 AM	Corsi Senior Center
February 16, 2018	11:00 AM	Lehman Village Senior Center

**Table 3. Survey dates, times, and venues – New York City.**

The survey instrument was first initially developed in Qualtrics software, at the same time, hard copies were prepared and brought to the senior centers. At the end of each survey day, the completed survey form (hard copies) were brought back and the responses manually transcribed to Qualtrics.

#### 4.4. Survey Results – El Paso

A total of 458 responses were received. Of those, 229 were in the English version of the instrument and 229 were in the Spanish version of the instrument. The number of responses received for individual questions is summarized in **Table 4**.

The following sub-sections report the results obtained for each question. A full listing of all the responses are compiled and listed in Appendix B. The statements listed in Appendix B are deliberately not edited (including spelling or grammatical errors) in order to retain their real inputs. For each question, the responses in English and Spanish were analyzed separately.

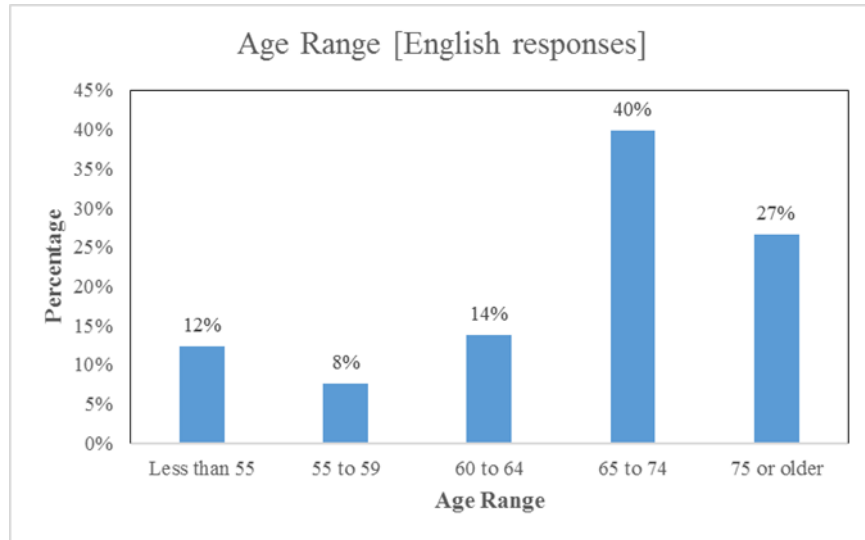
Question no.	Nature of question	No. of responses in English	No of responses in Spanish	Total no. of responses
1	Age	226	221	447
2	Gender	226	221	447
3	Employment status	219	212	431
4	Ethnicity	223	216	439
5	Language	229	229	458
6	Zip code	223	217	440
7	Type of residence	224	219	443
8	Impairment or disability	229	229	458
9	Electronic device used	229	229	458
10	Mobility assistance	229	229	458
11	Trip frequencies	214	219	433
12	Mode choice	214	219	433
13	Concern when planning a trip	229	229	458
14	Mobility challenge	155	144	299
15	Desired application functions	85	73	158
16	Motivation to use application	119	94	213
17	Data sharing	213	218	431

**Table 4. Number of survey responses – El Paso.**

#### 4.4.1. Question 1 – Age

*English – What is your age range?*

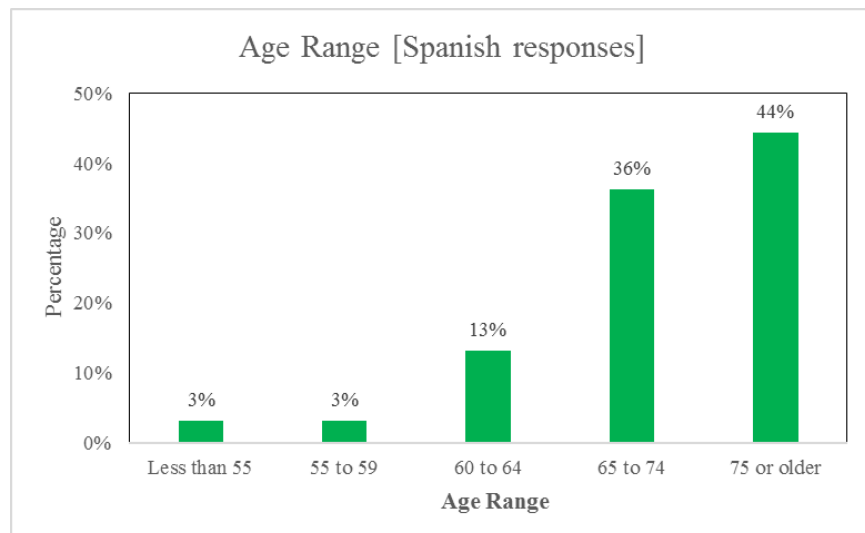
In this question, participants were asked to select the answer choice that included their age. The answer choices given were based on the age ranges in the definitions for seniors (i.e. 55 to 67), as reviewed in Section 2. The number of participants who answered this question (in English) was 226. As shown in **Figure 2**, the highest group was between the age of 65 and 74. This was followed by the age range of 75 and older.



**Figure 2. Age range [English responses] El Paso.**

*Spanish - ¿Qué edad tiene?*

The same question was asked in Spanish. As shown in **Figure 3**, of the 221 participants who responded to the Spanish version of the survey, the largest group was 75 years or older, followed by the age range of 65 to 74. It appeared that the participants who answered the Spanish version of the survey were older than those who answered the English version of the survey.

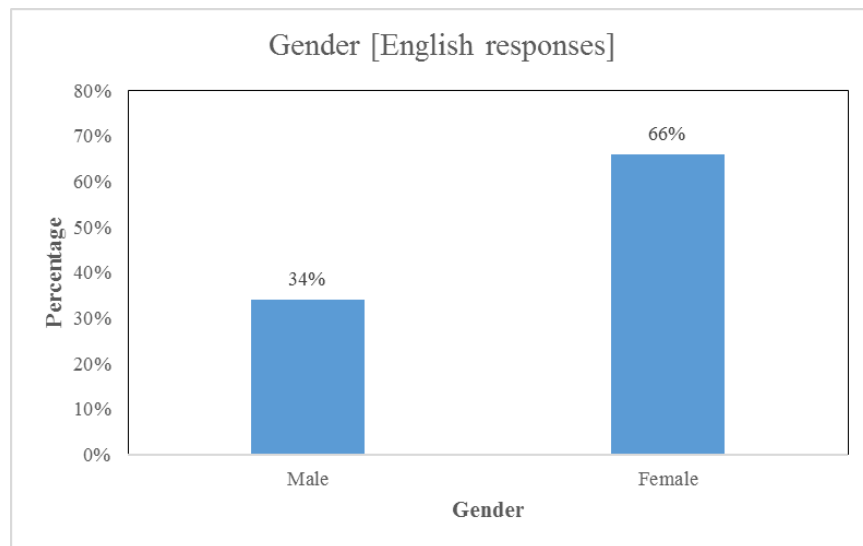


**Figure 3. Age range [Spanish responses] El Paso.**

#### 4.4.2. Question 2 – Gender

*English - What is your gender?*

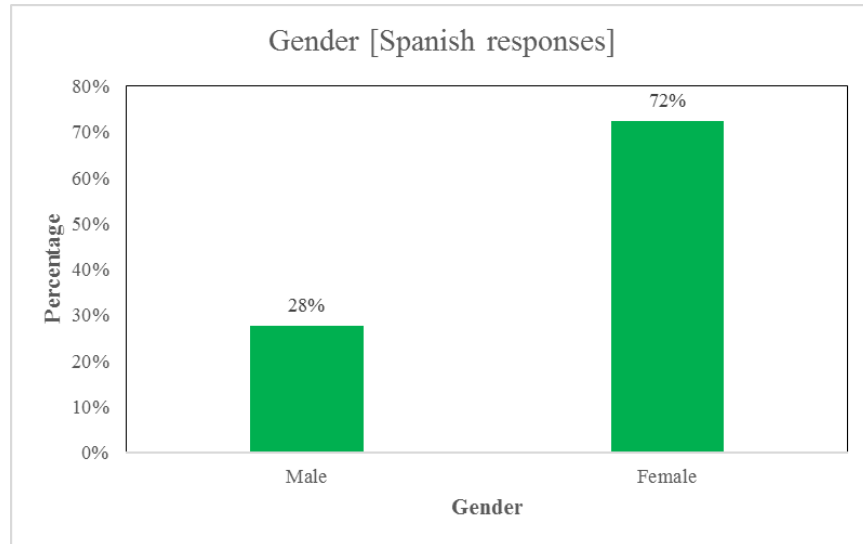
In this question, participants were asked to select the answer choice for their gender. There were only two answer choices: male or female. The results for the 226 responses collected in the English version of the survey for this question are presented in **Figure 4**. There were almost twice as many female participants as males.



**Figure 4. Gender [English responses] El Paso.**

*Spanish - ¿Cuál es su género?*

The same question was asked in Spanish, and 221 responses were collected. As shown in **Figure 5**, there were almost three times as many female participants as males.

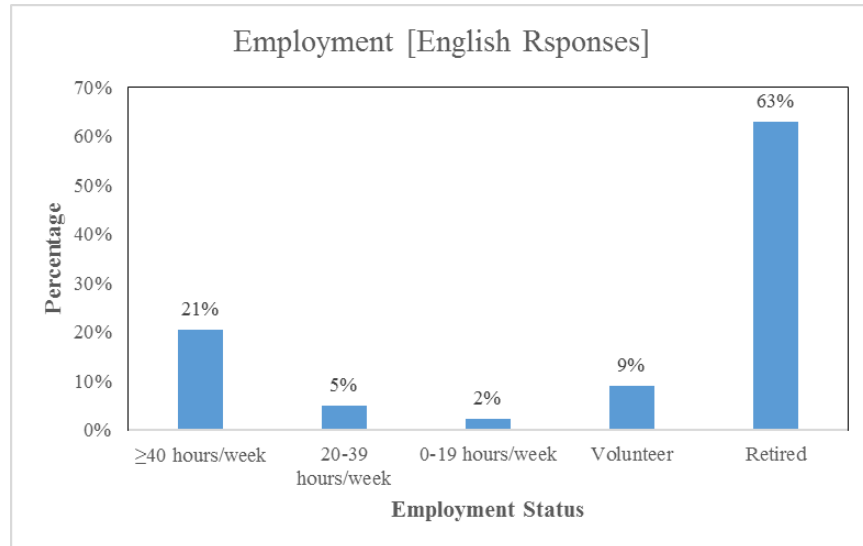


**Figure 5. Gender [Spanish responses] El Paso.**

#### 4.4.3. Question 3 – Employment Status

*English – What is your current employment status (optional)?*

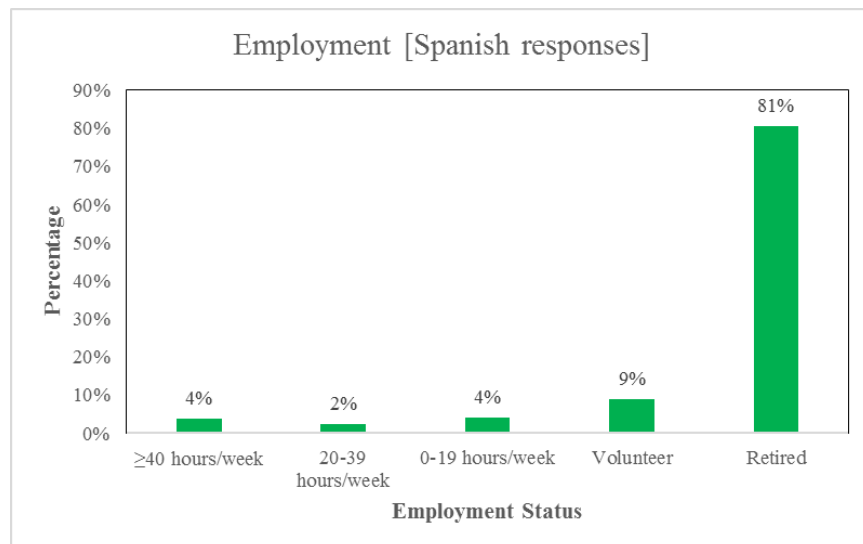
In order to reduce the length of the survey, as per the City of El Paso Parks and Recreation Department official's advice, this question was made optional. However, 219 participants still chose to answer this question. For this question, participants were asked to select the answer choice for their employment status. Each answer choice was a range of the number of working hours per week. Choices such as volunteer and retired were also given. The result of the English responses to this question is presented in **Figure 6**. A majority of the participants who answered the English version of the survey were retired, followed by those who have a full-time job (i.e. 40 hours or more per week with salary). These results are expected, as many of the seniors who frequent the senior centers were likely retired.



**Figure 6. Employment [English responses] El Paso.**

*Spanish - ¿Cuál es su situación laboral actual (opcional)?*

The same question was asked in Spanish, and 212 responses were collected. As shown in **Figure 7**, the majority of participants were retired, followed by those who work full-time with salary.

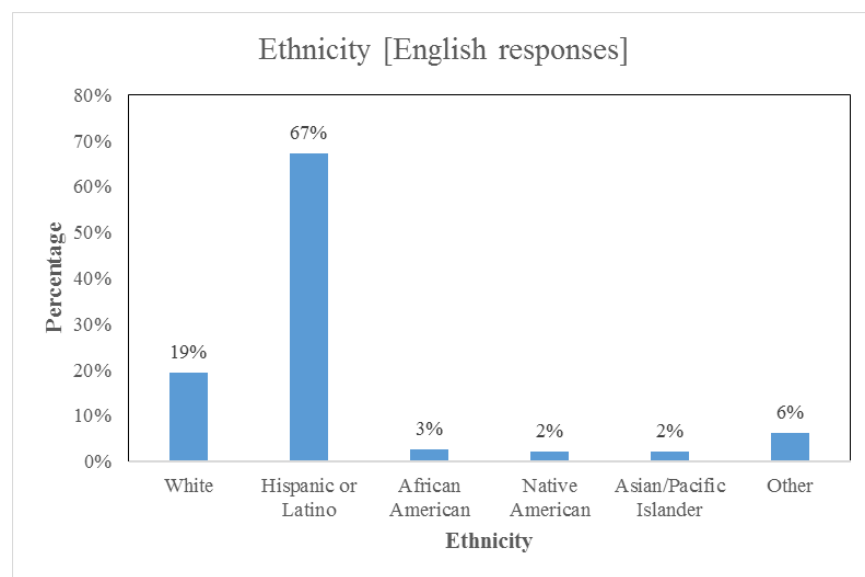


**Figure 7. Employment [Spanish responses] El Paso.**

#### 4.4.4. Question 4 – Ethnicity

*English – What is your ethnicity (optional)?*

This question asked the ethnicity of the survey participant and was the second optional question in the survey. There were 223 responses. The results for the participants who answered the English version of the survey are presented in **Figure 8**. The majority of participants reported being Hispanic or Latino, followed by White. This result is expected, given the geographical location of El Paso near the Mexican border.

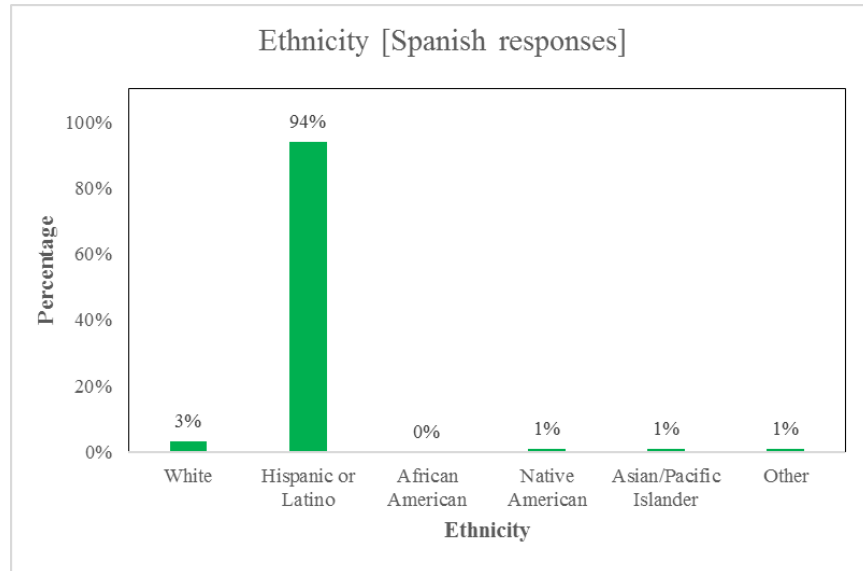


**Figure 8. Ethnicity [English responses] El Paso.**

*Spanish - ¿Cómo se identifica? (etnia/raza) (opcional)?*

The same question was asked in Spanish, and there were 216 responses. As shown in **Figure 9**, the majority of participants were Hispanic or Latino, followed by White.



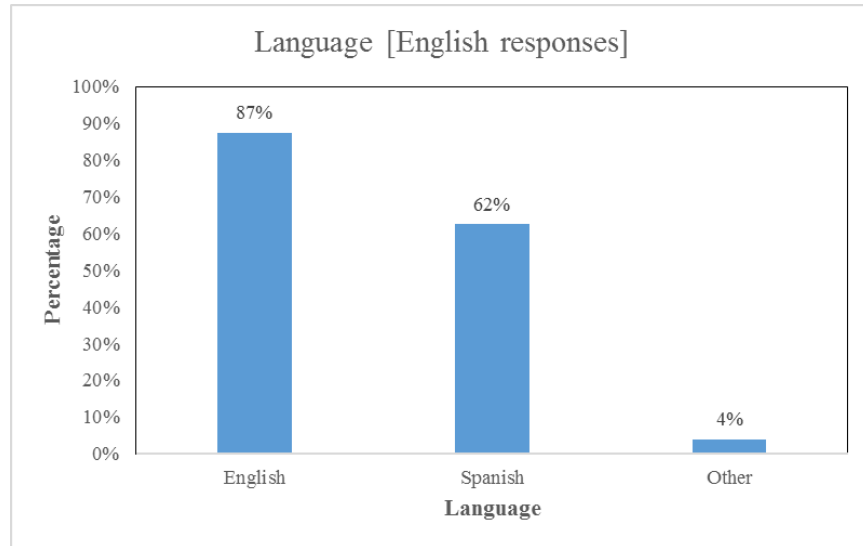


**Figure 9. Ethnicity [Spanish responses] El Paso.**

#### 4.4.5. Question 5 – Languages

*English – What languages are you able to understand, speak, and write with confidence? (You may select more than one).*

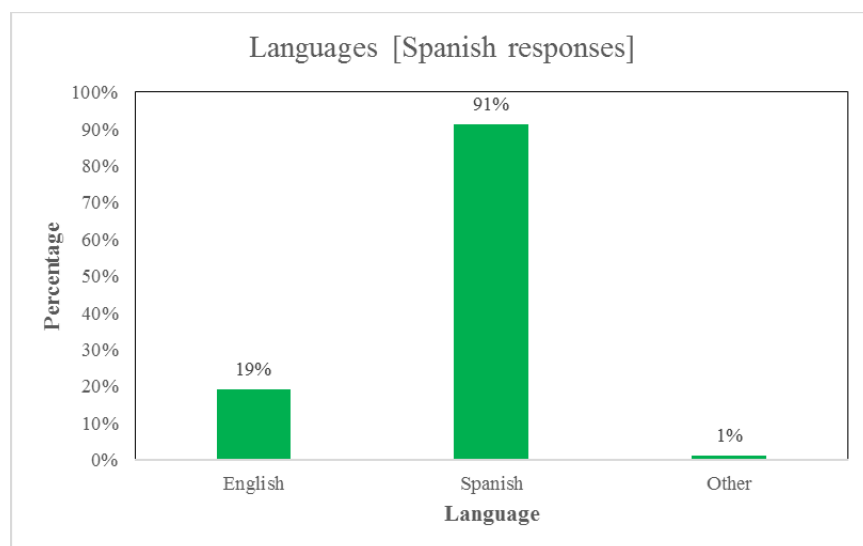
This question asked what language the participant was able to use with confidence. The purpose of this question was to determine which language(s) to use in the smartphone application’s interface. The results for the 229 English responses are presented in **Figure 10**. As expected, the majority of participants who responded to the English version of the survey reported speaking English with confidence, with a smaller percentage who could also speak Spanish with confidence. The Other category responses included, among others, German, French, Sign Language, and Hebrew.



**Figure 10. Languages [English responses] El Paso.**

*Spanish - ¿En qué idioma(s) se comunica con confianza? (entiende, habla, y escribe) (Puede seleccionar más de una respuesta.).*

The same question was asked in Spanish, and there were 229 responses. As shown in **Figure 11**, the majority of participants who responded in the Spanish version of the survey reported speaking Spanish with confidence, followed by those who could also speak English with confidence. The Other category responses only included Sign Language.

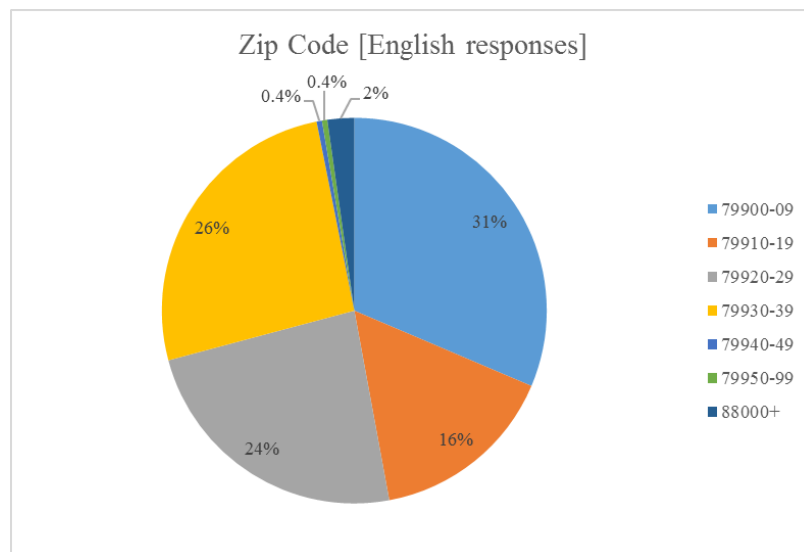


**Figure 11. Languages [Spanish responses] El Paso.**

#### 4.4.6. Question 6 – Zip Code

*English – What is the zip code of your residential address?*

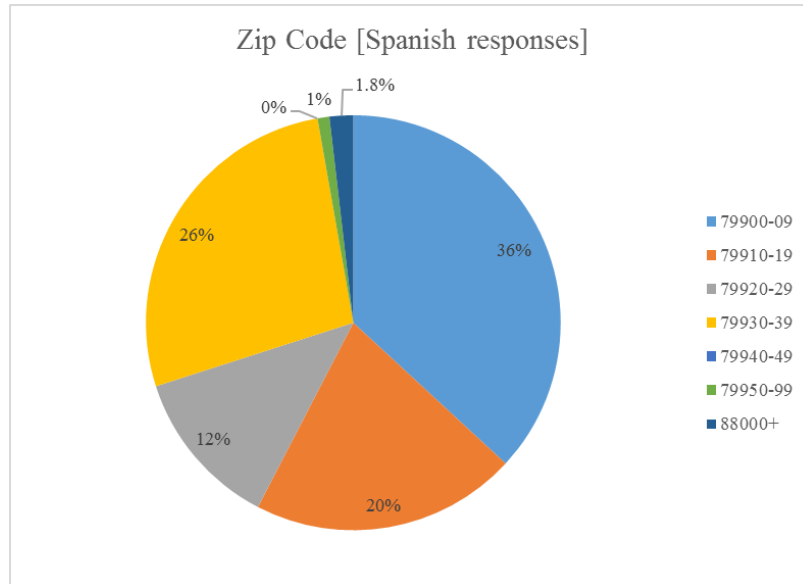
This question asked what zip code the participant lived in. The purpose of this question is to: (i) verify all areas of El Paso are represented; and (ii) determine what areas of El Paso the potential users live in, so that the initial content of the smartphone application may concentrate on those zip codes. The results of the 223 participants who answered the English version of the survey are presented in **Figure 12**. Virtually all zip codes in El Paso were represented, as well as some in New Mexico (i.e. zip codes greater than 88000).



**Figure 12. Zip code [English responses] El Paso.**

*Spanish – ¿Cuál es el código postal del lugar donde vive?*

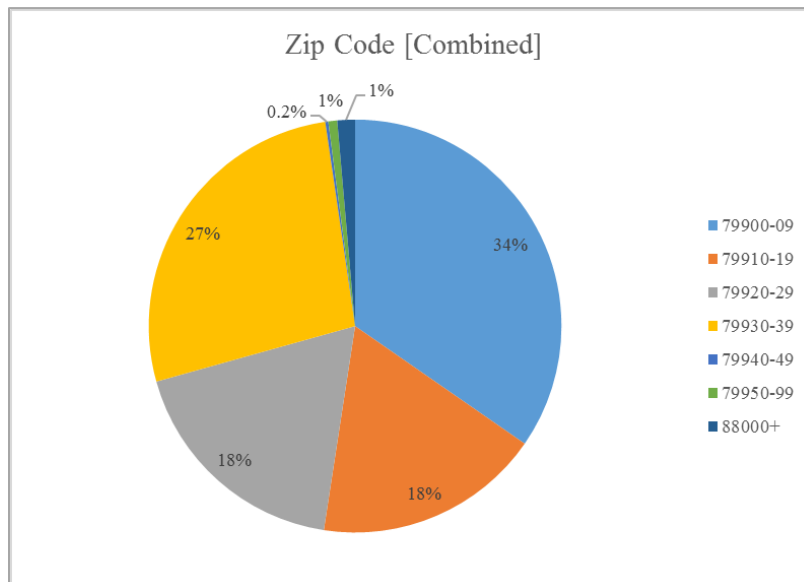
The same question was asked in Spanish, and there were 217 responses. As shown in **Figure 13**, virtually all zip codes in El Paso were represented, as well as New Mexico.



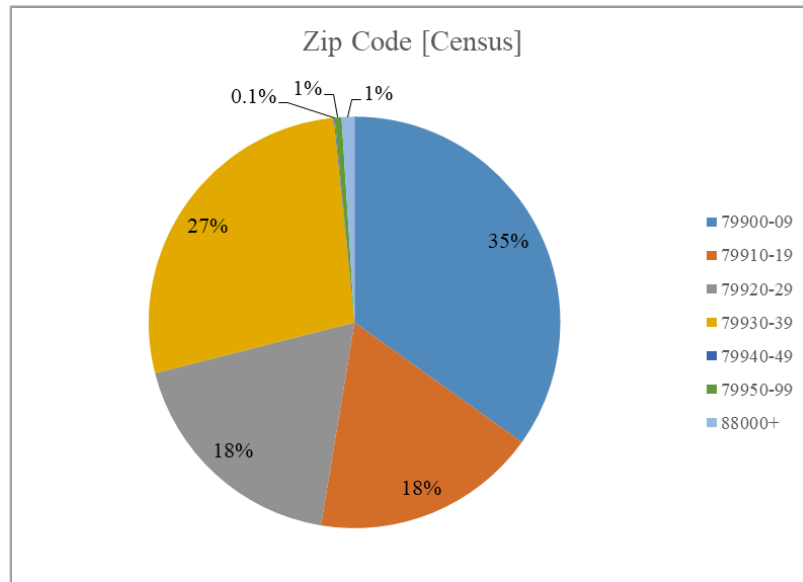
**Figure 13. Zip code [Spanish responses] El Paso.**

#### *Total*

The combined results from both the English and Spanish responses for this question (440 responses) are presented below in **Figure 14**. **Figure 14** provides justification that all areas of El Paso were represented for this survey.



**Figure 14. Zip code [all responses] El Paso.**



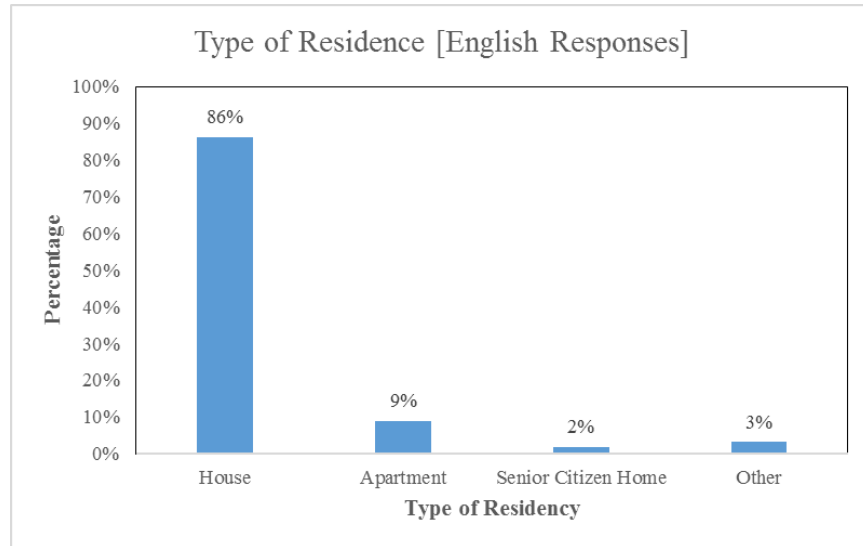
**Figure 15. Zip code [US Census data 2010 for El Paso seniors]**

In order to understand the spread of the data collection, the zip codes of the respondents are compared to the US-Census data for El Paso. The percent distribution of the survey respondents and the census information of population who are above 65 years old are listed according to the zip codes. The Census data information plotted in **Figure 15** above. As shown, the survey respondents are perfectly distributed compared to El Paso census data.

#### 4.4.7. Question 7 – Type of Residency

*English – How would you describe your type of residence?*

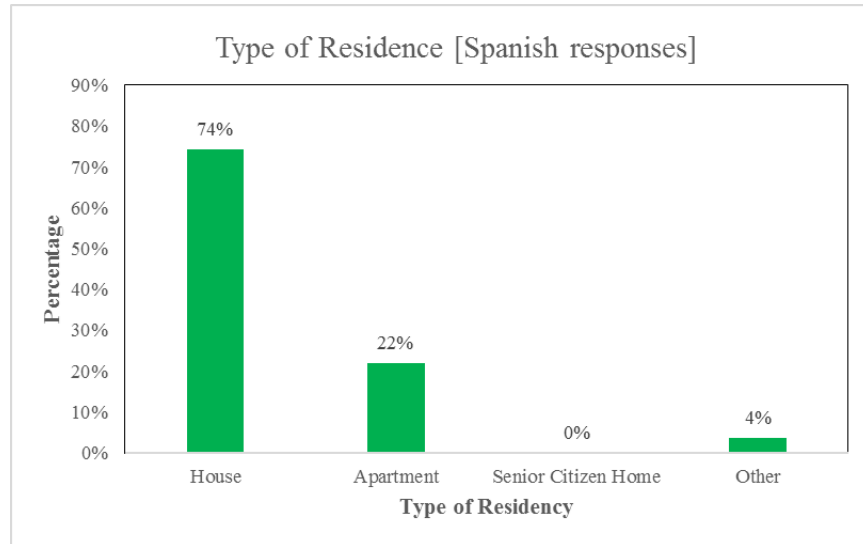
This question asked the participant to select the answer choice for their type of residence. The purpose of this question was to gain a better understanding of the independence of the seniors. The results for the 224 participants who answered the English version of the survey are presented in **Figure 16**. The majority of participants who answered the English version of the survey reported living in houses, followed by apartments. Very few respondents reported living in senior citizen homes. Other category responses included living with a relative or friend, a mobile home, and homeless. These results are expected, as much of the surveys were conducted at the senior centers, places where mobile and independent seniors frequently visit.



**Figure 16. Type of residency [English responses] El Paso.**

*Spanish – ¿Cómo describe su tipo de residencia?*

The same question was asked in Spanish, and there were 219 responses. As shown in **Figure 17**, the majority of participants who answered the Spanish version of the survey reported that they live in a home, followed by those who live in an apartment. There was a greater percentage of participants who answered the Spanish version of the survey who reported living in an apartment, as compared to participants who answered the English version of the survey. There was no participant who lived in a senior citizen home. Other category responses included living with a relative or friend, a mobile home, and military housing.

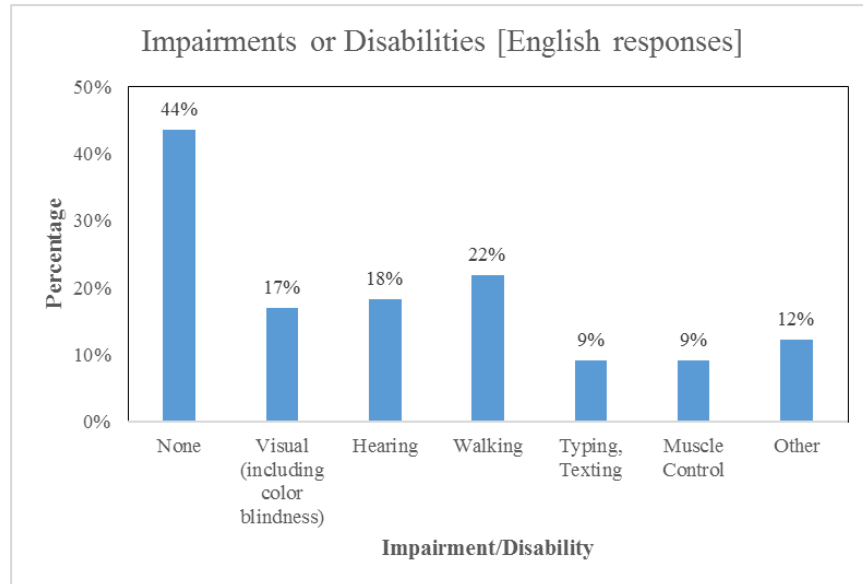


**Figure 17. Type of residency [Spanish responses] El Paso.**

#### 4.4.8. Question 8 – Impairments and Disabilities

*English – Do you have any of the following impairments or disabilities? (You may select more than one answer)*

This question asks the participant to choose all applicable answer choices for the impairments and disabilities that they may have. The purpose of this question was to gain a better understanding of the impairment and disability needs of the seniors. The results for the 229 participants who answered the English version of the survey are presented below in **Figure 18**. Slightly less than half of the participants who answered the English version of the survey reported having no impairment or disability, followed by those with trouble walking. It should be noted that every disability type was checked by at least 5% of the participants who answered the English version of the survey. Other impairments or disabilities included memory loss, arthritis, and fatigue.

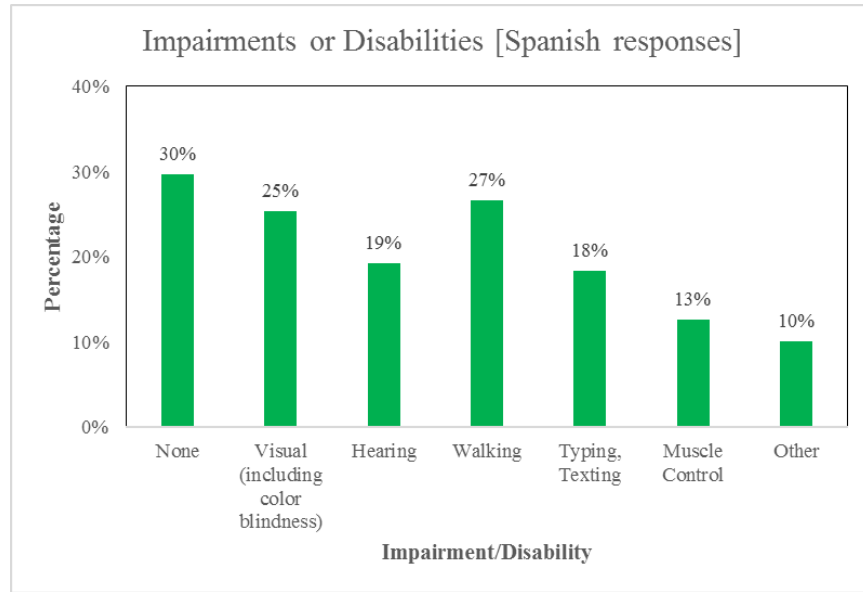


**Figure 18. Impairments/disabilities [English responses] El Paso.**

Spanish – Indique si tiene alguna discapacidad de la siguiente lista (Puede seleccionar más de una respuesta)

The same question was asked in Spanish, and there were 229 responses. As shown in **Figure 19**, approximately one-third of the responses reported having no impairment or disability. This percentage was lower than those who did the English version of the survey. It should be noted that similar to the English-responses, every disability type was reported by at least 5% of participants who answered the Spanish version of the survey. The Other category included high blood pressure and the ability to understand new information due to age.





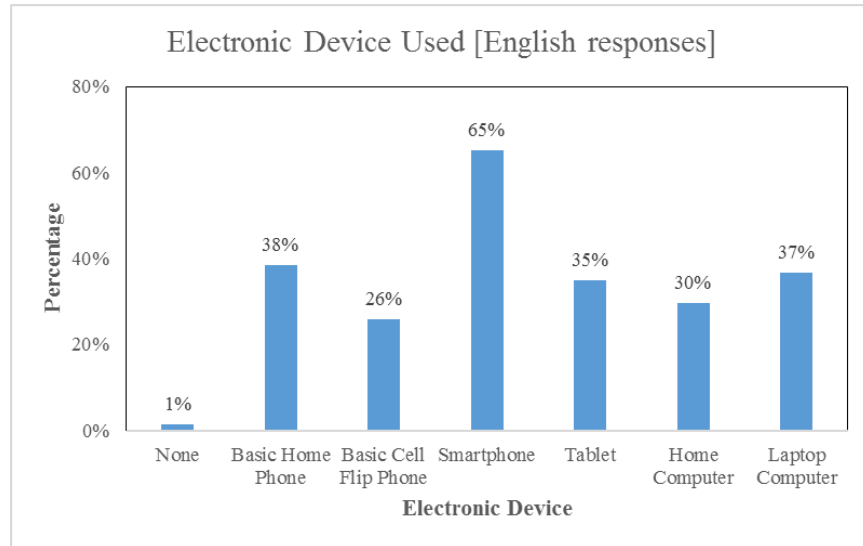
**Figure 19. Impairments/disabilities [Spanish responses] El Paso.**

#### 4.4.9. Question 9 – Electronic Device Used

This question consisted of two sub-questions.

*English – Do you use any of the following electronic devices? (You may select more than one answer)*

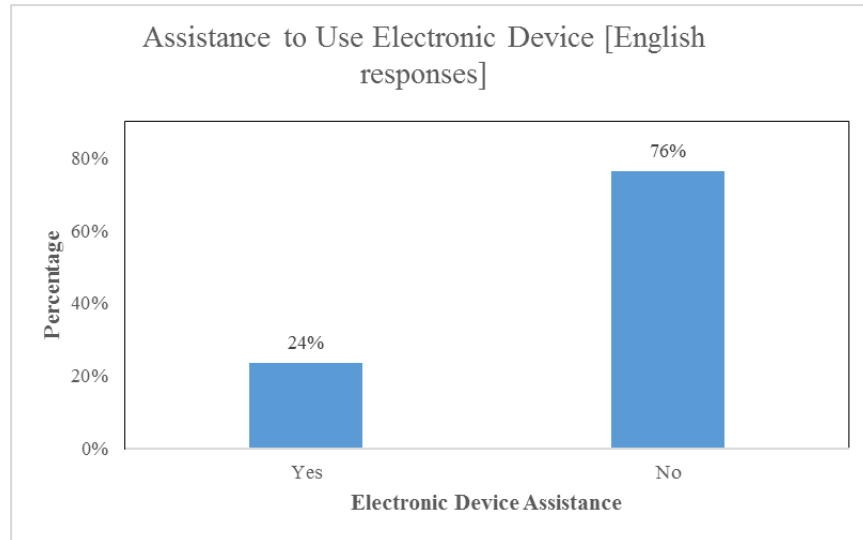
This question provided a different electronic device for each answer choice and asked the respondent to select all answer choices for the electronic devices that they use. The purpose of this question was to gain a better understanding of the market for the proposed application. If a majority of seniors do not even own or use a smartphone for example, then it is likely that the application will not be used, as there is no market for it. Fortunately, for the 229 participants who answered the English version of the survey, approximately two-thirds of seniors use a smartphone, as presented in **Figure 20**. Furthermore, virtually all seniors used at least one electronic device, as only 1% of participants who answered the English version of the survey reported using no electronic device at all.



**Figure 20. Electronic device use [English responses] El Paso.**

English – If you selected one or more options, do you need assistance using these devices?

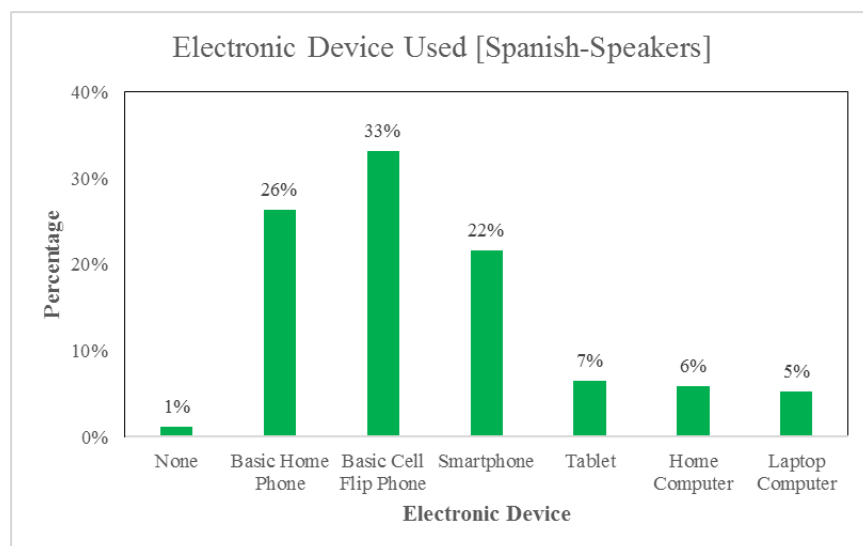
This question was a follow-up question to the question of electronic device usage. This question asked the participants who used at least one device if they require assistance to use such device(s). The purpose of this follow-up question was to gain a further understanding of their familiarity with the devices. The results of the 224 participants who answered the English version of the survey are presented in **Figure 21**. Over three-quarters of participants reported that they do not require assistance to use electronic devices. The remaining 24% need assistance. This indicates that this segment of the seniors may need some training, or their caregivers may be the users. It should be noted that this question asks the senior directly if they require assistance; therefore, the results for this part of the question are biased. For example, if a senior believes they do not require assistance to use their smartphone, but they can only perform the most basic of tasks, they do require assistance to operate the smartphone altogether; however, that is not reflected in these survey results.



**Figure 21. Electronic device assistance [English responses] El Paso.**

*Spanish – ¿Usa algún teléfono o equipo electrónico para comunicarse de la siguiente lista (Puede seleccionar más de una respuesta)?*

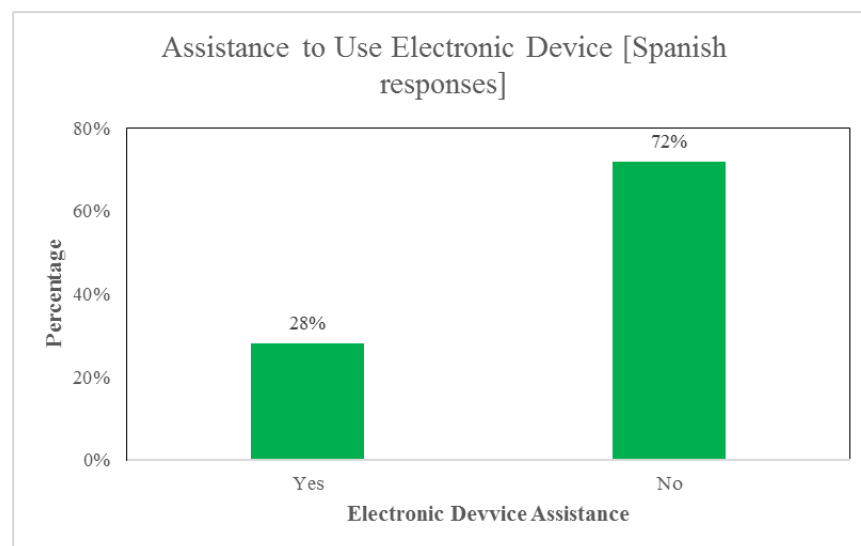
The same questions regarding electronic device use were asked in Spanish, and there were 229 responses. As shown in **Figure 22**, only one-third of the participants who answered the Spanish version of the survey reported that they use a smartphone. Approximately half of the Spanish speaking respondents reported that they use a basic cell phone (flip phone).



**Figure 22. Electronic device use [Spanish responses] El Paso.**

*Spanish – Si selecciono alguna de las opciones anteriores, ¿necesita el apoyo de alguna persona para usar estos equipos electrónicos?*

The same follow-up question regarding assistance to use the electronic device was asked in Spanish, and there were 217 responses. As shown in **Figure 23**, almost three-quarters of participants reported that they do not require assistance to use their electronic devices.



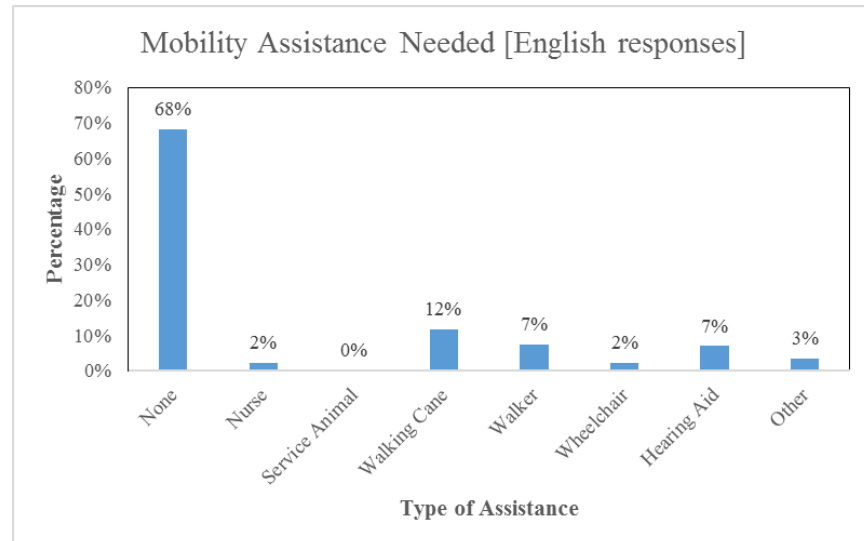
**Figure 23. Electronic device assistance [Spanish responses] El Paso.**

#### 4.4.10. Question 10 – Mobility Assistance

*English – Do you need any assistance when you make a trip to the city? (You may select more than one answer)*

This question provided different assistance types for each answer choice and asked the respondent to select all answer choices for the types of assistance they use when making a trip. For this question, a “trip” is defined as a one-way journey of at least ¼ mile from an origin to a destination. The purpose of this question is to determine what types of assistance the seniors require when they travel. If a majority of seniors need a wheelchair when they travel, for example, this should be incorporated into the mobile application accordingly. The results for the 229 participants who answered the English version of the survey is presented in **Figure 24**. A majority of seniors do not require any assistance when making a trip. Among the types of assistance needed, walking cane was most frequently used. These results are expected, as many of the seniors were surveyed at a senior center, a place where mobile, independent seniors frequently visit. It should be noted that the question asks the senior directly for their perception of assistance needed. Many seniors might report that they do not require any assistance when they really

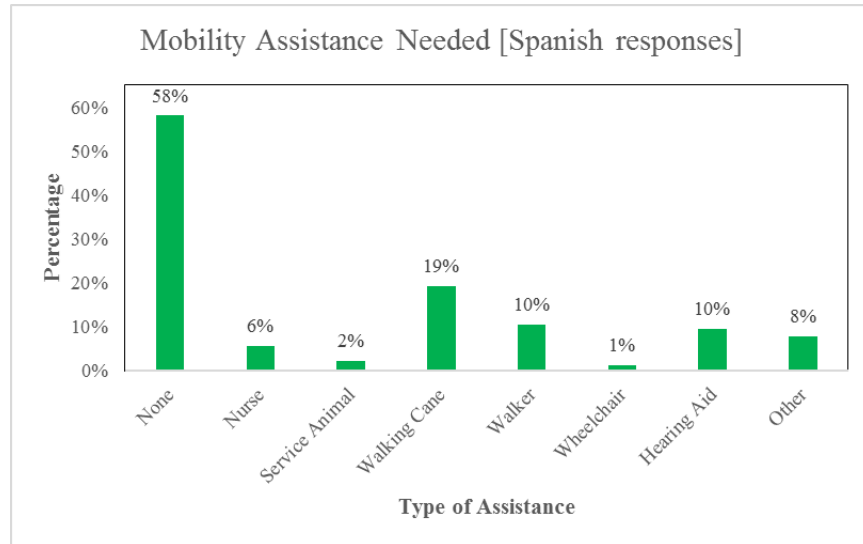
do require help from a spouse or family member. This was addressed in the other category answer choice. Some of the other choices are a sister, limited walking, and an escort.



**Figure 24. Mobility assistance needed [English responses] El Paso.**

*Spanish – Indique si necesita el apoyo de alguna de las siguientes opciones cuando realiza un viaje (Puede seleccionar más de una opción).*

The same question was asked in Spanish, and there were 229 responses. As shown in **Figure 25**, more than half of the participants who answered the Spanish version of the survey reported that they do not require assistance when making a trip within the city. Among the types of assistance needed, walking cane was most frequently used. The other category included glasses, spouses, and family members.



**Figure 25. Mobility assistance needed [Spanish responses] El Paso.**

#### 4.4.11. Question 11 – Trip Frequencies

English – How many times do you visit the following places in a week? (One answer per row)

This question was in tabular form and asked the participant to report the approximate number of times per week that they visit various places. The purpose of this question was to determine the frequency of the trips made by seniors on a weekly basis so that the navigation function of the smartphone application can prioritize the destinations. The results for the participants who answered the English version of the survey is presented in **Table 5**. Each row in the table should sum up to 100%. This question received 214 responses in the English version of the survey. All of them provided the trip frequencies for every destination.

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Work Place	70%	1%	3%	22%	5%
Volunteering Place	55%	13%	14%	16%	2%
Family Member, Relative, or Friend	9%	24%	46%	13%	8%
Grocery Store, Market, or Retail Shop	6%	21%	57%	12%	4%
Healthcare Facility, or Pharmacy	14%	67%	13%	5%	1%
Senior Center, Library, Park, or Gym	19%	16%	27%	33%	6%
Civic or Religious Center	23%	27%	44%	3%	2%
Restaurant, Coffee Shop, Diner	7%	30%	49%	10%	4%
Bank, ATM, or offices	14%	58%	23%	5%	0%

**Table 5. Trip frequencies [English responses] El Paso.**

A majority of the participants who answered the English version of the survey reported that they did not work or volunteer, as many were retired. Close to half the participants who answered the English version of the survey reported that they visited family members, relatives or friends one to three times a week. Similar percentages of the participants also visited the grocery store, market, retail shop, restaurant, coffee shop, diner, and a civic or religious center once to three times per week. A majority of them went to a healthcare facility, pharmacy, bank, ATM, or an office less than once per week.

*Spanish – ¿Cuántas veces a la semana visita los siguientes lugares (Seleccione una respuesta por línea)?*

The same question was asked in Spanish. The results for the participants who answered the Spanish version of the survey are presented below in **Table 6**. This question received 219 responses in the Spanish version of the survey. All of them provided the trip frequencies for every destination.

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Work Place	89%	2%	1%	6%	2%
Volunteering Place	63%	5%	14%	16%	2%
Family Member, Relative, or Friend	20%	20%	42%	13%	6%
Grocery Store, Market, or Retail Shop	9%	21%	53%	13%	4%
Healthcare Facility, or Pharmacy	16%	61%	14%	5%	4%
Senior Center, Library, Park, or Gym	11%	5%	24%	50%	11%
Civic or Religious Center	27%	17%	52%	3%	1%
Restaurant, Coffee Shop, Diner	21%	31%	38%	6%	5%
Bank, ATM, or offices	28%	50%	18%	3%	1%

**Table 6. Trip frequencies [Spanish responses] El Paso.**

A majority of the participants who answered the Spanish version of the survey reported that they did not go to a workplace or places they volunteered to help. The percentages are higher than those participants who answered the English version of the survey. The frequency distributions of the visits to the various places, especially the most frequently reported number of visits per weeks to the same destinations, appeared to be the same between the participants who answered the English and Spanish versions of the survey.

#### 4.4.12. Question 12 – Modes of Transportation

*English – How many times do you use each of the following means of transportation in one week? (Select one answer per row). Count a round-trip as two separate one-way trips. If one-way consists of bus followed by a taxi, count both of them as one trip.*

This question is also in tabular form and asked the participants to report the approximate number of times per week that they used various modes of transportation. The purpose of this question was to determine the frequency of each mode of transportation used by seniors on a weekly basis. The result for the participants who answered the English version of the survey is presented below in **Table 7** Error! Reference source not found.. This question received 214 responses in the English version of the survey. All of them provided the trip frequencies for every destination.



	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
<b>Walking More Than 1/4 Mile</b>	37%	18%	23%	11%	11%
<b>Bicycle</b>	89%	5%	4%	1%	0%
<b>Motorcycle/Scooter</b>	96%	0%	2%	0%	1%
<b>Car (as Driver)</b>	19%	4%	7%	16%	54%
<b>Car (as Passenger)</b>	35%	23%	20%	13%	8%
<b>Carpool (as Driver or Passenger)</b>	79%	8%	6%	4%	3%
<b>Public Bus</b>	75%	12%	5%	3%	4%
<b>Special Bus (e.g. Lift)</b>	91%	3%	2%	3%	0%
<b>Taxi</b>	94%	6%	0%	0%	0%
<b>Rideshare (e.g. Uber)</b>	94%	4%	1%	0%	0%

**Table 7. Modes of transportation [English responses] El Paso.**

A majority of the participants reported that they never use bicycle, motorcycle, carpool, bus, taxi and rideshare as their modes of transportation. Of those who traveled by car, a majority of them drove every day,

*Spanish – ¿Cuántas veces usa cada uno de los siguientes medios de transporte en una semana (Selecciona una respuesta por línea)? Un viaje de ida y vuelta cuenta como dos viajes separados. Si un viaje de ida consiste en un autobús seguido de un taxi, cuente ambos como uno solo.*

The same question (in tabular form) was asked in Spanish. The results for the participants who answered the Spanish version of the survey are presented below in **Table 8**. This question received 219 responses in the Spanish version of the survey. All of them provided the trip frequencies for every destination. The distributions of trip frequencies for each mode of transportation appeared similar to those participants who answered the English version of the survey.

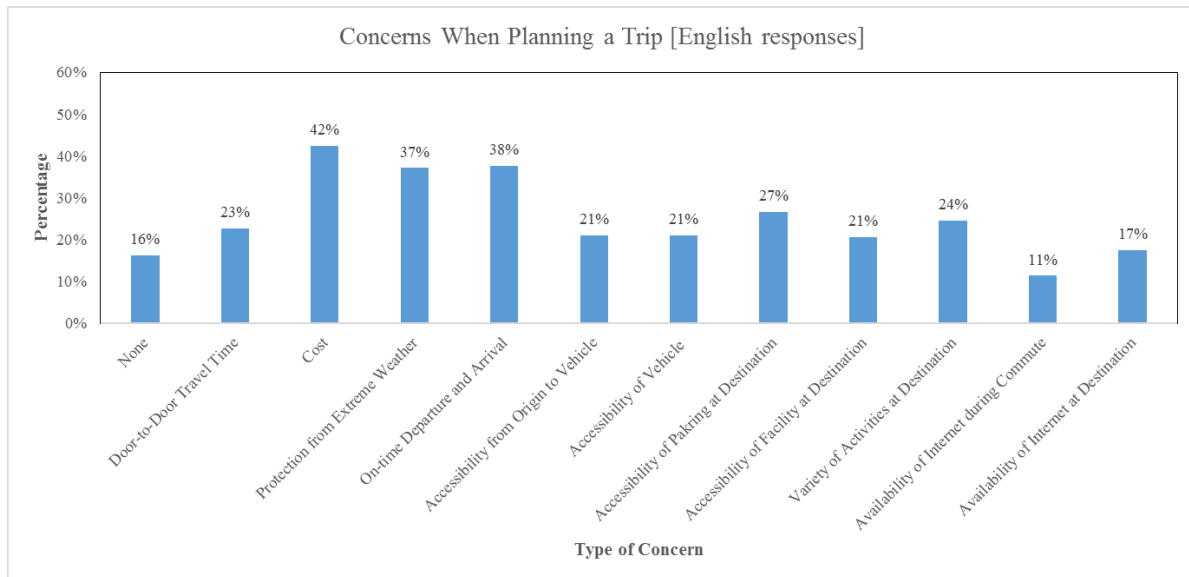
	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Walking More Than 1/4 Mile	45%	9%	21%	11%	14%
Bicycle	94%	0%	3%	1%	1%
Motorcycle/Scooter	99%	0%	0%	1%	0%
Car (as Driver)	42%	3%	5%	13%	37%
Car (as Passenger)	49%	9%	17%	10%	15%
Carpool (as Driver or Passenger)	79%	4%	9%	5%	3%
Public Bus	68%	10%	9%	5%	9%
Special Bus (e.g. Lift)	88%	5%	3%	2%	1%
Taxi	96%	3%	0%	0%	0%
Rideshare (e.g. Uber)	96%	3%	0%	0%	0%

**Table 8. Modes of transportation [Spanish responses] El Paso.**

#### 4.4.13. Question 13 – Concerns When Making a Trip

*English – What is your main concern when planning a trip? (You may select more than one answer)*

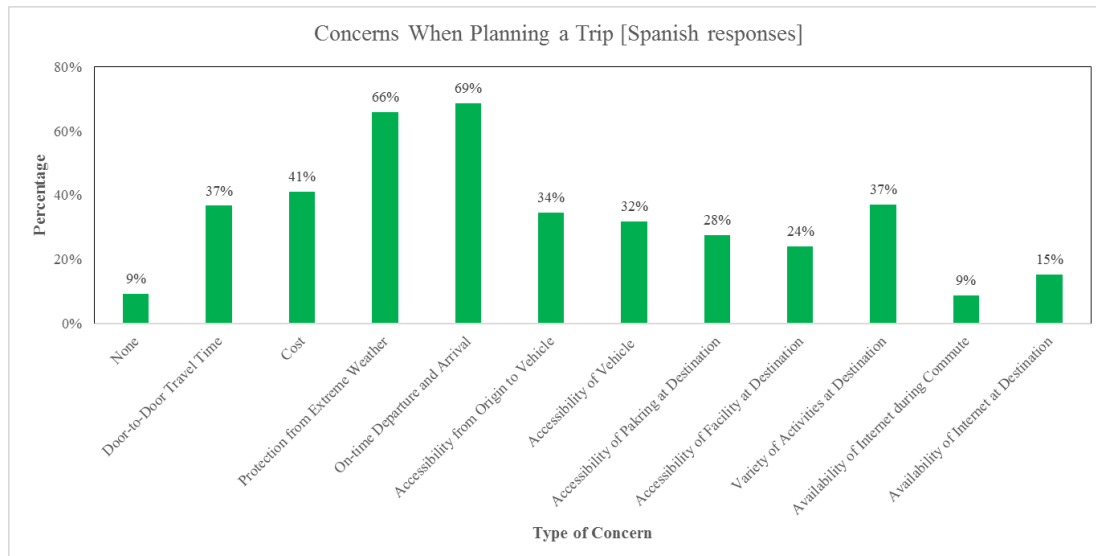
This question provided a common concern when planning a trip for each answer choice and asked the respondent to select all answer choices for their main concerns, so the smartphone application can be developed to address such concerns. In the question, the participants were provided with a list of 10 concerns. They may select any number of concerns from the list. There are 229 responses to this question, and the percentage of participants who have similar concerns is plotted in **Figure 26**. The most frequently mentioned concerns were cost, followed by on-time departure, and protection from extreme weather. This indicates that seniors: (i) base their trips on cost (e.g. closer destinations, inexpensive modes of transportation, etc.), (ii) are concerned with on-time departure and arrival; and (iii) base their trips on the current weather.



**Figure 26. Concerns when planning a trip [English responses] El Paso.**

Spanish – ¿Qué es importante para usted cuando planea un viaje (Puede seleccionar más de una respuesta)?

The same question was asked in Spanish, and there were 229 responses. The results for the Spanish-speaking respondents are plotted below in **Figure 27**. The participants who answered the Spanish version of the survey reported that on-time departure, followed by protection from extreme weather, were the main concerns. The Spanish-speaking respondents are more concerned with on-time departure and arrival than the English-speaking respondents.

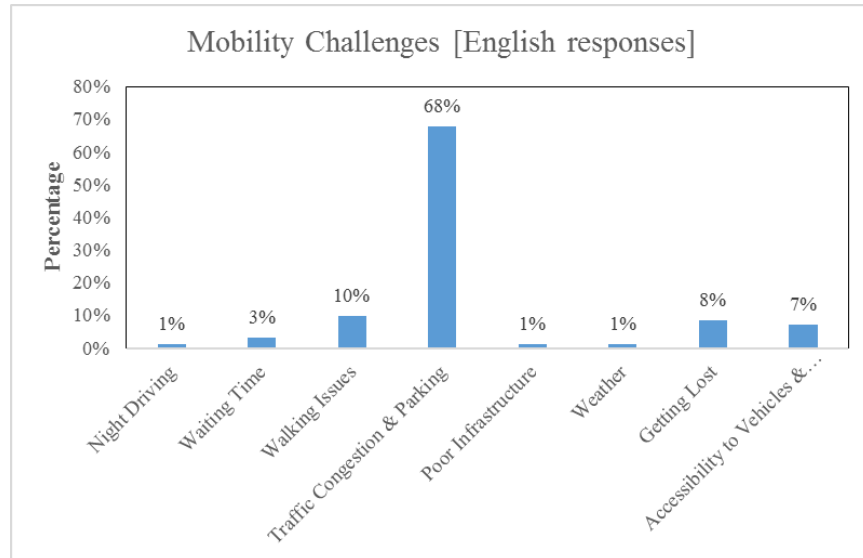


**Figure 27. Concerns when planning a trip [Spanish responses] El Paso.**

#### 4.4.14. Question 14 – Mobility Challenges

*English – Describe your biggest challenge when you commute in the city.*

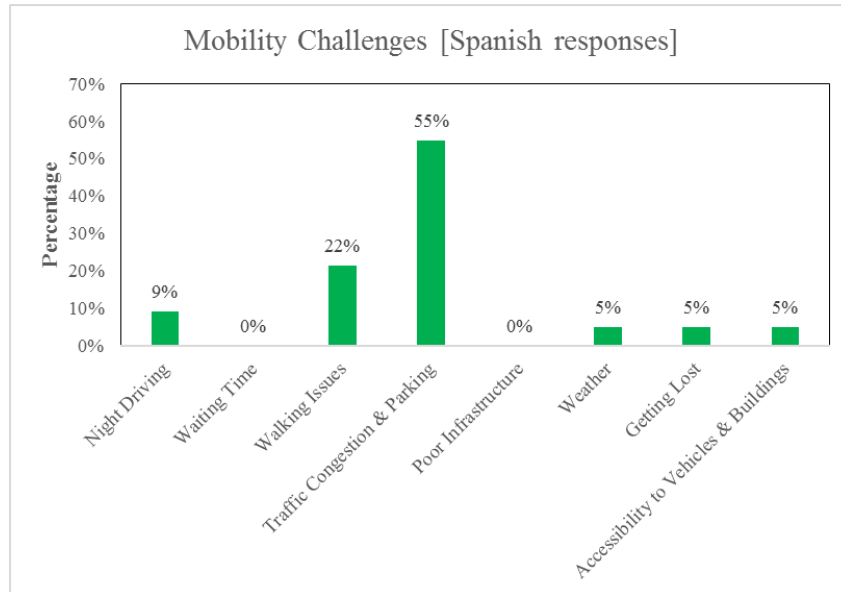
This is an open-ended question, which asked the participant to write down their biggest challenges when they travel in the city. The purpose of this question was to determine which mobility issues were faced by seniors. The results for the participants who answered the English version of the survey are presented below in **Figure 28**. 155 participants answered this question in the English version of the survey. Their written answers were organized into categories and the percentage of the participants who reported challenges in each category out of the 155 written responses was calculated and plotted in **Figure 28**. Traffic congestion and parking was the most frequently reported challenge they faced. There are 45 responses which are not included, as the participant either did not have any challenges or did not provide an applicable answer (e.g. “N/A”).



**Figure 28. Mobility challenges [English responses] El Paso.**

*Spanish – Mencione cuál es el mayor reto que enfrenta cuando viaja en la ciudad.*

The same question was asked in Spanish, and there were 144 responses, as shown in **Figure 29**. The most frequently reported challenges are traffic congestion and parking, walking issues, and night-time driving. There are 37 responses which are not included, as the participant either did not have any challenges or did not provide an applicable answer (e.g. “N/A”). In general, the responses for the English and Spanish versions were relatively the same.

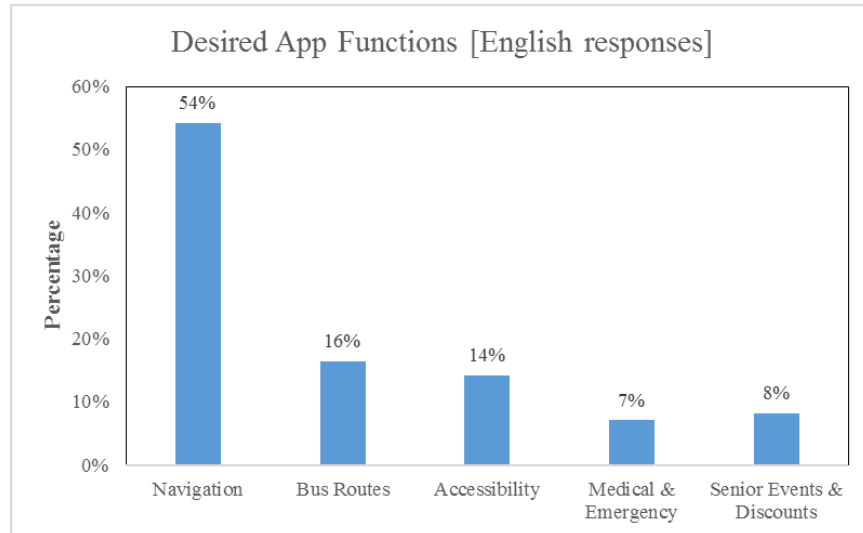


**Figure 29. Mobility challenges [Spanish responses] El Paso.**

#### 4.4.15. Question 15 – Key Application Functions for Seniors

*English – What is one function you would like to see in a mobile application (or App) that would cater to seniors needs?*

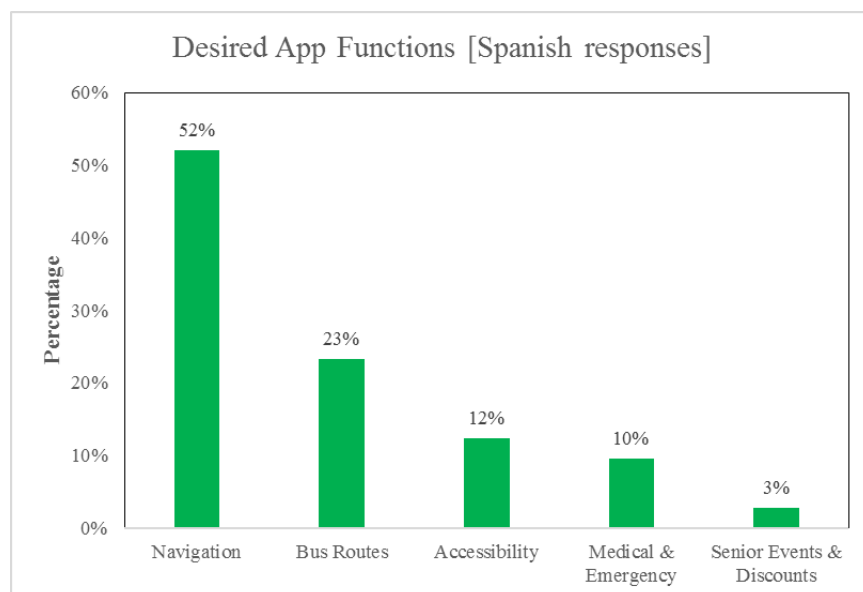
This is an open-ended question, which asked the participant to write the most important function they would like to have in a smartphone application. The purpose of this question is to determine what functions the smartphone application for seniors should have. The results for the participants who answered the English version of the survey is presented below in **Figure 30**. There are 85 participants who answered the English version of the survey who reported at least one function they would like to have. The most frequently stated functions are traffic conditions and navigation, followed by bus routes and accessibility provided by infrastructure.



**Figure 30. Desired application functions [English responses] El Paso.**

*Spanish – ¿Qué función o característica le gustaría ver en una aplicación móvil específica para adultos mayores?*

The same question was asked in Spanish. 73 participants who answered the Spanish version of the survey wrote down the functions they would like to have in a smartphone application. The written answers were organized and plotted in **Figure 31**. The most commonly desired functions were navigation, followed by bus routes.



**Figure 31. Desired application functions [Spanish responses] El Paso.**

#### 4.4.16. Question 16 – Motivation to Use Application

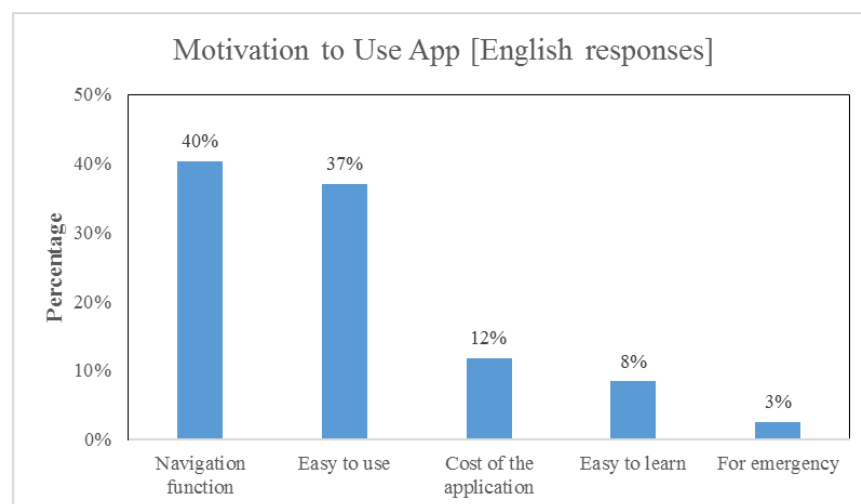
*English – If you were offered to use a mobile application (or App) that is designed to assist seniors to find places and commute, what would motivate you to use the application?*

This is an open-ended question, which asks the participant to state the factor(s) that would motivate them to use an application that is designed specifically for their mobility needs. The purpose of this question is to gain a better understanding of what would motivate a senior to want to use the proposed smartphone application. The results for the participants who answered the English version of the survey is presented below in **Figure 32**.

119 participants who answered the English version of the survey wrote down at least one reason that would motivate them to use the smartphone application. There were 80 participants who did not provide an answer because they do not own a smartphone. The most frequently cited reasons are, in decreasing order of frequency:

1. The navigation function;
2. The application was easy to use and accessible;
3. The cost of the application was low;
4. The application was easy to learn;
5. They needed the application to use in emergency situations.

The above reasons may be divided into motivation related to the application's functions (navigation, emergency) and motivations related to the application's features (easy to use, low cost, easy to learn).

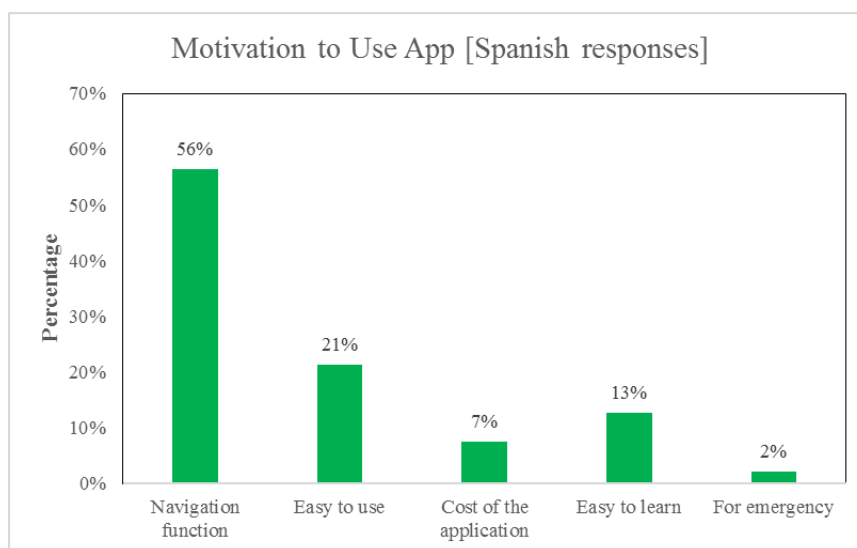


**Figure 32. Motivation to use smartphone application [English responses] El Paso.**



*Spanish – Si hubiera una aplicación móvil para ayudar a adultos mayores a encontrar lugares de interés y viajar en la ciudad, ¿Qué le motivaría a usar dicha aplicación?*

The same question was asked in Spanish. For the participants who answered the Spanish version of the survey, 94 of them reported at least one motivation. There were 118 participants who did not provide an answer because they do not own a smartphone. The most common answers, plotted in **Figure 33**, were similar to the motivations as shown in **Figure 32**. The only minor difference was relatively more participants who answered the Spanish version of the survey would use the application if it was easy to learn.



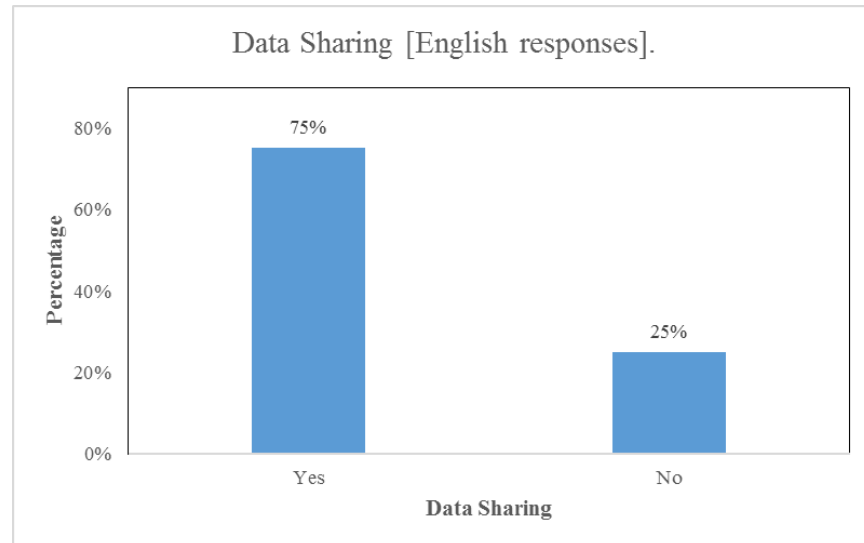
**Figure 33. Motivation to use smartphone application [Spanish responses] El Paso.**

#### 4.4.17. Question 17 – Data Sharing

*English – If you were a user of an App designed to assist seniors to find places and commute, would you be willing to anonymously share your data (e.g. location, route, means of transportation) to improve the services offered by to users (including yourself)?*

This question asked the participants if they were willing to share their data (e.g. location, route, means of transportation) to improve the services offered by the smartphone application to the users. The purpose of this question was to determine if the potential users would be willing to allow the application developer to use their usage data to improve the application and its database. The results for the 213 participants who answered the English version of the survey is presented below in **Figure 34**.

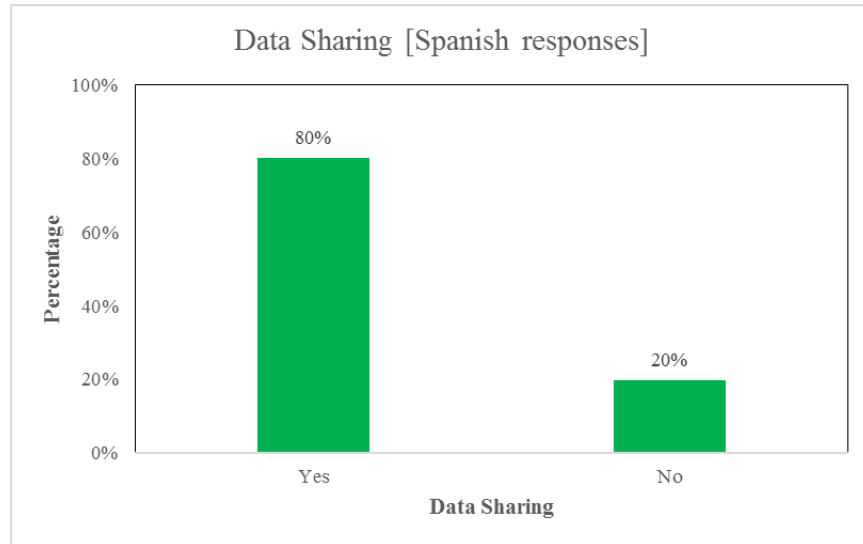
Approximately three-quarters of the participants who answered the English version of the survey are willing to anonymously share their data.



**Figure 34. Data sharing [English responses] El Paso.**

*Spanish – Si usted usara una aplicación diseñada a ayudar a adultos mayores a encontrar lugares de interés y viajar en la ciudad, ¿estaría dispuesto a compartir sus datos de manera anónima (ej., ubicación, rutas) para mejorar los servicios ofrecidos a los usuarios (incluyéndolo a usted)?*

The same question was asked in Spanish, and there were 218 responses. As shown in **Figure 35**, and compared to **Figure 34**, an even higher percentage of participants (80%) who answered the Spanish version of the survey are willing to anonymously share their data.



**Figure 35. Data sharing [Spanish responses] El Paso.**

#### 4.5. Survey Results – New York City

A total of 61 responses were received in New York City. Different from the El Paso survey, all surveys were conducted in English. The survey results were shared according to total responses in single figures for each. **Table 9** outlines the number of survey responses for New York City.

Question no.	Nature of question	Total no. of responses
1	Age	58
2	Gender	61
3	Employment status	61
4	Ethnicity	61
5	Language	61
6	Zipcode	61
7	Type of residence	60
8	Impairment or disability	61
9	Electronic device used	61
10	Mobility assistance	61
11	Trip frequencies	61
12	Mode choice	61
13	Concern when planning a trip	61
14	Mobility challenge	21
15	Desired application functions	15
16	Motivation to use application	13
17	Data sharing	61

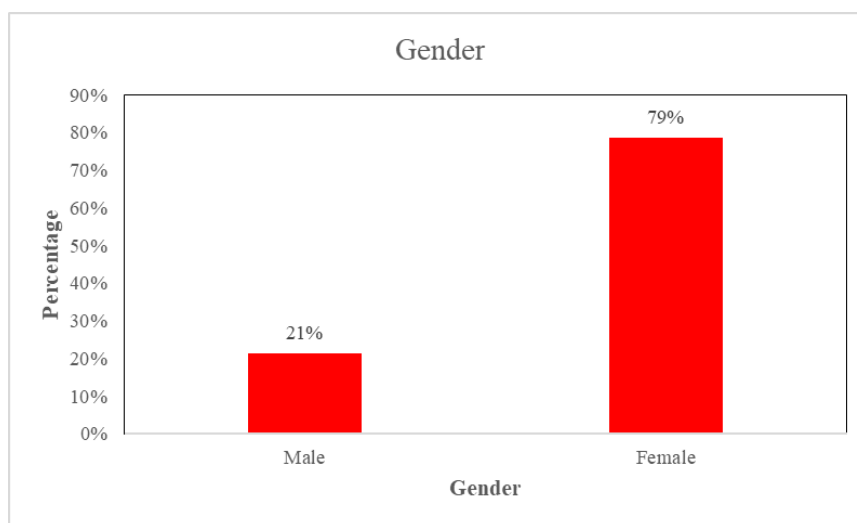
**Table 9. Number of survey responses – New York City.**

The following sub-sections report the results obtained for each question. For each question, the responses were analyzed separately under the corresponding sub-sections.

#### 4.5.1. Question 1 – Gender

*What category best describes your gender?*

In this question, participants were asked to select the answer choice for their gender. There were three answer choices: male, female or other. The results for the 61 responses collected in the survey for this question are presented in **Figure 36**. There were almost four times as many female participants as male.

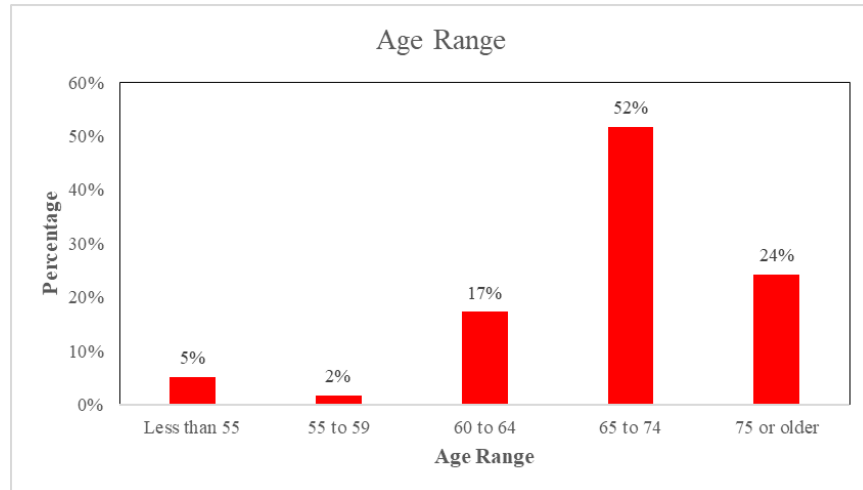


**Figure 36. Gender, New York City.**

#### 4.5.2. Question 2 – Age

*What is your age?*

In this question, participants were asked to declare their age. Then the responses are distributed among the ranges which were already defined in the El Paso survey. The number of participants who answered this question was 58. As shown in **Figure 37**, the highest group was between the age of 65 and 74. This was followed by the age range of 75 and older.

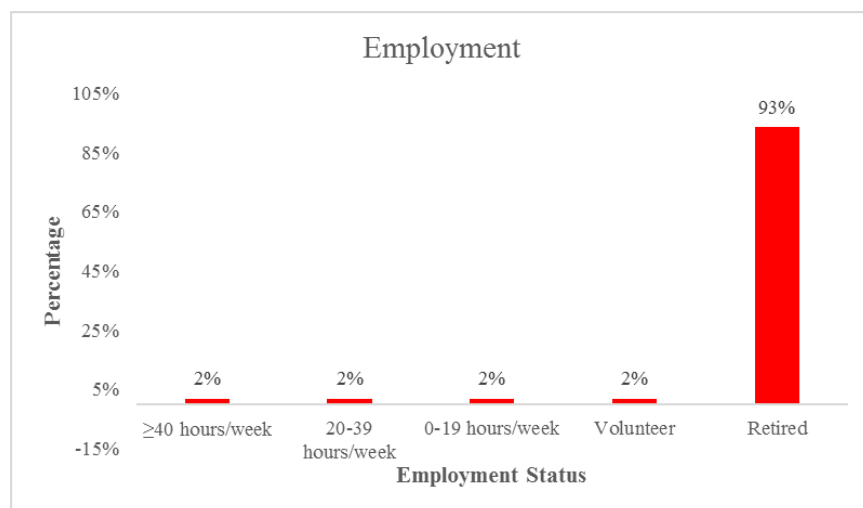


**Figure 37. Age range, New York City.**

#### 4.5.3. Question 3 – Employment Status

*What is your current employment status?*

61 participants answered this question. For this question, participants were asked to select the answer choice for their employment status. Each answer choice was a range of the number of working hours per week. Choices such as volunteer and retired were also given. The results of this question are presented in **Figure 38**. A vast majority of the participants who answered the survey were retired, followed by the others with the same percentages. These results are expected, as many of the seniors who frequent the senior centers were likely retired.

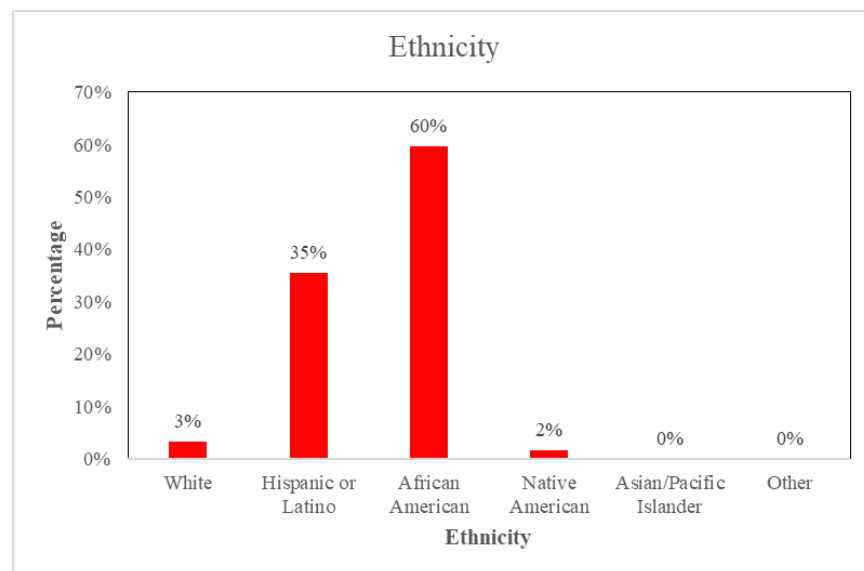


**Figure 38. Employment, New York City.**

#### 4.5.4. Question 4 – Race & Ethnicity

*Choose one or more races that you consider yourself to be:*

This question asked the race of the survey participant and allowed the respondents to select more than one. There were 61 responses. One participant has two races. The results for the participants who answered the survey are presented in **Figure 39**. The majority of participants reported being African American, followed by Hispanic or Latino.

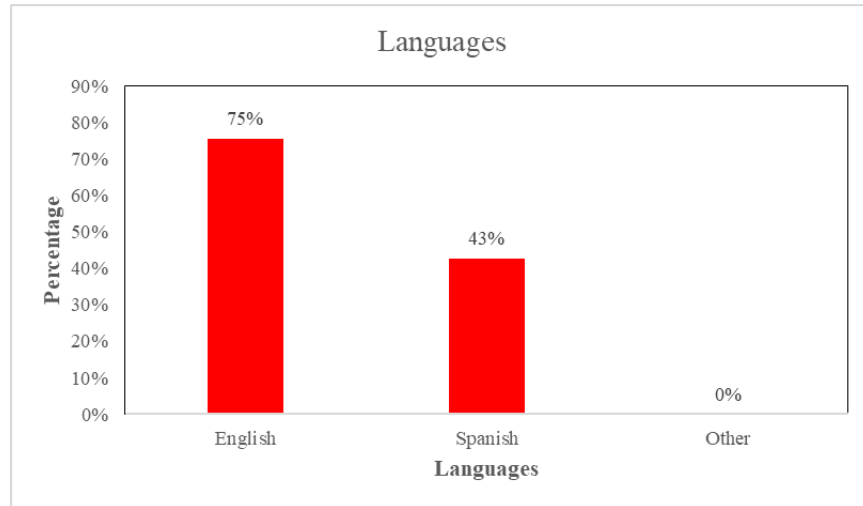


**Figure 39. Race & Ethnicity, New York City.**

#### 4.5.5. Question 5 –Languages

*What languages are you able to understand, speak, and write with confidence?*

This question asked what language the participant was able to use with confidence. The purpose of this question was to determine which language(s) to use in the smartphone application's interface. The results for the 61 responses are presented in **Figure 40**. As expected, the majority of participants who responded reported speaking English with confidence, with a smaller percentage who could also speak Spanish with confidence.

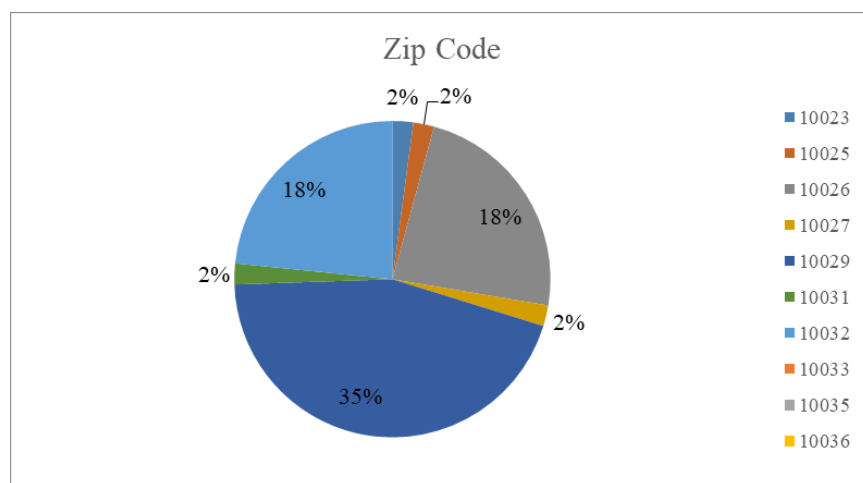


**Figure 40. Languages, New York City.**

#### 4.5.6. Question 6 – Zip Code

*What is your zip code?*

This question asks what zip code the participant lived in. The purpose of this question is to: (i) verify all areas are represented; and (ii) determine what areas the potential users live in, so that the initial content of the smartphone application may concentrate on those zip codes. The results of the 60 participants are presented in **Figure 41**. It is not as well distributed as the El Paso results.

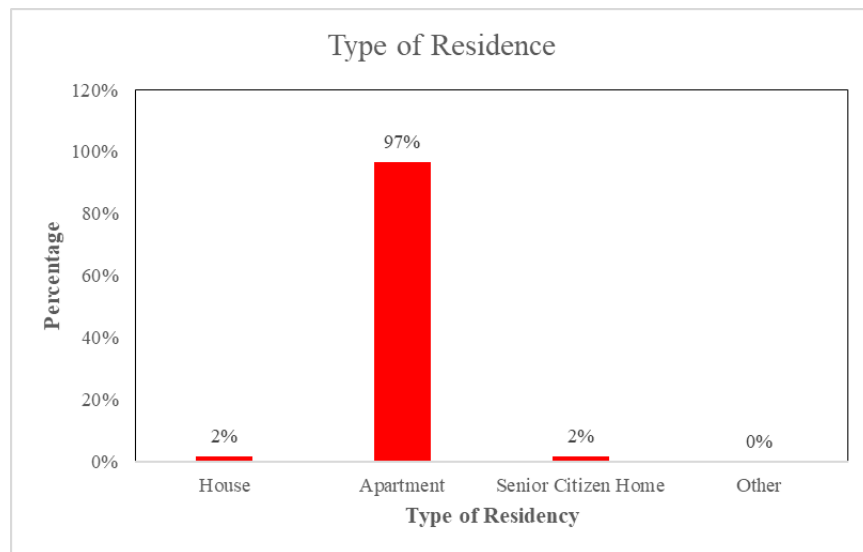


**Figure 41. Zip code, New York City.**

#### 4.5.7. Question 7- Type of Residency

*How would you describe your type of residence?*

This question asked the participant to select the answer choice for their type of residence. The purpose of this question was to gain a better understanding of the independence of the seniors. The results for the 61 participants are presented in **Figure 42**Figure 16. The vast majority of participants reported living in apartments, followed by houses and senior citizen homes. These results are expected, as much of the surveys were conducted at the senior centers, places where mobile and independent seniors frequently visit. The results are quite different from El Paso results where most of the respondents reported they live in houses.



**Figure 42. Type of Residency, New York City.**

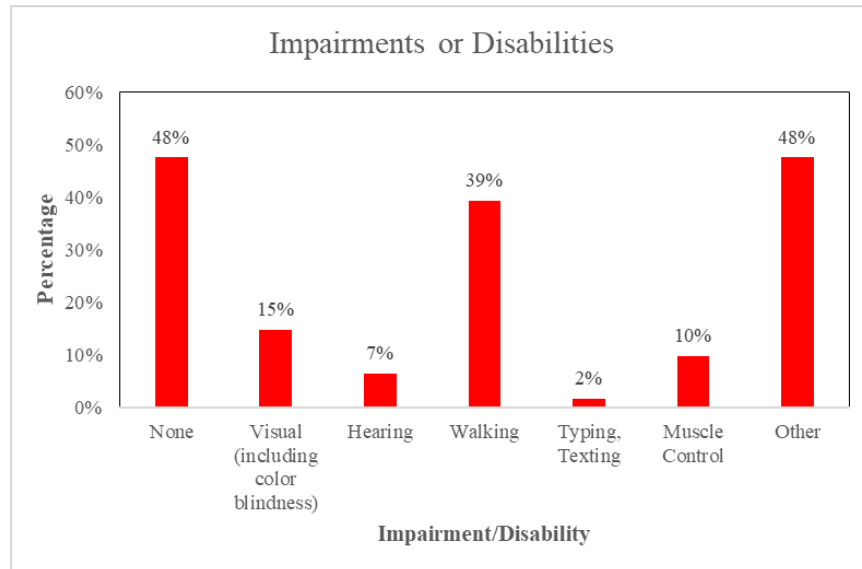
#### 4.5.8. Question 8 – Impairments and Disabilities

*Do you have any of the following impairments or disabilities?*

This question asks the participant to choose all applicable answer choices for the impairments and disabilities that they may have. The purpose of this question was to gain a better understanding of the impairment and disability needs of the seniors. The results for the 61 participants are presented below in **Figure 43**. Slightly less than half of the participants reported having no impairment or disability, with the same amount of respondents reporting having other impairments or disabilities including heart



problems, diabetes, asthma, and paresis. The next most common impairment or disability is walking, which nearly one-third of the respondents reported.



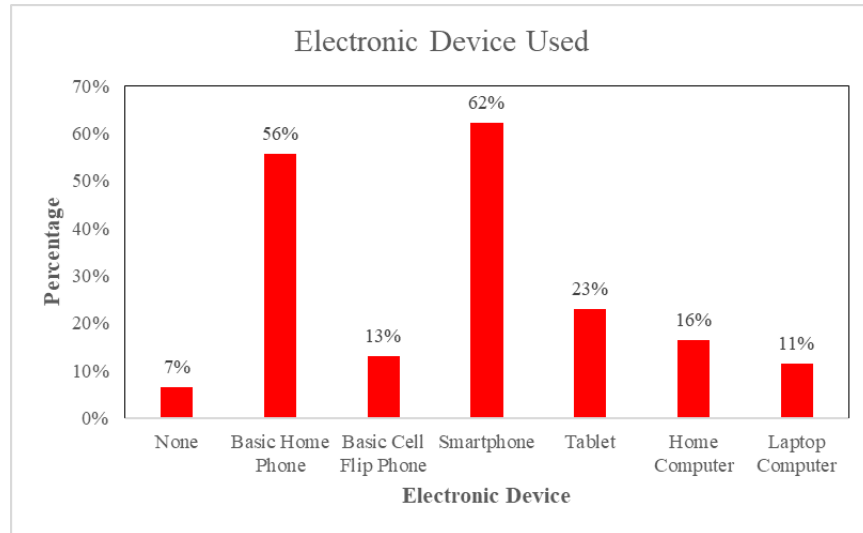
**Figure 43. Impairments/disabilities, New York City.**

#### 4.5.9. Question 9 - Electronic Device Used

This question consisted of two sub-questions.

*Do you use any of the following electronic devices?*

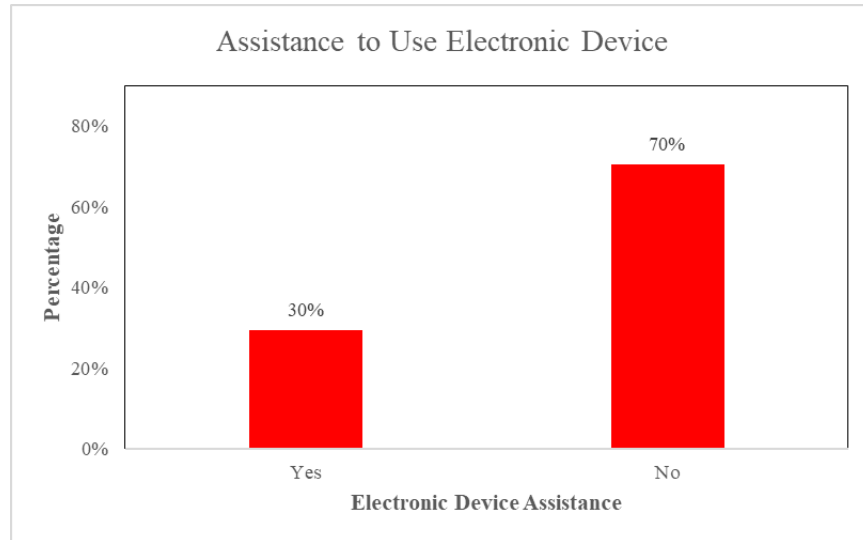
This question provided a different electronic device for each answer choice and asked the respondent to select all answer choices for the electronic devices that they use. The purpose of this question was to gain a better understanding of the market for the proposed application. If a majority of seniors do not even own or use a smartphone for example, then it is likely that the application will not be used, as there is no market for it. Fortunately, for the 61 participants, approximately two-thirds of seniors use a smartphone, as presented in **Figure 44**. Furthermore, the majority of seniors used at least one electronic device, as only 7% of participants reported using no electronic device at all.



**Figure 44. Electronic device use, New York City.**

*Do you need assistance using these devices?*

This question was a follow-up question to the question on electronic device usage. This question asked the participants who use at least one device if they require assistance to use such device(s). The purpose of this follow-up question was to gain a further understanding of their familiarity with the devices. The results are presented in **Figure 45**. Slightly less than three-quarters of participants reported that they do not require assistance to use electronic devices. The remaining 30% need assistance. This indicates that this segment of the seniors may need some training, or their caregivers may be the users. It should be noted that this question asks the senior directly if they require assistance; therefore, the results for this part of the question are biased. For example, if a senior believes they do not require assistance to use their smartphone, but they can only perform the most basic of tasks, they do require assistance to operate the smartphone altogether; however, that is not reflected in these survey results.

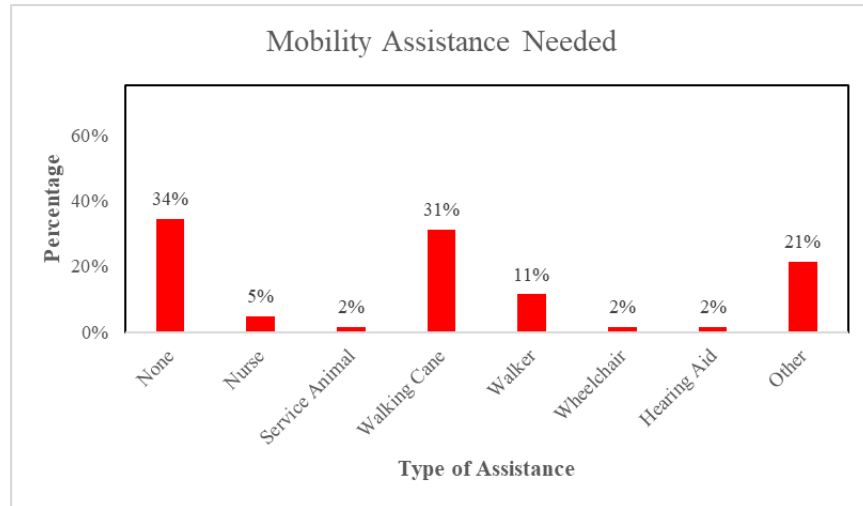


**Figure 45. Electronic device assistance, New York City.**

#### 4.5.10. Question 10 – Mobility Assistance

*Do you need any assistance when you make a trip in the city? (For this part “a trip” is defined as a one-way journey of at least ¼ mile from an origin to a destination.)*

This question provided different assistance types for each answer choice and asked the respondent to select all answer choices for the types of assistance they use when making a trip. For this question, a “trip” is defined as a one-way journey of at least ¼ mile from an origin to a destination. The purpose of this question is to determine what types of assistance the seniors require when they travel. If a majority of seniors need a wheelchair when they travel, for example, this should be incorporated into the mobile application accordingly. The results for the 61 participants are presented in **Figure 46**. One-third of seniors do not require any assistance when making a trip. Among the types of assistance needed, a walking cane was most frequently used. These results are expected, as many of the seniors were surveyed at a senior center, a place where mobile, independent seniors frequently visit. It should be noted that the question asks the senior directly for their perception of assistance needed. Many seniors might report that they do not require any assistance when they really do require help from a spouse or family member. This was addressed in the other category answer choice. Some of the other choices are oxygen tank, home member, and a supporter.



**Figure 46. Mobility assistance needed, New York City.**

#### 4.5.11. Question 11 – Trip Frequencies

*How many times do you visit the following places in a week?*

This question was in tabular form and asked the participant to report the approximate number of times per week that they visit various places. The purpose of this question was to determine the frequency of the trips made by seniors on a weekly basis so that the navigation function of the smartphone application can prioritize the destinations. The results are presented in **Table 10**. Each row in the table should sum up to 100%. This question received 61 responses. All of them provided the trip frequencies for every destination.

A majority of the participants reported that they did not work or volunteer, as many were retired. Around one-quarter of the respondents reported that they visited family members, relatives or friends less than once a week. Over one-third of the participants visited the grocery store, market, or retail shop one to three times a week. 30 % of the respondent visited a healthcare facility or pharmacy less than once a week. Nearly half of the respondents reported that they visited a senior center, library, park or gym three to six times a week. A similar percentage of the respondents visited civic or religious centers less than three times a week. Only one quarter visited a restaurant, coffee, shop or diner less than once a week. A majority of them went to a bank, ATM, or an office less than once per week.

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Volunteering Place	69%	2%	15%	5%	10%
Family Member, Relative, or Friend	41%	26%	15%	11%	7%
Grocery Store, Market, or Retail Shop	21%	11%	38%	20%	10%
Healthcare Facility, or Pharmacy	33%	30%	20%	15%	3%
Senior Center, Library, Park, or Gym	7%	5%	15%	44%	30%
Civic or Religious Center	43%	20%	28%	7%	3%
Restaurant, Coffee Shop, Diner	48%	25%	15%	10%	3%
Bank, ATM, or offices	31%	36%	25%	5%	3%
Other	85%	3%	3%	2%	7%

**Table 10. Trip frequencies, New York City.**

#### 4.5.12. Question 12 – Modes of Transportation

*How many times do you use each of the following means of transportation in one week? Count a round-trip as two separate one-way trips. If one-way consists of bus followed by a taxi, count both of them as one trip.*

This question is also in tabular form and asked the participants to report the approximate number of times per week that they used various modes of transportation. The purpose of this question was to determine the frequency of each mode of transportation used by seniors on a weekly basis. The results are presented below in **Table 11**. This question received 61 responses and all of them provided the trip frequencies for every destination.

A majority of the participants reported that they never use a bicycle, motorcycle, car as a driver, special bus and rideshare as their modes of transportation. Of those who traveled by car as a passenger, one-fifth of them drove less than once a week. The public bus usage was well distributed among frequency selections. Nearly all the responses were around 20%. The most frequently used mode of transportation according to the New York City survey was public buses. Nearly one-fifth of all respondents reported that they used public buses seven times or more in a week. Other modes of transportation included subway and train.

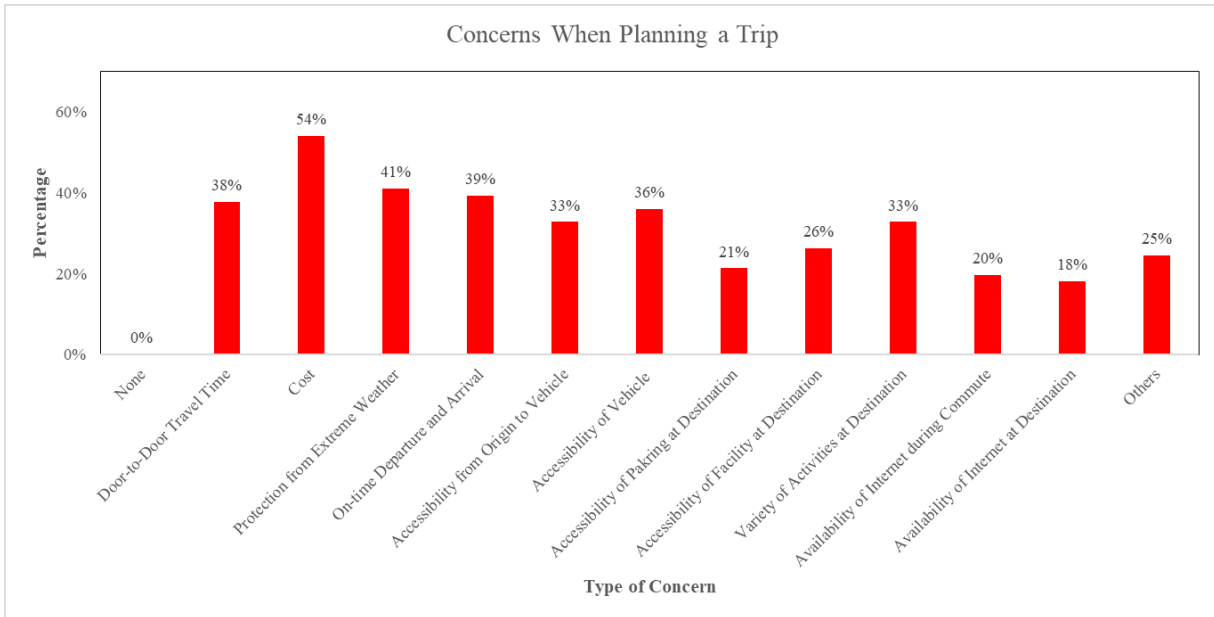
	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
<b>Walking More Than 1/4 Mile</b>	16%	10%	21%	23%	30%
<b>Bicycle</b>	93%	5%	0%	0%	2%
<b>Motorcycle/Scooter</b>	100%	0%	0%	0%	0%
<b>Car (as Driver)</b>	90%	5%	2%	2%	2%
<b>Car (as Passenger)</b>	54%	20%	7%	11%	8%
<b>Carpool (as Driver or Passenger)</b>	87%	5%	5%	2%	2%
<b>Public Bus</b>	20%	26%	20%	16%	18%
<b>Special Bus (e.g. Lift)</b>	80%	5%	10%	5%	0%
<b>Taxi</b>	56%	26%	11%	5%	2%
<b>Rideshare (e.g. Uber)</b>	87%	5%	5%	2%	2%
<b>Other</b>	93%	3%	2%	2%	0%

**Table 11. Modes of transportation, New York City.**

#### 4.5.13. Question 13 – Concerns When Making a Trip

*What is your main concern when planning a trip?*

This question provided a common concern when planning a trip for each answer choice, and asked the respondent to select all answer choices for their main concerns, so the smartphone application can be developed to address such concerns. In the question, the participants were provided with a list of 13 concerns. They may select any number of concerns from the list. There were 61 responses to this question, and the percentage of participants who have similar concerns is plotted in **Figure 47**. The most frequently mentioned concerns were cost, followed by protection from extreme weather and on-time departure and arrival. This indicates that seniors: (i) base their trips on cost (e.g. closer destinations, inexpensive modes of transportation, etc.), (ii) are concerned with on-time departure and arrival; and (iii) base their trips on the current weather.

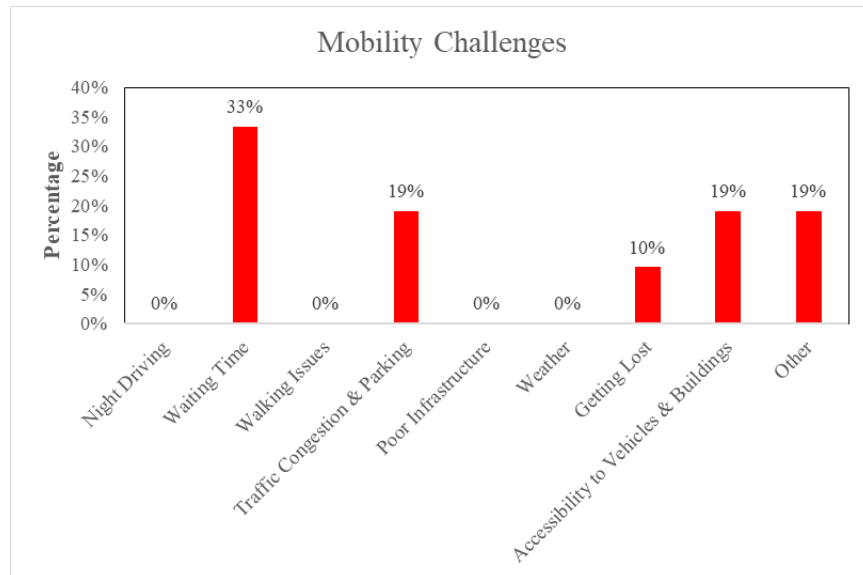


**Figure 47. Concerns when planning a trip, New York City.**

#### 4.5.14. Question 14 – Mobility Challenges

*Describe your biggest challenge when you commute in the city.*

This is an open-ended question, which asked the participant to write down their biggest challenges when they travel in the city. The purpose of this question was to determine which mobility issues were faced by seniors. The results for the participants are presented below in **Figure 48**. Only 21 participants answered this question for the survey. Their written answers were organized into categories that fit the El Paso results, and the percentage of the participants who reported challenges in each category out of the 21 written responses was calculated and plotted in **Figure 48**. Waiting time was the most frequently reported challenge they faced, followed by traffic congestion & parking, accessibility to vehicles & buildings and other challenges including safety and train use.



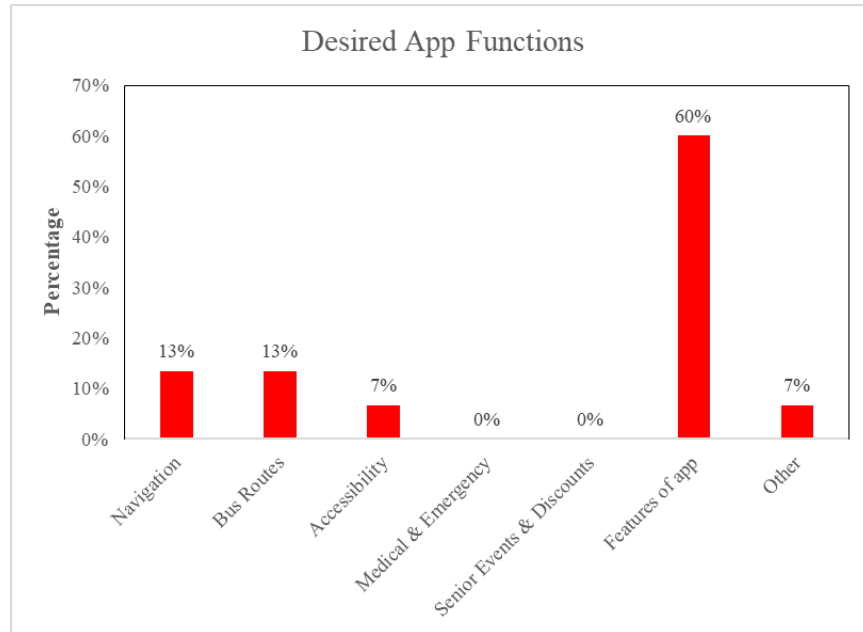
**Figure 48. Mobility challenges, New York City.**

#### 4.5.15. Question 15 – Key Application Functions for Seniors

*What is one function you would like to see in a mobile application (or App) that would cater to seniors needs?*

This is an open-ended question, which asked the participant to write the most important function they would like to have in a smartphone application. The purpose of this question is to determine what functions the smartphone application for seniors should have. The results are presented below in **Figure 49**. There were 15 participants who answered the survey who reported at least one function they would like to have. The most frequently stated functions are related to features of the application followed by bus routes and navigation. The other response was eager to learn the new technology about applications.





**Figure 49. Desired application functions, New York City.**

#### 4.5.16. Question 16 – Motivation to Use Application

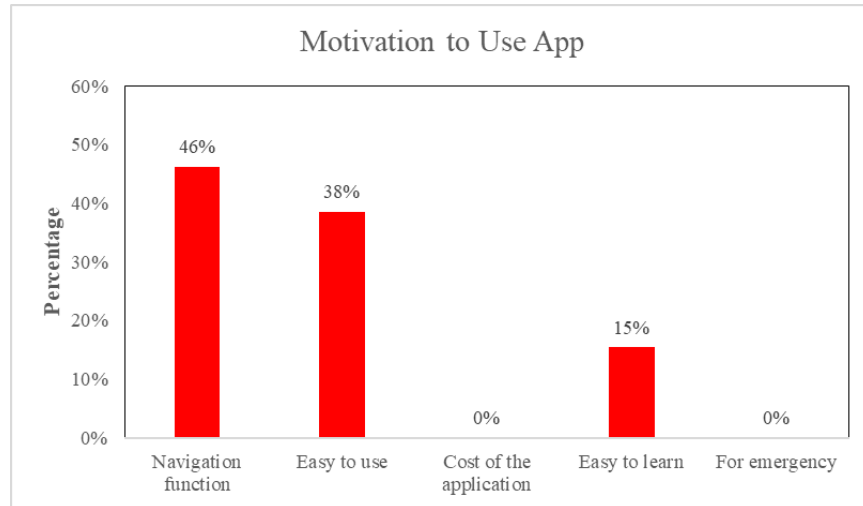
*If you were offered to use a mobile application (or App) that is designed to assist seniors to find places and commute, what would motivate you to use the application?*

This is an open-ended question, which asks the participant to state the factor(s) that would motivate them to use an application that is designed specifically for their mobility needs. The purpose of this question is to gain a better understanding of what would motivate a senior to want to use the proposed smartphone application. The results for the participants of the survey are presented below in **Figure 50**.

13 participants who answered the survey wrote down at least one reason that would motivate them to use the smartphone application. The most frequently cited reasons are, in decreasing order of frequency:

1. The navigation function;
2. The application was easy to use and accessible;
3. The application was easy to learn;

The above reasons may be divided into motivation related to the application's functions (navigation) and motivations related to the application's features (easy to use, easy to learn).

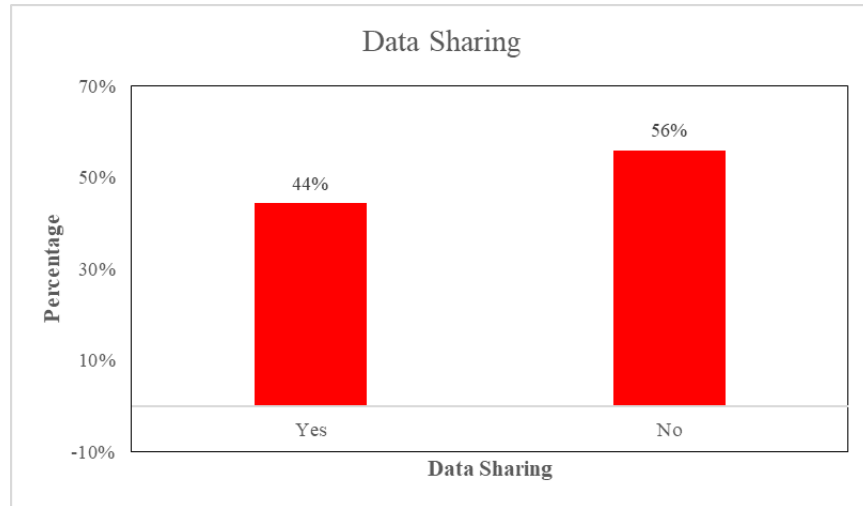


**Figure 50. Motivation to use a smartphone application, New York City.**

#### 4.5.17. Question 17 – Data Sharing

*If you were a user of an App designed to assist seniors to find places and commute, would you be willing to anonymously share your data (e.g. location, route, means of transportation) to improve the services offered by to users (including yourself)?*

This question asked the participants if they were willing to share their data (e.g. location, route, means of transportation) to improve the services offered by the smartphone application to the users. The purpose of this question was to determine if the potential users would be willing to allow the application developer to use their usage data to improve the application and its database. The results for the 61 participants who answered the survey are presented below in **Figure 51**. More than half of the participants in the survey are not willing to anonymously share their data.



**Figure 51. Data sharing, New York City**

## 4.6. Summary of Findings

The mobility needs surveys were conducted in El Paso, Texas and New York, New York. The survey instruments in El Paso were prepared in English and Spanish. On the other hand, the survey in New York was conducted only in English. El Paso survey results in each language, for each question, were analyzed separately in this report. On the other hand, combined results of El Paso and New York surveys were analyzed and compared by [Vechione et al. \(2018\)](#).

The key findings from this survey are:

- Smartphone applications for seniors should be intuitive, simple, and easy-to-use;
- Smartphone applications should have ADA-compliant alternate transportation modes (e.g. ADA-compliant buses, paved sidewalk, etc.) for senior users;
- Smartphone applications for the seniors should provide adjustable large font option to serve individuals with visual impairments;
- Smartphone applications for the seniors should have speech-to-text and text-to-speech recognition for those with hearing impairments;
- Smartphone applications for the seniors should be inexpensive, or even free;
- Smartphone applications for the seniors should get the users' permission to share their data anonymously with the developers; and
- The greatest mobility challenges faced by the seniors (which applications should help to solve) were traffic congestion (including work zones) and difficulty in finding places to park.

These are the key findings of the first survey which all were taken into account during the development of the prototype version of the Urban Connector application. The next section describes the development of the application, the tools used, functional, non-functional requirements, and user menu.

## SECTION 5. Prototype Application Development and Documentation

The development of the mobile application is based on the results obtained from the survey described in Section 4, using the state-of-the-art tools and techniques in the area. This section describes the main functionality of the application and how to operate it, along with the tools used during the development process.

### 5.1. Tools

The software tool used to program the prototype version of the Urban Connector was Android Studio Version 3.0.1 ([Android Studio, 2018](#)). The Android Studio specifically catered to the coding of an application in the Android operating system. After the code has been entered into Android Studio, Justinmind Version 8.1.0 ([Justinmind, 2018](#)) was used to create a prototype. The initial prototype was installed on a Samsung Galaxy S7 – Model number SM-G930F and tested under Android operating system Version 7.0, Baseband Version G930FXXU1DQHD and Kernel Version 3.18.14-12365438.

### 5.2. Functional Requirements

Functional requirements were developed with reference to the findings of the mobility needs survey reported in Section 4. The requirements are categorized according to their priority. [Vargas-Acosta et al. \(2019\)](#) analyzed 11 high priority, 8 medium priority, and 8 low priority requirements in their research.

### 5.3. Non-Functional Requirements

The application must:

1. Allow the user to adjust the font size and colors;
2. Allow the user to select the preferred language (Spanish or English);
3. Allow the user to input information using voice recognition, text, and clicks; and
4. Access functions with a minimum number of clicks and text.

### 5.4. User Menu

One-time configuration

- Font size - Use the arrows to increase and decrease the size of the font, click Next/Continue to go to the next screen.
- Language - Select English or Español for the desired language, click Next/Continue to set up the following screens with the desired language.

- Impairments - Select all impairments that apply, click Next/Continue to go to the next screen.
- Home address - Type a specific address, click Next/Continue to go to the next screen.

#### Go home

If a home address is provided, the Home icon will become colored and clickable. By clicking the Home button, the Urban Connector application will make use of Google Maps to show the route to get to the address provided in the home address screen.

#### Go to relatives

- By clicking on the Family & Friends icon, the Urban Connector application will show a list of family and friends. By clicking on a name, the Urban Connector application will make use of Google Maps to show the route to get to the address that has been entered in the record.

#### Add a new record

- To add a new record by using a map, click on the “+” sign, and choose Open Map to open Google Maps. Enter the location by selecting a point on the map. Then, enter the desired Name for that record, click Save.
- To add a new record by using direct input, click on the “+” sign, then choose “Direct input to enter a desired Name for the new record along with an address, and click “Save”

#### Open resources

- Click on the main menu (three horizontal bars), then click on “Transportation services”.

## SECTION 6. Pilot Survey

### 6.1. Background and Purpose

After developing the prototype version of the Urban Connector application, another survey was conducted to collect first-time users' feedback. The authors met with the representatives of the City of El Paso Parks and Recreation Department to demonstrate the prototype application and asked for permission to conduct the second survey. The authors were advised to recruit the majority of the participants from an event called National Fitness Day on May 30<sup>th</sup>, 2018, which was organized by the Parks and Recreation Department for the entire City. The authors were also given permission to visit senior centers to recruit additional participants.

### 6.2. Survey Instrument

A survey instrument was created which incorporated a consent form and questions about the subject's demographics and opinion about the prototype application. The consent form and questions were first drafted in English and then translated into Spanish. Both English and Spanish versions of the survey instrument were reviewed by representatives of the City of El Paso Parks and Recreation Department and then approved by UTEP's Institutional Review Board (IRB). The final version of the survey instruments consisted of 16 questions with four parts:

- Part 1: Five questions on participant's demographics and the use of mobile devices;
- Part 2: Five questions on participant's opinion about the user menus and ease of navigation between and within the menus;
- Part 3: Three questions on participant's opinion about the user interface designs (e.g., font size, icons);
- Part 4: Three questions on the participant's overall rating of the prototype Urban Connector application and open-ended feedback.

### 6.3. Survey Implementation

To advertise this survey and to help recruit participants, posters and videos were created. The posters have English and Spanish versions (see Appendix C). They summarize the results of the first survey. Four two-minute animated videos were prepared. Two of the videos were in English and the other two were in Spanish. For each language, the first video explained viewers the general characteristics and potential function of smartphones, while the second video presented the prototype Urban Connector application. Besides the National Fitness Day on May 30<sup>th</sup>, 2018, five different senior centers were visited in coordination with the staff at each center. The survey dates, times, and venues are presented in **Table 12.**

Date	Time	Venue
May 29, 2018	10:00 – 11:00 AM	East Side Senior Center
May 30, 2018	8:00 AM – 01:30 PM	Pavo Real Senior Center – National Fitness Day
June 4, 2018	10:00 – 12:00 PM	Grandview Senior Center
June 5, 2018	11:00 AM – 12:00 PM	Hilos de Plata Senior Center
June 6, 2018	10:00 AM – 12:00 PM	Polly Senior Center
June 7, 2018	10:30 AM – 12:00 PM	Pavo Real Senior Center

**Table 12. Prototype feedback survey dates, times, and venues.**

On the day of the pilot survey, a table was set up at the survey site with the UTEP logo. Incentives (water bottles, tote bags) and posters were displayed, and videos were played repeatedly on laptop computers to draw the attention of potential participants. Five student volunteers, trained and certified to follow IRB procedure, assisted in the survey. **Figure 52** presents a photo taken at the site. At the end of each survey day, the hardcopy versions of the survey instruments were brought back to the transportation laboratory on the UTEP campus. The responses were manually transcribed into Qualtrics.



**Figure 52. Survey booth at Pavo Real Senior Center on National Fitness Day.**



## 6.4. Survey Results

A total of 65 responses were received in the pilot survey. Of those, 22 were in the English version of the instrument and 43 were in the Spanish version of the instrument. The number of responses received for individual questions are summarized in **Table 13**.

The following sub-sections report the results obtained for each question. Full listing of all the responses are compiled and listed in Appendix D. The statements listed in Appendix D have been left deliberately not edited (including spelling or grammatical errors) in order to retain their original inputs. For each question, the responses in English and Spanish were analyzed separately, and results were combined for demonstration in this report.

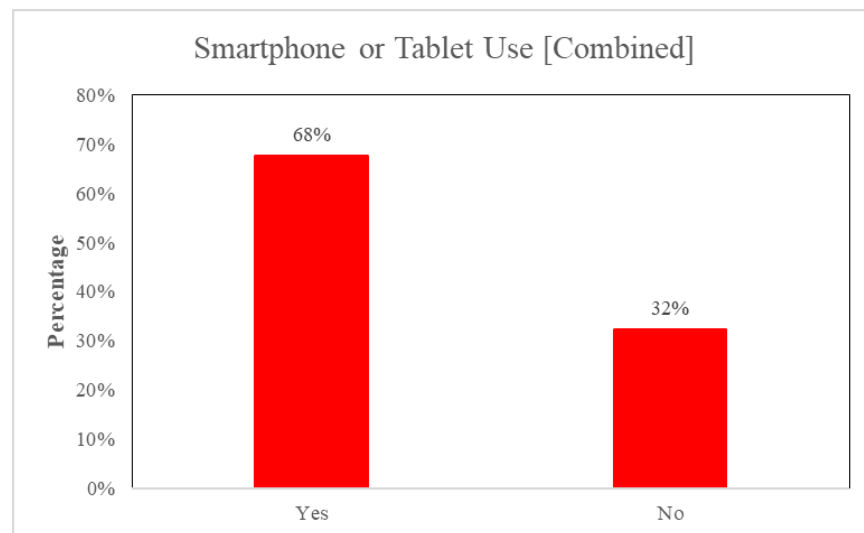
Question no.	Nature of question	No. of responses in English	No of responses in Spanish	Total no. of responses
Pre-1	Smart device use	22	43	65
Pre-2	Operating system of the smart device	22	43	65
Pre-3	Ask for assistance	22	43	65
1	Age	22	43	65
2	Gender	22	43	65
3	Electronic device use	22	43	65
4	Device assistance need	22	43	65
5	Smartphone use	22	43	65
6	Home screen menu	22	43	65
7	Frequent places menu	22	43	65
8	Transportation services menu	22	43	65
9	Graphic images	22	43	65
10	Entering preferences	22	43	65
11	Names of menus	22	43	65
12	Size of buttons	22	43	65
13	Colors used	22	43	65
14	Overall Evaluation	22	43	65
15	Recommendation to a friend	22	43	65
16	Suggestions for improvement	9	18	27

**Table 13. Number of second survey responses.**

#### 6.4.1. Pre Screening Question 1 – Smart Device Use

*I am a smartphone or tablet user. (Please write yes or no):*

The combined results from both the English and Spanish responses to this question (65 participants) are presented below in **Figure 53**. A majority of the survey participants (68%) reported having a smartphone or tablet. The results of the previous survey demonstrated that there were fewer smartphone or tablet users (49%). This indicates that smart device users (current possible users) were more likely to participate in the second survey where the participants are asked to use the smart devices and share their feedback. The survey responses of the remaining 32% of the participants were still useful, as they may acquire smart devices in the future, becoming potential users of the mobile application. Their responses were integrated and analyzed with those who have smart devices.

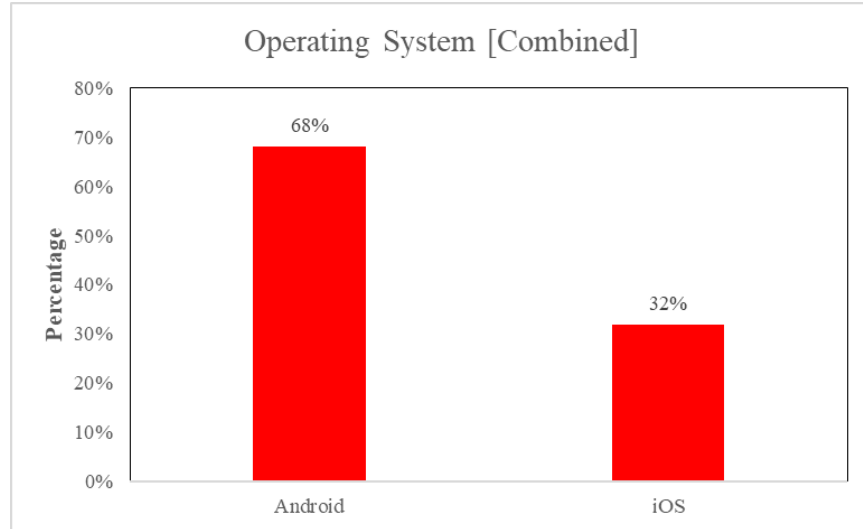


**Figure 53. Smartphone or tablet use [all responses].**

#### 6.4.2. Pre Screening Question 2 – Operating System Use

*The type of smartphone or tablet I am using is,*

In this question, participants were asked to select the answer choice between Android or Apple iOS. The combined results to this question (44 participants) are presented below in **Figure 54**. A majority of the survey participants (68%) reported having Android operating system on their smart devices, so it seemed developing the application for Android devices was a good starting point. To reach the other 32% of the participants, the Urban Connector application should be developed for Apple iOS in future research.

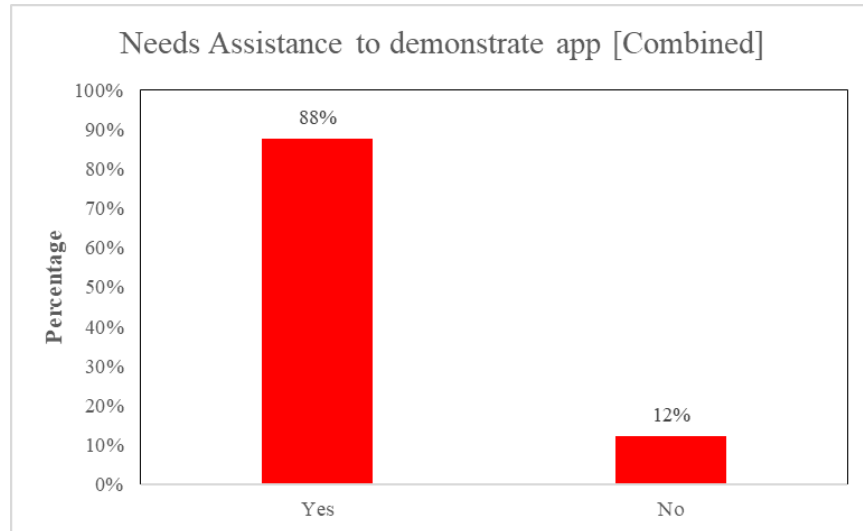


**Figure 54. Smart device operating system [all responses].**

#### 6.4.3. Pre Screening Question 3 – Need assistance to demonstrate the app

*I prefer UTEP assistance to demonstrate the application (Please write yes or no):*

In this question, participants were asked to select yes or no regarding whether they prefer the student-assistant to demonstrate the prototype Urban Connector application. The results with 65 participants are presented below in **Figure 55**. A majority of the survey participants (88%) reported that they need assistance to demonstrate the application before the student-volunteers handed them the mobile devices installed with the application. This indicates the need to educate seniors on the use of mobile devices (smartphones, tablets) so that they feel confident to operate them without assistance.

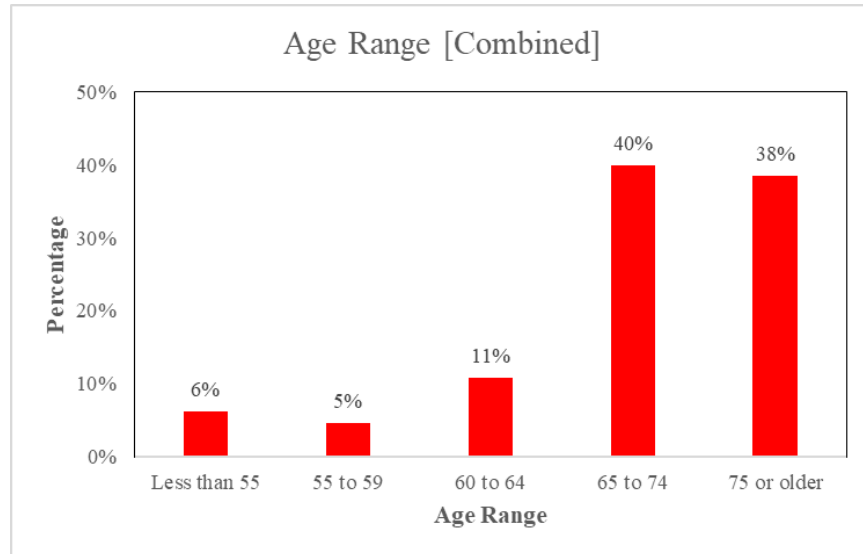


**Figure 55. Needs assistance to demonstrate the app [all responses].**

#### 6.4.4. Question 1 – Age

*What is your age range?*

In this question, participants were asked to select the answer choice which included their age. The choices given were based on the age ranges in the definitions for seniors (i.e. 55 to 65), as reviewed in Section 2. The responses to this question (65 participants) are presented below in **Figure 56**. Majority of the survey participants (78%) reported being age 65 or over. In the previous survey, the rate was 73%. Both surveys indicate that the volunteers were successful in recruiting the target participants (i.e. seniors over the age of 65).

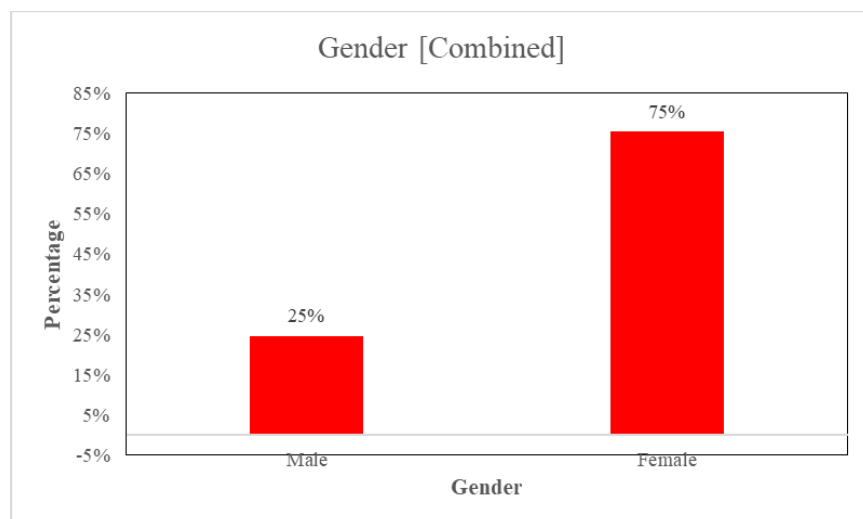


**Figure 56. Age range [all responses].**

#### 6.4.5. Question 2 – Gender

*What is your gender?*

In this question, participants were asked to select the answer choice for their gender. There were only two answer choices: male or female. Results are presented below in **Figure 57**. A majority of survey participants (75%) were females. In the previous survey, it was 69%.

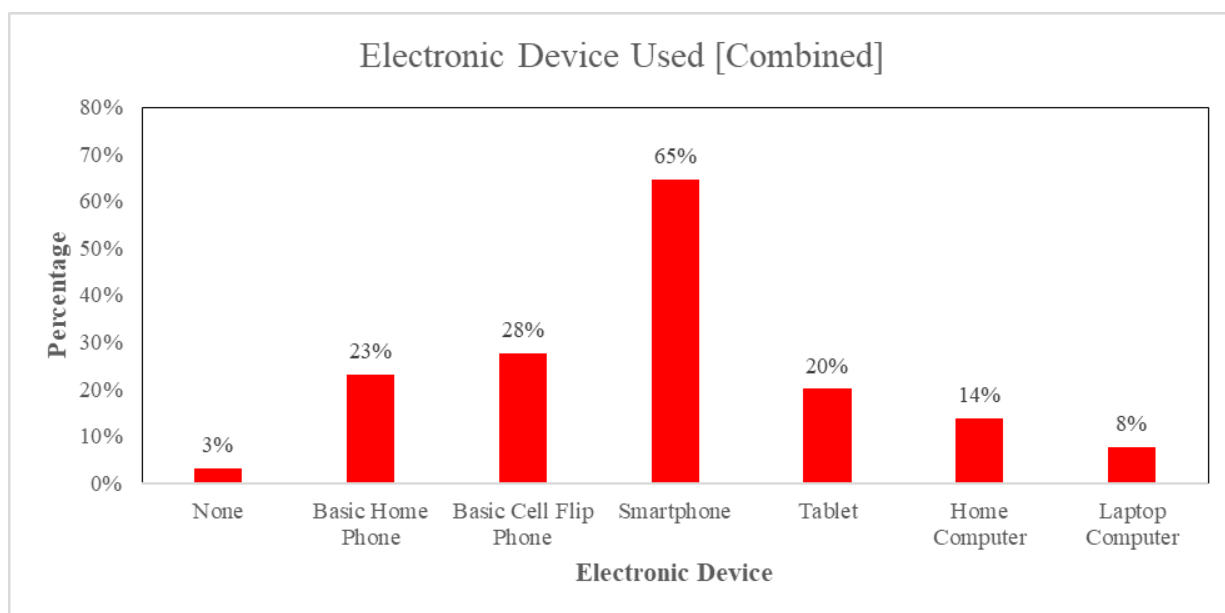


**Figure 57. Gender [all responses].**

#### 6.4.6. Question 3 – Electronic Device Used

*Do you use any of the following electronic devices? (You may select more than one answer)*

This question provided a list of different electronic devices for the respondent to select “yes” or “no” for each of them. The purpose of this question was to gain a better understanding of the market for the application and check the sample profile with the previous survey results. The responses to this question (65 responses) are presented below in **Figure 58**. Almost two thirds (65%) of the participants reported that they use a smartphone, followed by a basic cell flip phone (28%), and a home phone (23%). The results from **Figure 58** provide justification for the previous survey results and evidence that there is a market for a smartphone application for seniors.



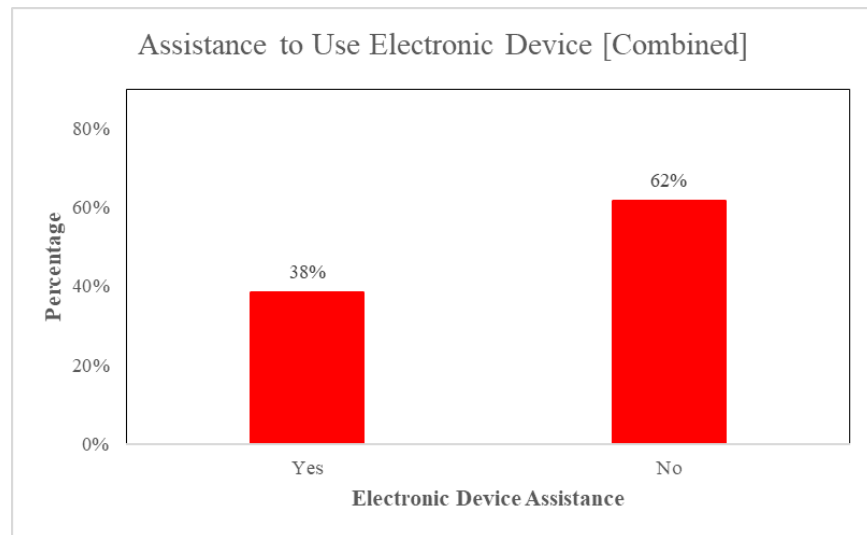
**Figure 58. Electronic device use [all responses]**

#### 6.4.7. Question 4 – Assistance to Use Electronic Device

*If you selected one or more options, do you need assistance using these devices?*

This question was a follow-up question to the question of electronic device use. This question asked the participant if they require assistance to use any electronic device. The purpose of this question was to gain a further understanding of their familiarity with the devices and identify the need for assistance. The combined results from both the English and Spanish responses for this follow-up question are presented below in **Figure 59**. More than half of the total participants reported that they do not

require assistance to use their electronic device (62%). The results from **Figure 59** provide justification that, not only are the seniors using smartphones and other electronic devices, they believe they do not require assistance to use their smartphones and other electronic devices.

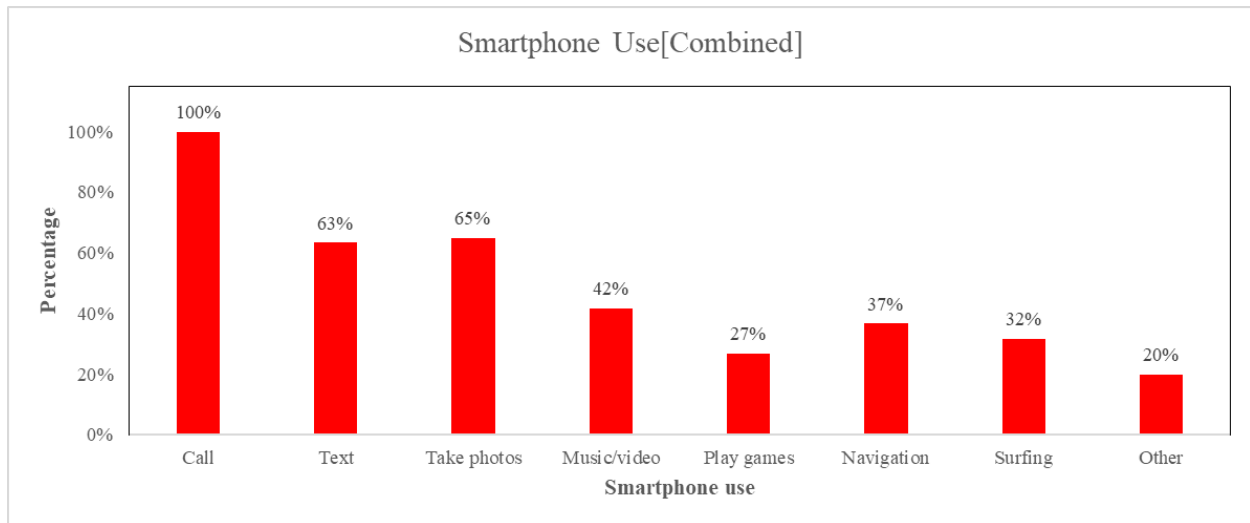


**Figure 59. Electronic device assistance [all responses].**

#### 6.4.8. Question 5 – Smartphone Use

*What do you do on your smartphone (select all that apply)*

This is a question in which the participant can select more than one answer. This question asked about the seniors' use of their smartphones. It asked the participant to select the functions in their smartphones they always used. The combined results from both the English and Spanish responses to this question are presented below in **Figure 60**. The functions, in order from the three most selected functions, are calling (voice), texting and taking photos.



**Figure 60. Smartphone use [all responses].**

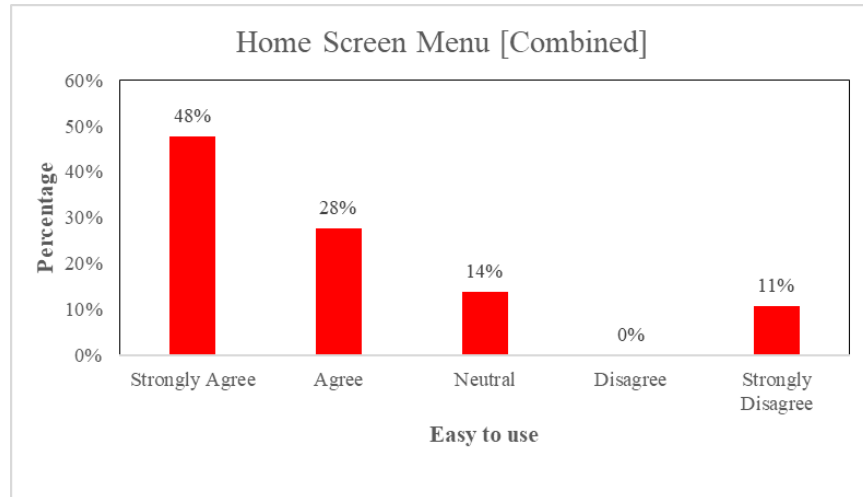
#### 6.4.9. Question 6 – Home screen menu

From Question 6 onwards, participants were asked about their opinion and to provide feedback for the prototype Urban Connector application.

*The Home Screen menu is easy to use.*

The Home Screen is the main menu from which the user can reach all the different services that the Urban Connector application provides. The participants are asked to comment on the ease of use of this menu. There are 5 choices ranging from strongly agree to strongly disagree. The combined results from both the English and Spanish responses to this question are presented below in **Figure 61**. 25% of the participants do not agree that this menu is easy to use. The most frequently mentioned issue with this menu is the non-adjustable font size.



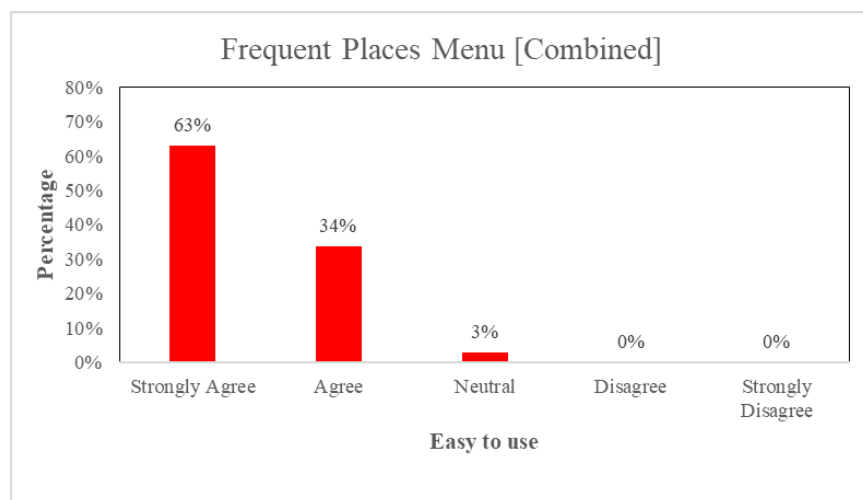


**Figure 61. Home screen menu [all responses].**

#### 6.4.10. Question 7 – Frequent Places menu

*The Frequent Places menu is easy to use.*

The Frequent Places menu allows users to add or remove the locations of frequently visited places. Once a location has been stored, the user will receive alternative routes to the address with the help of the phone's navigation function. The participants were asked to comment on the ease of the use of this menu. The responses to this question are presented below in **Figure 62**. Of the 63 participants, 97% of them agreed or strongly agreed that the Frequent Places menu was easy to use.

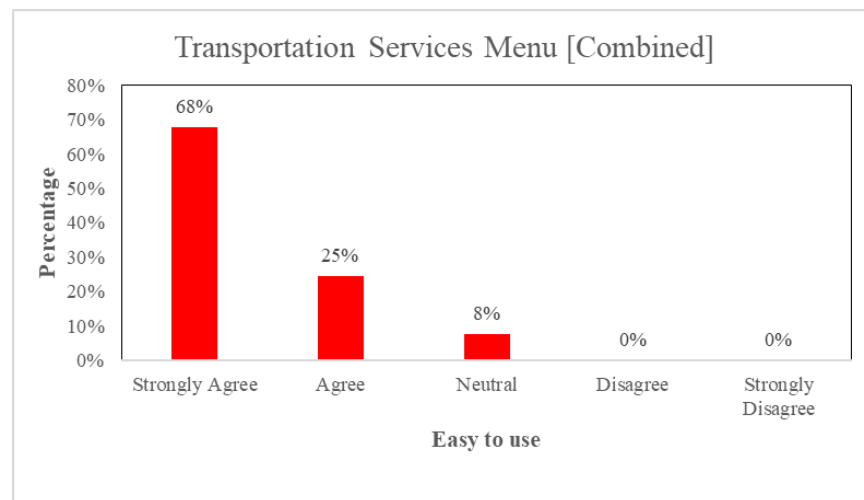


**Figure 62. Home screen menu [all responses].**

#### 6.4.11. Question 8 – Transportation Services menu

*The Transportation Services menu is easy to use.*

This is the menu that links users to the transportation services (City of El Paso, Sun Metro, Sun Metro Lift, Texas Department of Public Safety, etc.). The user can reach the most commonly used web pages for these services from the Transportation Services menu. The participants are asked to comment on the ease of use of this menu. There were five choices ranging from strongly agree to strongly disagree. The combined results to this question are presented below in **Figure 63**. 93% of the participants agreed or strongly agreed that this menu was easy to use.

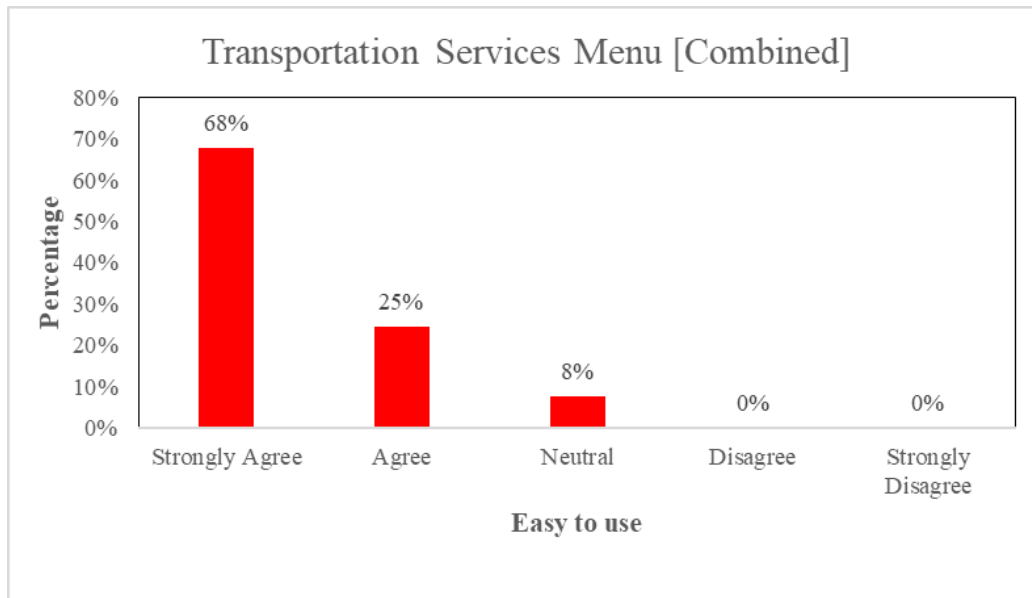


**Figure 63. Transportation Services Menu [all responses].**

#### 6.4.12. Question 9 – The Graphic Images

*The graphic images (buttons, icons) of Urban Connector Application are easy to understand.*

This question asked users' opinion about the intuitiveness of graphic images (buttons, icons) used in the application. There are 5 choices ranging from strongly agree to strongly disagree that the buttons and icons were easy to understand. The combined results from both the English and Spanish responses to this question are presented below in **Figure 64**. 68% of the respondents strongly agreed that the buttons and the icons were easy to understand. Another 25% of the respondents agreed that the buttons and the icons were easy to understand.



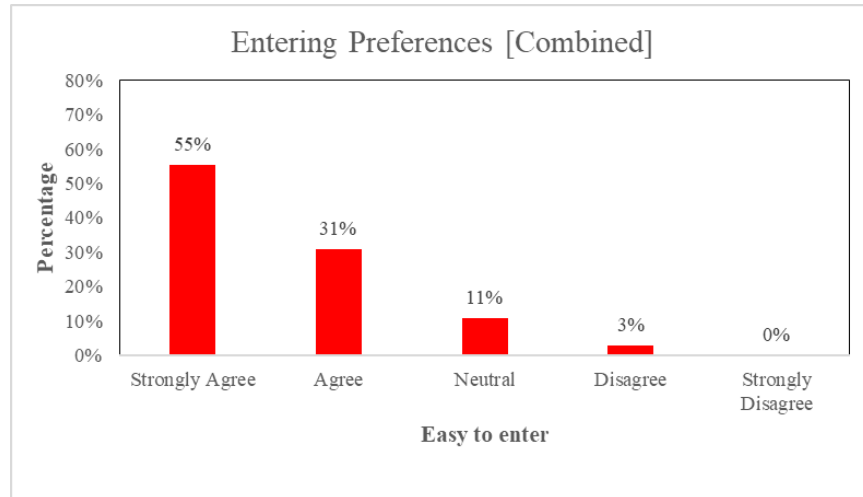
**Figure 64. The Graphic Images [all responses].**

#### 6.4.13. Question 10 – Entering Preferences

The prototype Urban Connector application starts with asking users to enter his/her preferences about the application, including the font size, the language and the disability or impairments the user has. Then, the user has the opportunity to enter his or her home address and this address is stored in the Frequent Places menu. Whenever the user clicks the Home icon, the routes to his home address appears on the screen. This question is designed to understand the users' opinion about the ease of entering their preferences.

*Entering my preferences on Urban Connector was easy.*

There were five choices ranging from strongly agree to strongly disagree to evaluate their opinion about the easiness of entering the preferences. The combined results from both the English and Spanish responses to this question are presented below in **Figure 65**. 86% of the participants reported that entering their preferences were easy and only 3% of the participants reported that it was not easy.

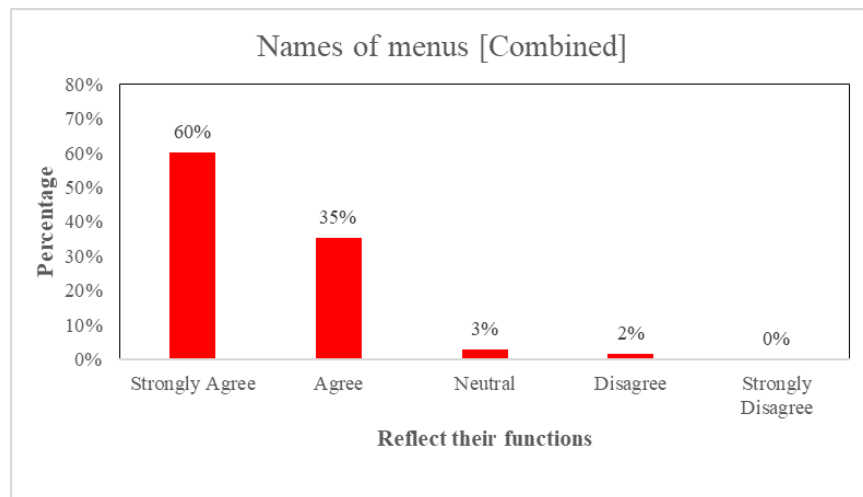


**Figure 65. Entering Preferences [all responses].**

#### 6.4.14. Question 11 – Names of Menus

*The names of the menus accurately reflect their functions.*

This question asked the users if the names of the menus accurately reflect their functions. There are 5 choices ranging from strongly agree to strongly disagree. The responses to this question are presented below in **Figure 66**. 60% of the participants strongly agreed that the names of the menus reflect their functions accurately, while another 35% of the participants agreed with the same statement.

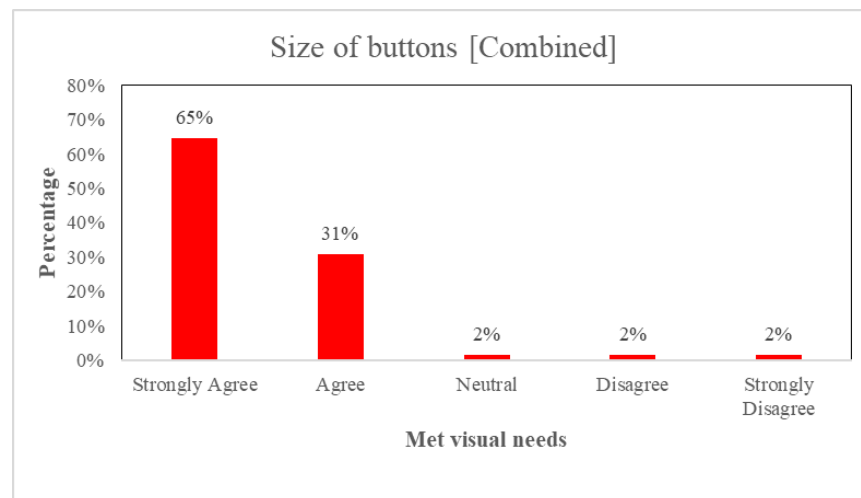


**Figure 66. Names of Menus [all responses].**

#### 6.4.15. Question 12 – Size of the buttons and text

*The size of buttons and text met my visual needs.*

The user has the opportunity to adjust the size of the displayed text in Urban Connector. This question asked if the size of the buttons and the text are large enough, or need to be adjusted to meet the participant's visual needs. There were five choices ranging from strongly agree to strongly disagree. The combined results from both the English and Spanish responses to this question are presented below in **Figure 67**. In total, 95% of the participants agreed or strongly agreed that the size of the buttons and texts met their visual needs.

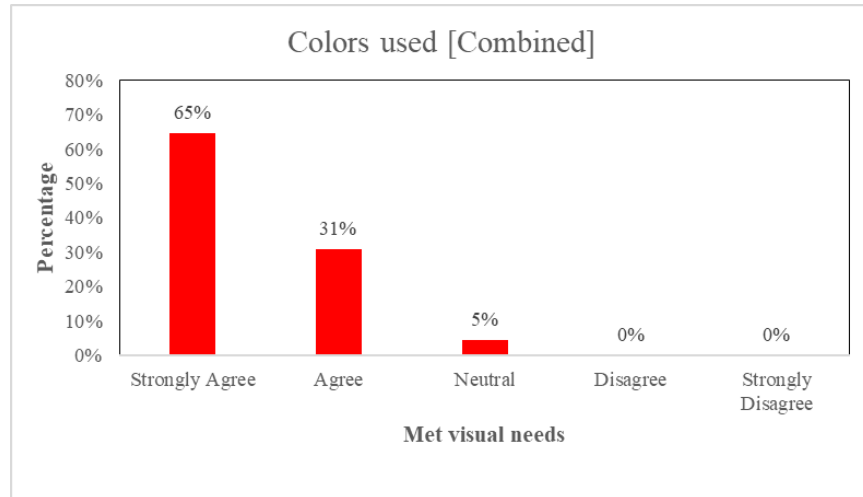


**Figure 67. Size of buttons and text [all responses].**

#### 6.4.16. Question 13 – Colors used

*The colors used in the application met my visual needs*

Although the user has the option to adjust the size of the text, the colors were set by the designer. This question asked the participants if the pre-set colors meet their visual needs. There were five choices ranging from strongly agree to strongly disagree. The combined results from both the English and Spanish responses to this question are presented below in **Figure 68**. In total, 96% of the participants agreed or strongly agreed that the assigned colors met their visual needs.



**Figure 68. Colors used [all responses].**

#### 6.4.17. Question 14 – Final Evaluation

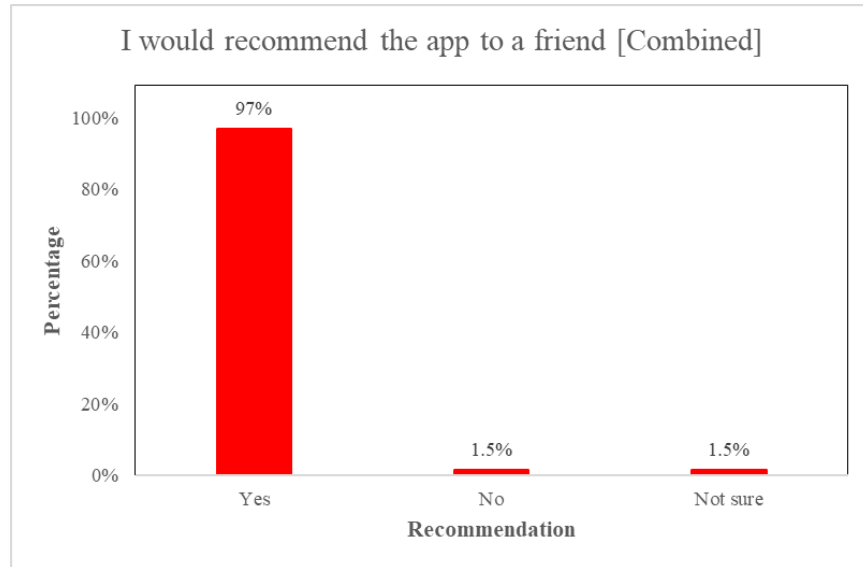
*What would be your rating for the application?*

The five-star rating system was used to evaluate the overall performance of the prototype Urban Connector application. This question asked participants to rate the overall impression on the application. There were five different choices, from excellent (5 stars), good (4 stars), average (3 stars), fair (2 stars) and poor (1 star). The combined results from both the English and Spanish responses for this question were aggregated. From all the 55 participants, the average rating was 4.63 stars. This is a good indicator that the overall evaluation of the prototype application was between good and excellent.

#### 6.4.18. Question 15 – Recommendation of the app to a friend

*I would recommend Urban Connector Application to a friend.*

If an application is useful, users will naturally recommend it to their friends. This question asked if the participant would recommend this application to a friend. There were three choices; yes, no or not sure at this moment. The combined results from both the English and Spanish responses to this question are presented below in **Figure 69**. In total, 97% of the participants reported they would recommend the application to a friend. Another 1.5% of the participants stated that they were not sure right now and the last 1.5% of the participants stated they would not recommend this application to a friend.



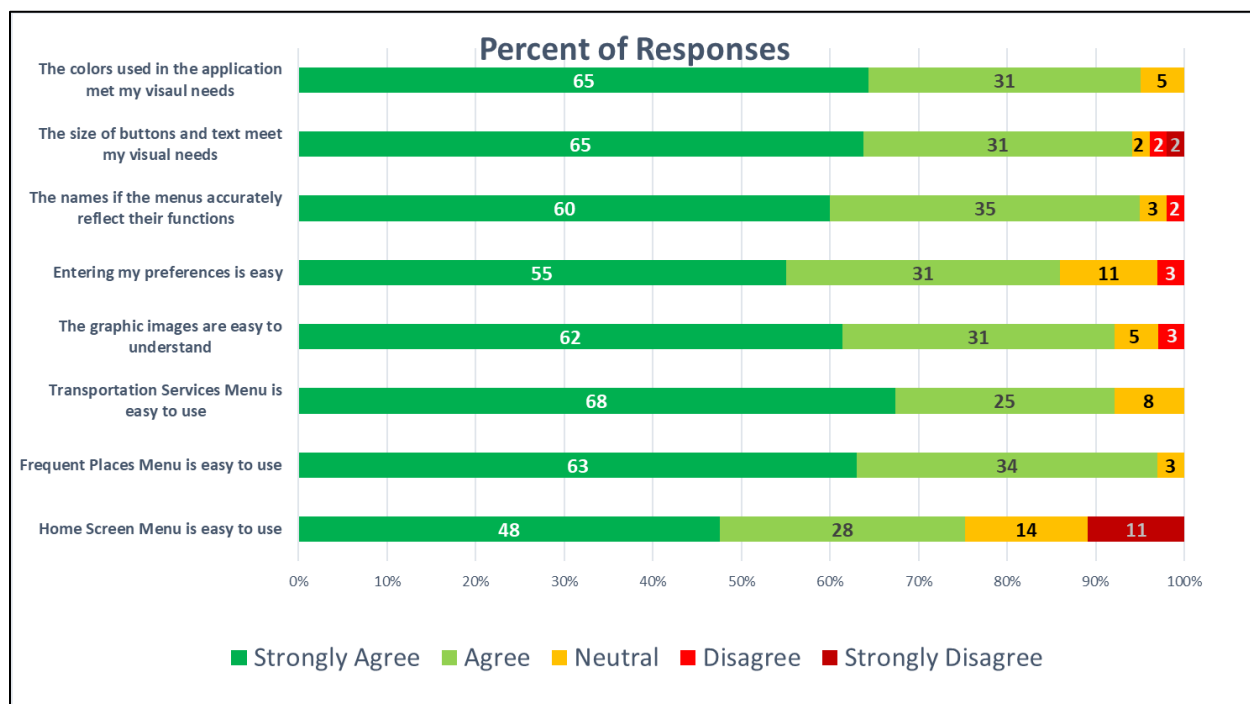
**Figure 69. Recommend to a friend [all responses].**

## 6.5. Summary of Findings

The pilot survey on the prototype Urban Connector application was conducted in El Paso on six different days at six different senior centers, from May 29 to June 7, 2018. Sixty-five (65) seniors participated in this survey, with 22 of them answering the English version of the survey form, and 43 of them answering the Spanish version of the survey form.

The survey first asked for the participant's familiarity with mobile devices. Of the 65 participants, 68% of them were already smartphone or tablet users and among them, 68% had Android operating system in their devices. Eighty-eight percent (88%) of the participants asked UTEP student-assistants to demonstrate the Urban Connector application before answering the survey questions.

The second and third parts of the survey recorded the participants' opinions about the prototype Urban Connector application. The major findings are plotted in **Figure 70**.



**Figure 70. Feedback on prototype Urban Connector application.**

The last part of the survey asked participants to give overall evaluations for the prototype Urban Connector application:

- Participants gave the application an average score of 4.63 on a scale of 1 to 5.
- 97% of the participants would recommend this application to a friend.



## SECTION 7. Usability Survey

### 7.1 Background and Purpose

After the development of the prototype version of the Urban Connector application and the subsequent modifications based on the pilot survey results, an additional survey was conducted to test the efficacy of the application's features. In collaboration with El Paso Parks and Recreation Department, the authors were advised to attend the 37<sup>th</sup> annual El Paso Senior Games as this event attracts a suitable conglomeration of seniors. During these events, the individuals demonstrating an interest in the application were recruited and received assistance to download the application on their personal devices. The recruited participants were then asked to engage in a minimum 30-day trial period concluding with the usability survey and bestowal of their participation incentives.

### 7.2 Survey Instrument

A survey instrument incorporating questions about the participants' demographics, application usability, and overall rating was developed in English and translated into Spanish. Both versions were first reviewed by representatives from the City of El Paso Parks and Recreation Department and later approved based on the guidelines set forth by UTEP's Institutional Review Board (IRB). The final version of the usability survey consisted of 24 questions in four parts:

- Part 1: About Yourself. Five questions on participant's demographics and usage of mobile devices;
- Part 2: About the Urban Connector Application in General. Ten questions on participant's opinion on user menu options, ease of use and usefulness of the functions;
- Part 3: Application Design Features. Three questions on the participant's opinion regarding the user interface design (e.g. font size, icons, colors);
- Part 4: Final Evaluation. Six questions on participant's overall satisfaction and rating of the tested application, as well as open-ended feedback.

### 7.3 Survey Implementation

A video, as a visual aid tool, was created to recruit seniors. The videos, created in both English and Spanish, feature how to install, personalize according to the user's preferences and apply the resources available to start the application's navigation capabilities. In addition to the mentioned Senior Games, frequently visited places by seniors in El Paso including Cafe Mayapan and El Paso Public Library were visited to meet an adequate recruitment turnout (in geographical spread and sample size). Authors also recruited participants from the Helping Hand Adult Day Care. The survey recruitment dates, times, and venues are summarized in Error! Reference source not found. below.

Date	Time	Venue
February 26, 2019	11:00 AM – 12:00 PM	Pavo Real Senior Center
February 27, 2019	11:00 AM – 12:00 PM	Pavo Real Senior Center
February 28, 2019	11:00 AM – 12:00 PM	Pavo Real Senior Center
March 2, 2019	9:00 AM – 12:00 PM	Polly Harris Senior Center
March 8, 2019	9:00 AM – 12:00 PM	Cafe Mayapan
March 9, 2019	9:00 AM -1:00 PM	Noland Richardson Rec. Center
March 15, 2019	10:00 AM – 11:00 AM	El Paso Community College
March 17, 2019	2:00 PM – 5:00 PM	El Paso Library
March 21, 2019	9:00 AM – 1:00 PM	Helping Hand Adult Day Care

**Table 14. Usability Survey Recruitment Dates, Times and Venues.**

During recruitments, the developed visual tool was repeatedly played on computer monitors. Posters demonstrating the previous survey's findings were displayed, and colorful flyers (as shown in Appendix E) were distributed to the seniors. **Figure 71** presents a photo of the recruitment booth set up at Pavo Real Senior Center. The volunteer students attending these events received proper IRB certification to survey human subjects and special training to prepare for expected frequently asked questions about the application. They aimed to encourage seniors to become participants in the study period.

The recruited seniors engaged in a phone call or personal interview to complete the survey after the 30-day period was over. Participants are first called to see whether they wanted to take the survey on the phone or in person. Many wanted to meet in person to complete the survey and be rewarded with the gift card. Researchers would ask for the time, date, and location that would be most convenient for the participants to meet. Many participants asked to meet at their local senior center or recreational center. Most were available in the morning with the exception of 6 participants that were available in the afternoon. Once the researchers met the participants, they asked the participants to complete the survey. Having submitted the survey, these individuals were rewarded with the promised \$10 gift card as an incentive. One participant did not want to receive the gift card. Most seniors wanted to take the survey in person except for five participants who took it over the phone. It took three to five minutes for each participant to answer the survey over the phone and in person.



Figure 71. Urban Connector Recruitment Booth at Pavo Real Senior Center.

## 7.4 Survey Results

A total of 38 responses were received in this usability survey. Of those, 22 were in the English version of the instrument and 16 were in the Spanish version of the instrument. The number of participants who responded in Spanish was less than the number of participants who responded in English. The number of responses received for individual questions is summarized in **Table 15**.

Question No.	Nature of Question	No. of Responses in English	No. of Responses in Spanish	Total No. of Responses
1	Age	22	16	38
2	Gender	22	16	38
3	Electronic Device Use	22	16	38
4	Device Assistance	22	16	38
5	Smartphone Use	22	16	38
6	Application Use	22	16	38
7	Usage Reason	22	16	38
8	User Preferences	22	16	38
9	Frequent Places Menu	22	16	38
10	Home Screen Menu	22	16	38
11	Graphic Images	22	16	38
12	Entering Addresses	22	16	38
13	Disorientation	22	16	38
14	Avoid Traffic Congestion	22	16	38
15	Fear of Late Arrivals	22	16	38
16	Size of Buttons	22	16	38
17	Menu Options	22	16	38
18	Visual Needs	22	16	38
19	Crash / Freeze	22	16	38
20	Fast Learning	22	16	38
21	Efficiency / Productivity	22	16	38
22	Friend Recommendation	22	16	38
23	Application Rating	22	16	38
24	Features Suggestion	19	10	29

**Table 15. Number of Third Survey Responses**

The following sub-sections report the results obtained for each question. All the responses are compiled and listed in Appendices L and M. For each question, the responses in English and Spanish were analyzed separately, and the results were combined.

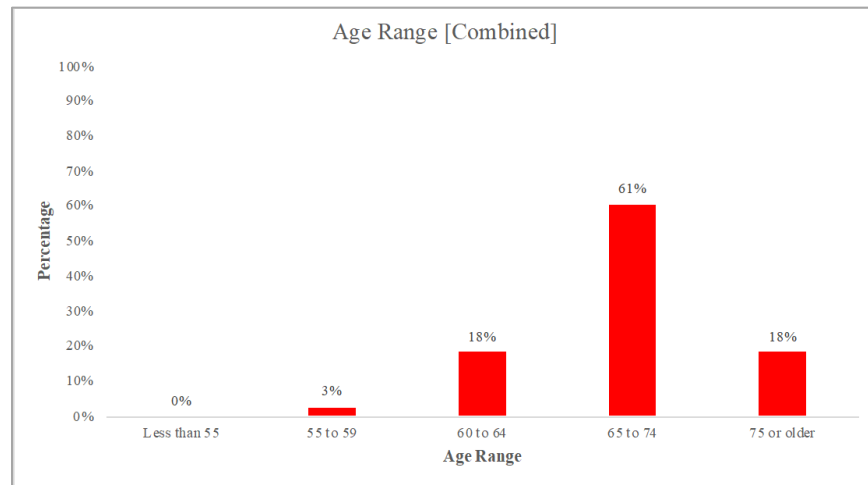
#### 7.4.1. Question 1 – Age

The following five questions inquire about the participants' demographics and technological proficiency.

*What is your age range?*

In this question, participants were asked to select the answer that accurately represented their age. The answer choices included less than 55, 55 to 59, 60 to 64, 65 to 74 and 75 or older. The combined

results from both the English and Spanish responses amounted to a total of 38 responses. As seen in **Figure 72**, the highest answer frequency corresponds to the age group of 65 to 74. The majority (79%) of the participants were older than 65. Compared to the age distribution results from the previous two surveys, this survey has the highest rate of over 65 years old senior participants.

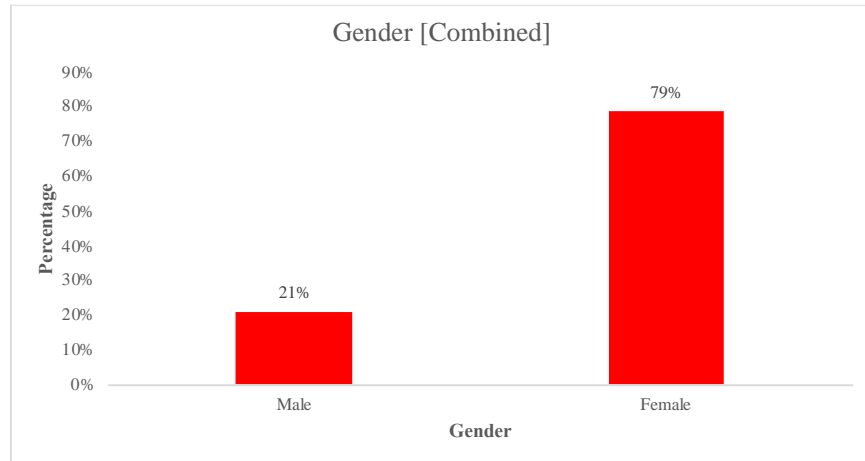


**Figure 72. Age Range [all Responses].**

#### 7.4.2. Question 2 – Gender

*What is your gender?*

This question required the recruited seniors to select the answer corresponding to their gender. The possible selections were either male or female. The combined results are presented in **Figure 73**. It is noted that 79% of the participants were female and 21% were male. Similar to the previous survey results, female participants are more interested in the study.

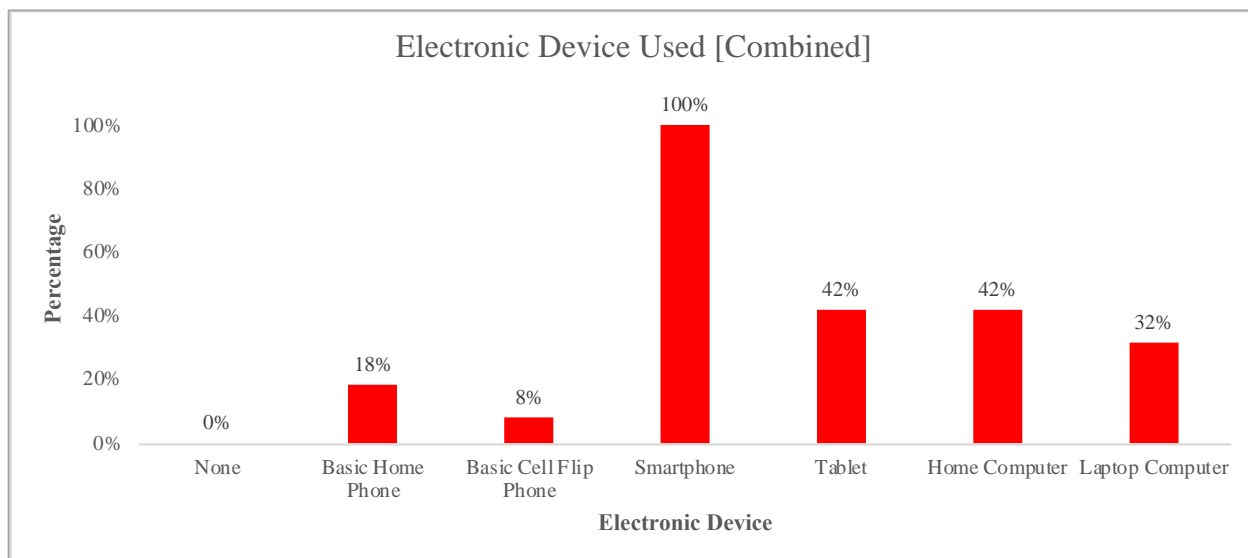


**Figure 73. Gender [all Responses].**

#### 7.4.3. Question 3 – Electronic Device Use

*Do you use any of the following electronic devices? (You may select more than one answer)*

In this question, participants were given a list of electronic devices and were asked to select those they have interaction with. These devices include smartphones, flip phones, and laptop computers. The question was included in the usability survey with the goal of obtaining a better understanding of the participants' technological proficiency. As seen in **Figure 74**, for the combined English and Spanish responses, 100% of them used a smartphone. Other popular electronic devices were tablet at 42% and home computer at 42%. These results differ from the first survey because this survey recruited seniors who had smartphones.

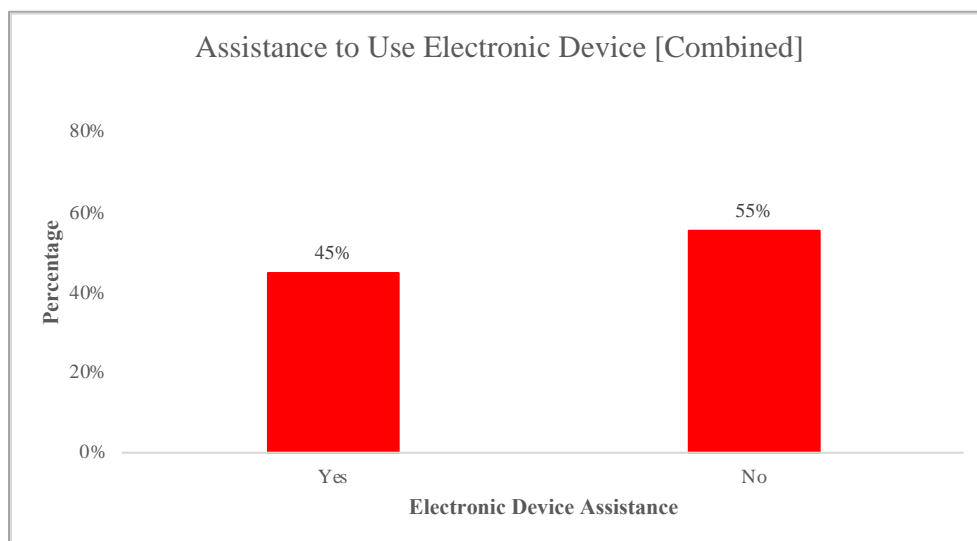


**Figure 74. Electronic Device Use [all Responses].**

#### 7.4.4. Question 4 – Device Assistance

*If you selected one or more options, do you need assistance using these devices?*

This question was a follow-up question to the previous one on electronic device use. This question is intended to gain a better perspective of the sample as well as to identify the need for assistance for those seniors who want to use an electronic device. The combined results from both the English and Spanish responses to this question are represented in **Figure 75**. About 55% of the participants did not need any assistance and 45% of participants needed assistance when using electronic devices. This may be interpreted as seniors using a new application in their devices are more likely to seek technical support.

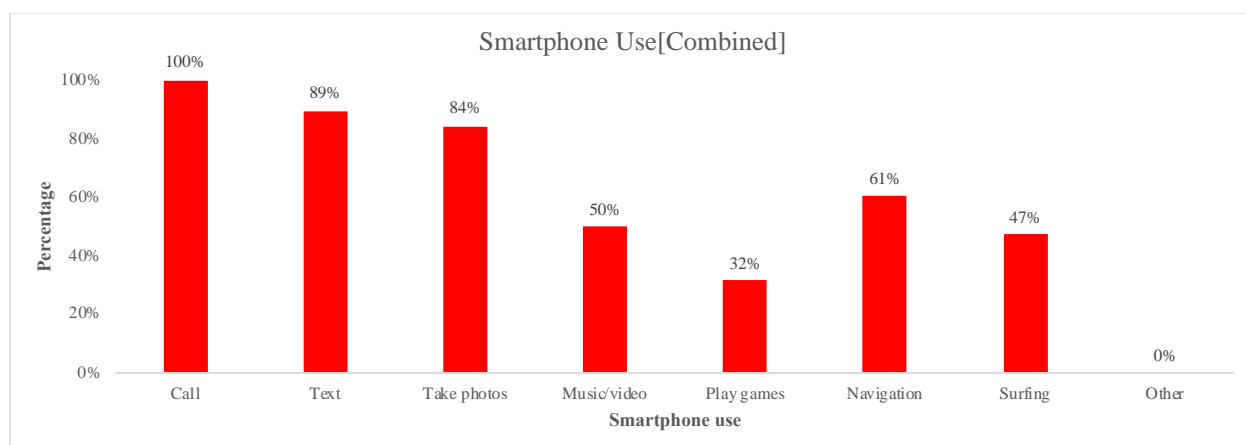


**Figure 75. Device Assistance [all Responses].**

#### 7.4.5. Question 5 – Smartphone Use

*What do you do on your smartphone? (Select all that apply)*

This question allows for multiple selections. The purpose of this question was to gain a better understanding of the capabilities of the senior in using smartphones through the usage pattern. The combined results from both the English and Spanish responses to this question are presented in **Figure 76**. Smartphones are used by 100% of the participants for calling and 89% for texting, followed by 84% for taking photos. Only 61% of the participants used their smartphone for navigation purposes.



**Figure 76. Electronic Device Use [all Responses].**

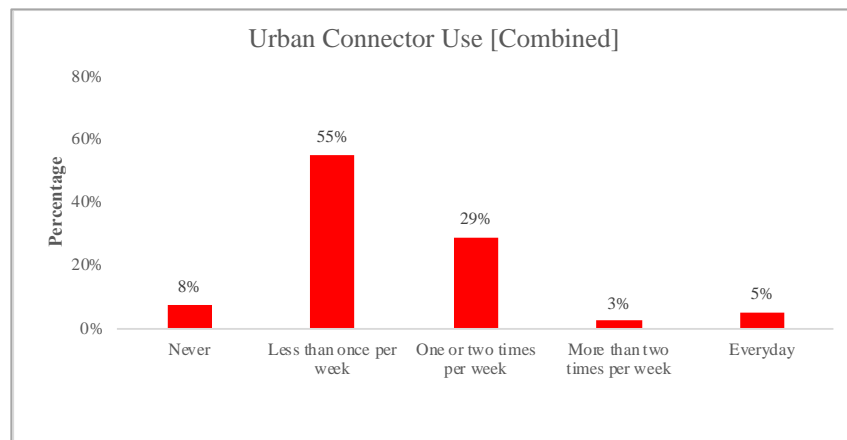


#### 7.4.6. Question 6 – Application Use

The following ten questions inquire about the participant’s interaction with the Urban Connector application in general.

*How often did you use the Urban Connector application since the installation?*

This question refers to the frequency of the participant’s interaction with the application. Users were asked to select the option that best fits their usage of the Urban Connector. A total of 38 participants provided answers. **Figure 77** presented below shows that on average, at least 92% of the participants used the application at least once per week.

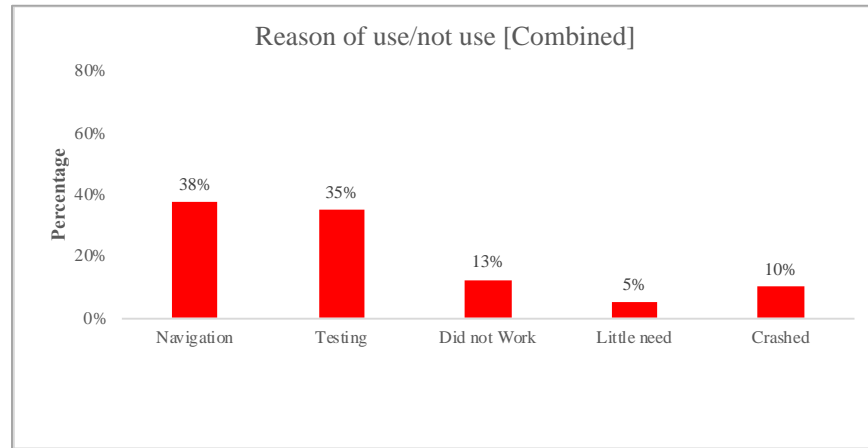


**Figure 77. Application Use [all Responses].**

#### 7.4.7. Question 7 – Reason of Use

*What was the reason you used/did not use the application?*

This question allows seniors to provide open-ended feedback based on their personal opinion as to why they did/did not utilize the application. The response statements are listed and grouped into five main reasons. The combined results of this question are presented in **Figure 78**. Navigation resulted in the most answered response with 38% of participants saying this was why they used the application. 13% of participants mentioned they did not use the application because it did not work.



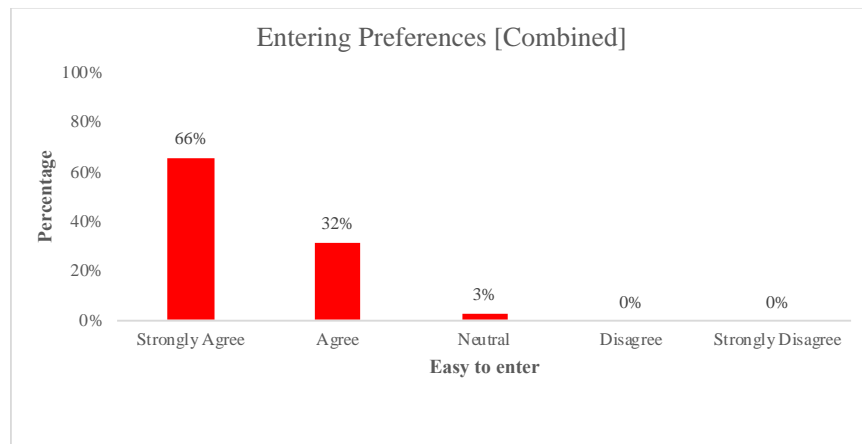
**Figure 78. Usage Reason [all Responses].**

#### 7.4.8. Question 8 – User Preferences

The following eight questions required the participants to rate their level of agreement with the statements. They were prompted to select their answer based on the following options: Strongly agree, agree, neutral, disagree or strongly disagree.

*When you started using the application, entering your preferences (selecting the font size, language, and impairments) and your home address were easy.*

In this question, participants were asked to enter their level of agreement with the statement that entering their preferences for the application’s graphics, as well as their personal user information, was easy. The combined results were given by 38 participants, and are presented in **Figure 79**. The results demonstrate that more than 90% of the participants strongly agreed or agreed it was easy to enter their user preferences.

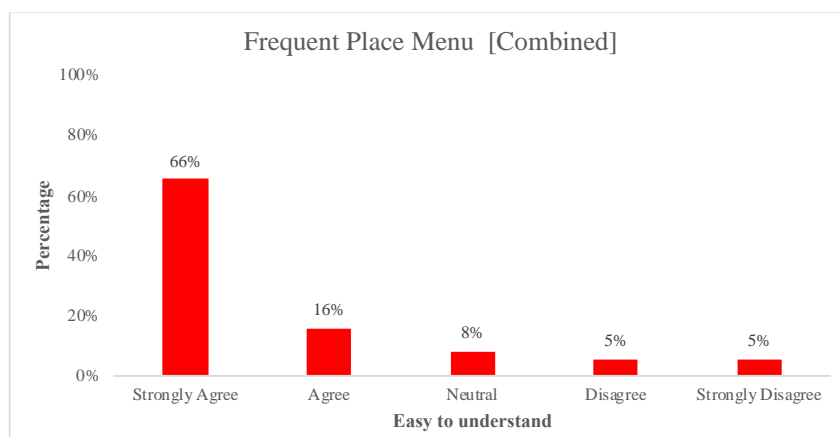


**Figure 79. User Preferences [all Responses].**

#### 7.4.9. Question 9 – Frequent Places Menu

*The Frequent Places menu is easy to use.*

The Frequent Places menu allows the Urban Connector users to input the addresses of their most-visited locations, such as their personal address or that of friends, family members, stores, etc. Once a location has been stored, end-users will be shown routes from their current location to these locations by tapping on the menu's graphical icons. This question prompted the seniors to evaluate how easy it was to use the Frequent Places menu. The combined results from both the English and Spanish participants for this particular question are presented below in **Figure 80**. Overall, there were 38 participants and 82% of them reported that the menu was easy to use. There was 10% who disagreed or strongly disagreed.

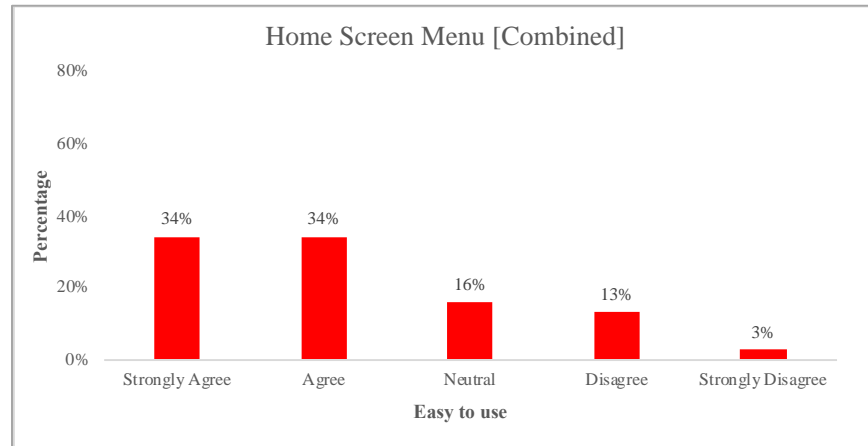


**Figure 80. Frequent Places Menu [all Responses].**

#### 7.4.10. Question 10 – Home Screen Menu

*The Home Screen menu is easy to use.*

The Home Screen menu is the main menu where Urban Connector users have access to different options, including the City of El Paso's transportation services. The participants were asked to comment on the main menu's ease of use. The combined results from both versions of the survey were analyzed by plotting **Figure 81**. Sixty-eight percent (68%) of all the participants strongly agreed or agreed that the Home Screen menu was easy to use. Those who disagree or strongly disagreed made up 16% of the respondents. They commented that the font size should be larger.

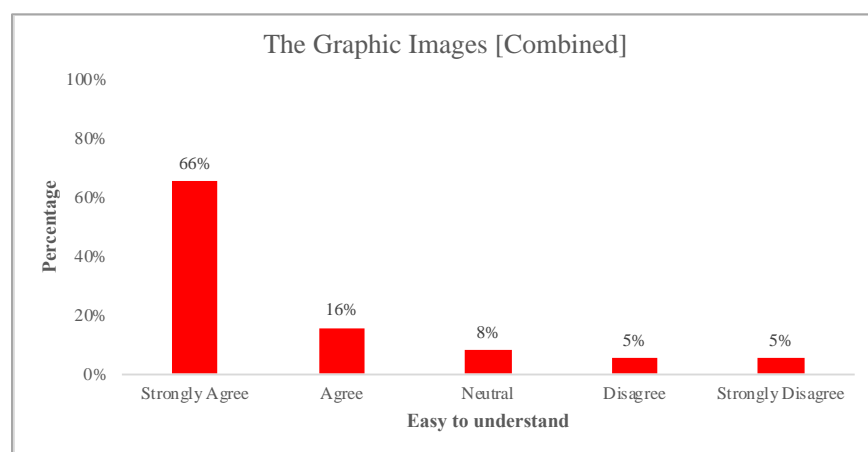


**Figure 81. Frequent Places Menu [all Responses].**

#### 7.4.11. Question 11 – Graphic Images

*The graphic images (buttons, icons) of the application were easy to understand.*

This question asked participants to comment on the intuitiveness of the graphical images presented within the Urban Connector applications. Specifically, they were required to take into consideration if the home, family, store, and other icons within the application were easy to understand. For example, if it was easy to understand that tapping the Home icon in the Frequent Places menu would provide users with a route to navigate to the address stored under the tapped icon. The combined results for both the English and Spanish versions of the survey for this question are presented below in **Figure 82**. Of all the 38 participants, 82% of participants strongly agreed or agreed that the graphic images were easy to understand. On the other hand, 10% of the participants disagreed or strongly disagreed.

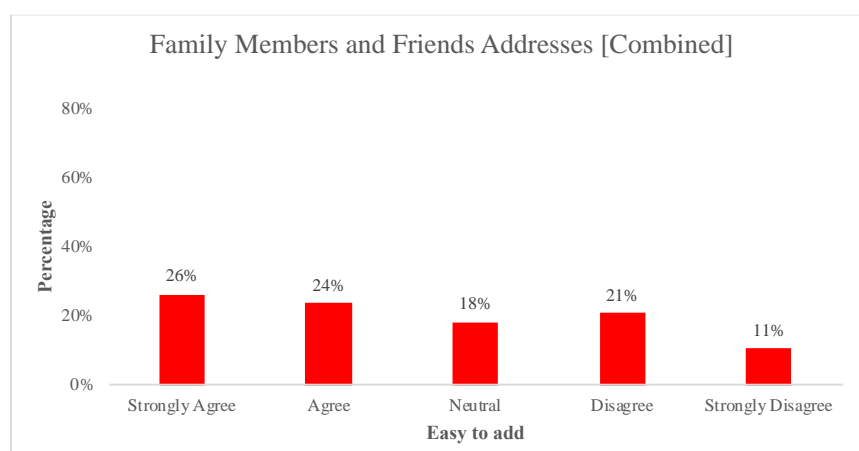


**Figure 82. Graphic Images [all Responses].**

#### 7.4.12. Question 12 – Entering Addresses

*It was easy to add your family members and friends' addresses in the Frequent Places menu.*

This question asked participants to comment on how comfortable their experience was when inputting their addresses in the Frequent Place menu. As mentioned previously in question nine, this menu offers users the flexibility to enter the addresses of their most-visited locations. The combined results for this question for both the English and Spanish version of the survey are presented below in **Figure 83**. Half of the participants agreed that entering their preferences was easy. A total of 32% of participants found it difficult to input family members' and friends' addresses.

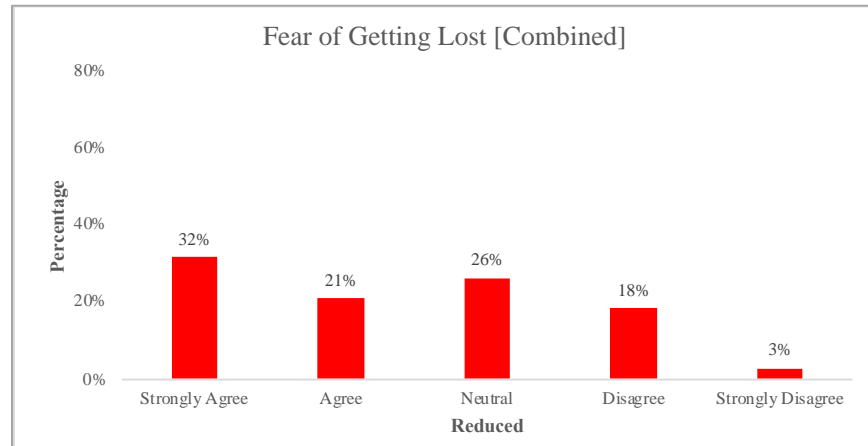


**Figure 83. Entering Preferences [all Responses].**

#### 7.4.13. Question 13 – Disorientation

*Your fear of getting lost is reduced with the use of the application.*

The results from the previous surveys from both El Paso and New York demonstrated that seniors commonly experience fear of getting lost or disoriented, which directly hinders their mobility. In this question, participants were asked if they agree that the fear of getting lost is reduced with the use of the Urban Connector. The combined results for both the English and Spanish responses are tabulated in **Figure 84** below. About 53% of the participants strongly agreed or agreed that their fear of getting lost was reduced by using the application and 21% disagreed or strongly disagreed.

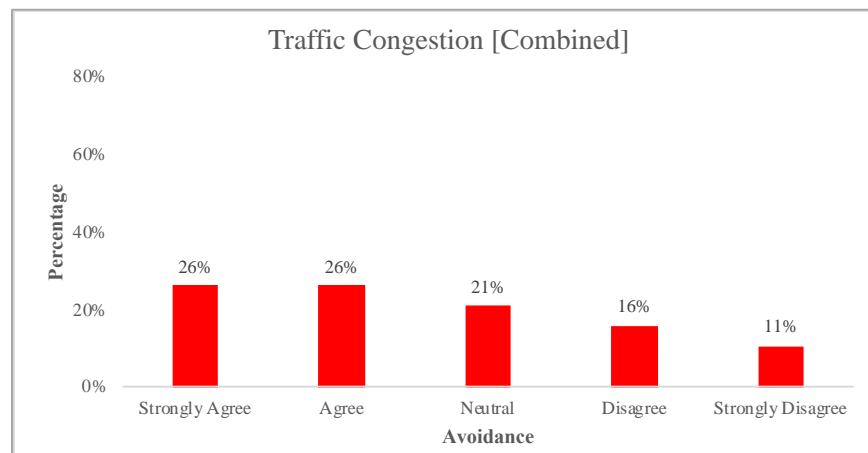


**Figure 84. Disorientation [all Responses].**

#### 7.4.14. Question 14 – Traffic Congestion

*The Urban Connector application helped you avoid traffic congestion.*

This question asked the participants if they agreed that the Urban Connector application helped them to avoid traffic congestion. The combined results for both the English and Spanish responses to this question are presented in **Figure 85**. It should be noted that 52% of the participants strongly agreed or agreed that they avoided traffic congestion by using the application whereas 27% of the participants reported the application did not help them to avoid traffic congestion.

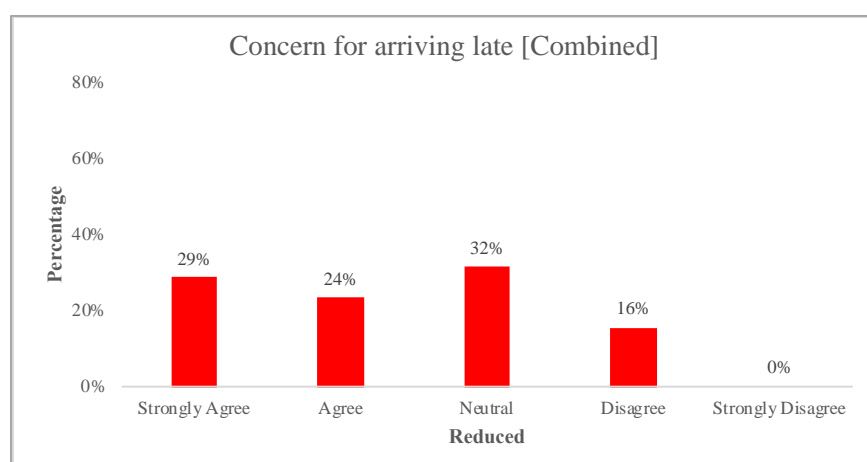


**Figure 85. Traffic Congestion [all Responses].**

#### 7.4.15. Question 15 – Late Arrivals

*Your concern for arriving late to an appointment is reduced with the use of the application.*

The last mobility concern expressed by seniors during the previous surveys was arriving late to their personal events or medical appointments. This question asked the participants if their chance of late arrivals was reduced by using the Urban Connector. The combined results were organized and plotted in **Figure 86**. Approximately 53% of the surveyed seniors agreed that their concern for arriving late was reduced by using the application.



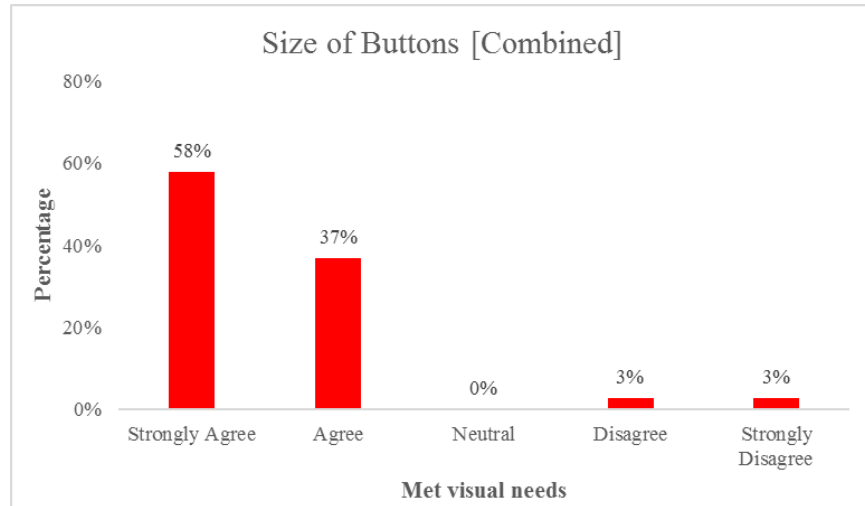
**Figure 86. Late Arrivals [all Responses].**

#### 7.4.16. Question 16 – Size of Buttons

The following three questions solicited feedback about the participants' level of agreement with statements about the application's user interface.

*English – The size of buttons and text met your visual needs.*

Once the application has been installed on the user's personal mobile device, the application will require the user to adjust the size of the buttons and text based on his/her personal preferences. This personalization is necessary to meet the visual needs of the user. This question directly asked participants if the application's size configuration adjustment helped them meet their visual needs. Responses to this question were organized and plotted in **Figure 87**. To summarize, 95% of the participants agreed or strongly agreed that the size of the buttons met their visual needs. Only 6% of participants mentioned that the size of the buttons did not meet their visual needs.

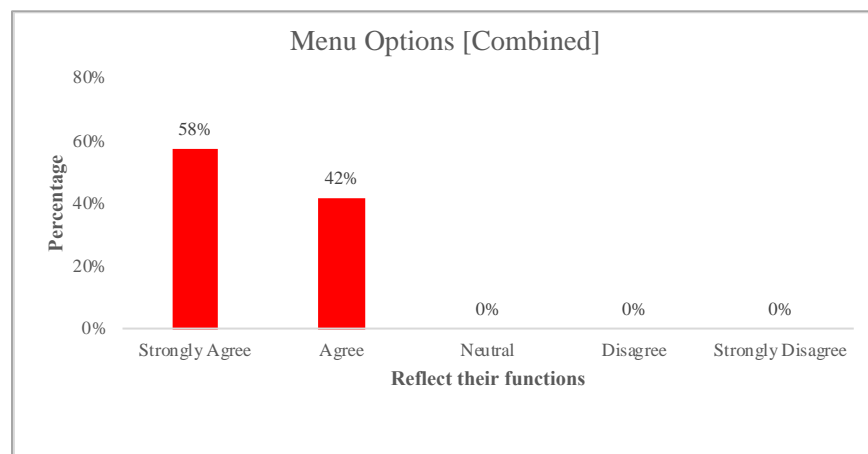


**Figure 87. Size of Buttons [all Responses].**

#### 7.4.17. Question 17 – Menu Options

*The menu options accurately reflect their functions.*

This question was incorporated into the usability survey to measure the accuracy of both the Frequent Places and Home menu functions. As expected, the combined results show the same trend that all respondents agreed that the Frequent Places and Home menu accurately reflect their functions (**see Figure 88**).



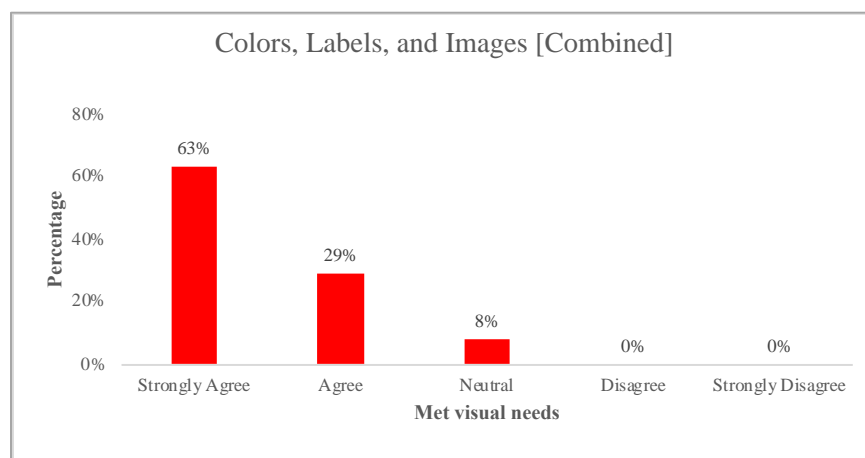
**Figure 88. Menu Options [all Responses].**



#### 7.4.18. Question 18 – Visual Needs

*The colors, labels, and images used in the application met your visual needs.*

Although the user has the flexibility to adjust the size of the buttons and text based on their personal preferences, the colors are standardized. This question required the respondents to state if the selection of colors met their visual needs. The combined results from both the English and Spanish responses for this question were aggregated and are graphically presented in **Figure 89**. A majority of the respondents, at 92%, strongly agreed or agreed that the colors, labels, and images used in the application met their visual needs. There was no disagreement.



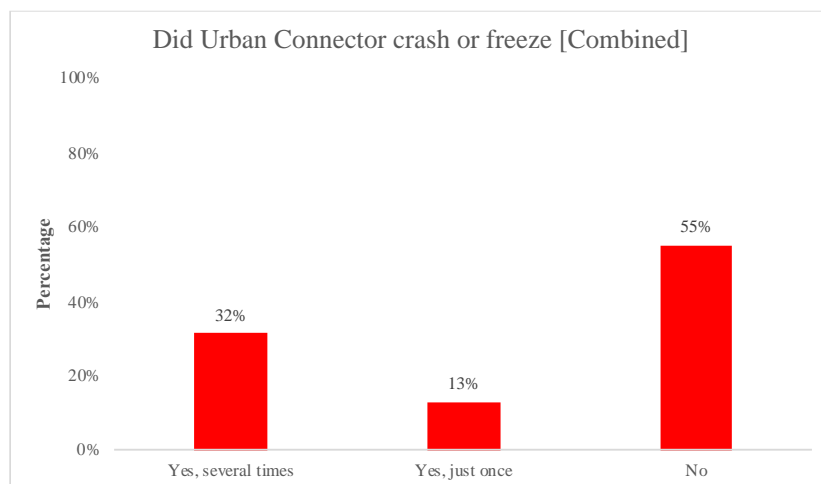
**Figure 89. Visual Needs [all Responses].**

#### 7.4.19. Question 19 – Crash/Freeze

The remaining six questions asked the participants to evaluate the Urban Connector application. These questions ranged from yes or no responses to an open-ended format.

*Did the Urban Connector application crash or freeze during use?*

This question was included in the usability survey in order to obtain a status of the application's stability. The available response choices included from yes- several times, yes-just once, and no. The combined results from all the responses to this question, in both languages, are presented in **Figure 90**. The majority of participants (55%) mentioned that the application did not crash or freeze during use followed by 32% who mentioned it crashed and froze several times. Only 13% of the participants said it crashed only once.

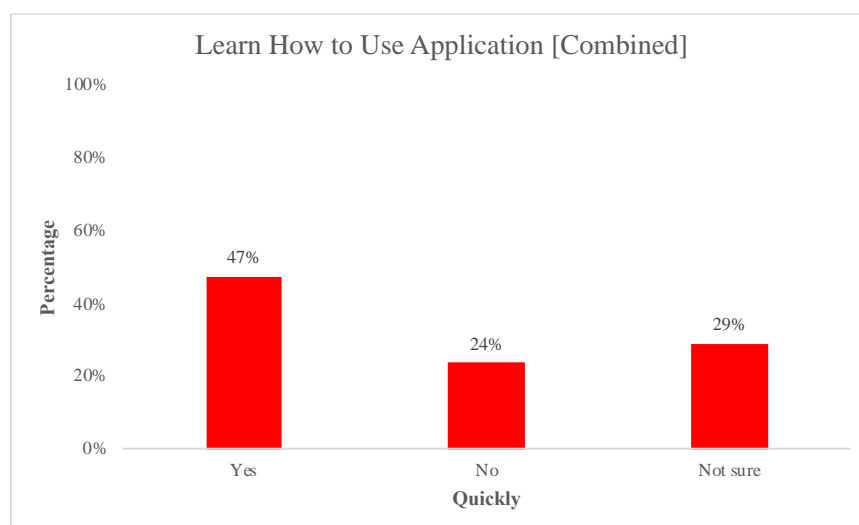


**Figure 90. Crash/Freeze [all Responses].**

#### 7.4.20. Question 20 – Fast Learning

*Did you learn how to use the application quickly?*

During the design process of Urban Connector, the authors alongside the design team envisioned a relatively easy to use application, as the target population is not familiar with mobile applications and technology in general. This question is intended to measure the adaptability of users, taking specifically into account if they were able to learn to use the application in a rapid manner. The combined results from both the English and Spanish responses to this question are presented below in **Figure 91**. Overall, 47% of all participants learned how to use the application quickly. Of the remaining participants, 29% were not sure and 24% did not learn how to use the application quickly.

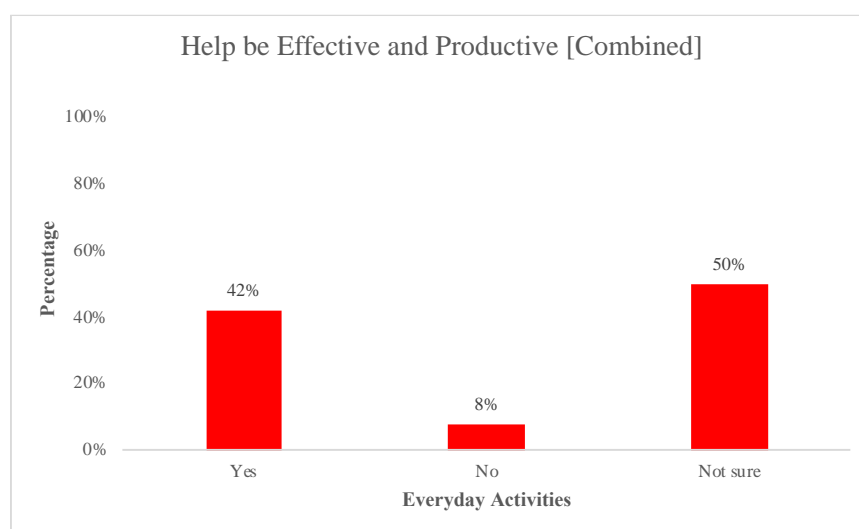


**Figure 91. Fast Learning [all Responses].**

#### 7.4.21. Question 21 – Productivity

*Does this application help you become more effective and productive in your everyday activities?*

This question was incorporated into the survey to understand the benefits experienced by the users. The three possible answers were yes, no, and not sure. The combined results from both the English and Spanish responses to this question are presented below in **Figure 92**. Half of the participants responded that they were not sure if the application helped them to be more productive. This is followed by 42% of the participants who said that the application helped. The last 8% of the participants responded that it did not help.

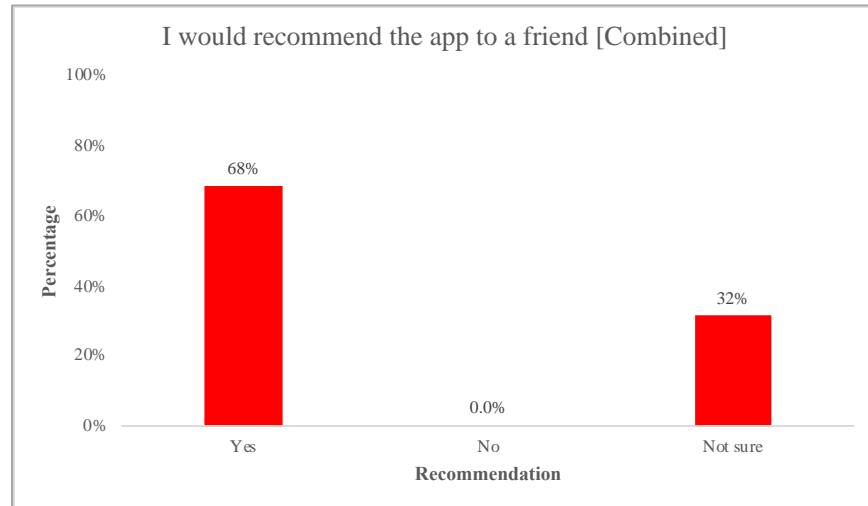


**Figure 92. Efficiency/Productivity [all Responses].**

#### 7.4.22. Question 22 – Friend Recommendation

*Would you recommend the application to a friend?*

To have a better understanding of the usefulness of the Urban Connector application, this question is incorporated to measure the users' inclination to recommend the mobile application to a friend. The question consisted of three possible answer selections including yes, no, and not sure at this moment. The combined results from both the English and Spanish responses to this question are presented below in **Figure 93**. In total, 68% of participants would recommend the application to a friend, while 32% of participants said they were not sure if they would recommend it to a friend. No participant responded they would not recommend it.



**Figure 93 Friend Recommendation [all Responses].**

#### 7.4.23. Question 23 – Application Rating

*What would be your rating for the application?*

The commonly found 5-star rating system was used to evaluate the participant's overall opinion of the Urban Connector application. This question asked users to rate their overall impression of the product by selecting one of the following choices: excellent (5 stars), good (4 stars), average (3 stars), fair (2 stars) and poor (1 star). The combined results from both the English and Spanish responses for this question was 3.47 stars.

#### 7.4.24. Question 24 – Features Suggestion

*What features do you think we should add to the application?*

In order to understand the features that users would like to see implemented in the future versions of Urban Connector, this question invited seniors to provide additional recommendations. The response statements are listed in Appendix F and have been deliberately left unedited (including spelling and grammatical errors) to capture the users' real input.

## 7.5 Summary of Findings

The usability test for the Urban Connector application was conducted in El Paso by recruiting 40 seniors in March 2019. Thirty-eight (38) seniors used the Urban Connector for one month followed by answering the survey questions in English and Spanish. Twenty-two (22) completed the English version of the survey form, and 16 answered the Spanish version of the survey form. The usability survey was divided into four parts.

- Part 1 asked the participants about their profiles. Among the 38 participants:
  - 79% were aged 65 or over;
  - 79% were female;
  - 100% used a smartphone, 42% used a tablet, and 42% used a home computer;
  - Smartphones are mainly used for calling, followed by 89% texting, and 84% taking photos. Only 61% of the participants use their smartphone for navigation.
  - More than half of the participants did not need assistance to install the Urban Connector application.
- Part 2 of the survey asked about the participant's usage of the Urban Connector application. Participants were given five answer choices for each question: strongly agree, agree, neutral, disagree or strongly disagree. From the responses of the survey:
  - 92% used the Urban Connector application at least once per week;
  - 98% strongly agreed or agreed that entering their preferences was easy, no participants disagreed or strongly disagreed;
  - 68% strongly agreed or agreed that the Home Screen menu was easy to use and only 16% disagreed or strongly disagreed, and they mainly asked for the font size to be increased;
  - 82% strongly agreed or agreed it was easy to understand the Frequent Places menu. 10% disagreed or strongly disagreed;
  - 82% strongly agreed or agreed that the graphic images were easy to understand. 10% disagreed or strongly disagreed;
  - 53% strongly agreed or agreed that it was easy to enter the addresses of family members and friends. 21% disagreed or strongly disagreed;
  - 53% strongly agreed or agreed that the fear of getting lost was reduced by using the application. 21% disagreed or strongly disagreed;
  - 52% strongly agreed or agreed that the Urban Connector application helped them to avoid traffic congestion, 27% disagreed or strongly disagreed;
  - 53% strongly agreed or agreed that their concerns for arriving late were reduced by using the Urban Connector application; 16% disagreed or strongly disagreed.
- Part 3 of the survey asked the participant's opinions about the application design features.

- 95% strongly agreed or agreed that the size of the buttons and text met their visual needs. 6% disagreed or strongly disagreed;
  - 100% strongly agreed or agreed that the names of the menus accurately reflected their functions;
  - 94% strongly agreed or agreed that the colors, labels, and images used in the application met their visual needs. No one disagreed or strongly disagreed.
- Part 4 of the survey asked the participant to evaluate the overall impression of the Urban Connector application.
  - Participants gave the application an average score of 3.47 stars out of 5;
  - 68% of the participants would recommend this application to a friend;

## SECTION 8. Conclusions

Seniors encounter mobility issues and change in their lifestyle. Smartphone applications are a potentially useful tool to assist seniors in meeting their mobility needs. However, the available applications have not been adequately designed to cater to the needs of the seniors.

The objectives of this project are: (a) to understand the lifestyle and mobility needs of seniors; (b) to develop a prototype smartphone application that caters to the needs identified; and (c) to conduct tests and gather feedback for the prototype application.

Seniors are defined by their ages. The minimum age at which one is considered a senior varies from 55 to 67, with a majority of definitions using 65. Seniors are often challenged by mobility issues related to physical, visual and hearing impairments. Such impairments necessitate transportation services to be designed according to their needs. Electronic devices and their software (such as smartphone applications) should be designed for the ease of use by seniors.

Before and during the development of the application, the research team conducted three surveys with seniors. The first survey was conducted in El Paso, Texas and New York City, New York, with the same questions in English and Spanish, in both locations. The objective of this survey was to better understand the mobility needs of the seniors so that the smartphone application could be developed to better meet those needs. Researchers reached out 458 participants in El Paso and 61 participants in New York City. Based on the key findings of the first survey, the Android platform was selected as the platform by which to develop the Urban Connector smartphone application.

After the development of the prototype of the Urban Connector application, a second survey was carried out in El Paso with 65 participants. The second survey focused on collecting the first time users' feedback. Researchers provided seniors with mobile devices with the application installed. The participants were asked to explore the application for five minutes and then answered questions about the features of the application. Over 70% of the seniors agreed that the features of the application met their needs. The participants gave the application an average score of 4.63 on the scale of 1 to 5, and 97% of the participants said that they would recommend this application to a friend.

The comments received in the second survey included features that seniors would like to see in the Urban Connector application. The research team implemented the requests, improved the functions and user interface. The new prototype was field-tested by 38 seniors in El Paso, followed by a third survey of the pilot test group. The recruited participants were asked to use the Urban Connector application for a 30-day trial period concluding with a usability survey. Most of the questions in this survey asked the participants to state if he/she strongly agreed, agreed, was neutral, disagreed, or strongly disagreed with a given statement. The statements were related to the ease of use or benefits of the Urban Connector applications. Overall, in the third survey, more than half the participants said that they strongly agreed or agreed with the statements given in the questions. The average rating was 3.47 out of 5.00 and 68% of the participants said that they would like to recommend the Urban Connector application to a friend.

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# MAKE YOUR OPINION COUNT!

Participate in a survey conducted by UTEP to gather information about your mobility needs. The goal is to develop a mobile application (App) named Urban Connector that caters to the transportation needs of senior citizens.

**WHEN:** November 06

**WHERE:** Hilos de Plata

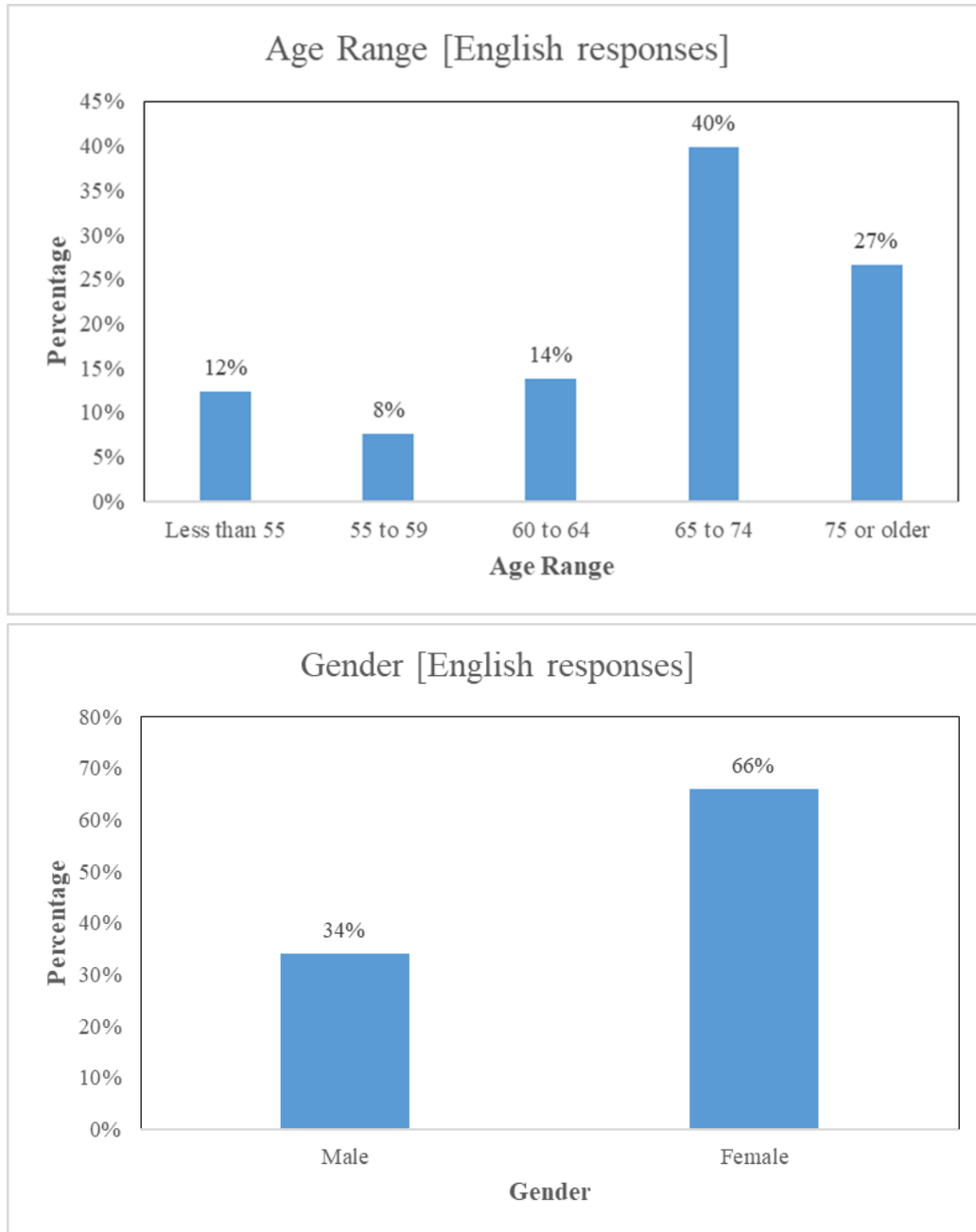
**TIME:** 9:00 AM-12:00 PM

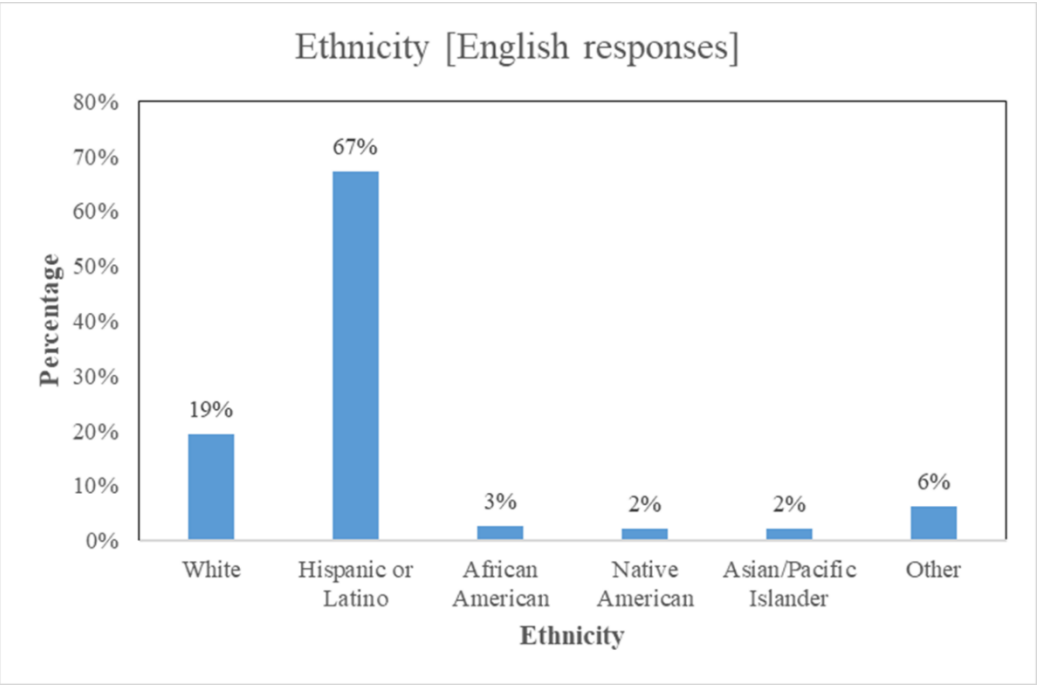
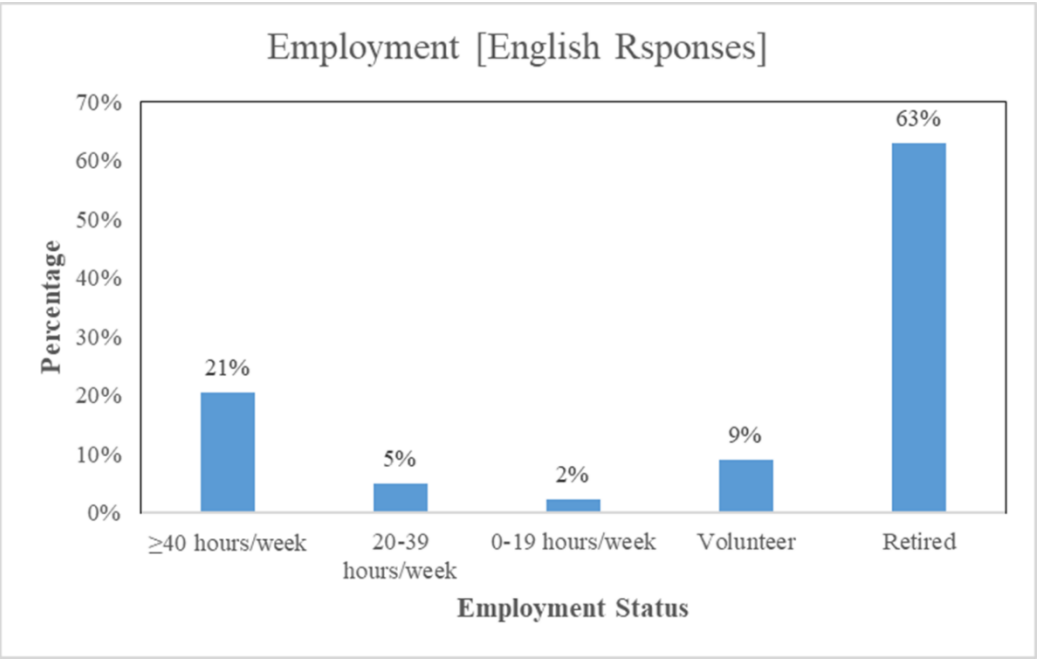
Funded in part by the National Science Foundation Grants HRD-1342038, HRD – 1242122, CNS-1551221 and the Department of Transportation Grant F8741-02.



## APPENDIX B – Mobility Needs Survey Statistics

### English





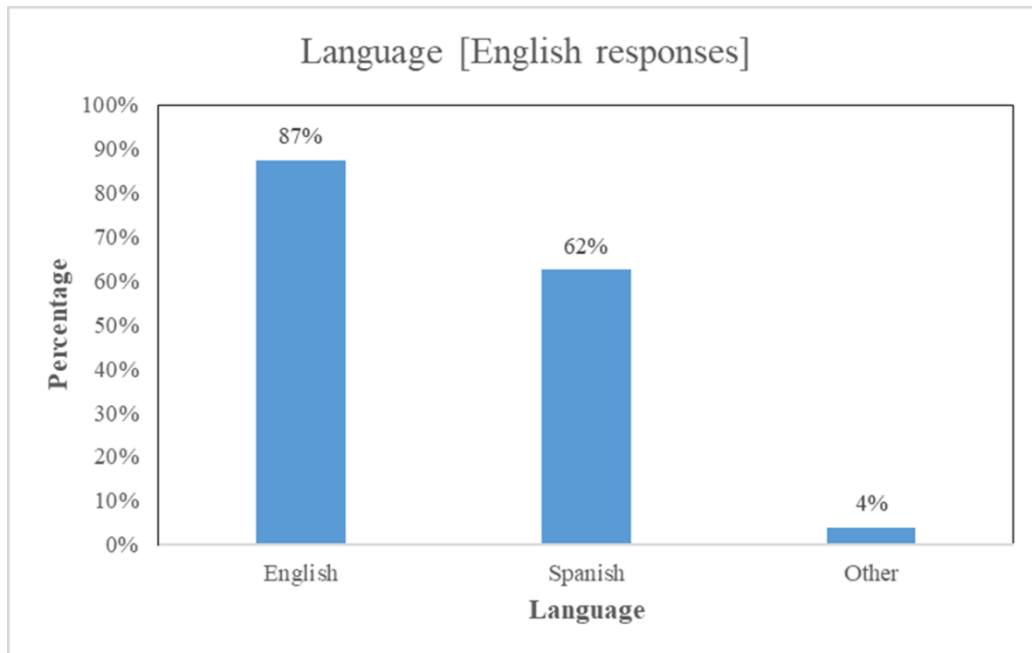
Other

Hispanic/Anglo mix

Native American/Hispanic

Black Latina

## Mexican American



Other

very little German

German

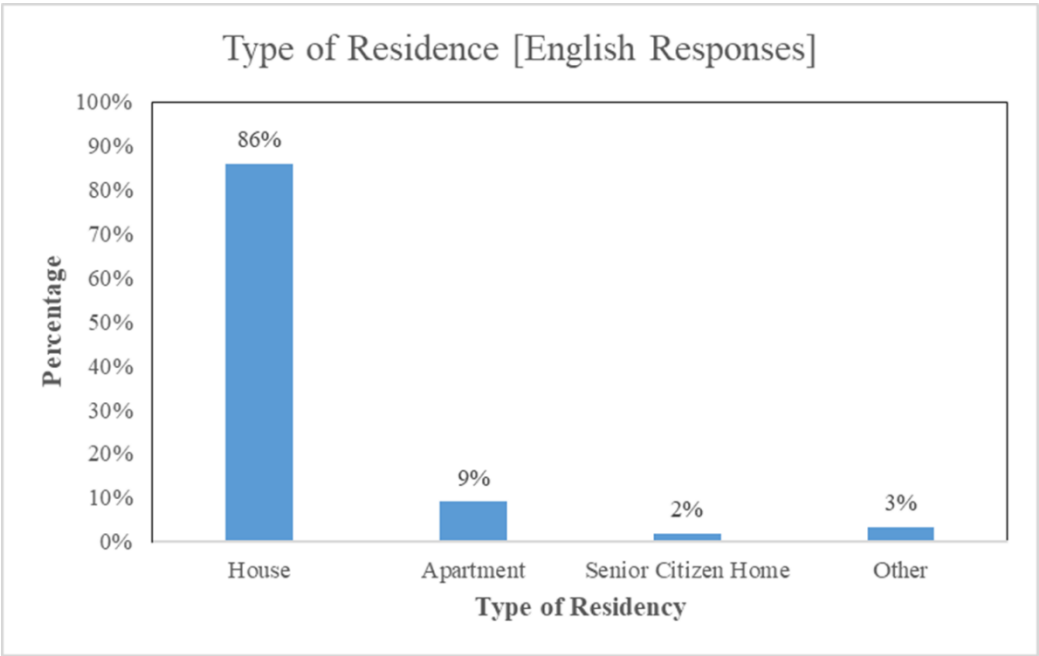
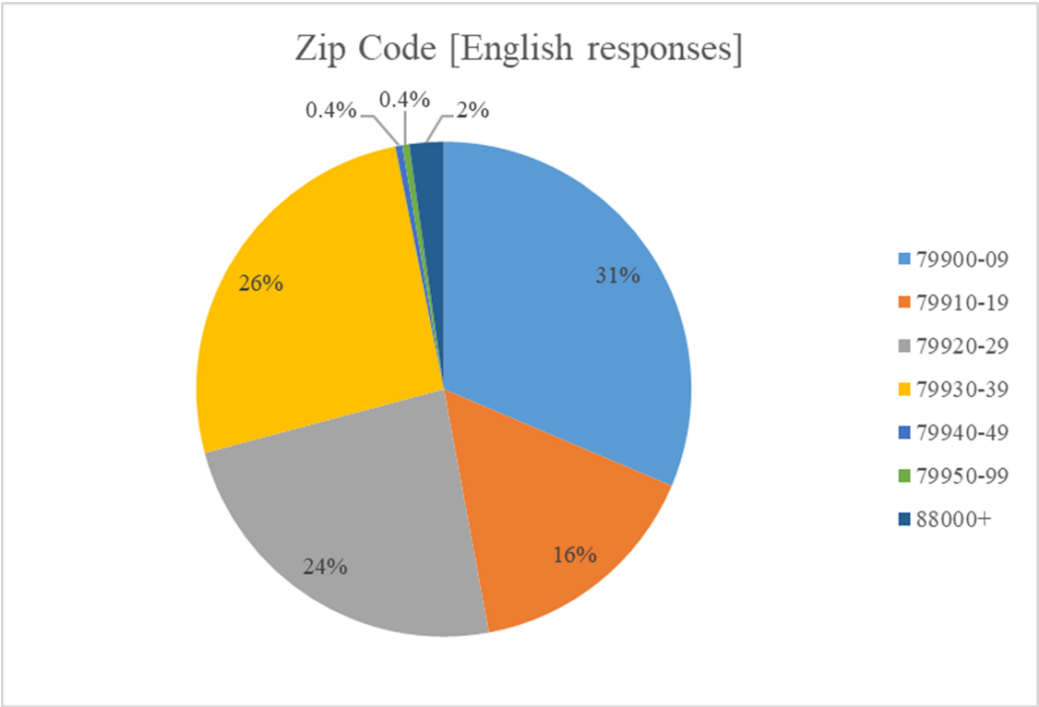
FRENCH

Sign language

Hebrew

German

German, Italian



Other

With my brother/House

no answer

mobile home

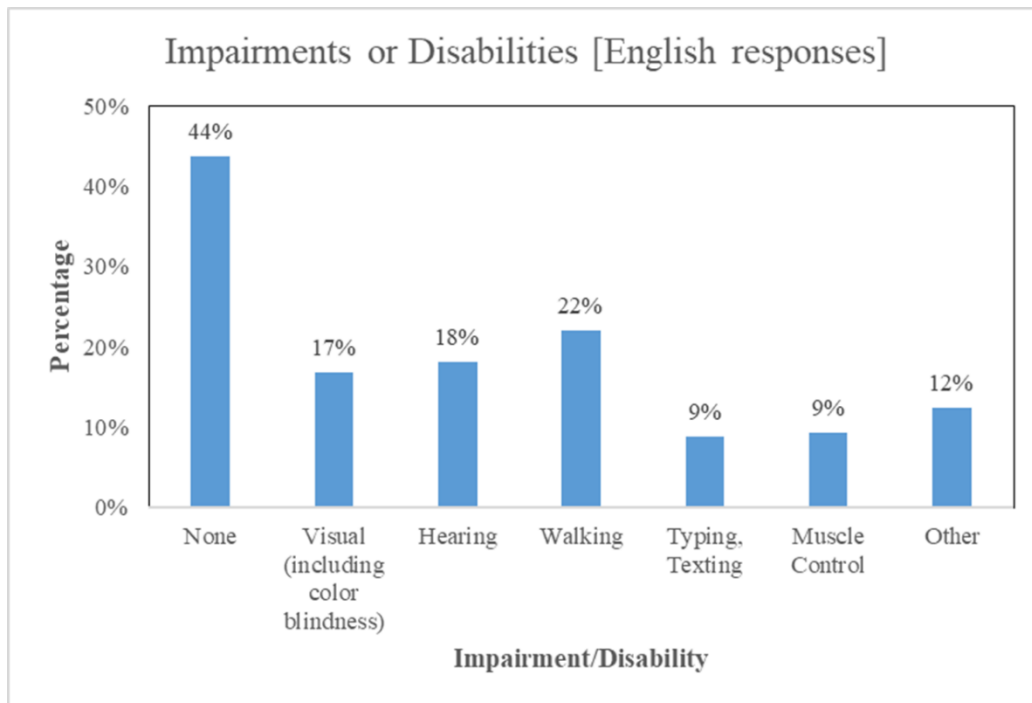


homeless

Living with friend

Trailer

Duplex



Other

military disabled

Knees

fatigue

memory loss

arthritis

Chronic back pain

limited walking

Controlled diabetic

Diabetes, neuropathy

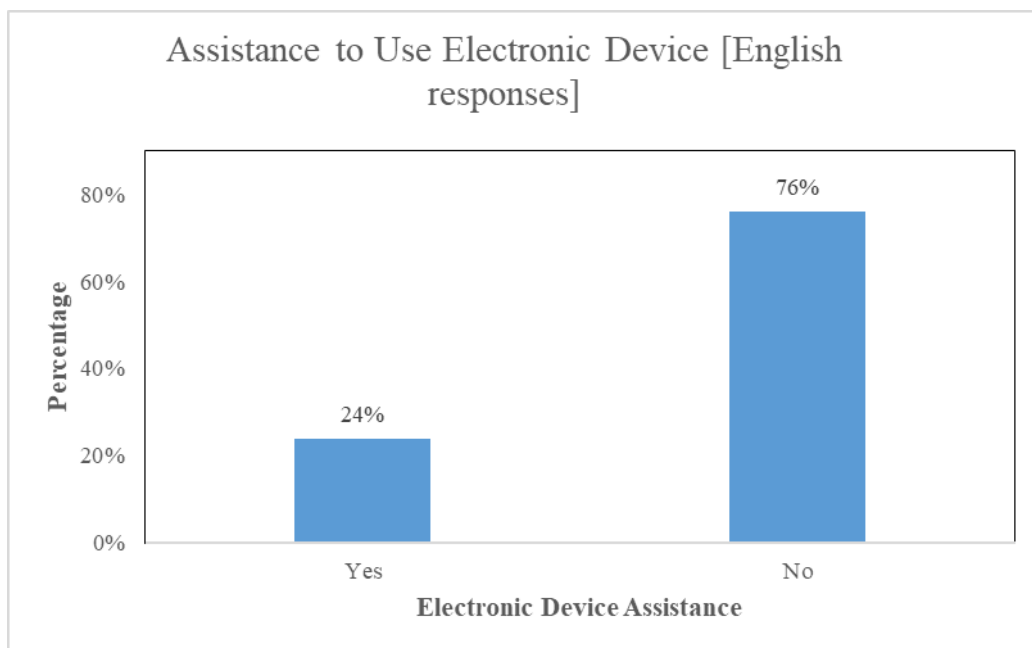
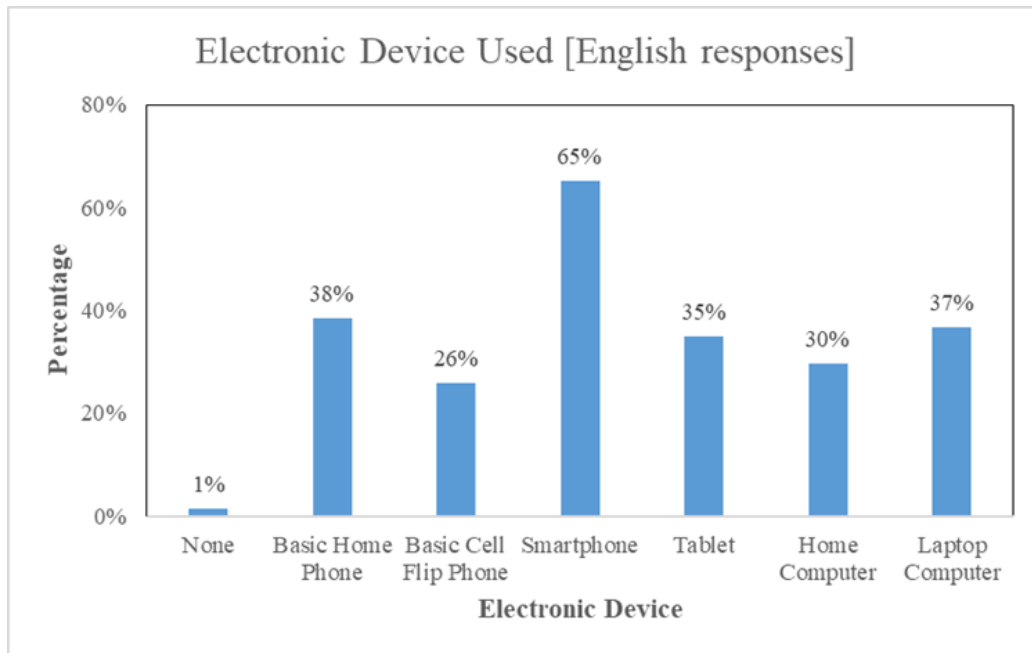
Vertigo

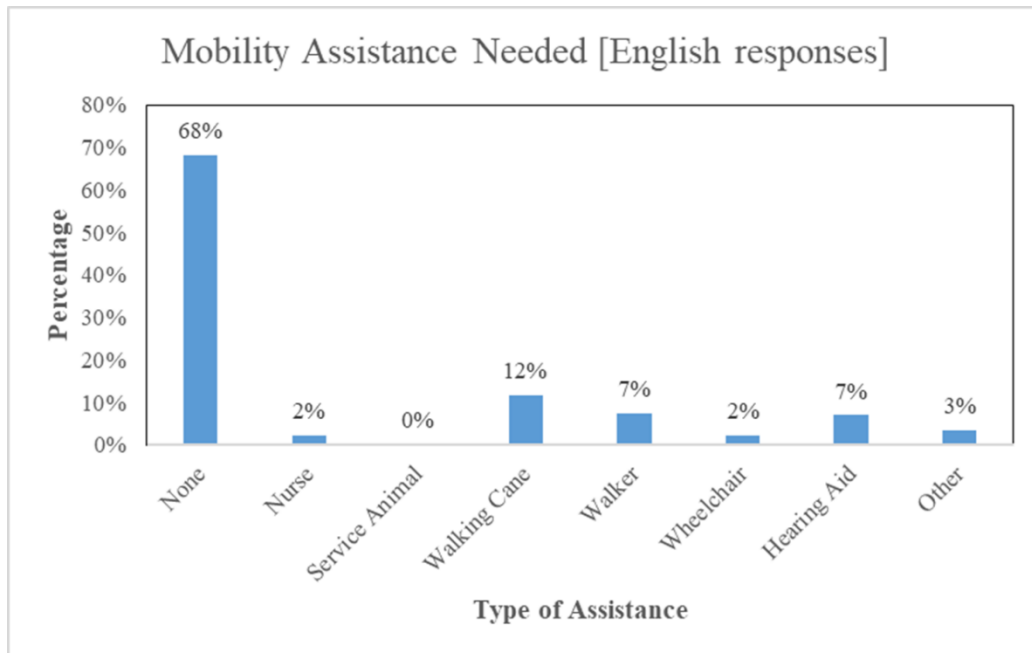
Stroke

Diabetic

Fatigue

I can't Drive





Other (please specify) - Text

sister

sometimes I need a cane, other times not

Wait on transport (usually son or daughter)

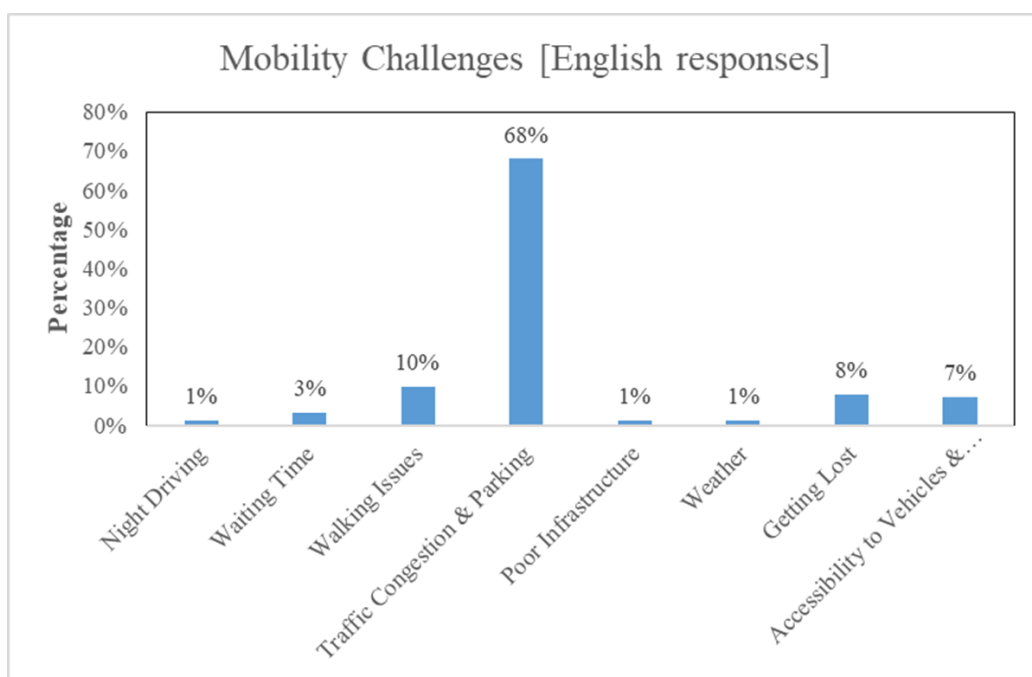
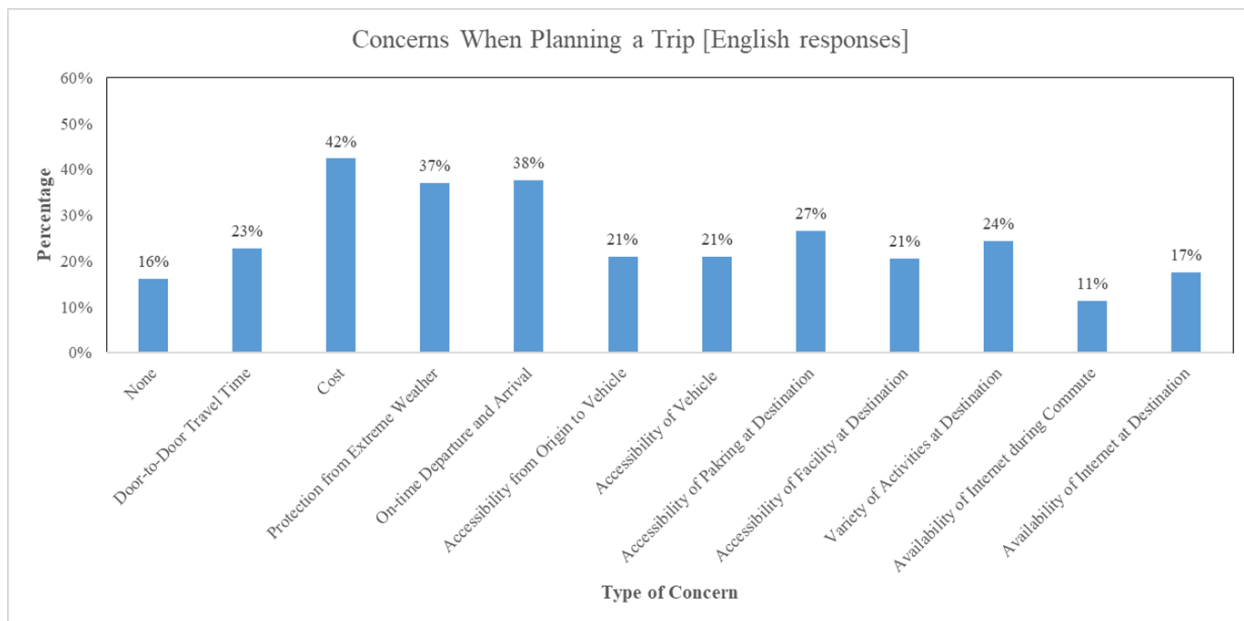
escort

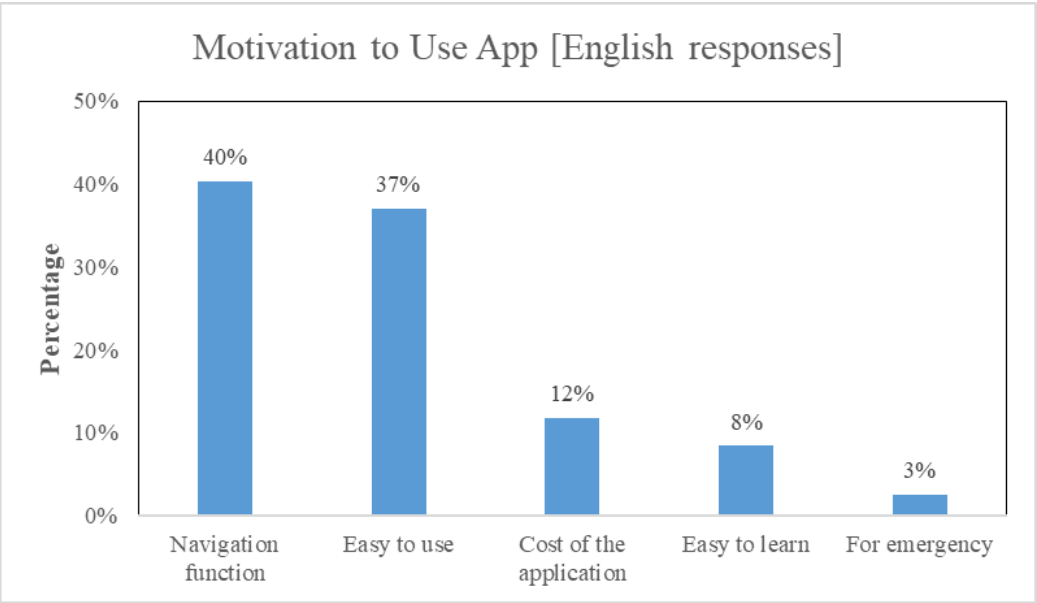
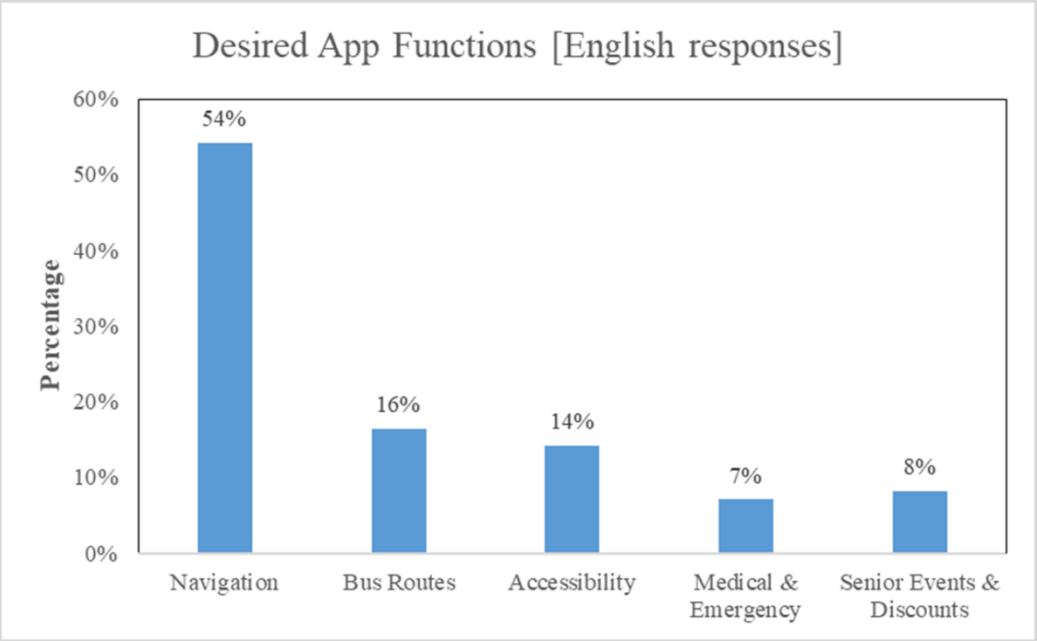
I have no need for such services

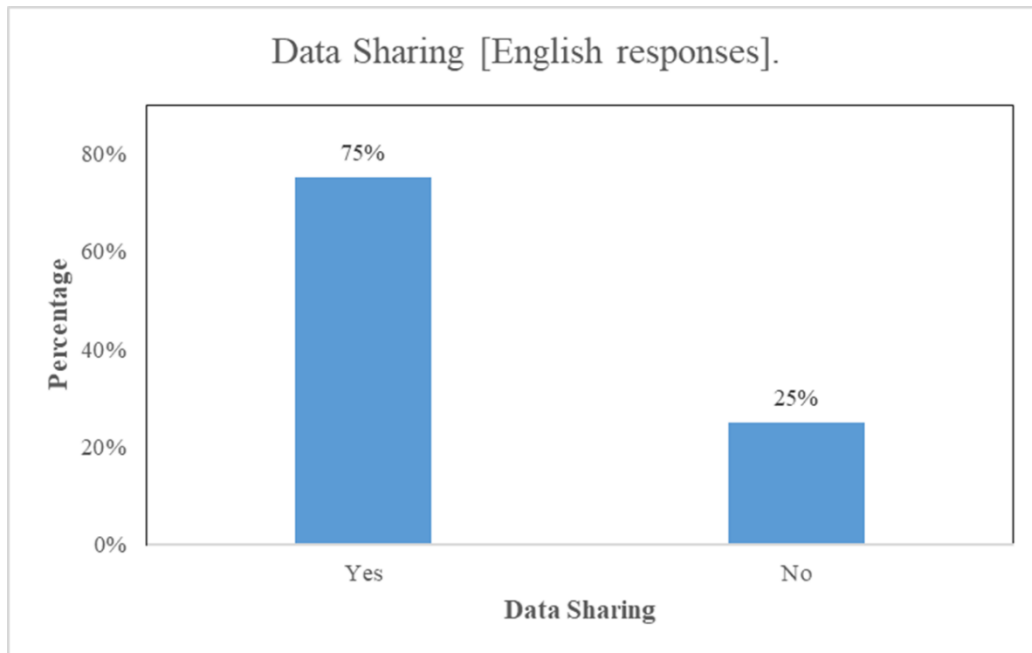
limited walking

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Work Place	70%	1%	3%	22%	5%
Volunteering Place	55%	13%	14%	16%	2%
Family Member, Relative, or Friend	9%	24%	46%	13%	8%
Grocery Store, Market, or Retail Shop	6%	21%	57%	12%	4%
Healthcare Facility, or Pharmacy	14%	67%	13%	5%	1%
Senior Center, Library, Park, or Gym	19%	16%	27%	33%	6%
Civic or Religious Center	23%	27%	44%	3%	2%
Restaurant, Coffee Shop, Diner	7%	30%	49%	10%	4%
Bank, ATM, or offices	14%	58%	23%	5%	0%

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Walking More Than 1/4 Mile	37%	18%	23%	11%	11%
Bicycle	89%	5%	4%	1%	0%
Motorcycle/Scooter	96%	0%	2%	0%	1%
Car (as Driver)	19%	4%	7%	16%	54%
Car (as Passenger)	35%	23%	20%	13%	8%
Carpool (as Driver or Passenger)	79%	8%	6%	4%	3%
Public Bus	75%	12%	5%	3%	4%
Special Bus (e.g. Lift)	91%	3%	2%	3%	0%
Taxi	94%	6%	0%	0%	0%
Rideshare (e.g. Uber)	94%	4%	1%	0%	0%







### Describe your biggest challenge when you commute in the city.

no

Not experiencing any challenges. I just walk to take the bus. I'm not experiencing any struggles with the bus.

Doesn't drive at night

Not really, I just use it to come here to the center

I pay \$5 per day to come to the senior center. They should lower the price. They always pick me up late

None, just driving at night

Legs hurt when I walk too much. It hurts even more when its cold

None, We still drive around our neighborhood

the waiting time for transportation

N/A

It scares me when I'm alone waiting

Getting to appointments on time

traffic (a lot)

walking

traffic and parking facilities

traffic and construction

fighting traffic

don't go much to the city? If I do my daughter goes with me

with main street or streets in the neighborhood they are some in bad situations where I can't even go on the sidewalk I to get off on the streets

no answer

traffic and construction-road work

traffic. depends on spouse to drive or other

traffic on the freeway

no answer

no answer

no courtesy. cant walk too far

no answer

i usually take the bus and get as close as possible to my destination

walking long areas

none

not to get lost and find place

no answer

no answer

construction

finding parking space

traffic

Transportation

Traffic

Traffic

Traffic, bad drivers

Walking

Sense of direction (need GPS)



## Transportation

Hoping that i don't fall

traffic and dumb drivers

traffic

heavy traffic

not getting ran over

no problem

finding my way around

mobility

traffic

traffic and construction

being on time because I am always late because of traffic. I walk sometimes

usually getting lost

traffic

traffic

none

traffic

traffic, congestion

knees both

traffic

None

Money, don't have enough money for my expenses. When my car breaks down I need to go to a senior center closer to my house because I can't walk a lot or long distance, and the bus doesn't come this way. It's getting difficult to walk.

Traffic

Not available

TRAFFIC

Money

slow traffic

traffic

traffic & road construction

WEATHER

heavy traffic on I10

parking

changing lanes in traffic

Parking

traffic

Traffic

Street construction/repairs

restroom accessibility

Travel time and sufficient handicap parking

Traffic

traffic

Time

Traffic and health (depending on how I feel)

Climate

Places with too much noise

Forgetting something very important

Level places

Access to areas for easy walking

Long distance walking

The construction on the west side: closures

Parking

None

too many cars on road

Rush hour traffic

Safety in traffic

I am my husbands main care taker, so I struggle caring for his mobility.

Parking

not enough side walk

parking

over-all accessibility, e.g. sidewalks, entrances, bathrooms

My biggest challenge when I travel to the city is that it takes me a long time to reach my destination for so much avenue under construction.

traffic

none

Language

none

sometimes I don't know when buses are leaving or arriving when I'm at a bus stop.

None I use my car.

Parking

N/A

TRAFFIC/CONSTRUCTION

heavy traffic

Not to get stranded especially in the dark or bad weather

none

traffic

Traffic

Transportation car and walking

need to have a road or city map

access to public transportation and money

no answer

being able to find a handicap parking

None

Getting in and down the car

Construction/traffic

Shopping around, had difficulty moving around the stores. She doesn't own a smart phone

Traffic

Walking from parking to facility

Hace an older vehicle. High gas use.

Heavy traffic

Obtaining directions/traffic congestion/do i have enough gas

Dealing with traffic due to active freeway construction

My mother is in a wheelchair, when we have to commute to dr visits or any activity it?s really hard to find handicapped accessible spots. Very few places have ramps, automatic doors or even parking spots.

None

Traffic because of bad driving of other drivers

Traffic

Traffic

congested traffic

Traffic and distracted drivers

City under construction

construction delays

I10 construction problems

Lack of parking spaces available.

Sun metro has been doing a good job. Maybe after the age of 75, bus fare should be free.

NONE

Traffic causes me to only stay on the west side

Finding the place

Visibility (signs/paint not bright enough, especially at night)

Traffic

Traffic is bad, so I only stay on the westside

Staying awake

Timing schedule for buses

I do not use internet and I hate to see people on their phones constantly

Knowledge

Traffic

Mobility or maneuverability

Distance from bus stop to my office. Okay most days, but when transporting things can be a bit far. I also hate crossing Mesa after dark--I often take Lyft so I can avoid crossing Mesa after dark.

My health, access to bathrooms

I rely on my husband and it's dangerous driving

Traffic, young people cutting me off

Traffic, speed bumps, cars going too fast

No challenges, I can move around well

Finding good places to eat

Traffic, speed, getting lost

Traffic

People drive too slow

Traffic

Cost, gas

Cars cutting me off

To get to the destination on time

Memory, losing consciousness, forgetful. I like to be at senior center by 9:00 AM and I get my hair done once per week

Time management (making appointments on time)

N/A

N/A

Traffic (safety, more traffic control and not enough police)

Traffic

N/A

N/A

Bus scheduling and making sure I can carry all my stuff when I get on the bus
Many stores do not have the motorized carts. I cannot walk for any length of time
I don't drive
N/A
N/A
Don't like to drive in heavy traffic
N/A
None
Traffic
Traffic and condition, safe route for bad weather.
Walking
None
Secure transportation, drive with precaution.
I cannot drive at night
Traffic
Knowing where everything is
Being on time
Being on time
Parking downtown
N/A
My nephew takes me
To know where I go, Knowing
The traffic and the closing of streets.
None
caminar
I walk to slow so the bus leaves me behind.
can't go by myself, I can't walk by myself anymore, I fall easily. I need my husband to take me.
walking

Traffic. Safety, need to drive cautiously to prevent accident.

parking

None

Bad drivers

Traffic

**What is one function you would like to see in a mobile application (or App) that would cater to senior needs?**

No answer

I'm not sure. No smartphone

I would like a smartphone

transportation information

N/A everything is good

None

I tend to stay to my self. My sister in law tells me that I'm not friendly. Maybe information to socialize

N/A everything is fine

distinguish what type of transportation is

N/A

if I would like but I do not use it

Sites to sit down

give bus routes that people can take when no car

area of service

easier access to transportation

to be easy

to facilitate handicap

i don't use a mobile

to have better equipped doors in stores, doctors, and offices. No equipped automatic doors

no answer

no answer

smartphone
no answer
none
on time departure
i don't know
no answer
no answer
n/a
no answer
no answer
senior discount
no answer
Ambulance and medical
no answer
no answe
Accuracy in destination
Easy access
Easy access
Parking accessibility
Large font
Directions
Simplicity
How much time it takes to get to my destination.
not sure
senior events
i don't have access to an app
no answer
none



map

to better use technology

learning what transportation is available. Learning how to use technology

service information for older adults

when traffic is down

when using public transportation, a reminder of when I should get off the bus

show when there is less traffic

no answer

simplify technology to seniors

lifts on all buses

emergency alert

none

night drivers when it gets dark

I hardly use the cellphone. I lose it all the time

Navigation

Bus routes and times

HOW TO USE APP

Gps

large text for eye problems

n/a

That it include Southern NM

LARGE VISUAL ICONS

Traffic warnings

destination parking availability

know in advance about road closures or accidents

none

First aids aboard

accurate information regarding street closings

easy picture identification

bus schedule app that works like google maps. Put in origin and destination and it shows bus routes and transfers along with time table

Best routes and how long it will take

things to do

Easy to operate

How long it will take to get from one place to another

Doctor appointments

Places for seniors

Places for seniors to go

Transportation and reminders

Transportation

Easy route directions

understandable icons

Hand free should not ask to enter a number

None

Hands off voice commands

Simplified

An app for flip phones or a service line.

Easy use.

map driving

"I'm at this bus stop -- how soon will the bus be here?"

simplicity

Be easy to use for everyone

informaci?n

more buses

I don't know

none

something that would allow me to see time departures of public buses around the city.

Easy call for medical service transportation

Easy to use

Appointment Scheduling

VOICE INFO

Social Security App

easy magnification

Larger letters ok

Availability of transporation choices and places if I can't drive

n/a

no cellphone; make it easier to understand like where other stress/ freeways are located. where libraries are located.

no answer

Places that are handicap friendly

Easy navigation

no

to show me how to get to places

bus information

Formularies of medications that way dr cant rip you off

Where to find places that offer senior discounts

Rideshare info

Easy bilingual instructions in large print

Simplicity

Age friendly

Buildings that are easily accessible with a wheelchair.

Do not use apps

None

An app that tells me what is happening in the city

None
info about drugs and doctors and local hospitals
Accessibility simple and big letters
Construction obstructions
not sure
Ease of use.
Mobility options.
Able to see bus routes, times, and see where the bus is
none
Events/construction downtown (ball games) and help with parking
Easy to use for senior
N/A
Route to avoid traffic congestion
Easily accessible, simple
Wheelchair access
More training to use a smartphone
I rely on my daughter as my driver
N/A
Recreation places (camping)
Traffic updates and where I am in the city (big picture)
accurate arrival times
Very large print
N/A
Walking routes with sidewalks (not gravel) and places where it's safe to walk (no traffic)
Bigger letters
I don't know how to use Google Maps or other apps, need to learn or someone to teach me
Places to eat
To help me get around

N/A

Shortest route to destination and traffic warnings

Big enough to see and use (if I don't have my glasses)

N/A

Ability to call 911 from App

I don't know

Main concern is to go see the doctor

Availability and knowledge of local resources

Look for stuff

I have a flip phone

Tracking the bus to expedite pick-up and not be in extreme heat/cold on the street, not enough money to buy smartphone

Transportation (Sun Metro does not have enough lifts and drivers)

Learn languages

N/A

Include cost of service for the bus so I can administer money and know what service goes to what place (help identify services I need) so I can make sure I have a schedule to go back home

Simple app that is easy to see. I don't want to mess with phone pop-up settings and there must be room for error (if I enter the wrong information)

Large address numbers

Resources

N/A

Bigger prints

N/A

food delivery

Traffic condition information, where to avoid traffic, and good reception.

Information about transportation at night

How to get somewhere by myself without assistance

None

Having exact addresses and more information about the destination place

Make it less complicated

N/A

Schedule

Schedule

Don't even want to mess with it

None

None

Information about the places I can go (Medical clinic & senior center)

Easier to use

To find the place.

none

Don't know how to use it.

Don't use any of that, not even the computer.

very user friendly

to tell you when you arrive to your destination.

safety

Community Centers

accessibility of destinations

up to date and accurate information on local resources

**If you were offered to use a mobile application (or App) that is designed to assist seniors to find places and commute, what would motivate you to use the application?**

No answer

No smartphone

No smartphone. She needs to learn how to use it

No smartphone just a basic cellphone

No

in the future when I can't anymore

I try not to get involved

I think in the future when I needed I would

if I did not have to go until the last of the way

I do not see anymore I should talk

I had the big name so that I can see it

To get to where I go

places to go to eat, have fun (not be stuck at home)

if it's safe

easy way of accessing app

yes

no answer

yes

to get more convenient designated access to place I go to

no answer

no answer

smartphone

to find how to get to places

no answer

yes

maybe

no answer

we have a Garmin and also an app-map on our computer and we use it frequently

yes

no answer

no answer

yes

no answer

the need for it
no answer
no answer
Simple to use
One touch connect
One touch connect
Helpful information
Accuracy
Yes
Easy to understand
yes
easy access and form
to find out about seniors
training
no answer
someone teach me how to use it
having a map designed for hospitals
more education on use of new technology
yes
have access to internet and maps to move around
being on time
being able to take the bus without feeling like I am going to get lost
if the app accurately showed traffic live time on the roads of el paso tx.
no answer
no answer
time, knowledge, and actual use
more concern on event attendance
none



Speak to the application

I already know how to move around, but sometimes I don't know the name of the streets. I would use it so I can show people how to get to places.

User Friendly

More technology education

EASE OF USE

Nothing

if it made my travel faster

time of commute

accessibility & inclusion in program

NO

Need

YES!

user friendly

none

traffic reports

For Dr appt

ease of use

user friendly

Simplicity, ease of use

Easy to use

ease of accessibility

Yes

N/A

N/A

N/A

N/A

N/A

N/A

Friendly use

nothing

Yes

Easy maps

already using GPS

Easy steps to navigate

Safety, no falls

If someone can teach me then yes.

Fair prices.

when needs to travel

ease of use

simplicity

Be on time to any destination

ease of use

doctor

To visit places

none

reassurance that it can be used by a family member to track me down if I ever get lost.

I dont need it

Accuracy

Efficiency of app

HEARING, rather than reading instructions

fast and easy

Easier way to communicate with children and grandchildren from out of town.

Conducting business from home

easier than Google maps

Its for seniors

Need this App to stay active

to get to y destination faster

to find places & to show you where there are better places, libraries to use the computer.

to go where we need to go as much as we need to

if it told me that handicap parking is close to the place I want to go.

Being able to help

no answer

to show me how to arrive easier to my destination

If I was by myself.

Cost

Any cost savings that would be involved

Usefulness

Real Needs

Big, bold print

Functionality

Yes

Do not have smart phone

If it is really helpful

Free

No

free of charge

It can get me to my destination with ease and for it to be simple to use, one two or three steps not more

Don't know

easily understood

Ease of use.

Points for rewards similar to those used by Metropia.

Make it easy to use and understand

yes

To guide someone who is taking me

To find places

N/A (no interest) - Older people are afraid of technology (build a wall against)

Getting around (avoiding traffic and construction)

Being able to meet all the concerns

When I can't drive

Yes 100%

No

Reliability

A good app that is possibly free

Traffic to avoid time wasted during commute

finding new places to get to with public transportation

I do not have a cell phone

I only use my phone for emergencies

Help seniors and encourage them to walk

Help me move around

Understand how to use it and classes on how to use it

Easy to read and surf

Affordable price

N/A

Warning about traffic problems

Yes

N/A

I have one

To be taught the app and what's new with technology

When is there less traffic and my daughter lives far so I don't get to see her often

Economics

Look for places to visit
Need phone first
Visiting museums (going downtown for walking) and visiting friends more often and going to events
If the app was easy to use
N/A
N/A
My own personal needs
Easy to use
Free
N/A
N/A
Finding locations
N/A
Yes
if it were actually helpful and easy to use
If bad weather & have to travel long distance & time of date depends on traffic.
Don't have to worry about who can take us.
Learn how to use the App
improve the mobility for peoples services
Not a big fan of technology
Emergencies & other
Cost
Free and not complex (as simple as possible)
Free and not complex (as simple as possible)
Free (low cost)
None
I don't have a way to move around
To be able to move and discover places.

It would be good to go out and distract myself.

The Price

none

For emergencies when I need to use the phone for something.

To learn

Being taught how to use it

sometimes I don't know the address and it tells me where its at.

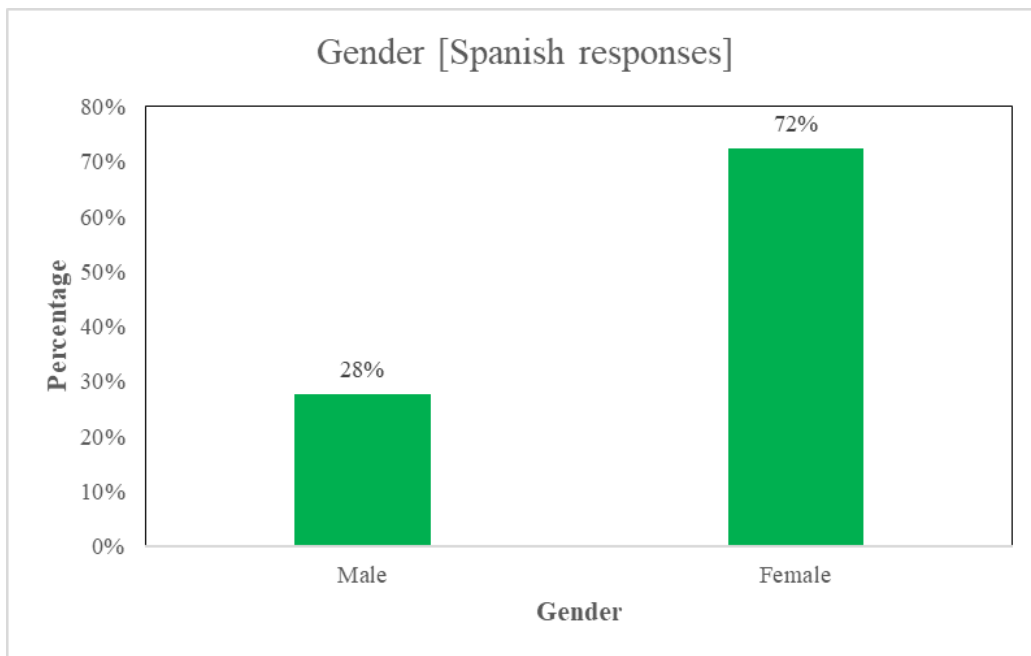
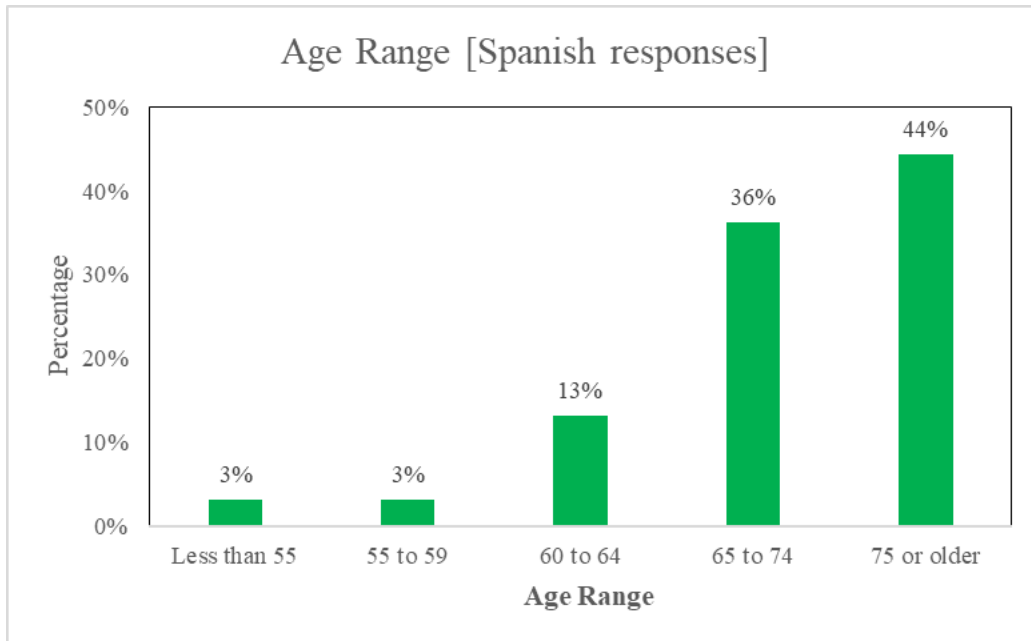
relevance to my situation

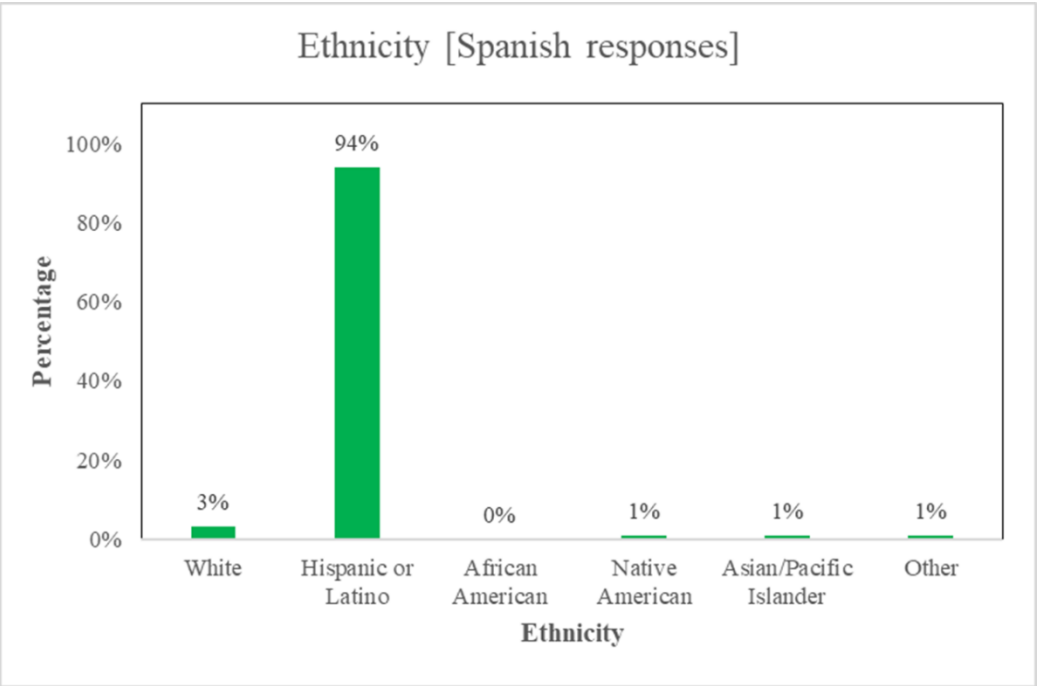
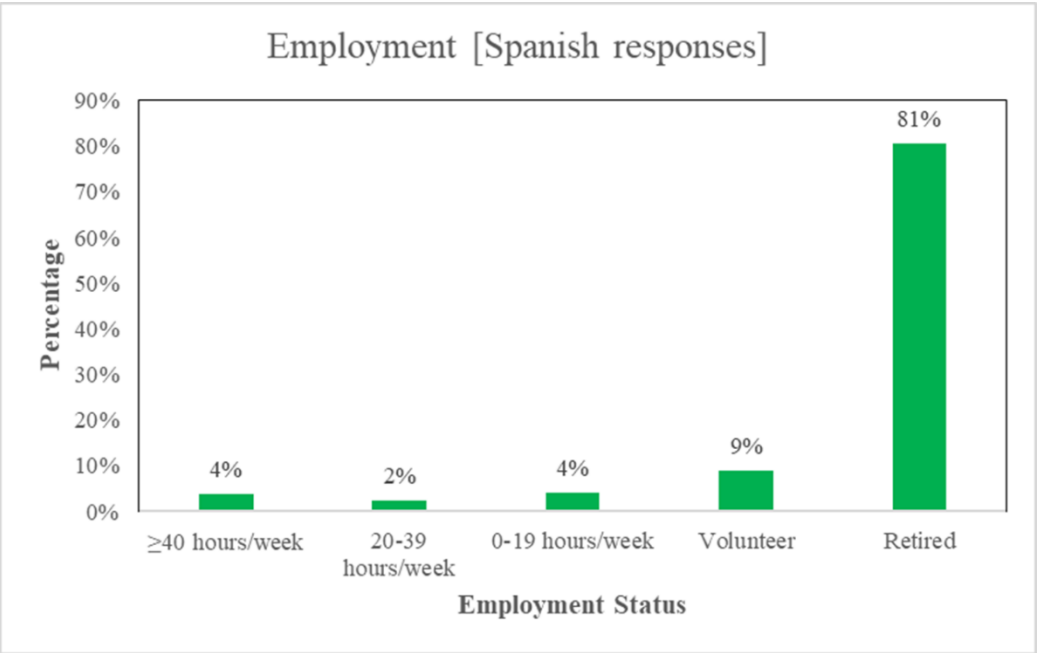
Events

handicap accessibility

how useful it is after trying it.

## Spanish

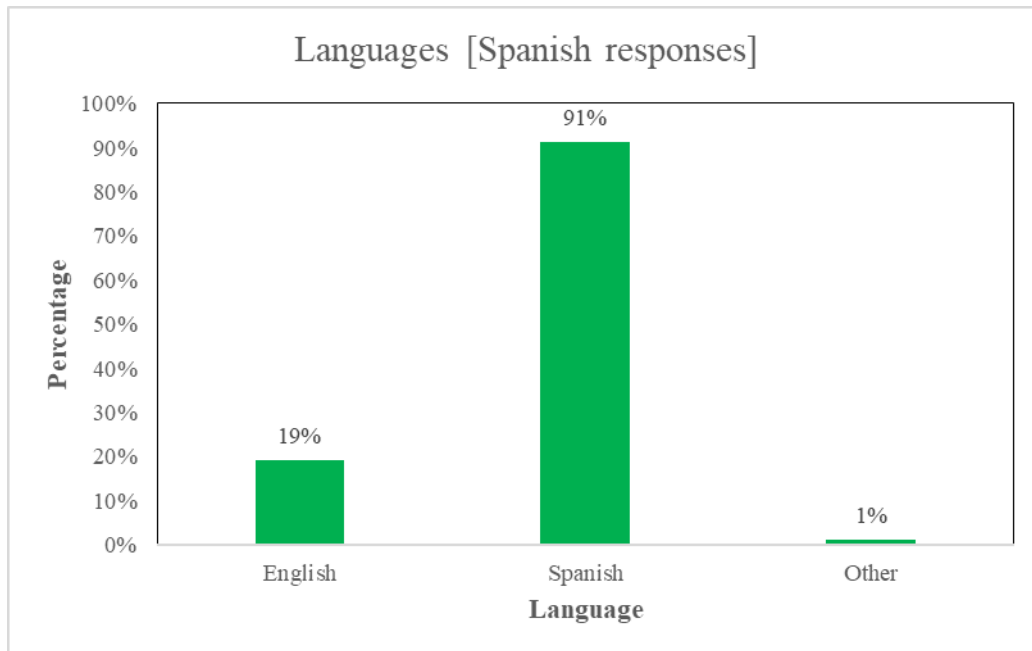




Otro:

Mexican

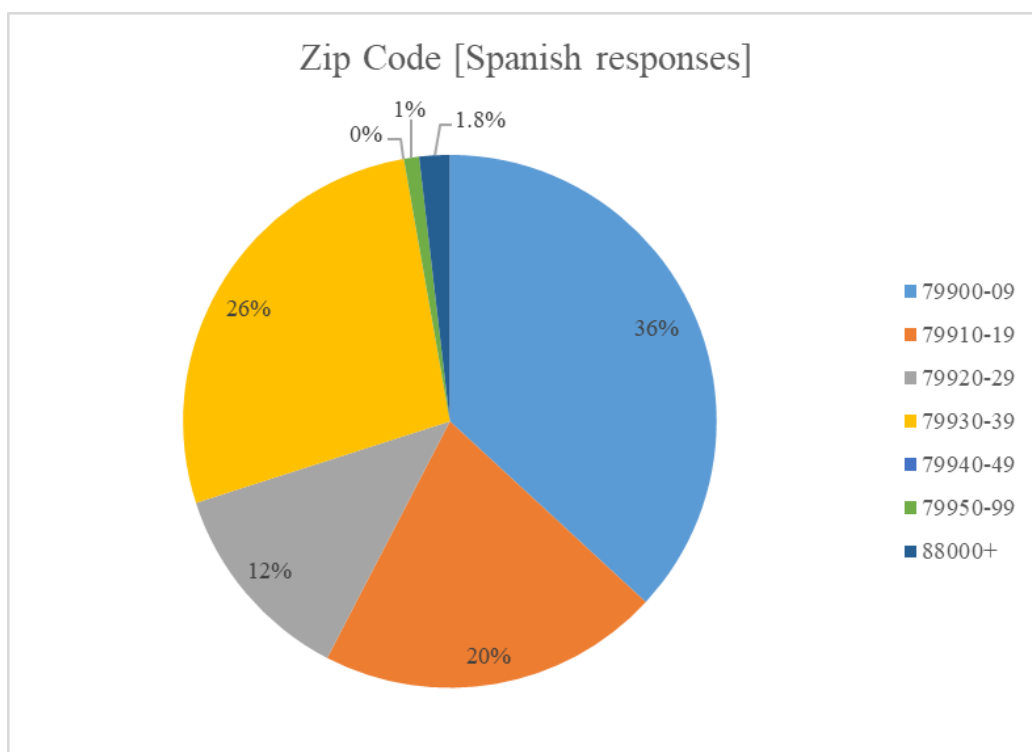


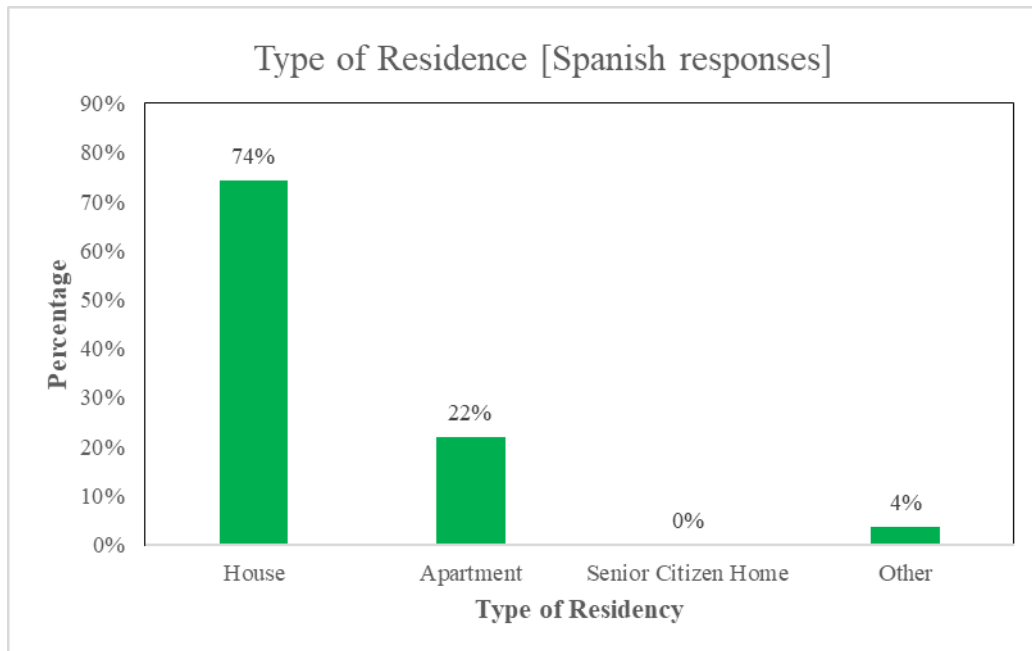


Otro:

sign language

Spanglish





Otro:

son's house

Mobil Home

Shelter/ Farm worker's center

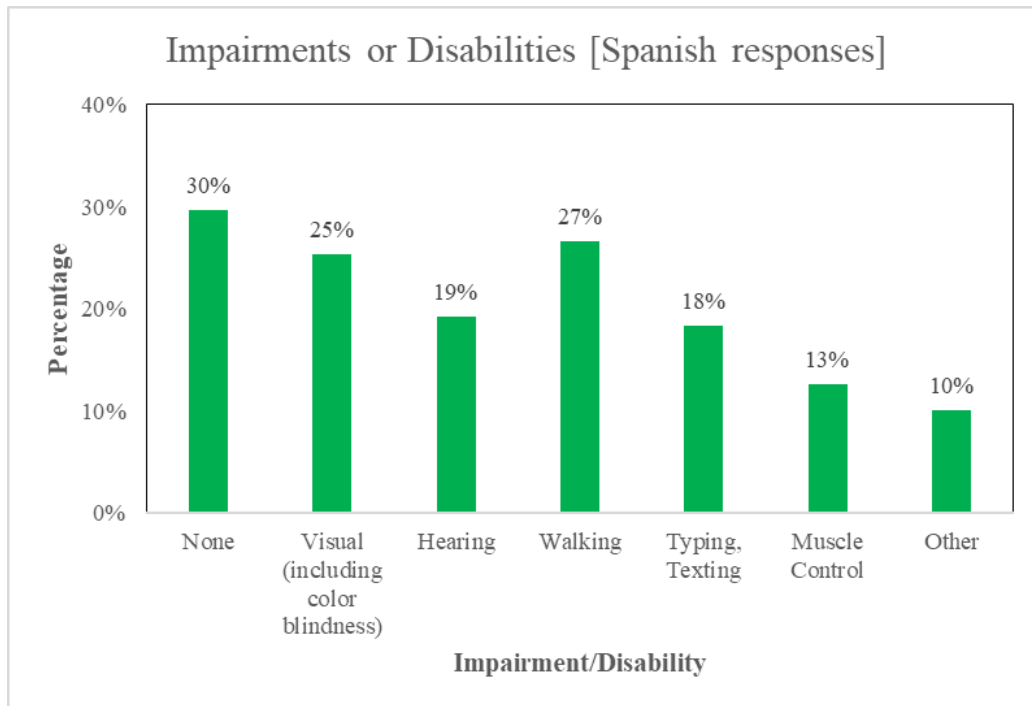
adult daycare and special housing

Military Housing (lives with her son)

Mobile Home

rents a studio

Mobile home



Otro:

High blood pressure

understanding new information due to advanced age

Padezco de osteopausis en la columna yertesno. en ocasiones tengo maneos. Tengo cataratas ojo izquierdo.

Dolor de cuerpo, Visual solo un poco

deaf

Prosthetic leg

my knees hurt when I walk

knee

arthritis and osteoporosis

high blood pressure

heart problems

Autism

pacemaker

Respiratory, oxygen tank

Hernia

N/A

Not specify

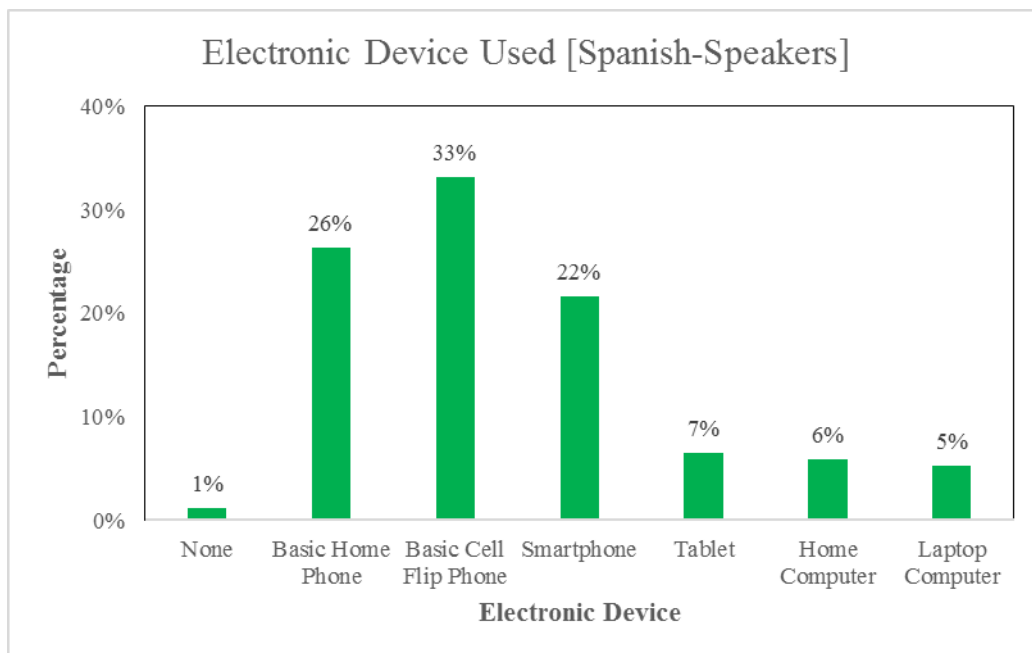
Major Depressive Disorder, chronic bronchitis with bursting of blood vessels

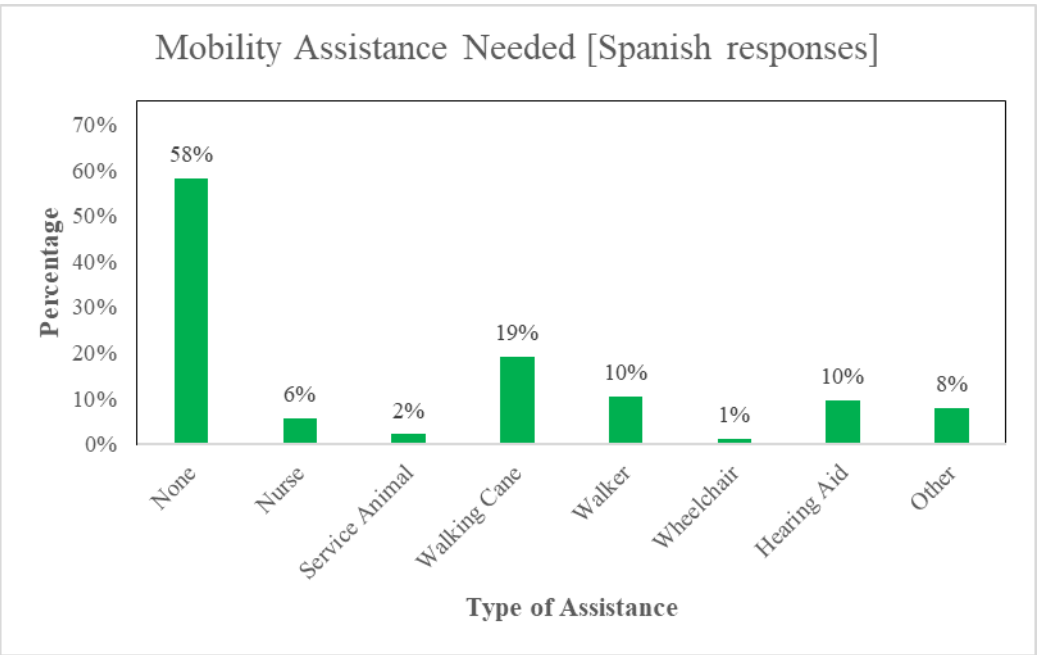
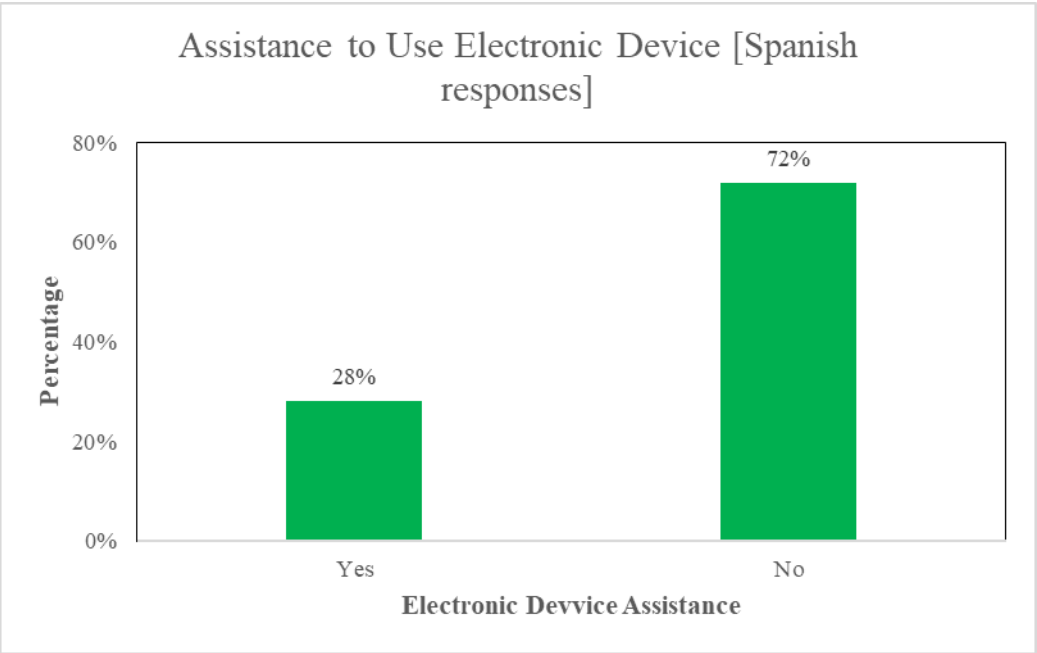
Diabeties

Hip fracture

Back Issues

N/A





Otro:

Provider services

Needs hearing aid, but doesn't own one

Husband

Hasta ahora no

glasses

supportive belt

glasses

Glasses

glasses, but doesn't likes to use them

N/A

Depend on daughter

machine to sleep, machine for muscle control.

husband/ daughters

assistance with spouse

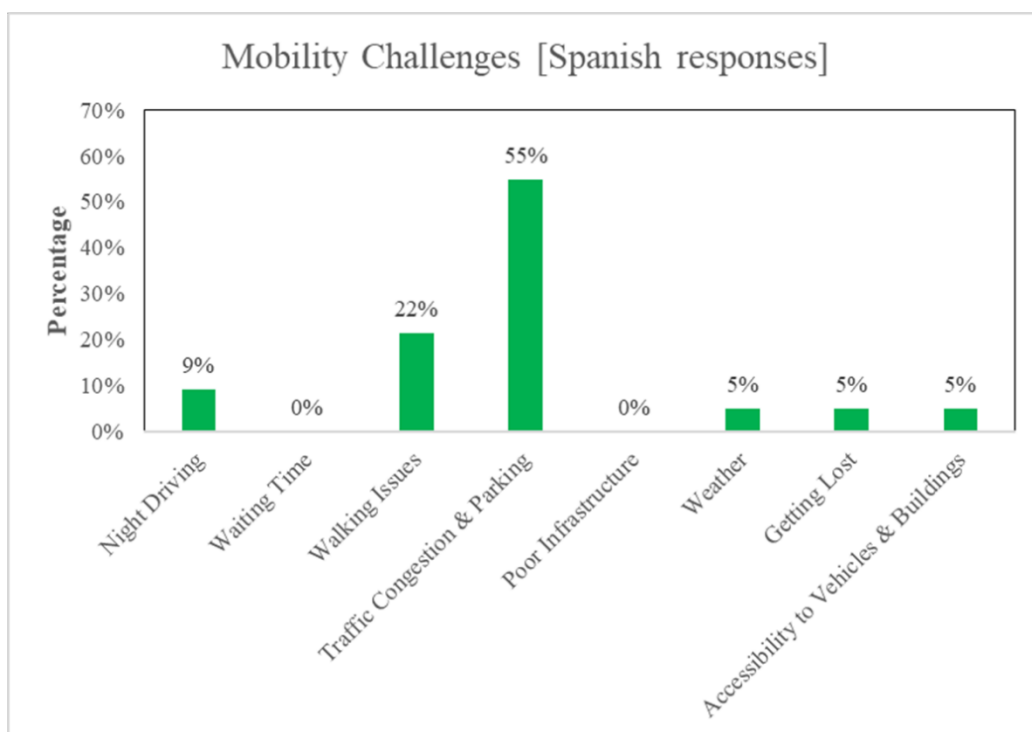
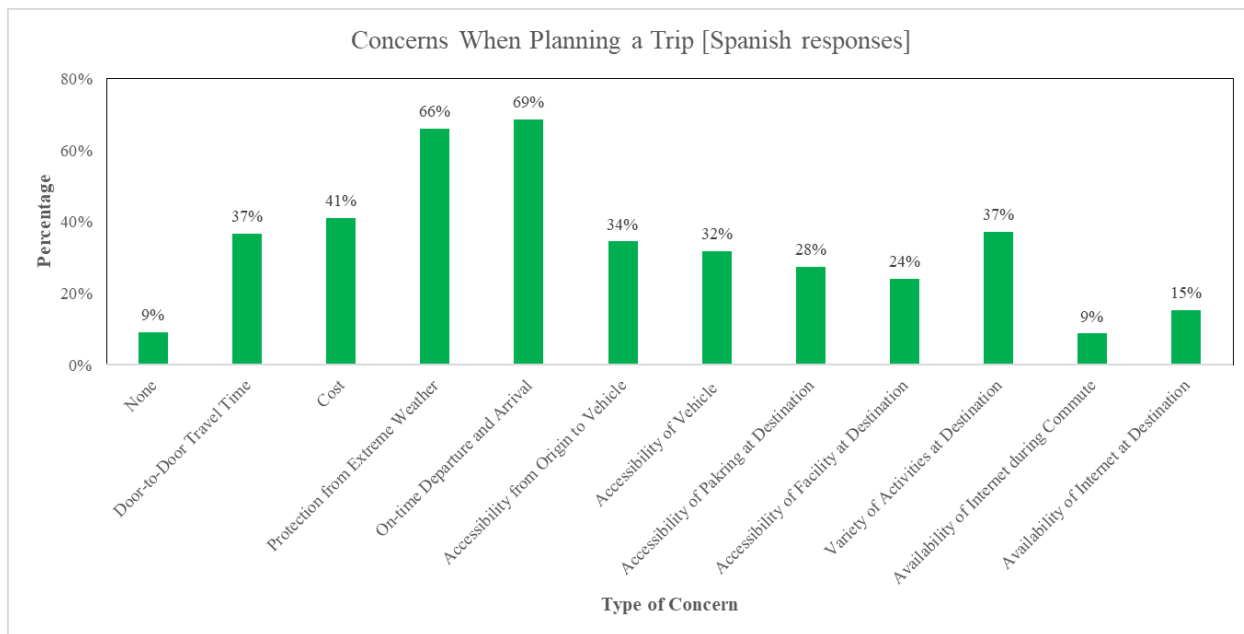
n/a

Lack of speed, sometimes need help from someone as support

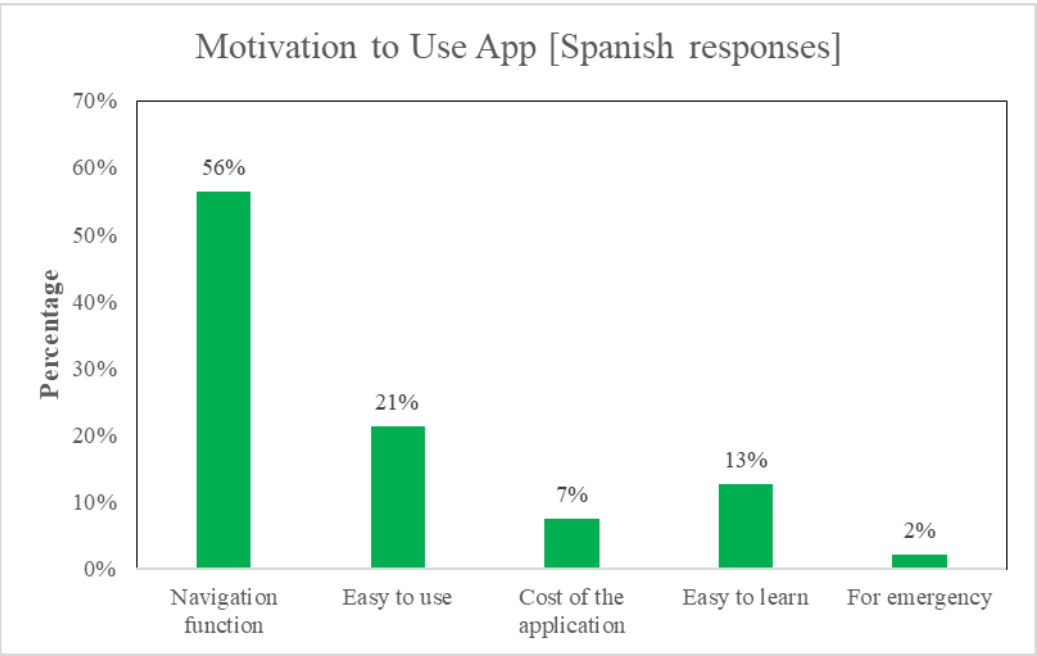
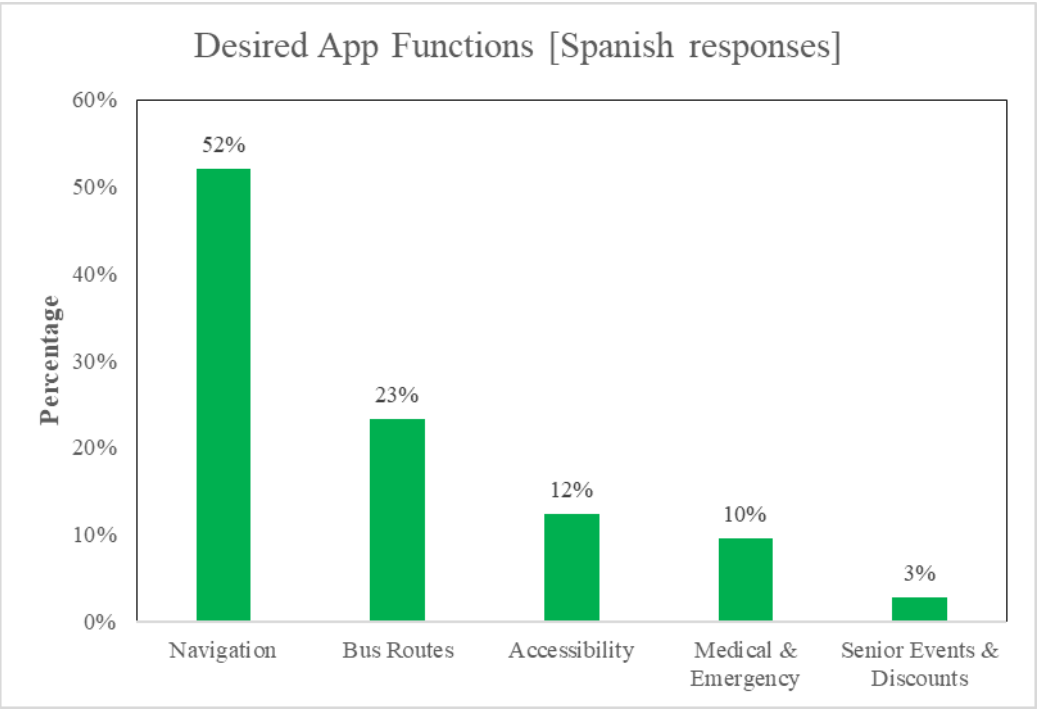
N/A

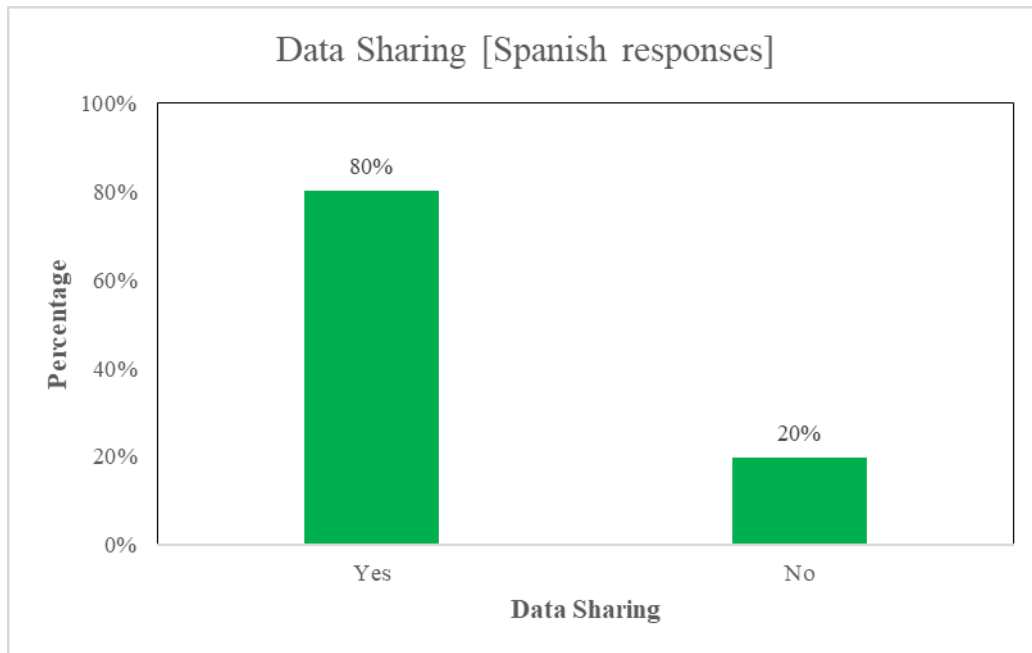
	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Work Place	89%	2%	1%	6%	2%
Volunteering Place	63%	5%	14%	16%	2%
Family Member, Relative, or Friend	20%	20%	42%	13%	6%
Grocery Store, Market, or Retail Shop	9%	21%	53%	13%	4%
Healthcare Facility, or Pharmacy	16%	61%	14%	5%	4%
Senior Center, Library, Park, or Gym	11%	5%	24%	50%	11%
Civic or Religious Center	27%	17%	52%	3%	1%
Restaurant, Coffee Shop, Diner	21%	31%	38%	6%	5%
Bank, ATM, or offices	28%	50%	18%	3%	1%

	Never	Less Than Once/Week	1 to 3 Times/Week	3 to 6 Times/Week	7 Times or More/Week
Walking More Than 1/4 Mile	45%	9%	21%	11%	14%
Bicycle	94%	0%	3%	1%	1%
Motorcycle/Scooter	99%	0%	0%	1%	0%
Car (as Driver)	42%	3%	5%	13%	37%
Car (as Passenger)	49%	9%	17%	10%	15%
Carpool (as Driver or Passenger)	79%	4%	9%	5%	3%
Public Bus	68%	10%	9%	5%	9%
Special Bus (e.g. Lift)	88%	5%	3%	2%	1%
Taxi	96%	3%	0%	0%	0%
Rideshare (e.g. Uber)	96%	3%	0%	0%	0%









**Mencione cuál es el mayor reto que enfrenta cuando viaja en la ciudad.**

traffic

When I need to take the bus. My daughter takes me to places

Fall risk. Has trouble walking. When she goes to the store she can only buy a few items because she needs to carry them back home. It is hard going to the stores and buying stuff when you ride the bus. She has a hard time attending her doctor's appointments. The other day one of her friends gave her a ride to her appointment, but there was no one to pick her up.

I rest when I get tired of walking. I struggle with the schedule that is why I go walking. On the weekend the bus schedule is even worst, it takes a while.

The street where I get the bus will be closed for three weeks. I don't think I'll be able to come here (senior center) in the meantime

the bus is sometimes far and I'm not sure when I need to get off. When that happens I call my children so that they can give me a ride

Traffic and accidents

traffic, construction & and closed streets

Sometimes the bus is late and we have to wait

No, I walk everywhere. I like to walk to remain active. I only use the bus when I have a doctor's appointment

I don't like to drive at night or when it's snowing. He is independent

Not yet. I'm still driving at night and on the freeway

Not yet

On Saturdays morning the bus is always late and on Sundays its even worse. Sometimes I need to ask my sister or I'll go a little earlier to get on time to work. At nights when I get off from work, I need to walk all the way from here (montana and ochoa) to EPCC to take the bus.

traffic

Uses the Lift to go to the senior center. Bus (lift) sometimes picks her up on the opposite side of the building and she has a hard time walking. She no longer drives long distances. Her children don't want her driving anymore so they drive her around.

Completely depends on the adult day care program

Getting to know important places

When there is no transportation and I have to walk to go somewhere

Finding a ride. Right now I have to go to San Vicente and I do not have anyone to take me. At this moment I don't use the lift yet, but I would likke to get those services the problem is that they charge a lot. Sometimes I walk to my appointment or to different places, but right now its really cold to do that.

Drives and walks slow.He doesn't go out when it's snowing.

I have a hard time walking. I do not drive anymore, my husband takes me to places. The bus is expensive, the charge us \$ 5 to bring us here to the center and pick us up from here. A lot of people cannot afford and that is why they do not come everyday to the center. We get a very small check

For all of us to drive well. There are several accidents for that reason. We need to drive in a calm manner and follow the laws.

I don't go out as often anymore. Today I came to the senior center because they brought me here, but I hardly come. I'm not interested in going out anymore. Now I just stay at home because I don't want to bother my children by asking them for a ride. They already take me to my doctor's appointment. The doctor said I need a surgery on my knee to help me walk.

Mi condicion fisica debil

Planificacion del viaje para llegar a tiempo

La seguridad puntualidad en la hona de necogida y regreso a mi casa

N/A

N/A

Trafico

Ya no puedo ir sola

to walk

my son takes me in the car. If not, I use the bus

I hardly go out, my daughter drives me around. She sometimes doesn't wants me to drive because of traffic and because I have a hard time seeing at night

doesn't drive long distance. Her daughters or friends take her to places. She doesn't drive in the freeway

safety/traffic

cannot walk long distance that why she doesn't uses the bus

not a lot

loneliness

the time it takes me to get to my destination when there is traffic or construction work going on

driving with precaution

transportation

waiting for the bus

staying alive

the fatigue

Nothing

Ella dice que su mayor reto es estar sola. Ella dice que ella a estado en muchas situaciones donde ella a tenido que hacer cosas ella sola como cambiar una llanta o ir a agarrar gas porque se a quedado tirada pero para ella siempre es muy dificil

precautions

Le preocupa de so seguridad. Ella siente que su edad la pone mas a arriesgo de que la puedan asaltar.

traffic

not enough awareness for the deaf community and the lack of services

walking where there are no sidewalks

a lot of traffic and closed streets

she has the lift to go to places and its \$5

bus schedule

closed streets

Become familiar with streets and when the street is one way only

traffic and closed streets

it's uncomfortable the waiting time at the bus station

traffic

the traffic and appointments when it's rush hour

I have to arrive on time otherwise i miss the bus

traffic

Traffic

Finding parking nearby, I can't walk long distance. There are only a few spots for handicapped in most places. I have to wait until there is one available to park. I hardly go to the stores for the same reason.

There are several people who are in a hurry and do not obey the traffic laws.

Not yet

N/A

Trafico

N/A

N/A

Llegar a tiempo

none

ninguno

traffic, dark

insomnia

I hardly leave my house because i don't have a ride. I only walk to my son's house and to the gas station.

I don't know the schedule for the bus

traffic

the traffic, wait for rush hour to pass, can't see at night

I'm still strong for my age, but the weather is strong during summer.

batteries for my hearing aid

find someone who can help me when I cannot move my arms

They don't allow my dog in several places

transportation

batteries for hearing aid

traffic

traffic

Traffic

long distance. if the place i'm going to is nearby i'll drive, but when it's not I look for someone to take me. Also, i didn't qualify for the bus card.

none

traffic

Has problems with his leg. He uses public transportation and the bicycle as means of transportation

When I drive long distance I need to stop for a break

none

traffic

none

He uses public transportation, doesn't own a car. Doesn't have family in El Paso, friends usually give him a ride or uses public transportation.

I don't go to places that are far from my house anymore.

remembering to bring with me my glasses and other things

Sister assisted participant complete survey. My brother only needs a calm environment when traveling.

my wheelchair gets stuck in some streets. I'm afraid of falling

I have visual problems, have difficulty driving at noon

I know how to use Uber and my son transports me, but my only problem is to move around with my oxygen tank

traffic, doesn't drive at night

stress due to traffic, fear of falling

moviendome

no puedo conducir

carreteras rapidas, muy saturadas..freeway.

Traffico

asegurarme que sepa donde estoy en cada momento para no perderme y saber como regresar a hi hogar.

Traffic

The waiting time of the bus.

When the bus is not in time. This is important because we have doctor's appointments we need to attend. The bus takes a long time. My daughter and grandsons sometimes take me to places.

There is no public transportation outside city limits. The time that I need to wait for the Lift is a lot. After calling to schedule my pick up i need to wait half an hour for the bus to arrive. We time we spend waiting for the lift is longer than the travel time.

Has limited places she visits

Traffic

none, I depend on my daughter.

Traffic

Hates traffic, not afraid to go out, 1/2 hr 1/2 mile on sunland

Not enough signs with large font on the street.

I don't experience any challenges. I don't drive on the freeway anymore because there are a lot of big trucks

The parking lots

Traffic

Traffic

when the bus does not arrive

The traffic

Reckless drivers

El trafico

My feet get swollen

I can't be alone, I need to be with someone.

I don't have a car, my husband is the one who drives.

I have a car

Car exhaust makes me cough and vomit violently, dizziness, anxiety attacks, convenience

Be punctual

trafico

traffico

None

No puedo usar transporte publico porque no funciona bien. Camino, uso el coche o uso Uber

Tragic

weather and driving long distance

to have a safe trip

"I have no problem". Reported that her daughter does not allow her to use public transportation, and she feels limited. Fall risk/ history of falling.

make people happy, trouble walking

weather, fear of driving when it is snowing or raining.

walking around the stores

I walk slow

Needs help from a provider. Provider helps her move around.

Being alert and distractions while driving

driving long distance and poor eyesight

Husband helps her when she needs to go to places

none

getting up and down of the car. My back hurts

none

traffic

walking

None, I don't drive. My daughter takes me to places. She is always available for me.

Everything is fine, I can still drive.

Traffic

Not experiencing any problems

The traffic

Daughter drives me around, I don't know how to drive or use public transportation. I have poor eyesight.

Traffic, sometimes people drive bad

Traffic. Have trouble driving at night

The weather, I don't like hot weather. Sometimes there is no one to take me to places and there is no bus stop near home

Getting up and down the bus

Driving long distance. When I use public transportation I have difficulty getting in the bus

El no saber manejar limita mis actividades

walk



I'm worried about the weather because I have diabetes.

no answer

Traffic, needs help, owns a cane and walker-she is fall risk, cost of app.

doesn't drive. Her husband takes her and she depends on her children.

no, she already know her way around

don't drive long distance

Tall stairs

the traffic and the schedule.

El clima de afuera y dentro del bus

it is safe to commute in taxi than driving myself. Traveling in public transportation is difficult because my legs hurt.

Que haya mas informacion sobre las paradas y horarios del transporte publico en mi comunidad. Y lugares para saber donde esta desponible el transporte publico?

Traffic, protecting self from those who drive recklessly

needs to walk, uses the bus and needs to know the route. Her sister picks her up.

problems with her car/ cost of gas/ cost of living. Has app, but does not know how to use them.

spending a long time sitting

traffic and depends on her husband and children to move around

fear of falling, arriving late, house is 20 min. away from food city

none

Traffic

gets rides from friends

traffic, don't know where to go.

traffic and translation

Traffic and transfer

construction in downtown, and moving around the city when the streets are closed.

traffic

transfer time

getting lost or not knowing how to get to my destination. I get lost easily. For example, when I go to the hospital I don't know how to find the exit. I only know how to use my smart phone to make calls.

traffic and transfer

traffic, excessive traffic/ too many cars

none

Lack of money and scare of falling

traffic

bad drivers

n/a

none

traffic notifications

None

Traffic

weather

Traffic, have difficulty walking on Mesa street, and need ride to doctor's appointments.

Nothing

The weather

Traffic

Be late

### **¿Qué función o característica le gustaría ver en una aplicación móvil específica para adultos mayores?**

picture of the bus

I don't have a cellphone

Information on the bus or someone that can pick me up for my appointments. She has a hard time getting the services because there are a lot of instructions she needs to follow.

places that are safe to go on our own. Uses smartphone to answer and make calls

Lift and information on transportation. I don't know how to use my cellphone. I only use it to answer calls. I'm scared that my phone will lock if I do something wrong

bus schedule is what I struggle the most with. Somtehing easy to use

easy to use; doesn't have a smartphone

simple

Doesn't know how to use her cellphone. Sometimes I don't understand it (cellphone)

---

Information on much time I have to get to a place

---

Transportation information is necessary for everyone that comes to the senior centers

---

maps

---

Discounts for older adults. He doesn't own a smartphone

---

Other options for the bus. For example, like if the bus doesn't get here on time you can take this other bus. Or even discount for the Uber.

---

Doesn't uses his cellphone, something easy to use

---

Something that I can use it and order transportation on my own. That's something I don't like about Uber, I need to call my daughter so that she can order an Uber for me. I don't want to be asking her to do it for me. Something that we can use even if we don't own that type of cellphones (smartphones).

---

for it to have music

---

picture of the bus

---

picture of the bus

---

Information on who could take me to my doctor's appointments which are every three months. The bus takes a while to arrive.

---

transportation

---

Transportation, the majority of older adults don't drive

---

More access for older adults such as sidewalks and special doors. There are several people that struggle with that, but not me yet.

---

No, I can't think anymore. I don't use my cellphone and I don't have that type of equipment

---

Localizar rapido un camion

---

Hovarios y rutas de los viajes ademas, costos

---

Comunicacion direct y practica. Facilidad en la aplicacion en su disenu e imagen. siempae

---

Si tubiera un telefono lo usaria

---

Emergencias

---

Algo gratis

---

Foto del autobus

---

auditory

---

Information on services. I hardly sees

---

no cellphone

---

Doesn't have smartphone. Transportation for when one can no longer drive

heath

doesn't uses her cellphone

transportation information

buses to travel

for it to be simple and practical

app to use uber

nothing

nothing

nothing

none

signing classes

Ella quisiera que la aplicacion la haga sentir felicit e acompañada.

none

Ella quisiera una aplicacion donde ella pudiera tener todas sus contraseñas.

none

services that facilitate mobility among deaf older adults

i need to know what an app is

large font, and light contrast settings

no

large font

cheap

Ability to keep in touch with my PCP

provide information to older adults without asking for personal information

large font

the weather

handicapped parking and weather

easy to use. i don't want to be answering or doing a lot of things for it to work.

something that is easy such as a button

just one button that gives you the map fast and easy

parking availability, to know what places are handicapped friendly.

You cannot see the signs at night or the names of the streets

Everything needs to be more clear, I hardly see

N/A

Como llegar a lugares mas facil

N/A

Descripcion de lo que hay disponible

Tiempo que toma para llegar a lugares

no

none

don't know

learn how to use the bus and taxi.

to tell me the exact time for the bus. Like the time, days, and location the bus comes.

I would like to know more and how to get to places with the map. Information on specials

interested, but does not have a smart phone

none. i'm not interested in that, they should work on other things.

no answer

I would like an app that offers uber services but for older adults.

no, my children and grandchildren order taxis or ubers for me

locate transport areas

reminders of appointments or stuff for personal use

I hardly use my phone

equipped transportation

transportation that is well equipped

I prefer having it on paper, and something with easy questions or commands. At this age its hard to understand what they want. It needs to be easy to use and understand. I'm afraid of using the internet.

easy to use, doesn't know how to use smartphones

doesn't own a smartphone and doesn't know how to use them

information on social services. I use the map service on my phone and struggle to use it, but I eventually I get it to work. I think something easier to use

music or things to distract me. Sometimes I struggle because I have poor vision and need help from my provider

He is on the process of getting a free flip phone

no answer

none

don't know, doesn't own a cellphone

Only uses phone to answer and to make calls.

reminders for doctor's appointments.

Not only for adults, but also for the nurses.

I don't have a smartphone, I would prefer for the streets and buses to improve

i don't use apps, I don't need them

I would like to have an app that is actualized and specific to El Paso

easy

easy to use

simple de usar

Horario del autobus

no entiendo a que se refiere?

Practicalidad

un mapa de la parte de la ciudad donde me encuentre.

Mas disponibilidad

uber

I don't know how to use it, you would have to teach me. Maybe if we could have classes to learn how to use the cellphone.

the bus, faster transportation options and routes.

Does not have a smart phone, For emergencies

Had a cell phone, no longer has one

Easy to use

Finding the route to take with less traffic.

Not a user, just calls

Major information on services and maps of your destination.

No answer

Doesn't apply

Show how to use the app

Easy to use

Information on bus schedule, I leave my house at 8 AM

To not take to much space on my phone.

show how to arrive to destination

None

Games

I don't use my phone, I use a walker.

Everything is okay, if it was probably in Spanish

no answer

No selling or sharing data on me. Privacy. No invasive permissions. No tracking.

The time that the trip would take

pay in cash

facil de usar

none

No entiendo para que serviria

doesn't uses apps and doesn't own a smartphone.

let us know about traffic.

Doesn't know how to navigate the internet. She needs classes to learn and needs a smartphone.

something similar to google maps

Only uses phone for calls and social media apps. It helps her keep in touch with friends. She is not a social person, she hardly goes out.

easier ways to arrive to place of destination

Only uses cellphone to answer calls and to make calls

does not uses cellphone

Does not uses cellphone

information on where I can seek help.

weather information. struggles when it's extremely cold.

Maps

Already uses google maps and understands it. If anything, medication information would be useful. Sometimes he struggles with that when he visits the doctor.

none

doesn't own a smartphone

Maps

Doesn't have smartphone

I don't know how to read or write. I don't have that type of phone (smartphone)

Does not has a smartphone. Provide information on transportation services for those who do not have transportation or means to come to senior centers. A lot of people don't come for that reason

Doesn't own a smartphone

Amplitude

I don't know how to use apps. Needs help using phone

I still drive. I don't have a smart phone

Big letters

Transportation options

Don't have a smartphone

Information about transportation and for it to be accessible

Facil de usar

don't know

Information on health, someone to pick me up

no

hasn't used apps



hasn't used apps.

uses phone to make calls, hardly uses apps.

doesn't own a cellphone

big letters

what the best routes are, and locations of interest.

to help us move around the city and information on health.

Que nos informe donde y a que horas va pasar el transporte publico para poder usar lo en mi comunidad.

don't know

map of routes and directions

learn how to use the programs in the phone.

no answer

doesn't have a smart phone

how to get from one place to another, and how to use apps.

learn to use other applications

the cost of the phone, don't have one.

does not know how to use computer

the cost for a smart phone/ and accessible

a car

not to know where to go

updates on traffic, what places have the most traffic, and what the easiest route is. Get notifications when the freeway is closed and for the app to have an auditory feature

the cost of the phone

the phone to use the cost

transportation information and to learn how to use the app

have access to uber

do not have interest/ need

to teach me how to drive and play the piano

let it be easy to use, and in spanish

transportation to tourist places

traffic information

bus schedule

none

N/A

accessible and easy

Map service

Map service

GPS map

Easy access

Free for everyone

To let me know when there are accidents

Information about public bus

**Si hubiera una aplicación móvil para ayudar a adultos mayores a encontrar lugares de interés y viajar en la ciudad, ¿Qué le motivaría a usar dicha aplicación?**

picture of the place. Go to the grocery store

No cellphone

no

to go to places and for distraction purposes

doesn't know how to use her cellphone

in case I get lost

no

no

No smartphone

Doesn't own a cellphone

the transportation, like how to drive at night

I don't understand how to use the cellphone that much

I don't have the need for that yet. I have my two cars that are still working well.

Information that is there like what the schedule for the bus is or other options on what bus to take

Doesn't own a smartphone

Being able to use it without asking my daughter to do it for me.

Grandfather

Ability to talk to the device to say things like "take me to this place"

picture of the place

It's really good for older adults to use. There are several that live on their own.

none

transportation

Doesn't own a cellphone. that there would be more ease and opportunity

I don;t like to leave my house anymore so that I don't bother my family, and I don;t like to seek attention

Si la utilizaria si me ensenan

Si

Museus, luganes histoaicus y tunesticos; teatnos; restaurantes y tiendas

Algo de torar

Citas medicas

Que me ensenen

Foto del lugar

doesn't have a smartphone. Has a flip phone, but has a hard time hearing it

no cellphone

no cellphone

no smartphone

to socialize

I don't have that equipment, how would I be able to have access to this service (app) if I only have a flip phone

no, i don't have a cellphone. She is not in the stage where she forgets a lot of things

trip or go out for a ride

si

when they are older and depend on someone

no answer

no answer

no answer

only if i couldn't move

no answer

Lo le que motivaria seria si ella viera que otra gente como ella tambien lo estan usando.

social services

Que no cueste dinero y fuera facil de comprender.

none

my mobility

for it to facilitate my mobility when I go out

routes to get to places, directions, weather

no

learn to use the cellphone

becoming familiar with different routes to get to places

to find my destination in a fast and easy way

in case i want to go somewhere

to go to the doctor

maps and routes

maps

maps

a map

maps

I would like to use it because it takes us a while to learn new things and we forget everything

I don't need it

I don't need it

N/A

Que seria facil de usar

N/A

El podaer llegar al lugar indicado

Si

no

none

don't know

learn to use the bus and taxi to be able to go out

when my daughter cannot take me somewhere, I would like to be able to move around by myself using the bus or taxi

yes, to learn.

access. Questions on how to qualify for services

no

no answer

It would facilitate my mobility

no

Not interested

i'm not interested

I would like to learn, but I don't know how

there are several new streets that now a days we don't even know

maps

when I have doctor's appointments

doesn't own a smartphone

none

none

Right now I'm fine, but when I get older I'll probably need things like special transportation with medical equipment such as a wheelchair

Doesn't own a cellphone

no answer
information
doesn't own a cellphone
Doesn't own a smartphone
i'm not interested
not at this moment.
nothing
I wouldn't use it
yes, I like museums and parks a lot
easy and cost
cost and easy to understand
educacion tecnologico
Si la gente me diera paseos
no se..
Que sea gratis
como en realidad no conozco la ciudad, algo que me ayude a saber donde estoy y que tan lejos estoy de mi casa.
Costo
Spanish and large font
n/a
For myself and for other people who come. We cannot afford to buy a car and it's necessary to know what options are available for us.
no
None
None
Easy to operate
Not use tech
no answer
No answer

Would like to know more

To show if the place accepts credit cards

To conect with friends

no answer

Easy to use.

to see new places in El Paso

None

Spending time with more people

I good to know how to move through the city with my daughter.

no answer

no answer

Convenience of access, immediate access without reservations, reliability, timelines

to know how long it will take to get there

Easy to understand (someone explain)

Facil de entender; una persona que por favor me explique

none

No entiendo para que serviria. Acuerdense que no somos fanaticos de explorar apps. Necesitamos que nos los expliquen

Conocer

none reported

make life easier and not get lost.

Learn how to use the cellphone

To not get lost

To have updated information and well informed.

It would make her daughter's life easier to drive

Doesn't know how to use cellphone, only uses it to answer calls.

does not uses cellphone or apps.

doesn't know

Being able to go out.

don't know

I don't have a smartphone, I don't even know how to use it.

When he needs something (ex: finding locations)

more map information

the stability to move around

Directions to places I don't know how to get to.

Needs to learn how to use it

Maybe in the future when I need it

Needs to learn how to use phone. It would be easier to find places

Learn how to use smartphone

Finding places of interest and travel to meet places in the city

My daughter uses it and she takes me to places.

I just know a few streets but not all the streets sometimes I get lost looking for an address

Move around and go out with my friends. We usually go out for dinner on Wednesdays

Don't know

Don't know

Don't know

Que fuera gratis

don't know

spend time with people

no

better options to move and how much it costs.

no answer

has friends that struggle to move around the city.

no answer

map services

find places easier



Que hubiera mas lugares interesantes que visitar

to go downtown or civic center.

Que sea sencilla para aplicar en mi telefono y este en mi idioma.

for emergencies like getting directions when needed. Wife uses the phone and guides him when he drives.

use the map

accurate information and easiest way to arrive

no answer

directions to get to places

would like to use it to visit and spend time with her children.

information on senior centers

don't have a smart phone

relies on granddaughter

no answer

know how to use technology, have access to uber

access to uber

I need to know since I move around the city a lot.

being able to pay the cost of the phone

cost

learn more about technology

access to uber

n/a uses flip phone

know what other places people go

If I was to be hurt for me to be able to use the application without any issues

museums

no

motivated to go to new places

none

availability of schedules and various routes

---

free and comfortable

---

easy to use

---

easy to use

---

easy to use

---

Learning how to use it

---

that it caters to all type of needs

---

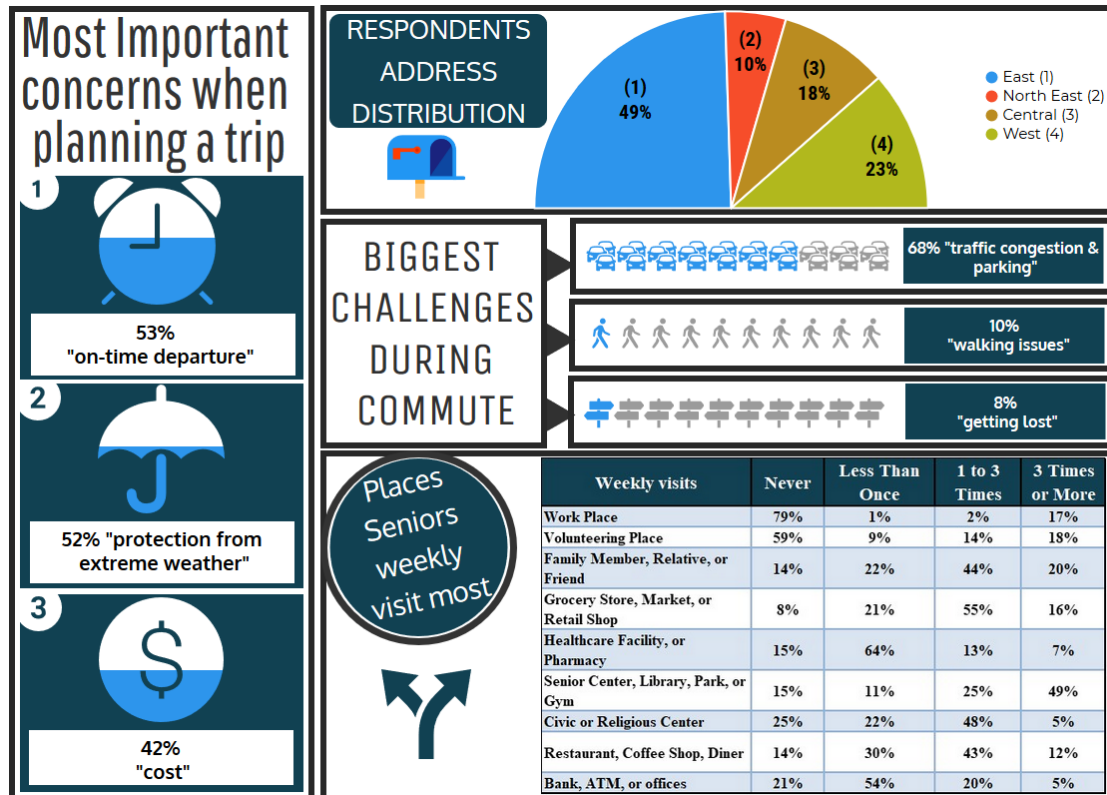
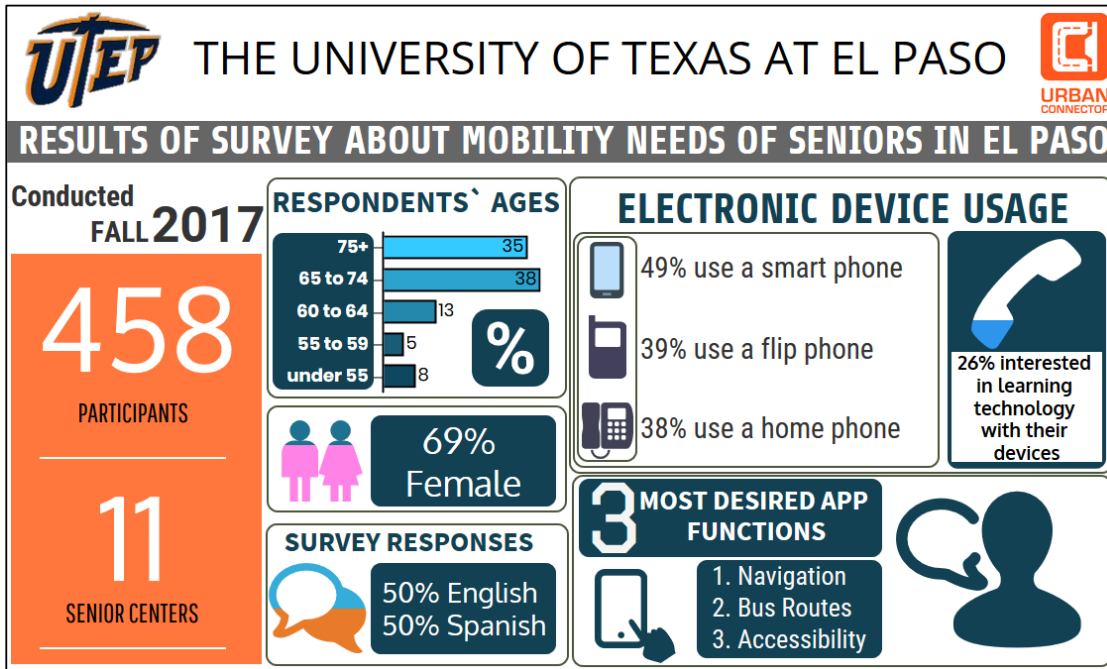
To make life easier while driving

---

not a fan of technology

---

## APPENDIX C – Pilot Survey Infographic Flyer



**C2SMART**  
CONNECTED CITIES WITH  
SMART TRANSPORTATION

The project is funded by C2SMART (U.S. Dept. of Transportation Tier 1 University Transportation Center)  
For more information please contact to Dr. Guillermina Gina Núñez-Mchiri (ggnunez@utep.edu) or  
<http://c2smart.engineering.nyu.edu/current-projects>





# UNIVERSIDAD DE TEXAS EN EL PASO



## RESULTADOS DE ENCUESTA SOBRE LA NECESIDAD DE MOVILIDAD EN ADULTOS MAYORES DE EL PASO

Realizado en  
OTOÑO 2017

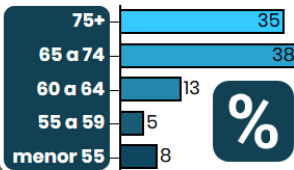
458

PARTICIPANTES

11

CENTROS PARA ADULTOS  
MAYORES

### EDAD PROMEDIO DE ENCUESTADOS



69%  
FEMENINO

### RESPUESTAS DE ENCUESTA



50% Inglés  
50% Español

### USO DE APARATOS ELECTRÓNICOS



49% usa teléfono  
inteligente



39% usa teléfono móvil  
de tapa



38% usa teléfono de casa



26% están  
interesados en  
aprender sobre  
la tecnología  
con sus aparatos

3

### FUNCIONES MÁS REQUERIDAS EN LA APLICACIÓN



1. Navegación
2. Rutas de Autobús
3. Accesibilidad



### La preocupación más grande al planear una salida

1



53%  
"salidas a tiempo"

2



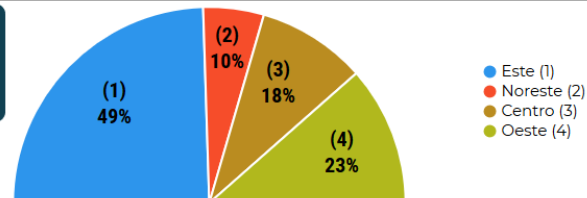
52% "protección en climas  
extremos"

3



42%  
"costos"

### Distribución de encuestados por dirección



### DESAFÍOS EN VIAJES CORTOS



68% "congestión del  
tráfico y  
estacionamiento"



10%  
"problemas al caminar"



8%  
"temor a perderse"

### Lugares más visitados por adultos mayores



Visitas Semanales	Nunca	Menos de Una	1 a 3 Veces	3 Veces o Más
Lugar de Trabajo	79%	1%	2%	17%
Lugar de Voluntariado	59%	9%	14%	18%
Miembro de Familia o Amigo	14%	22%	44%	20%
Tienda de abarrotes y Despensa, Supermercado	8%	21%	55%	16%
Centro Médico o Farmacia	15%	64%	13%	7%
Centro para Mayores, Biblioteca, Parque, o Gimnasio	15%	11%	25%	49%
Centros Cívicos o Religiosos	25%	22%	48%	5%
Restaurantes, Cafeterías, Cenas	14%	30%	43%	12%
Bancos, Cajeros Automáticos, u Oficinas	21%	54%	20%	5%

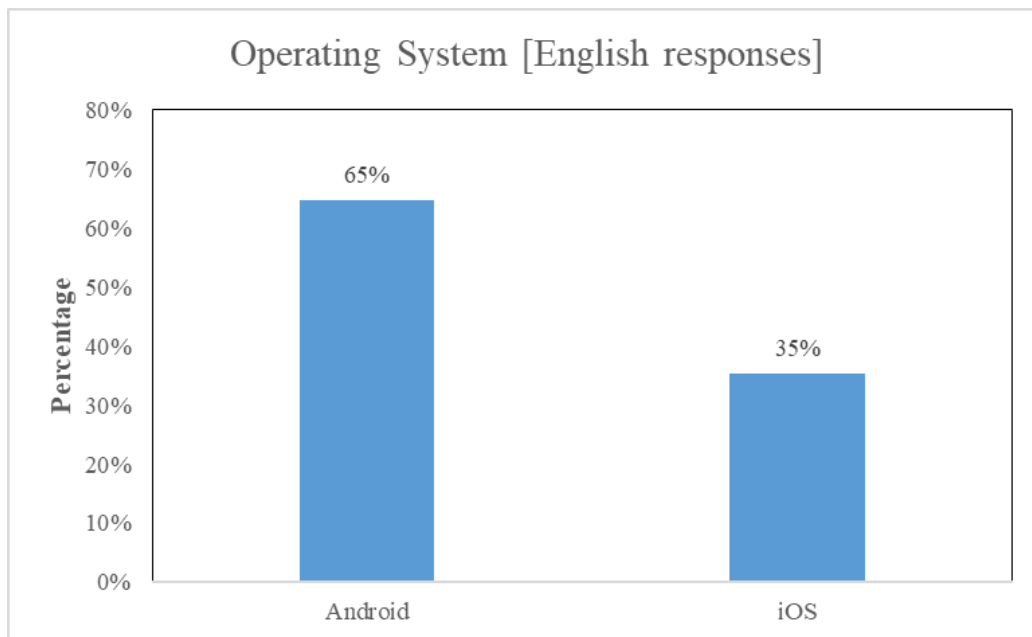
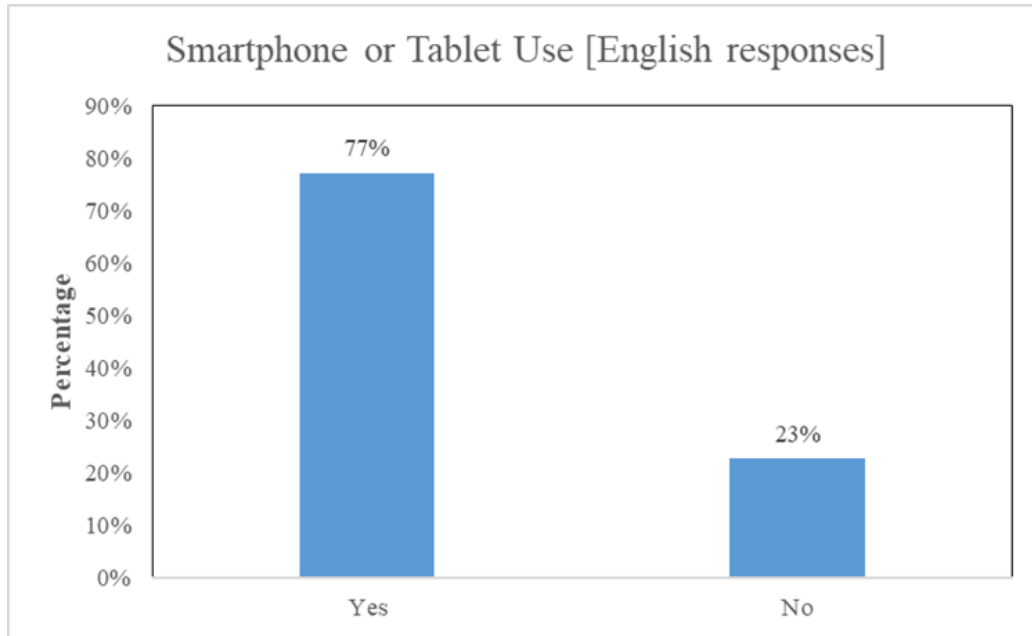


Este proyecto es patrocinado por C2SMART (Departamento de Transporte, Tier 1, Centro de Investigación sobre Transporte).  
Para más información, contacte a Dr. Guillermina Gina Núñez-Mchiri (ggnunez@utep.edu) o  
<http://c2smart.engineering.nyu.edu/current-projects>

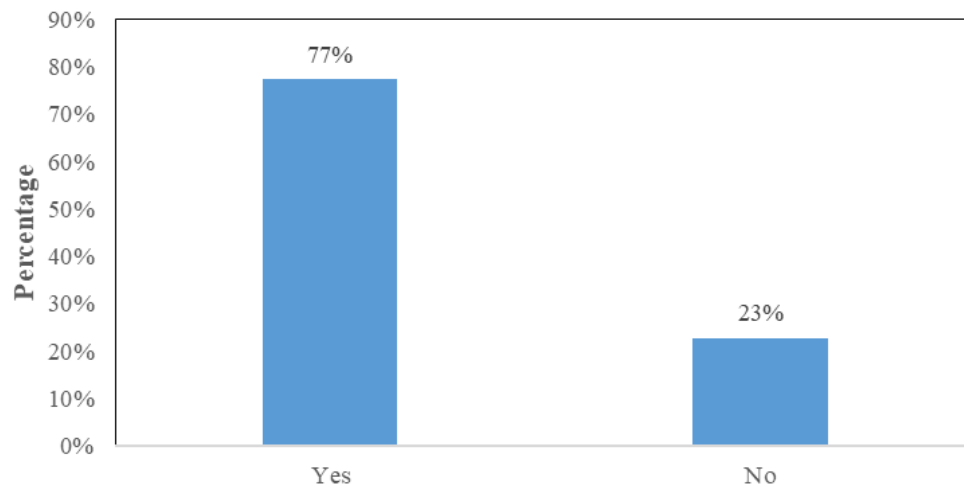


## APPENDIX D – Pilot Survey Summary statistics

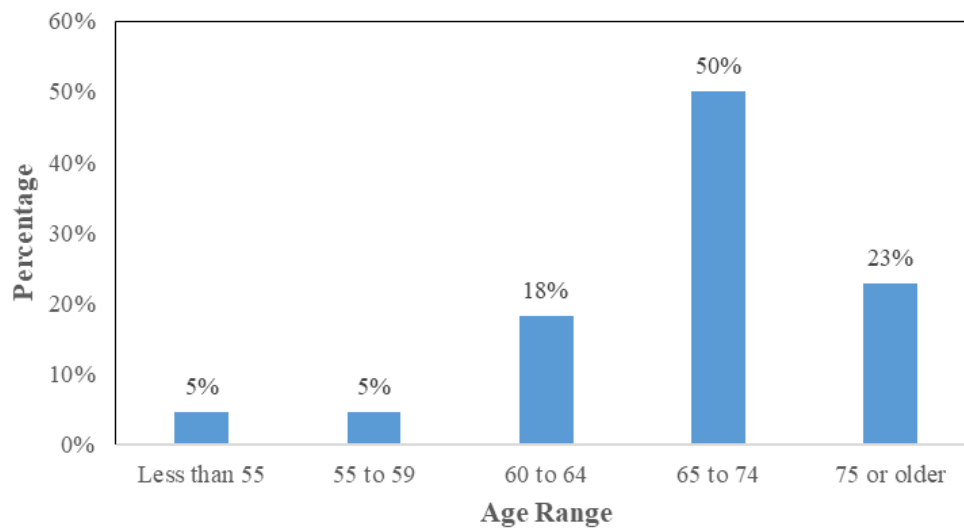
### English

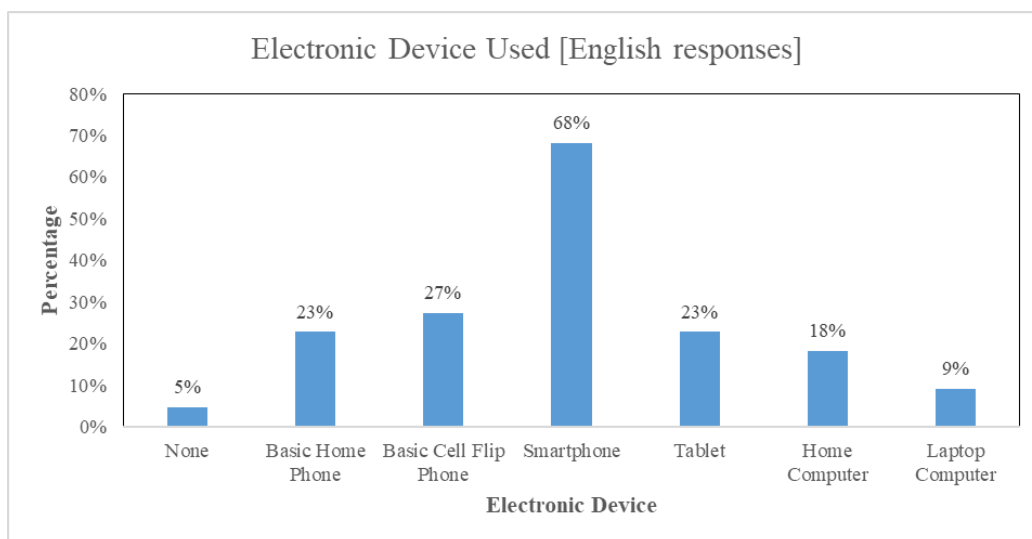
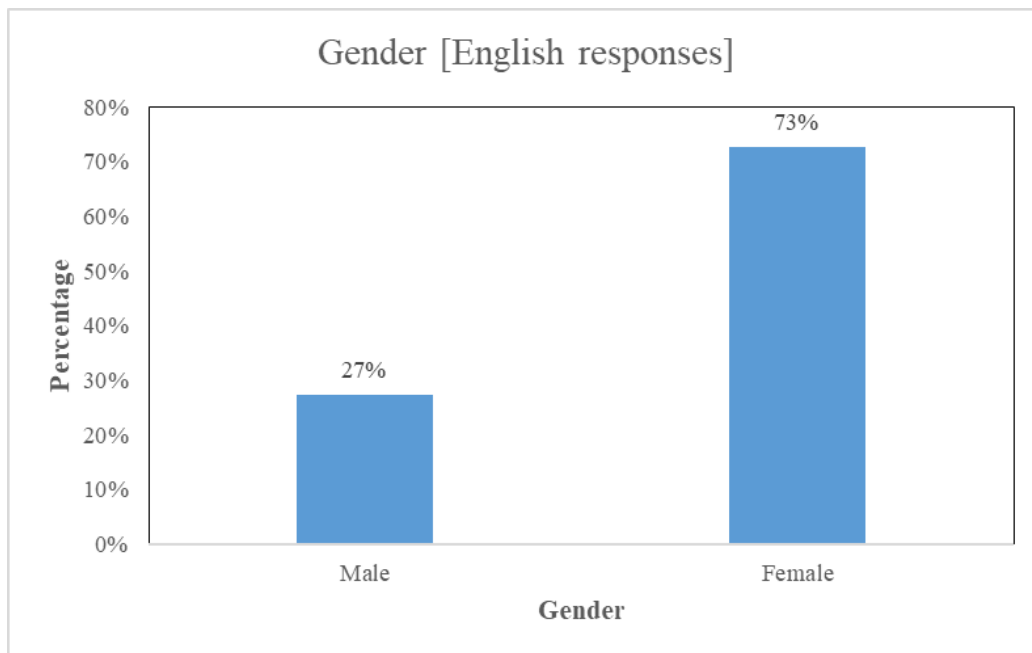


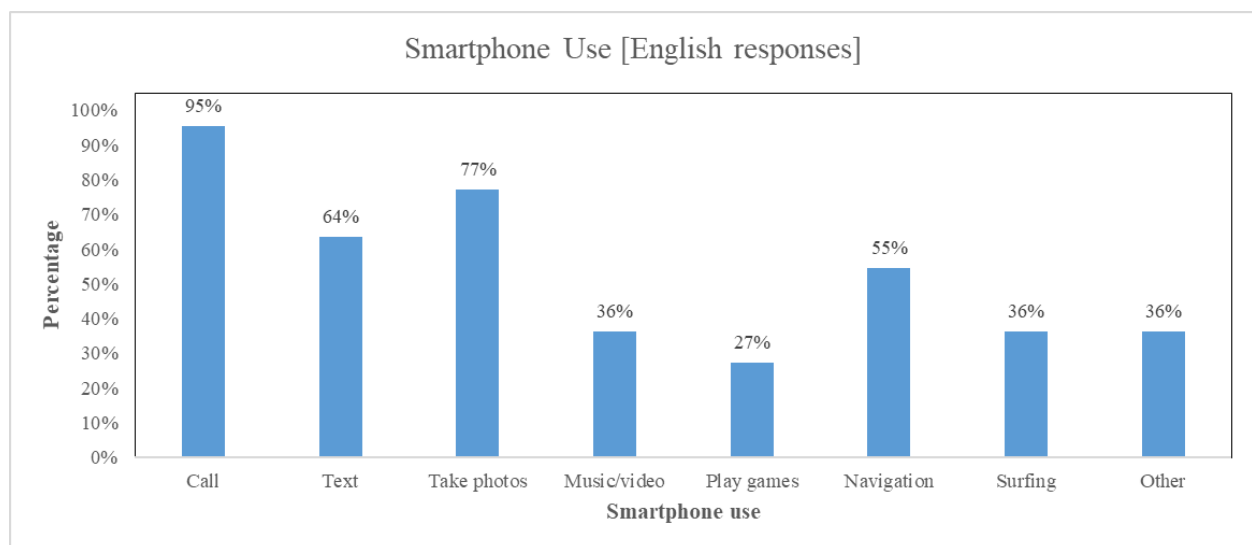
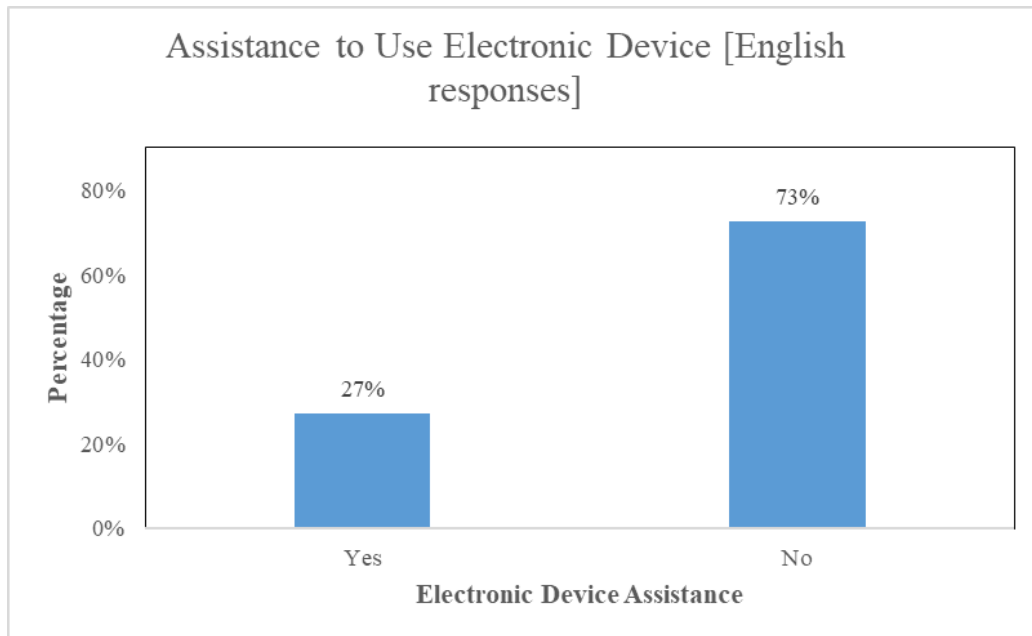
Needs Assistance to demonstrate app [English responses]



Age Range [English responses]







Other

facebook

hobbies

email

email

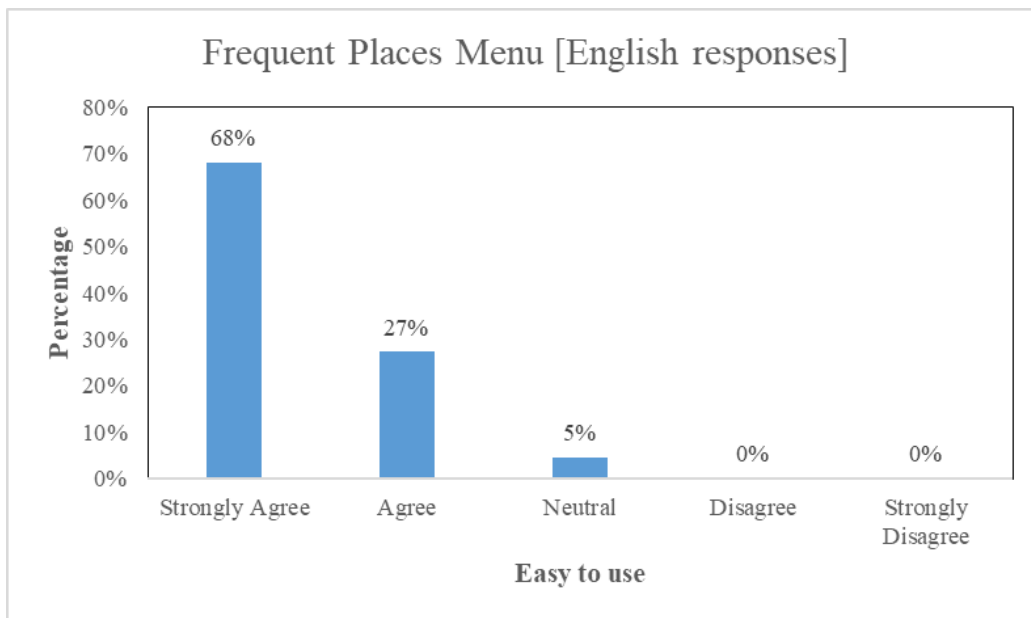
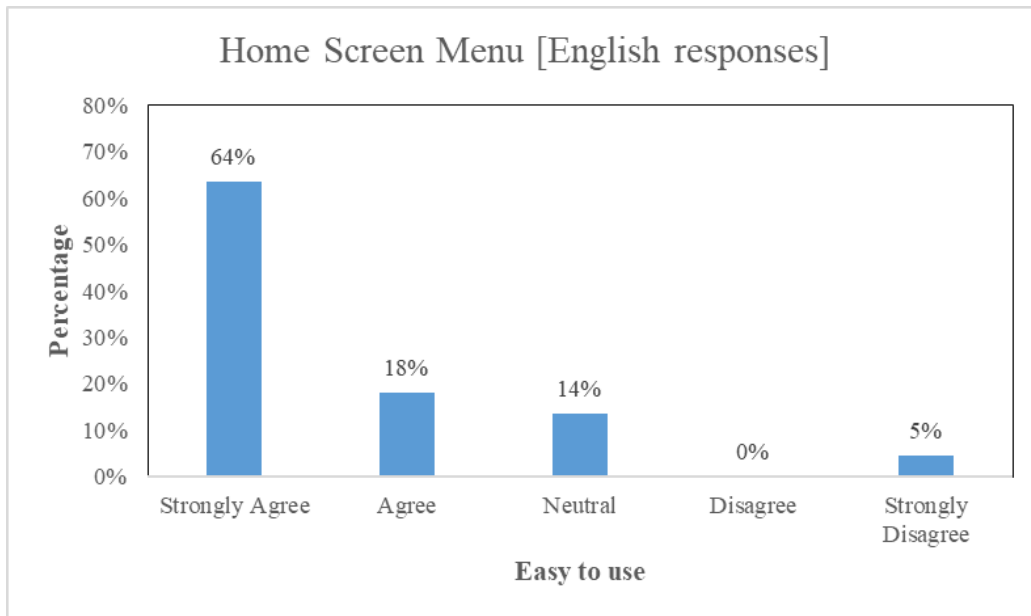
make payments

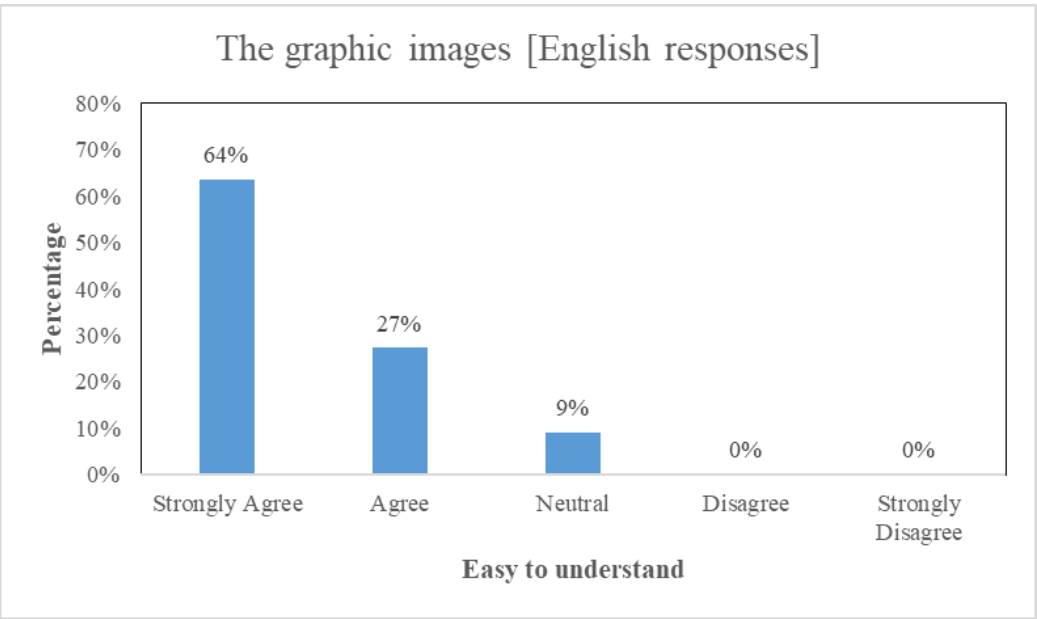
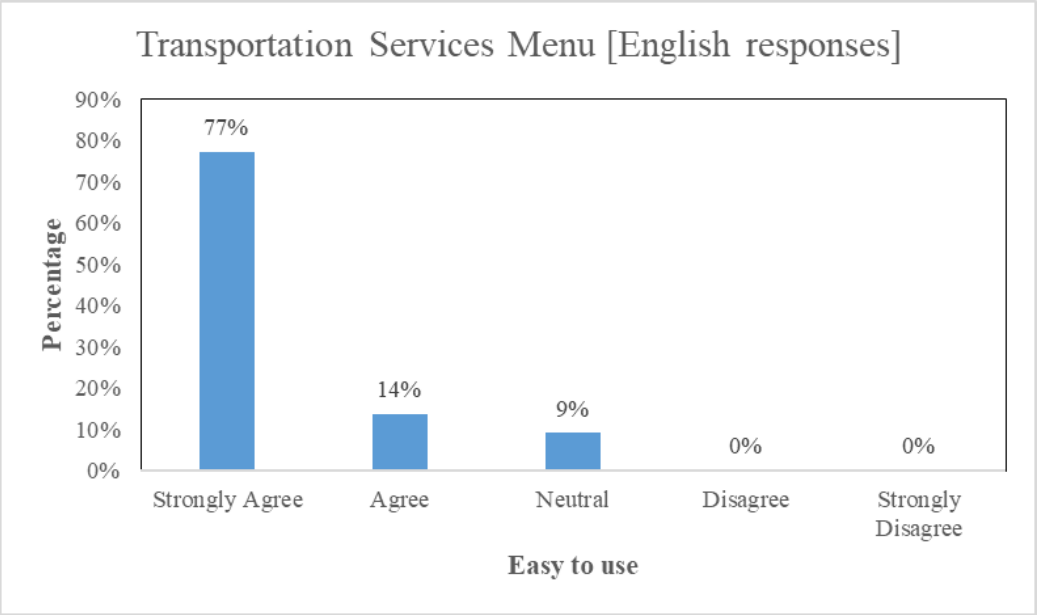
none

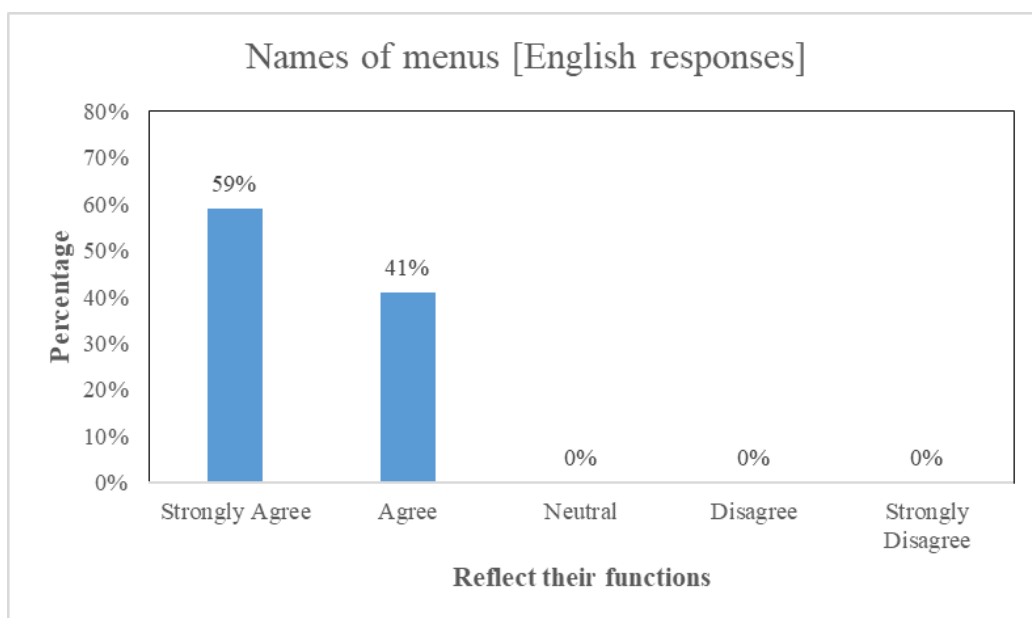
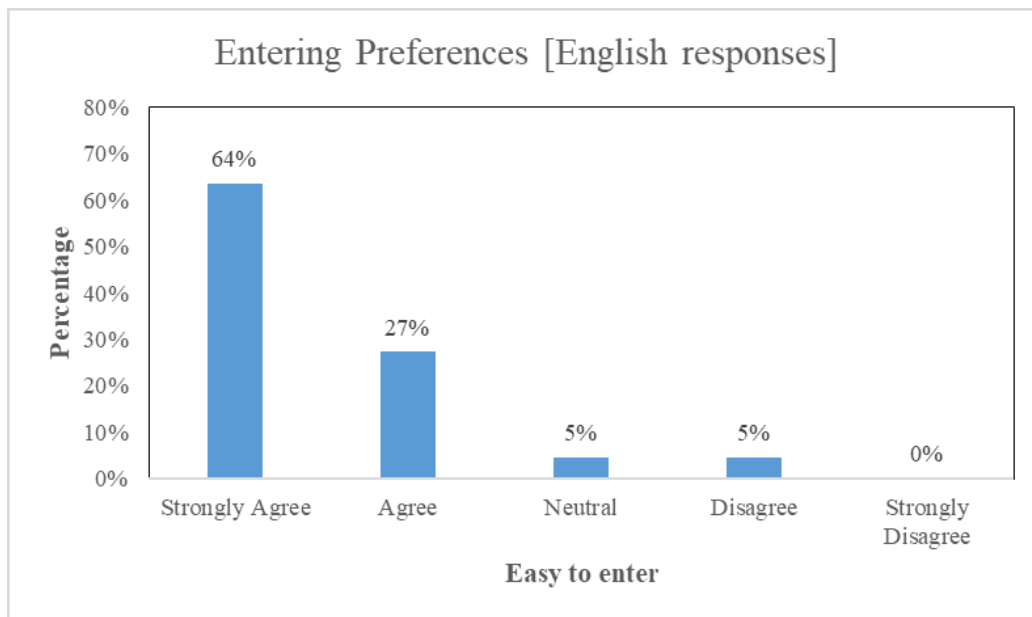


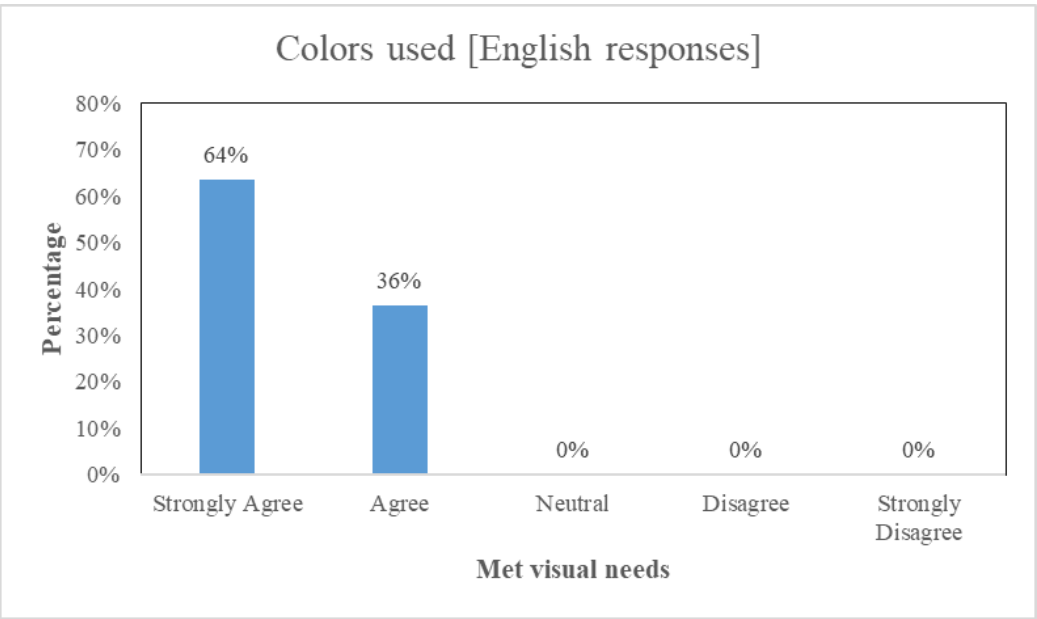
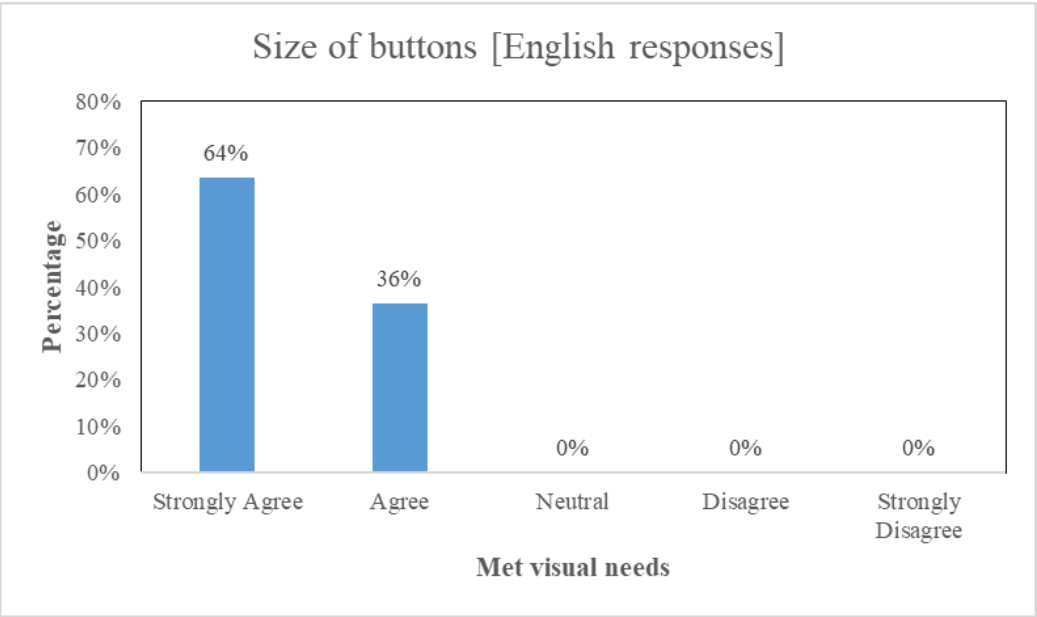
email,bank,pay bills, create videos

time, location





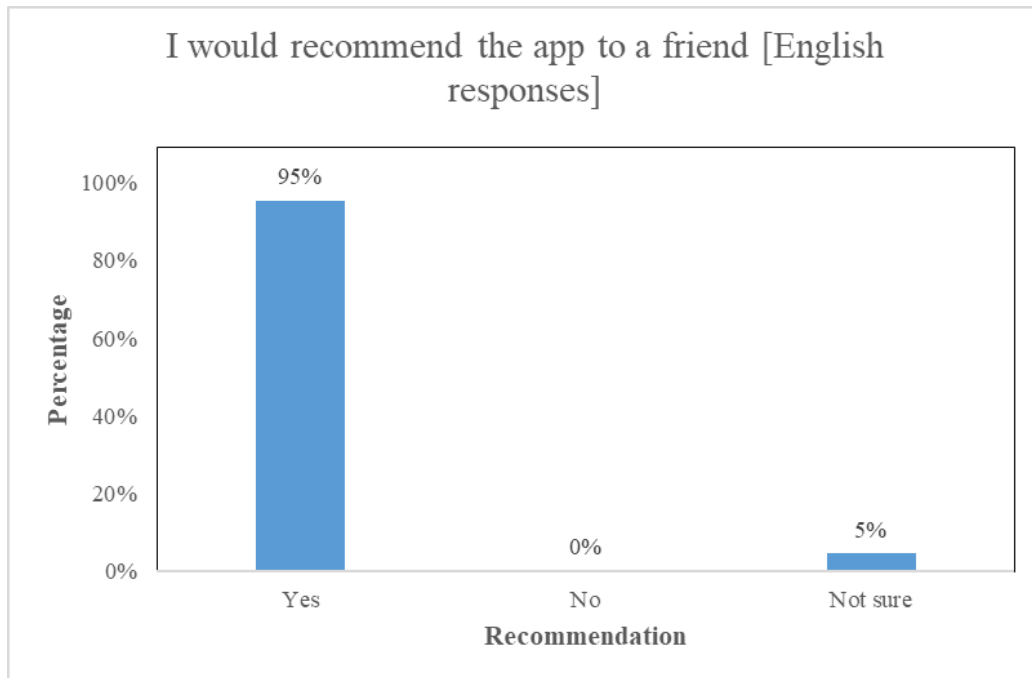




English Responses

4.55/5.00





**Suggestions for improvement:**

allow images and buttons to be larger. After release someone to come to centers and teach how to use the application

just to need to understand hoe to use the buttons

personalized routes with drivers

option for calling or texting that you add to the list can be good

there should be no limit on number of addresses you can add

trolley and parking information, your location sending to your friends and family members

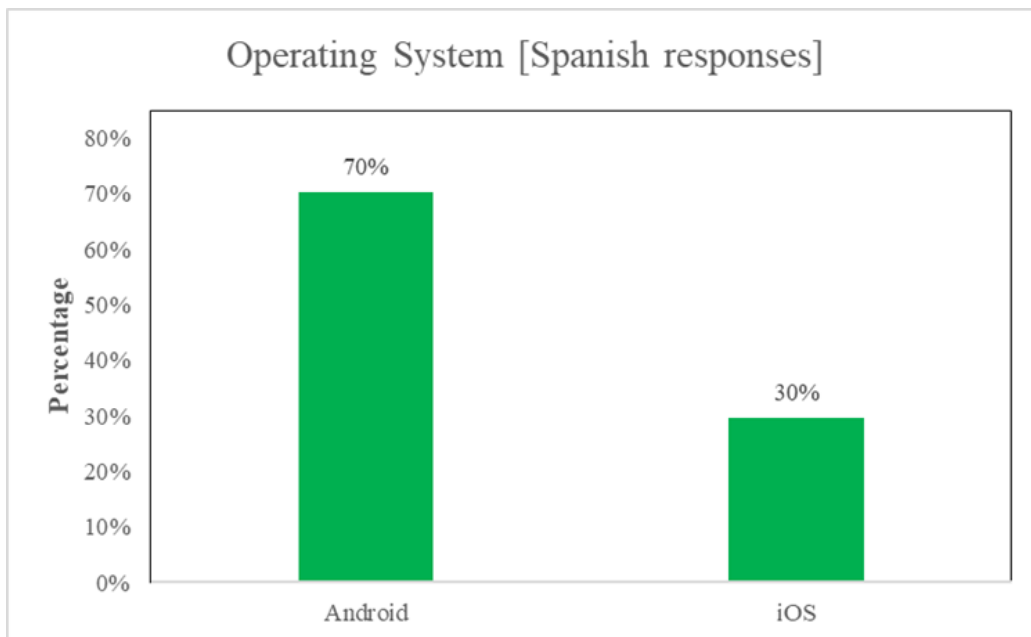
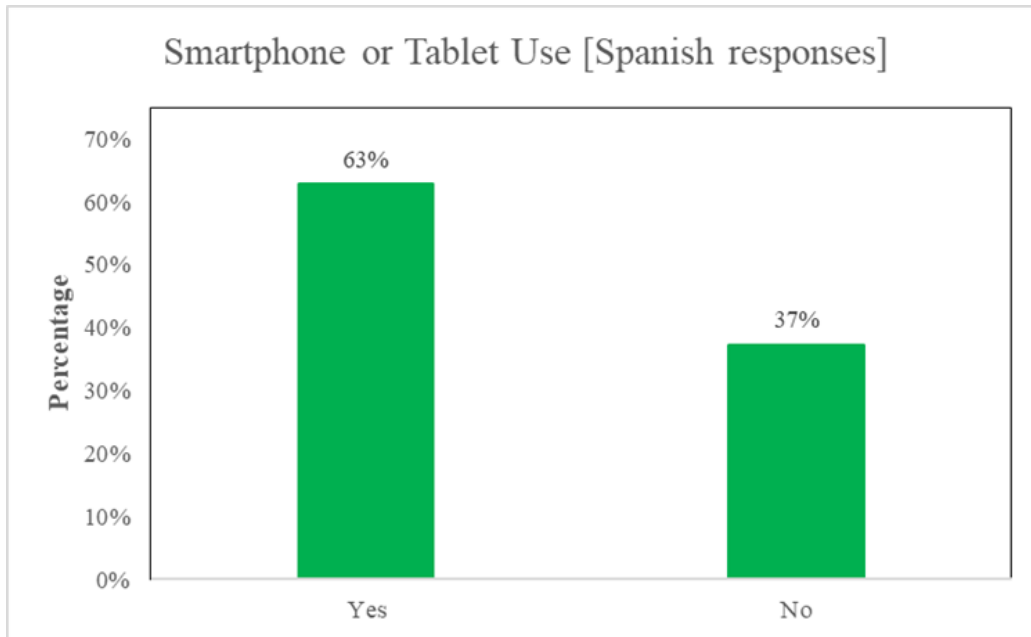
you have covered everything probably include drug store. medical appointment, information or medical emergency, police department

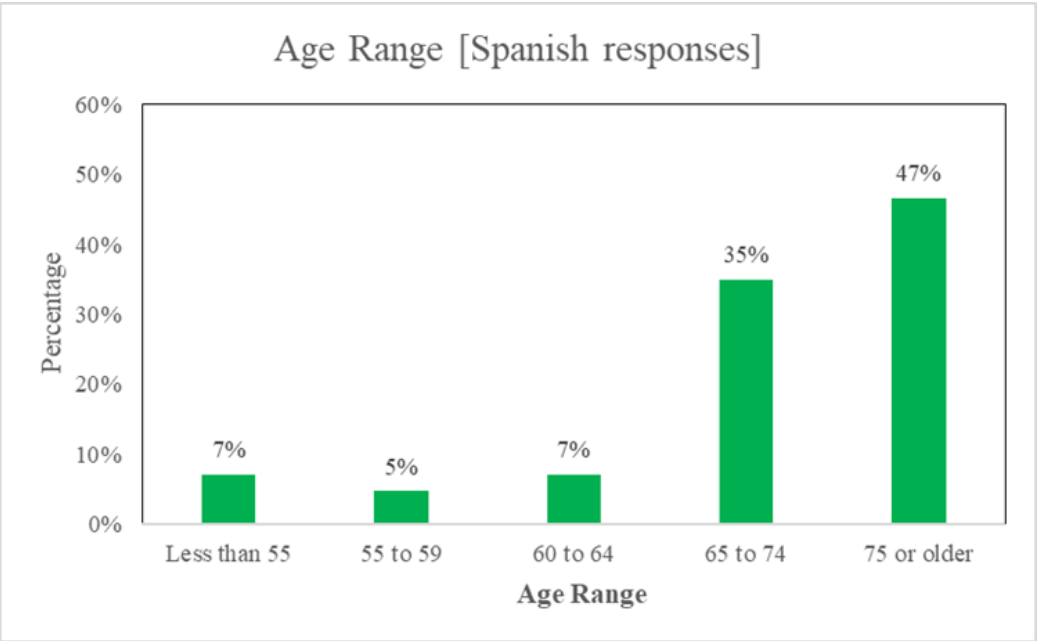
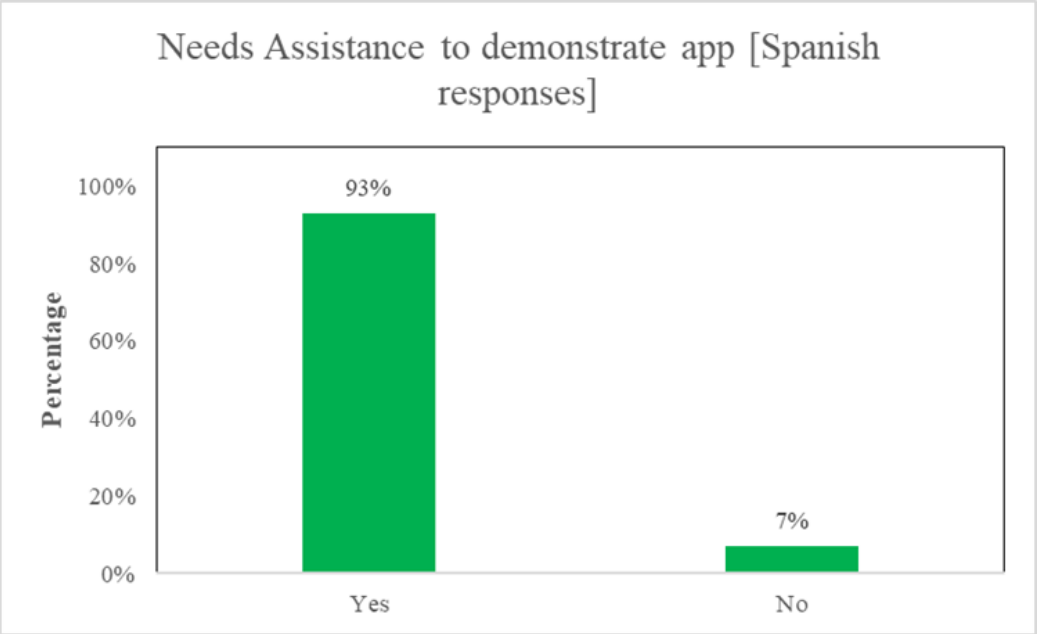
excellent

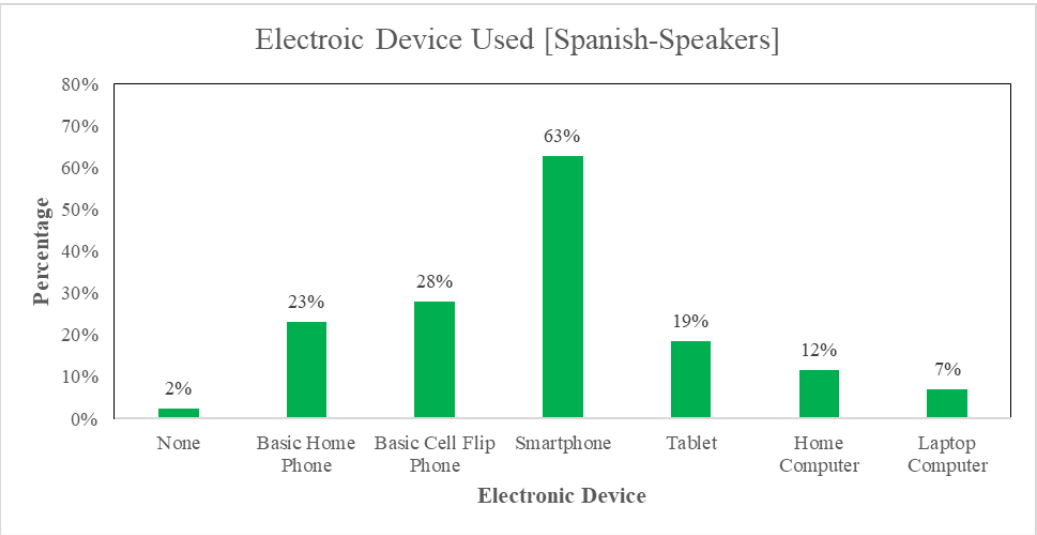
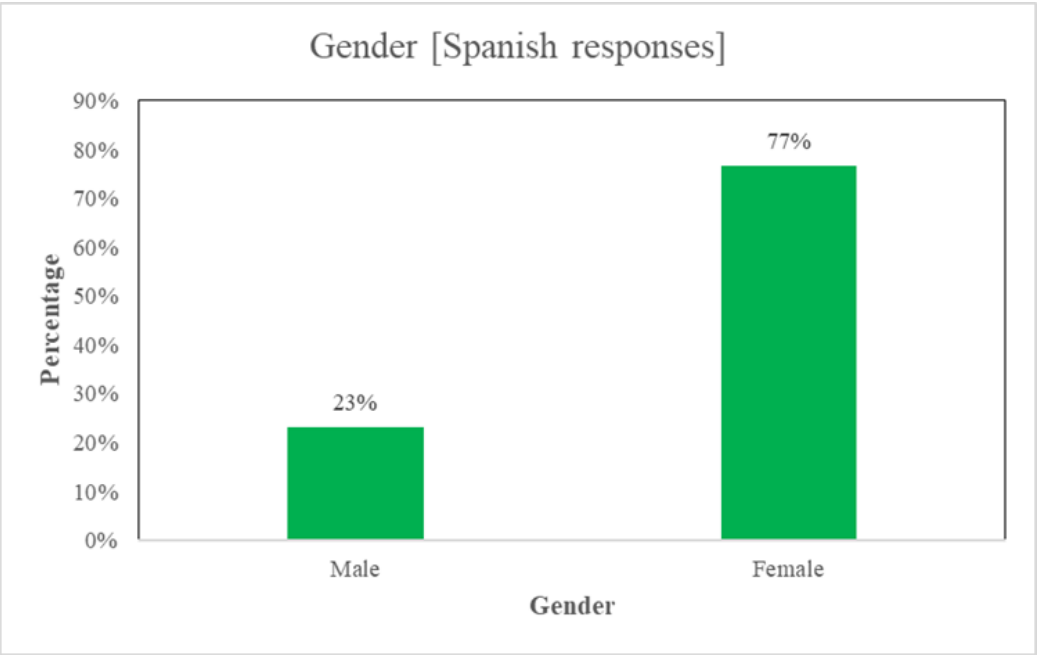
it is sufficient, find a way to communicate and explain app to older adults

no pop-up screens when clicking other things

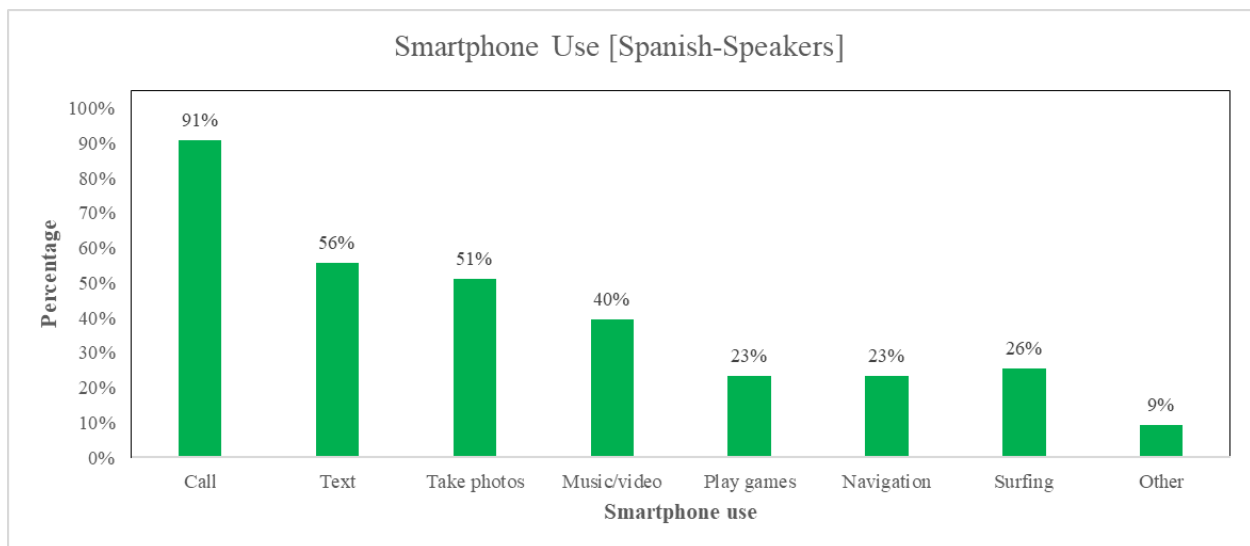
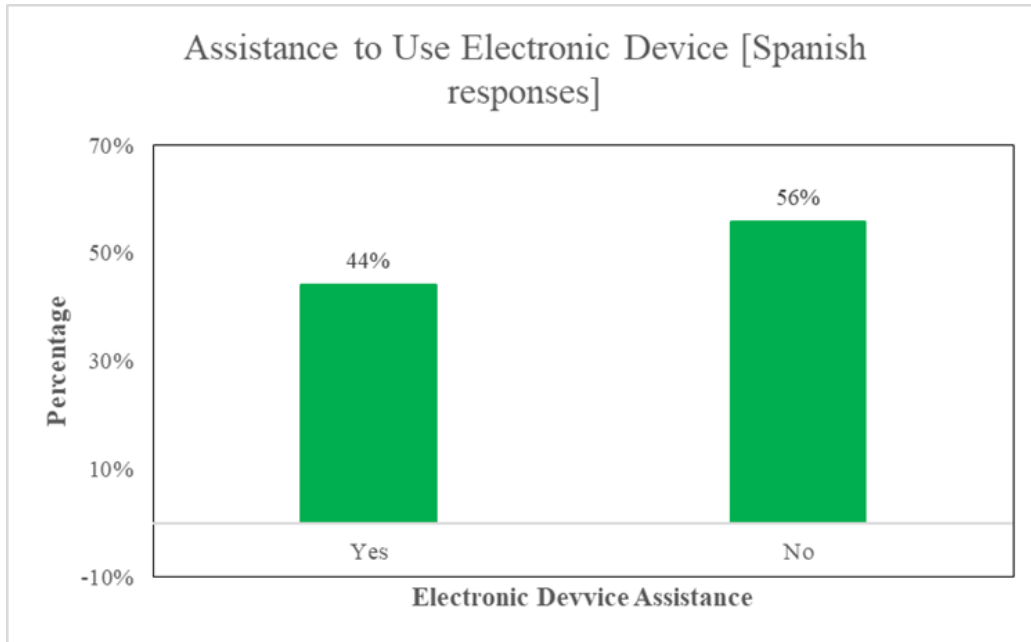
## Spanish









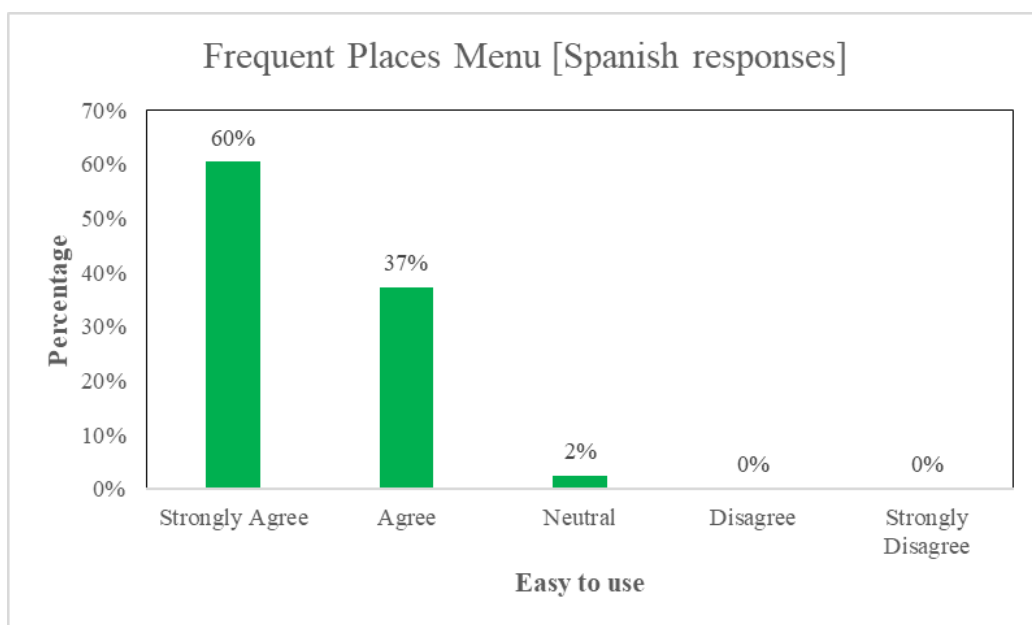
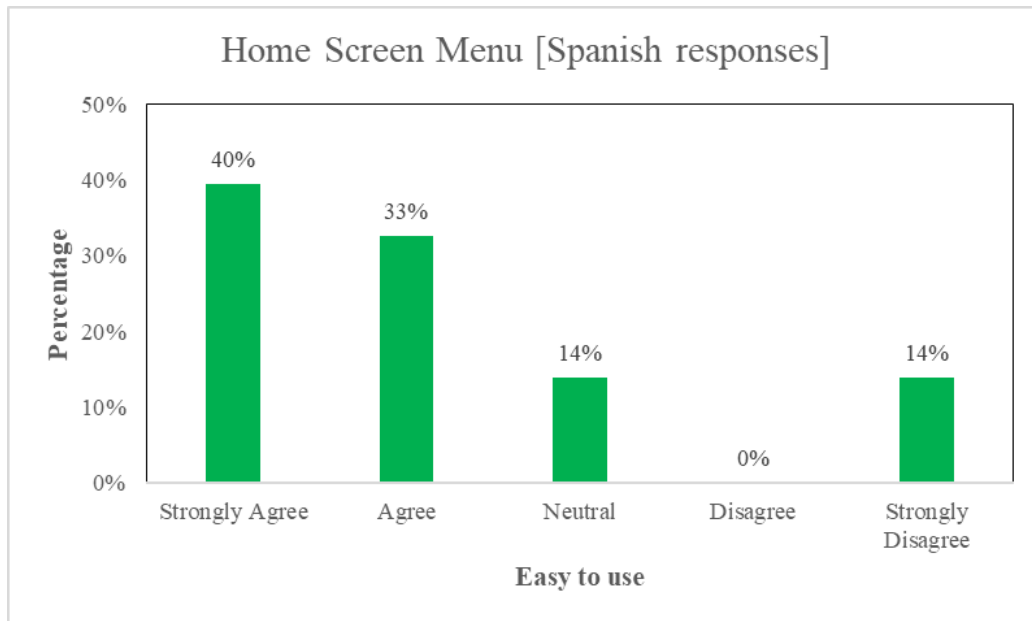


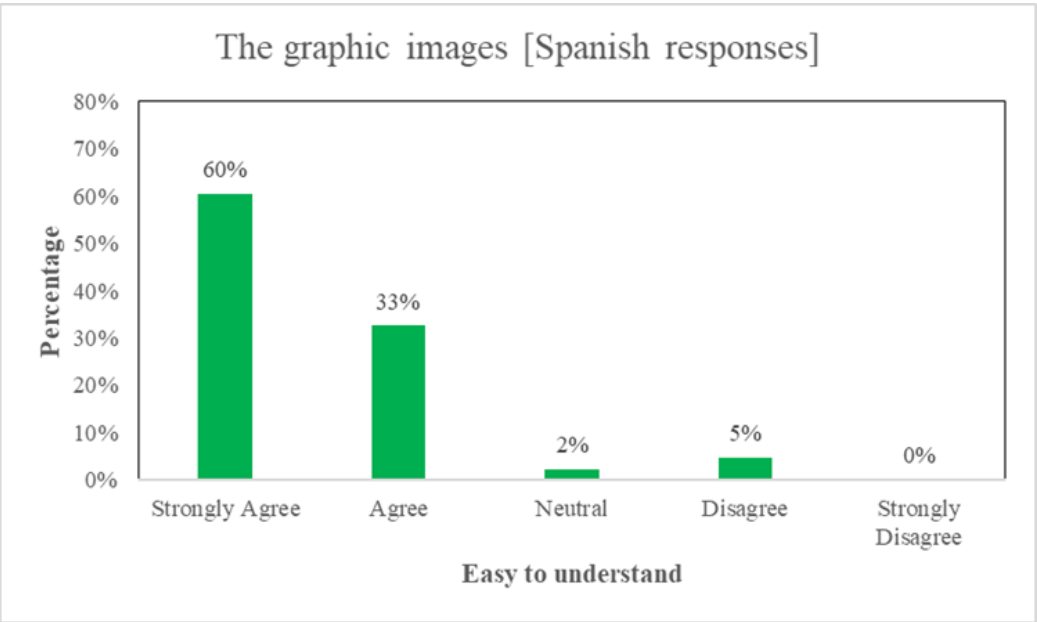
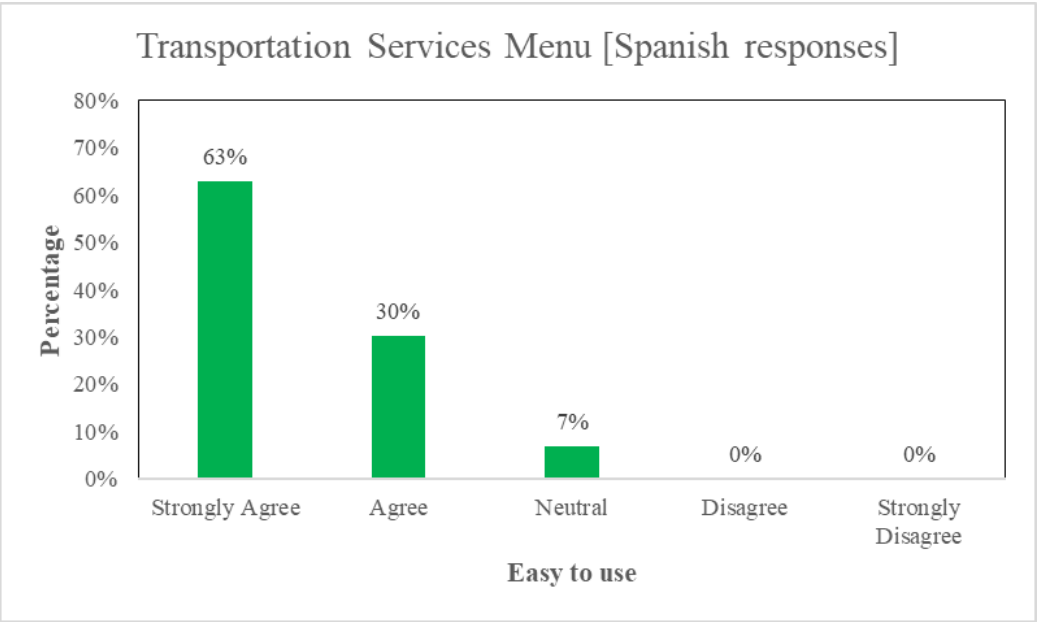
Otro

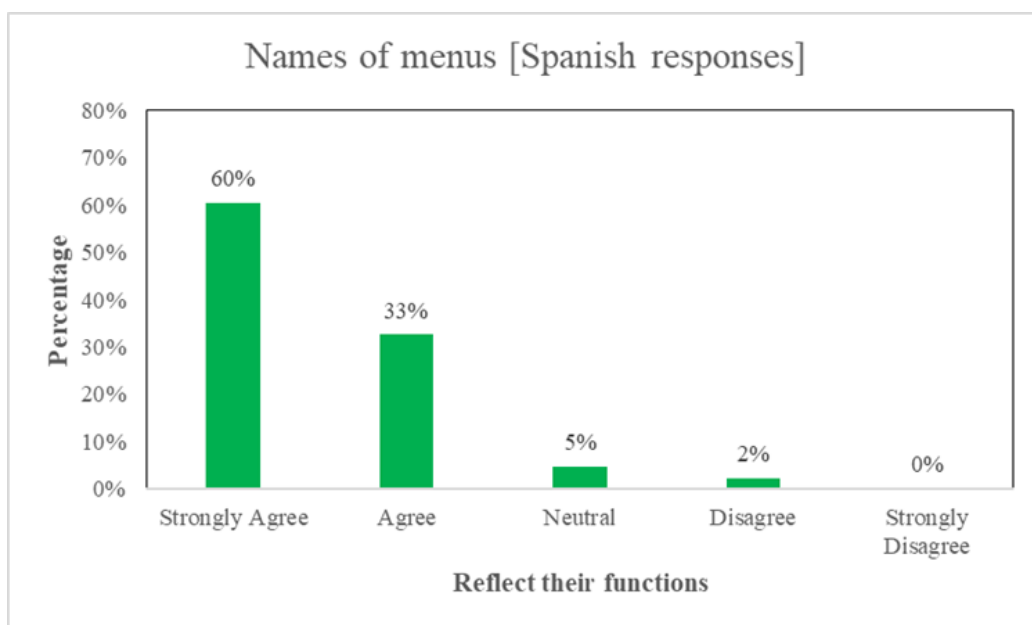
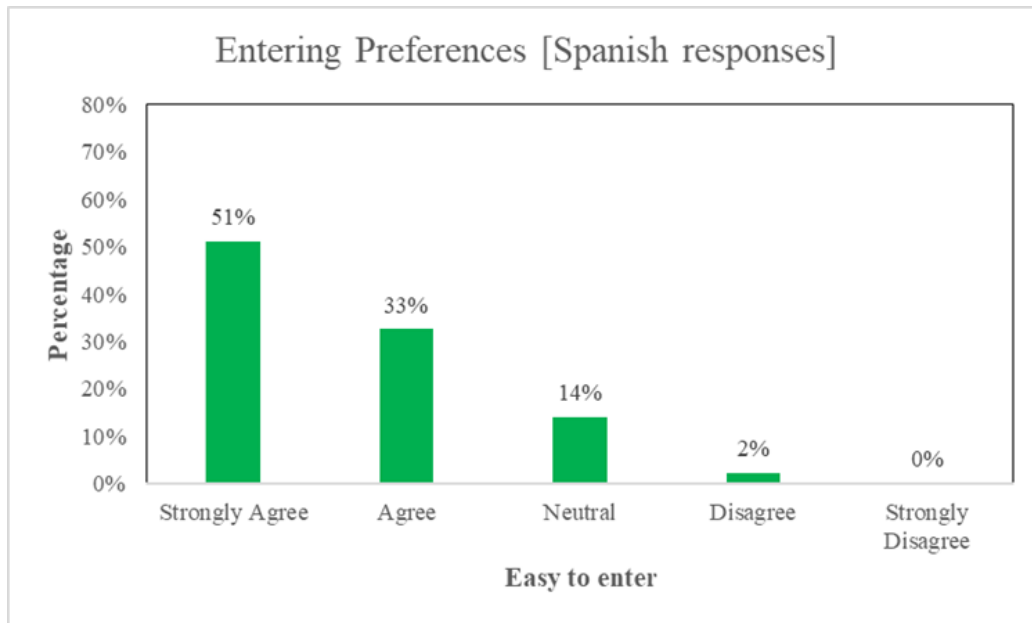
n/a

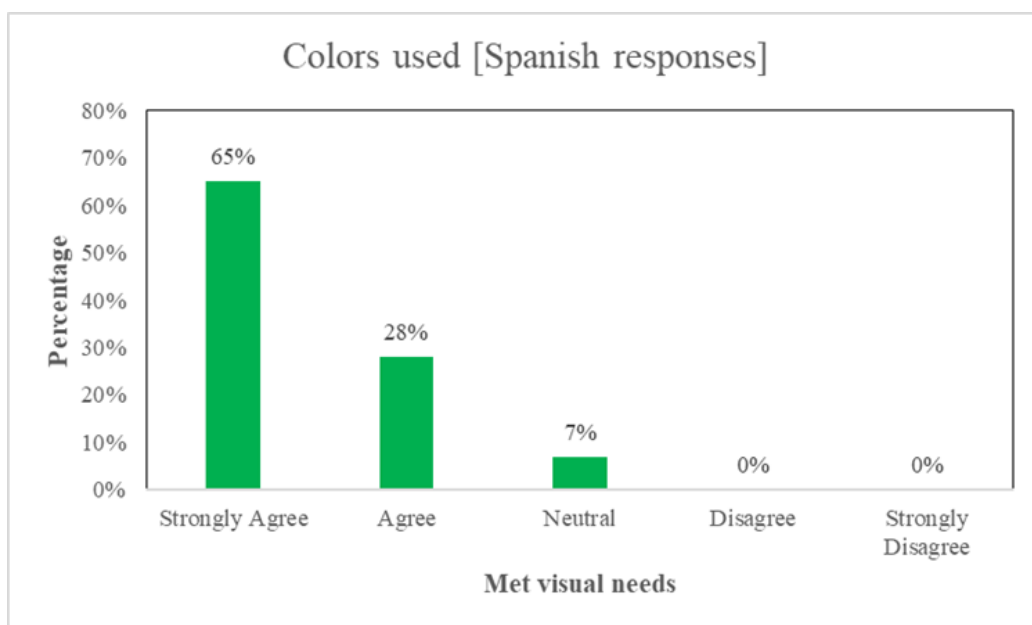
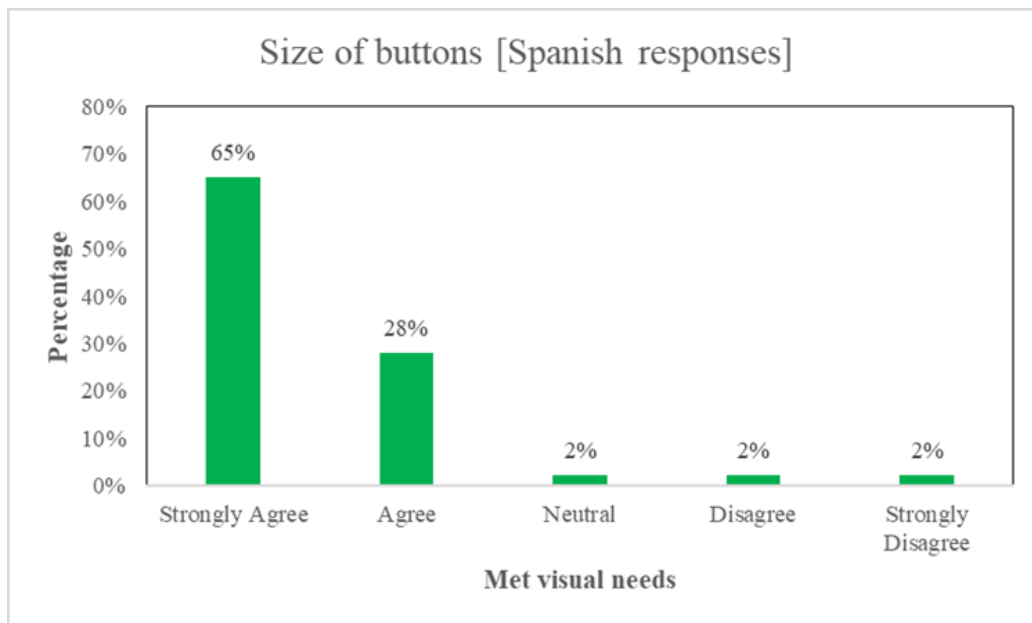
n/a

n/a





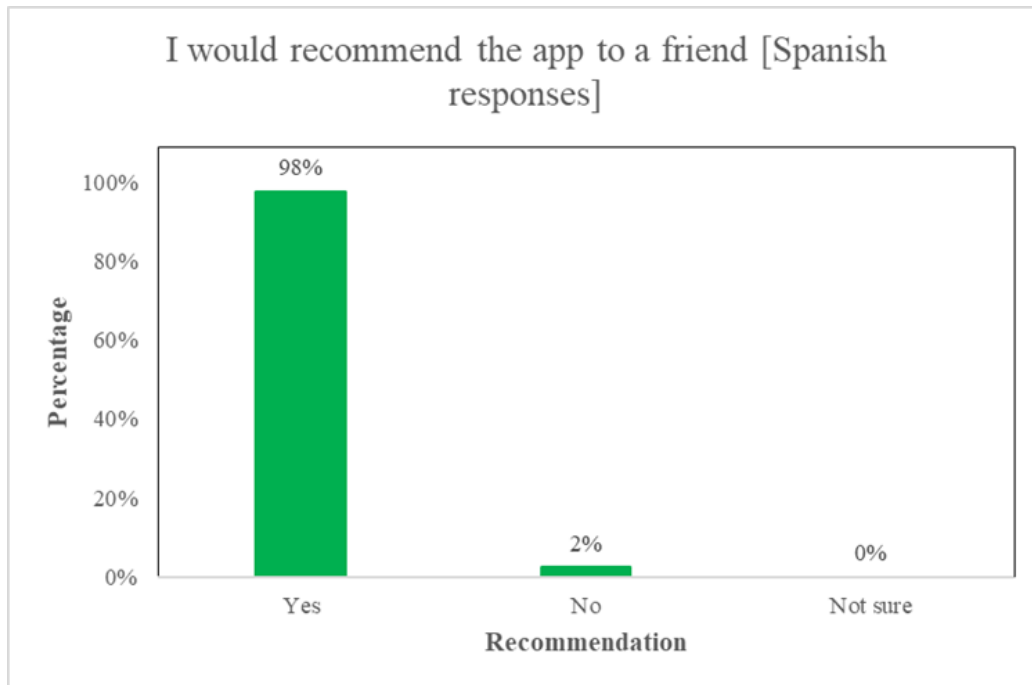




Spanish Responses

4.67/5.00





### Sugerencias:

has no internet and use of computers at senior centers

not every seniors have vehicles or smartphones, my advice is sun metro should provide a special bus for seniors,

letras en el menu se quedar chicas avando cambiamos el tamano

come more time to fully explain

mas grandes letras

main menu letters bigger

ayuda a usar aplicacion

ayuda para usar aplicacion y letras mas grandes

easier bus schedules

come and teach, vengan a enseñar todo para preparacion

ofrecer mas ayuda para entenderla

n/a

que vengan a enseñarnos la aplicacion a nuestro telefono

n/a

esta bien, tracker

na, se me hizo suficiente lo que vi y esta bien

more applications for senior citizens

esta bien

brighter color

muy bien

n/a

teach senior citizens how to utilize the application

parece que todo esta bien solo mejorar las letras para que sea mas grande

muy bien todo

n/a

n/a

No hasta que nola vea por completo

perfect

excellent

suggestions of churches, times of metro, direction suggestions

que se termine lo mas pronto posible

## APPENDIX E – Usability Survey Infographic Flyer

**Download Urban Connector and Explore EL PASO**

**1. Download App**  
Today our team members will assist you to install it

**2. Personalize**  
Select font size, language and, if any, impairments for better app experience

Select font size  
Seleccione el tamaño de la letra

Select language  
Seleccione idioma

Select if you have any of the following impairments  
☐ Visual impairment  
☐ Hearing impairment

Select the aids that you use  
☐ Cane  
☐ Walker  
☐ Wheel chair

**3. Store frequently visited addresses, or any other**

Home address  
Address 1  
Address 2  
City  
State  
Zip code

Home  
Senior center  
Grocery store  
Family & friends

**4. Navigate**  
Tap icons on frequent places menu to go home, with family and friends and new locations

**5. Enjoy exploring El Paso**  
Never get lost again, avoid traffic congestion, arrive on time and explore!

**C2 SMART**  
CONNECTED CITIES WITH SMART TRANSPORTATION

This project is funded by C2SMART (US Dept. of Transportation Tier 1 University Transportation Center). For more information, please contact Orlan Gurbuz (gurbuz@miners.utep.edu)

**UTEP**

## Your Participation is Valuable!

### What is Urban Connector?

- Mobile device application developed for assisting the mobility needs of seniors in El Paso

### Who are we?

- We are researchers from the University of Texas at El Paso interested in your opinion

### Why do we need your participation?

- You are important and your feedback will help improve the quality of life for all seniors around the city

### Who is eligible?

- Seniors 65+ with Android cell phones

### When will the test end?

- 30-day study period ending with rewards!

Your opinion matters,  
make it count!



**Descargue "Urban Connector" y Descubra EL PASO**

**1. Descargue la "App"**  
El día de hoy nuestros compañeros le ayudarán a descargarla

**2. Personalize**  
Seleccione el tamaño de la letra, lenguaje, y si tiene discapacidades

Select font size  
Seleccione el tamaño de la letra

Select language  
Seleccione idioma

Seleccione si tiene alguna de las siguientes discapacidades  
☐ Débil visual  
☐ Discapacidad auditiva

Seleccione si usted utiliza alguno de los siguientes apoyos  
☐ Bastón  
☐ Andadera  
☐ Silla de ruedas

**3. Introduzca sus direcciones más visitadas, o cualquier otra**

Dirección  
Dirección 1  
Dirección 2  
Ciudad  
Estado  
Código postal

Home  
Centro para adultos mayores  
Tienda  
Familia, seres y amigos

**4. Navegue**  
Seleccione los iconos en el menú de lugares frecuentes para ir a casa, con familiares y amigos y lugares nuevos

**5. Disfrute descubrir El Paso**  
No se vuelva a perder, evite la congestión vehicular, llegue a tiempo y descubra!

**C2 SMART**  
CONNECTED CITIES WITH SMART TRANSPORTATION

Este proyecto es patrocinado por C2SMART (Centro Universitario Tier 1 de Transportación del Departamento de Transportación de E.U.A.). Para mayor información, por favor contacte a Dr. Guillermo Nolasco-Melton (gnolasco@utep.edu) 915-747-6132

**UTEP**

## ¡Su Participación es Importante!

### ¿Qué es "Urban Connector"?

- Aplicación de teléfono móvil diseñada para atender las necesidades de transporte de las personas de la tercera edad en El Paso

### ¿Quiénes somos?

- Somos investigadores de la Universidad de Texas en El Paso interesados en su opinión

### ¿Por qué necesitamos su participación?

- Usted es importante y sus sugerencias ayudarán a mejorar la calidad de vida de las personas de la tercera edad en la ciudad

### ¿Quién es elegible?

- Personas con 65+ años con celulares Android

### ¿Cuándo terminará el estudio?

- Estudio de 30 días con incentivos para agradecer su participación

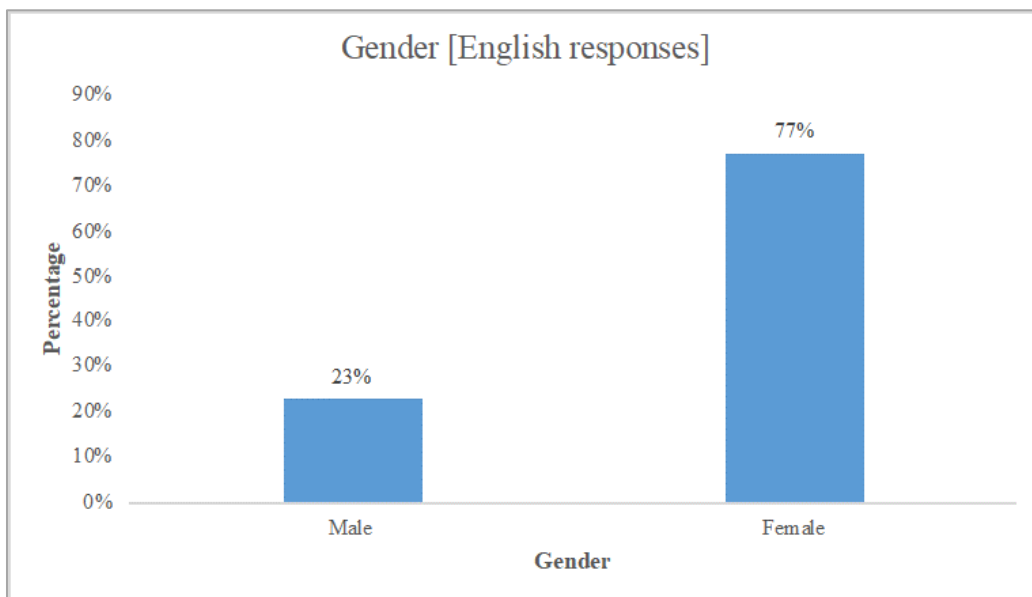
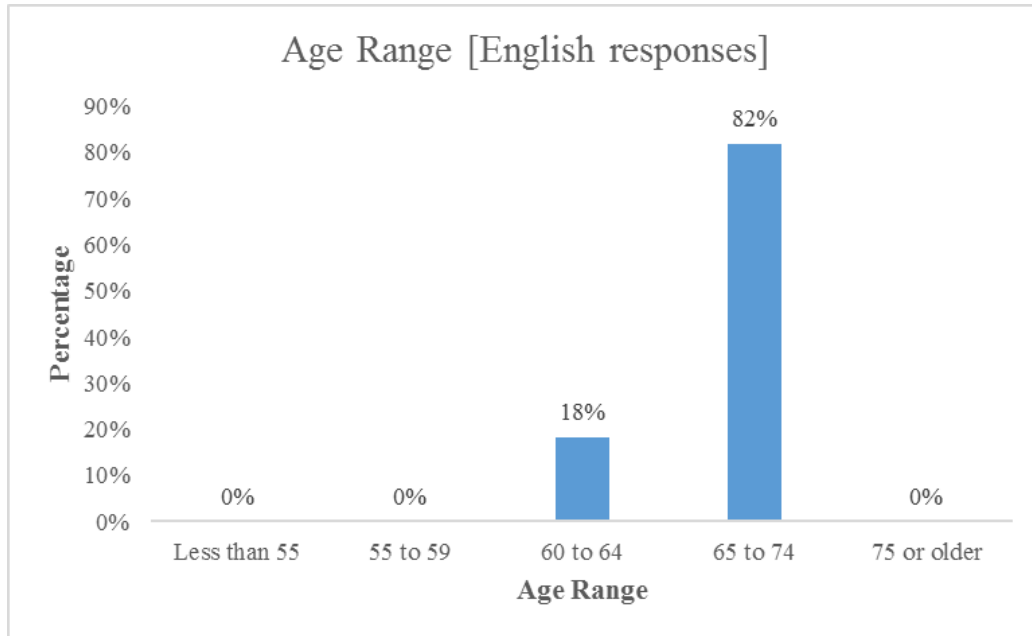
¡Su voz es importante,  
hágala contar!

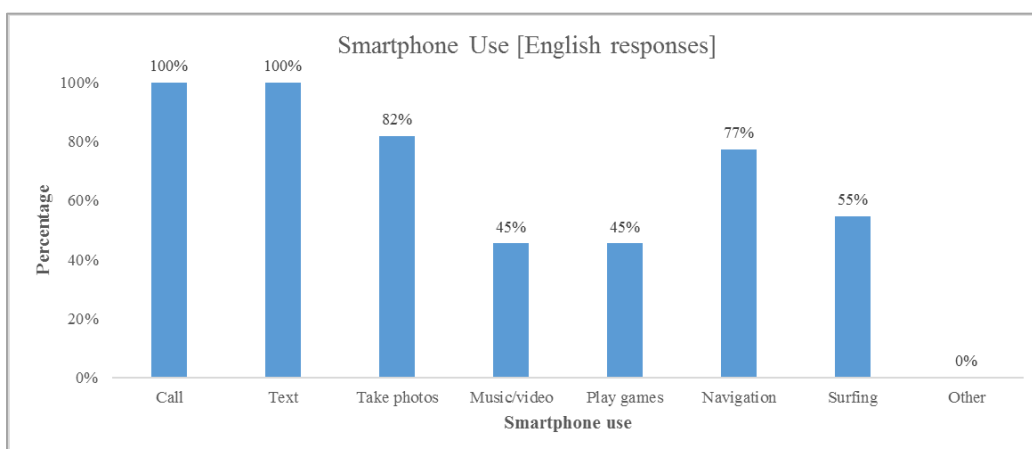
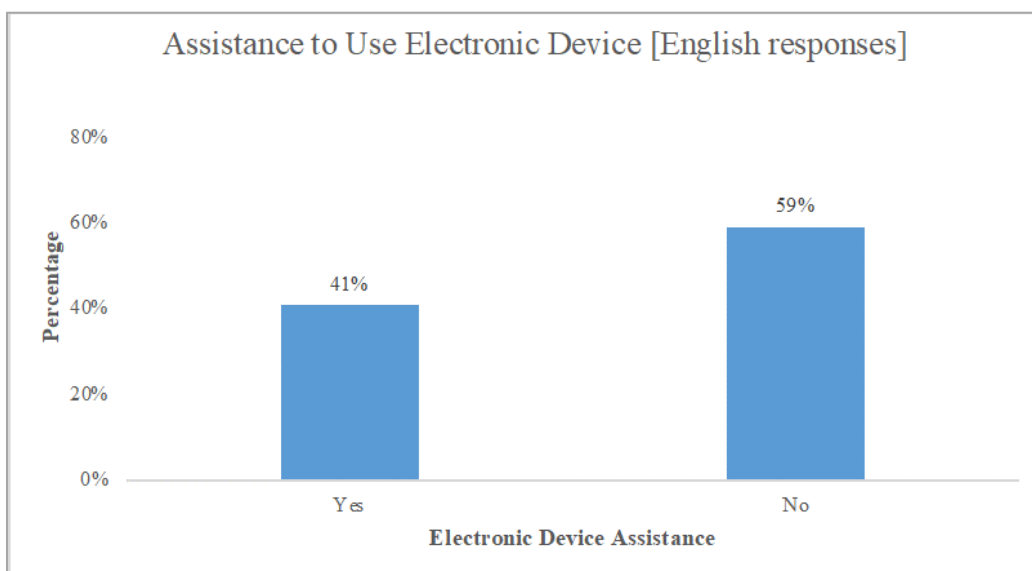
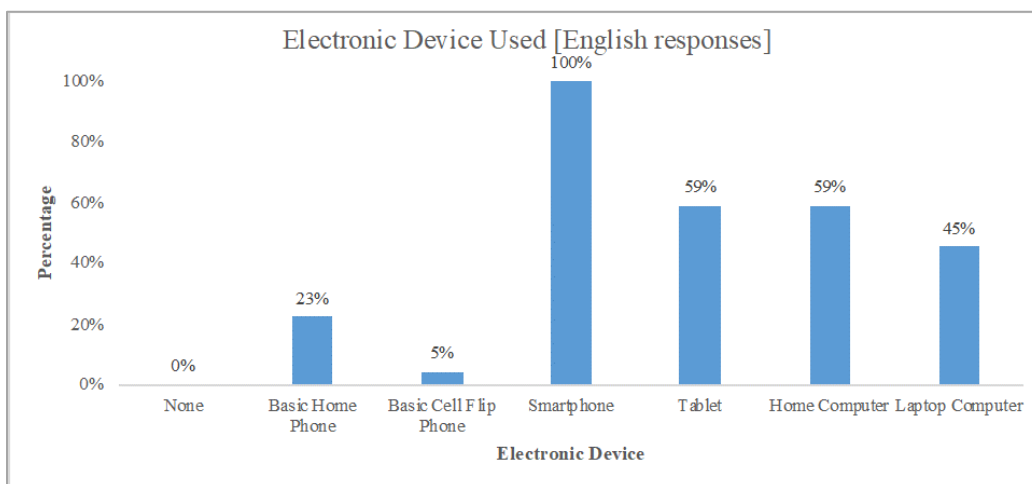


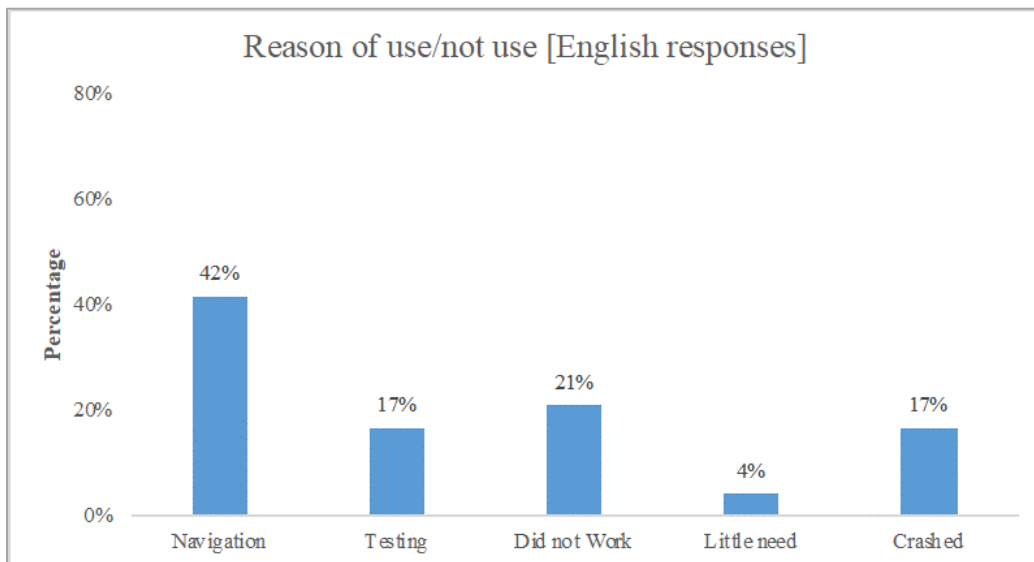
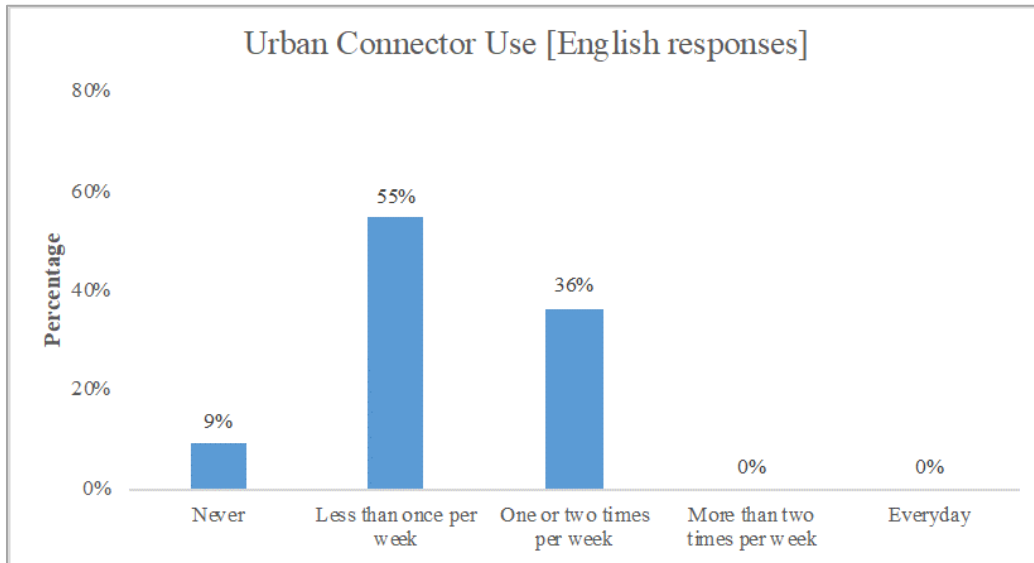


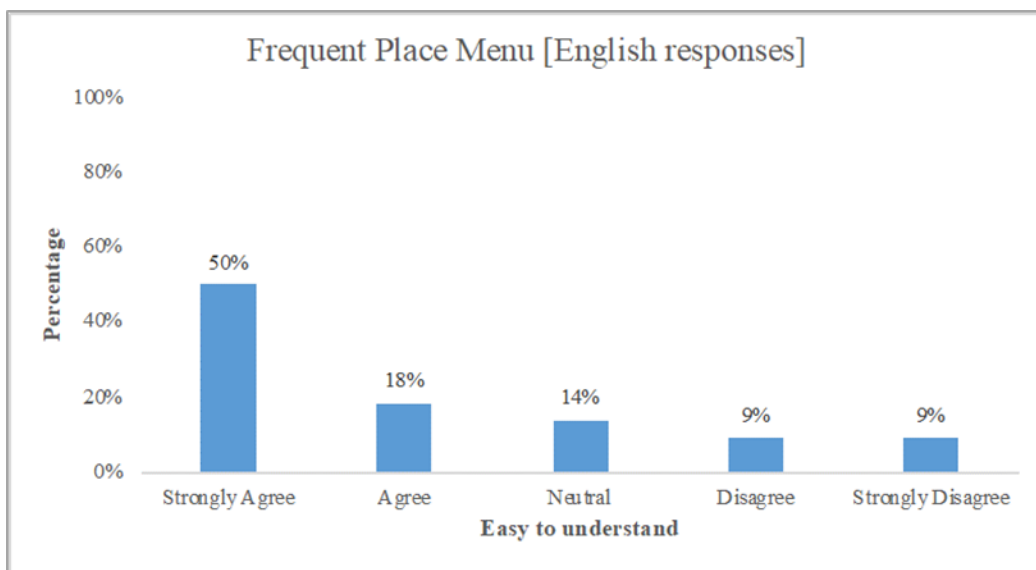
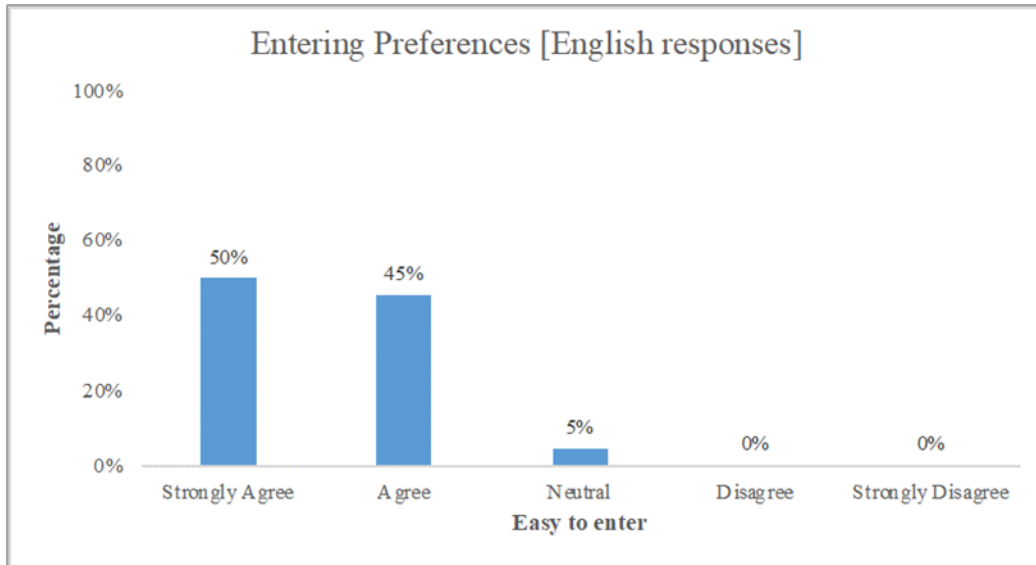
## APPENDIX F – User Usability Survey Summary Statistics

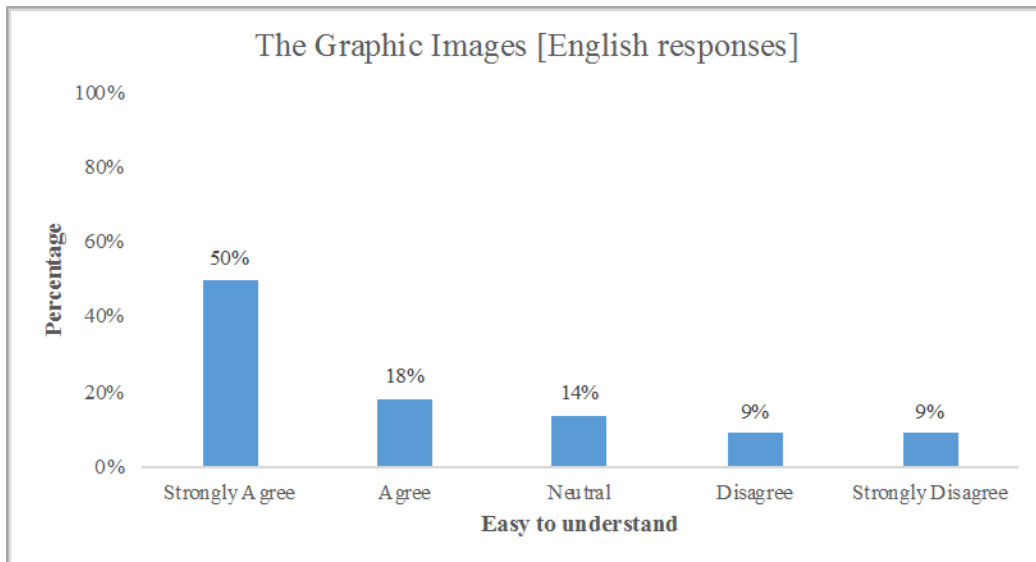
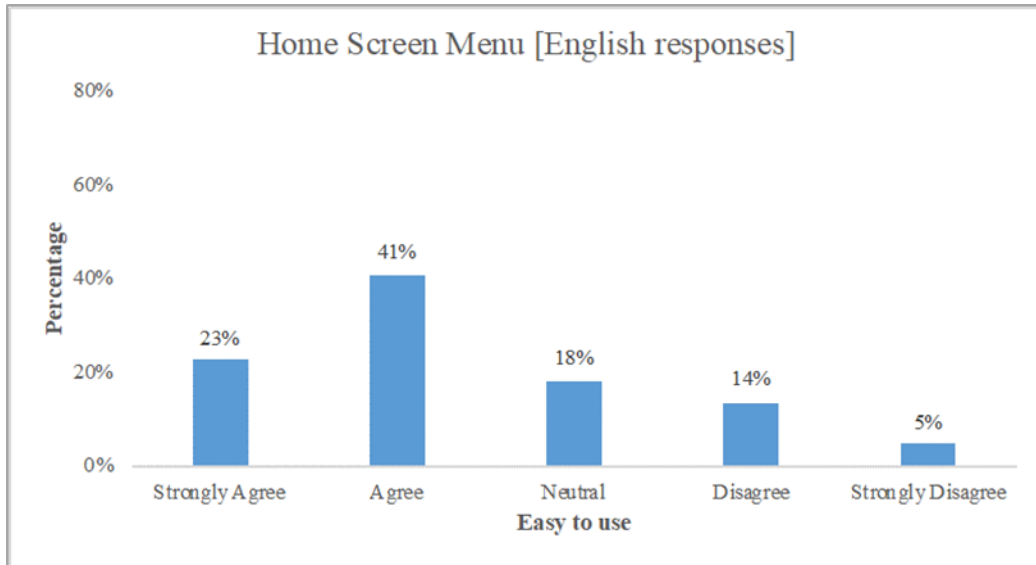
### English

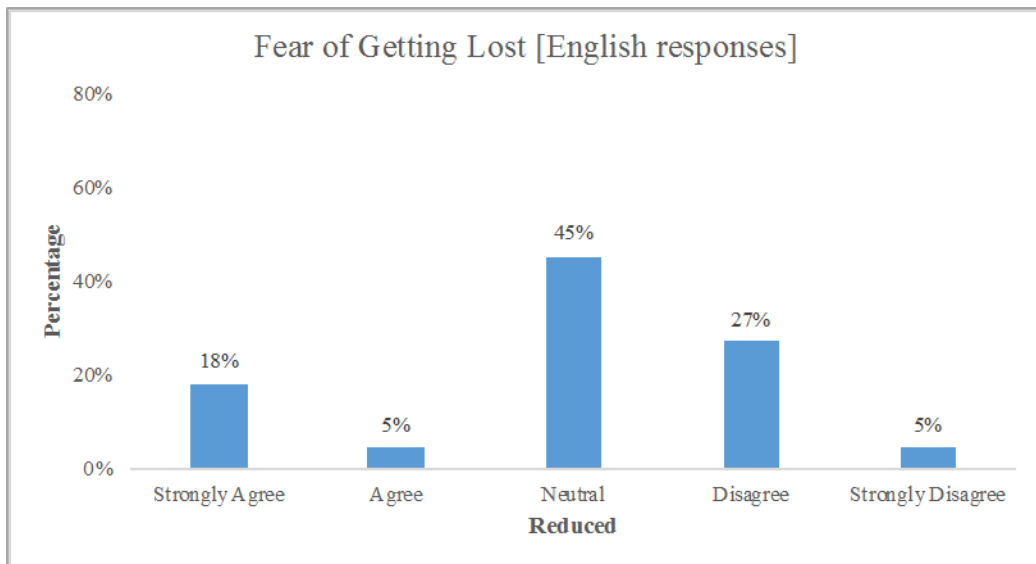
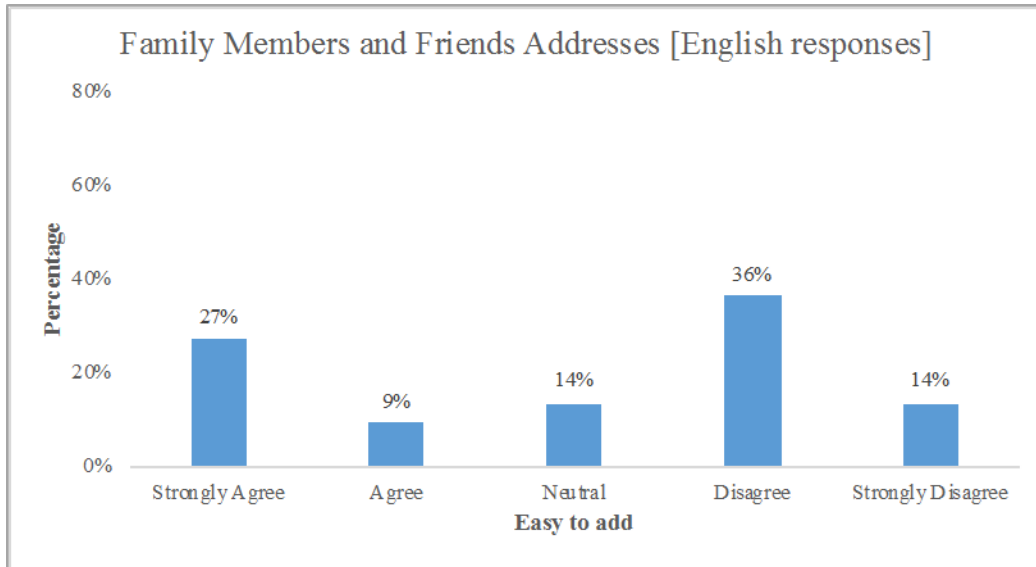


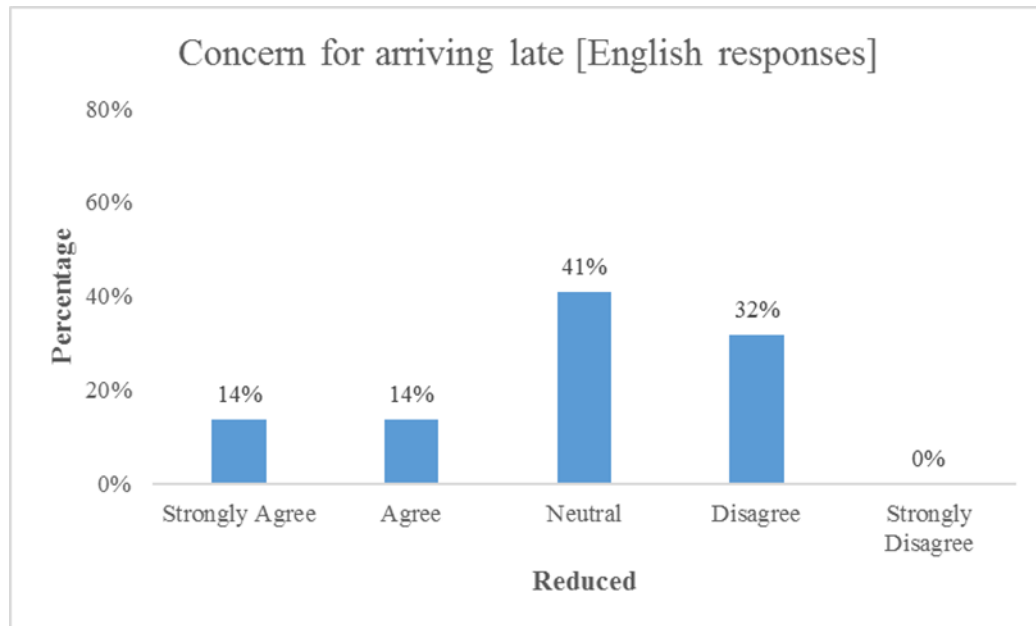
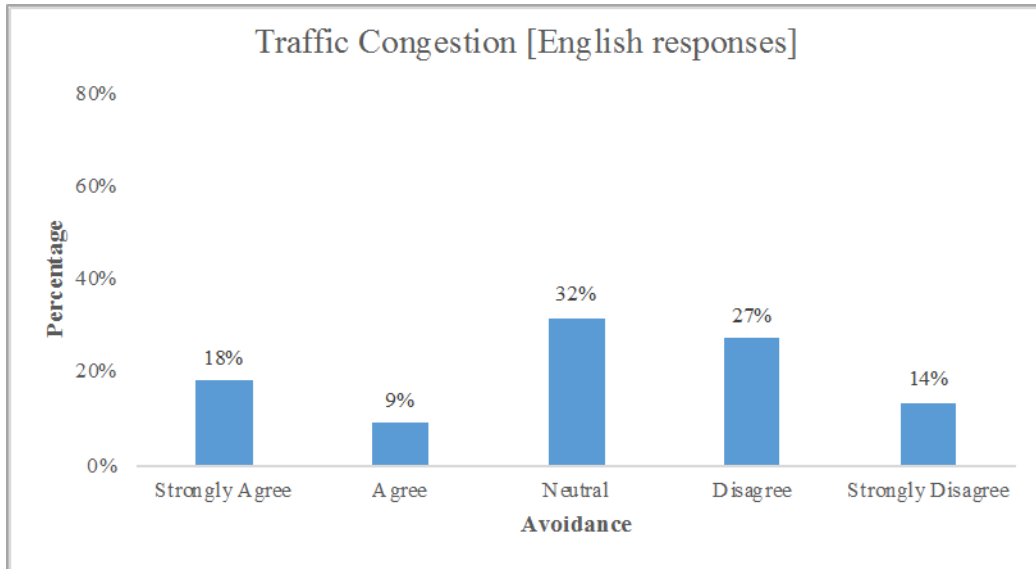


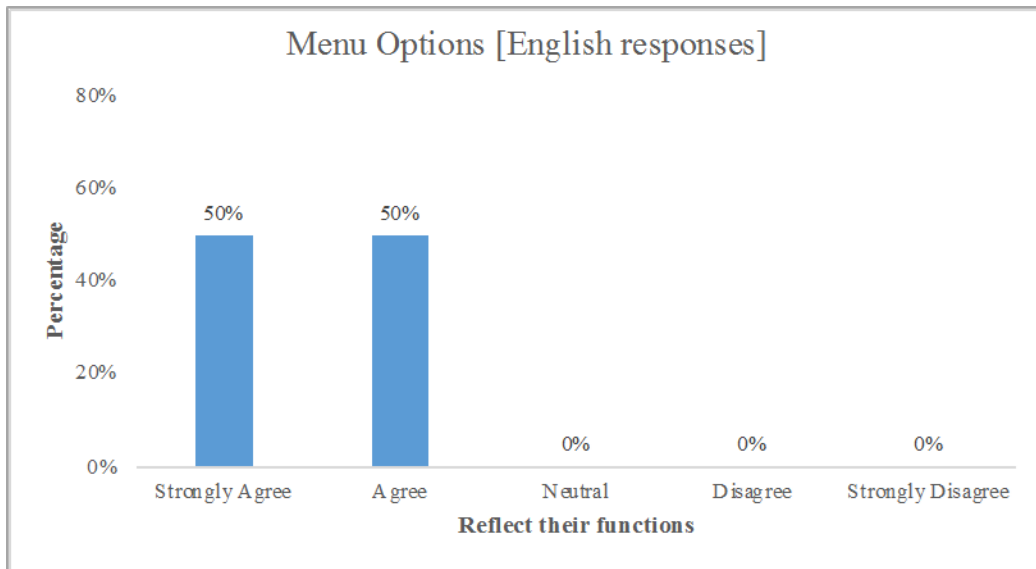
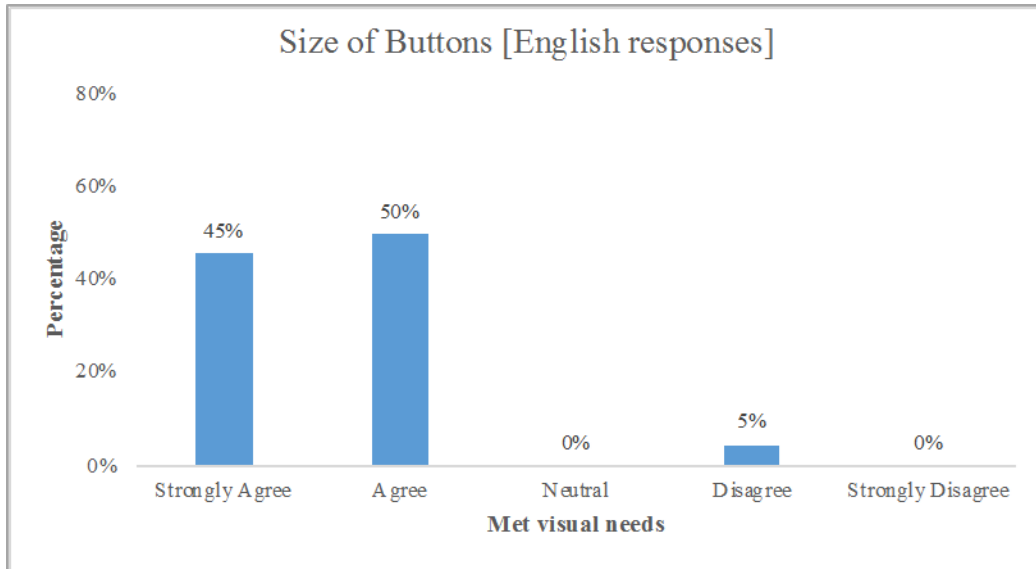




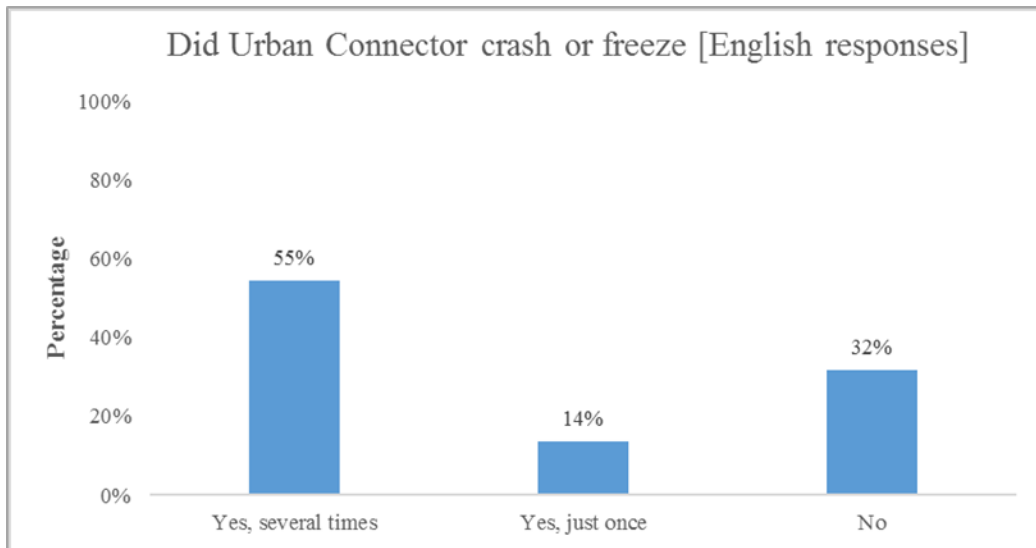
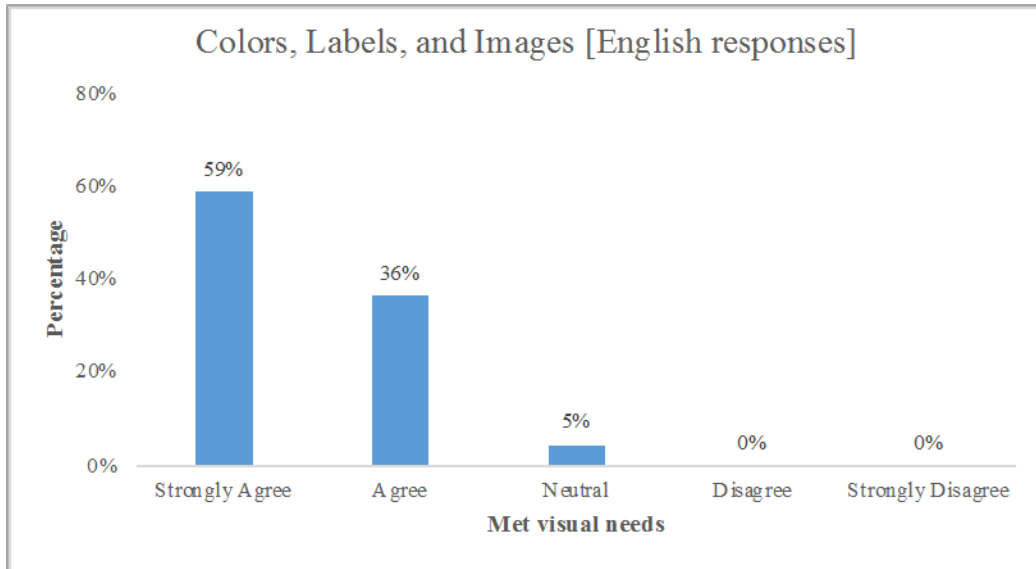


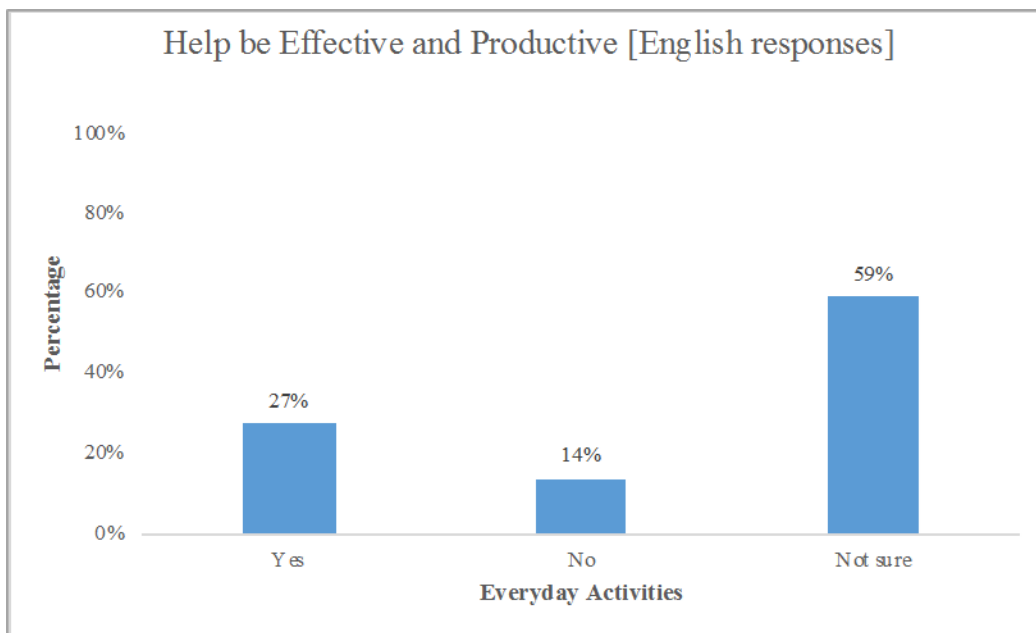
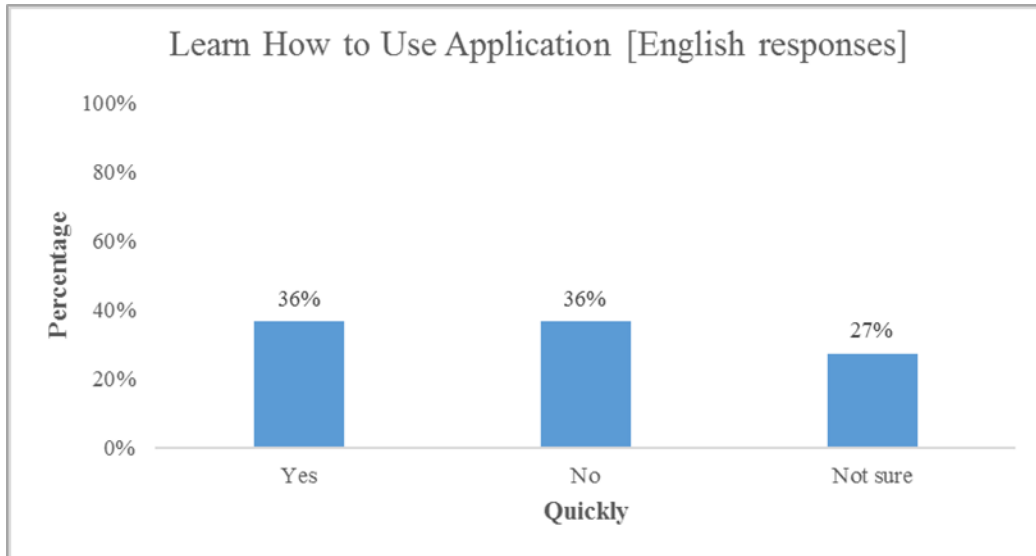


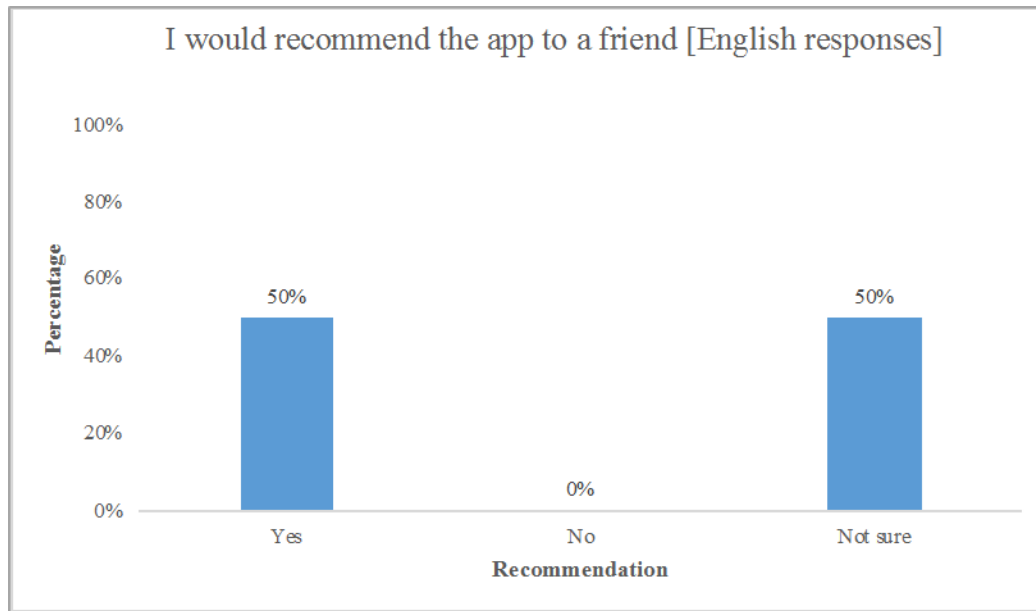












English Responses

2.77/5.00



### Suggestions for improvement:

make it easier to use

Voice activation- like google microphone should send location (current location) to other people

There are some icons inactive- they should be functional

make it simpler explain better how to use it fix the application

Fix icons to make it work

Fix application

Make it work Name of places instead of addresses

Modifying it to make it work fix icons

make it simpler

mimic other existing applications not user friendly make it easier

Voice command more icons Emergency phone numbers contacts and 911 Be able to locate wherever they are

Improve icons to work

Map did not work. it did not ope. it kept on crashing. Explain how to use it better

---

Put name instead of addresses because it took me to new mexico instead of texas or make it easier to fill in the address in friends and family icon

---

Safest not fastest Piggybacking google- it is making me use google maps

---

Work on icons and it would even be more excellent

---

Improve icons so they can work

---

More icons

---

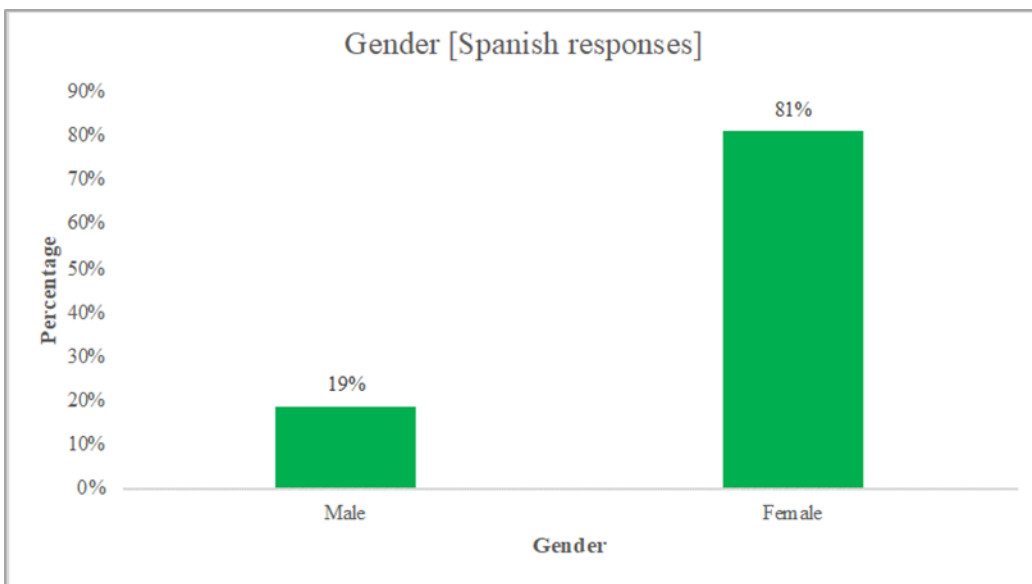
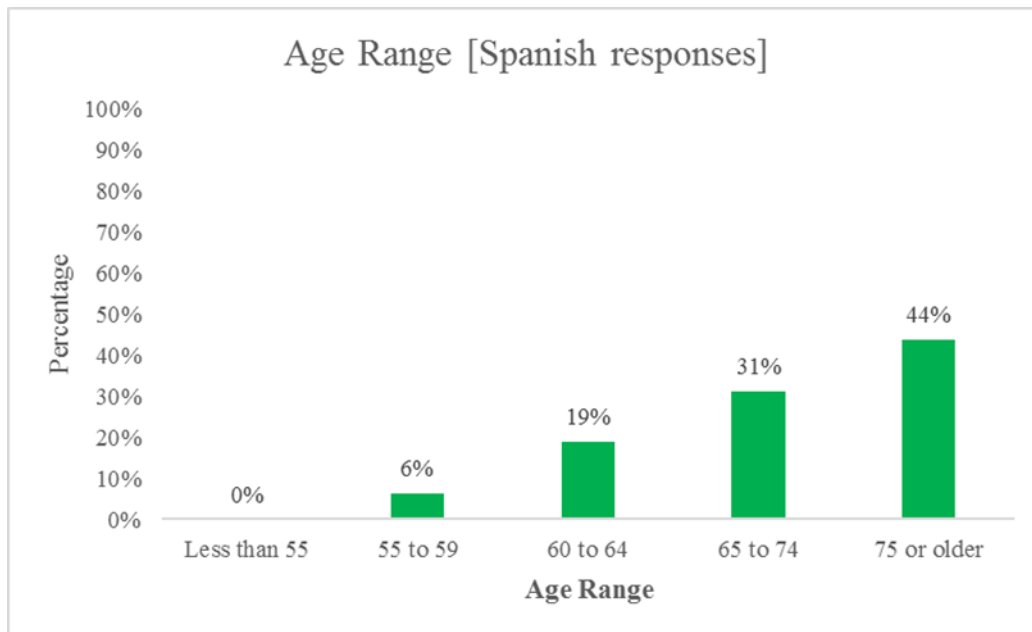
Make it work could not get very far in the app

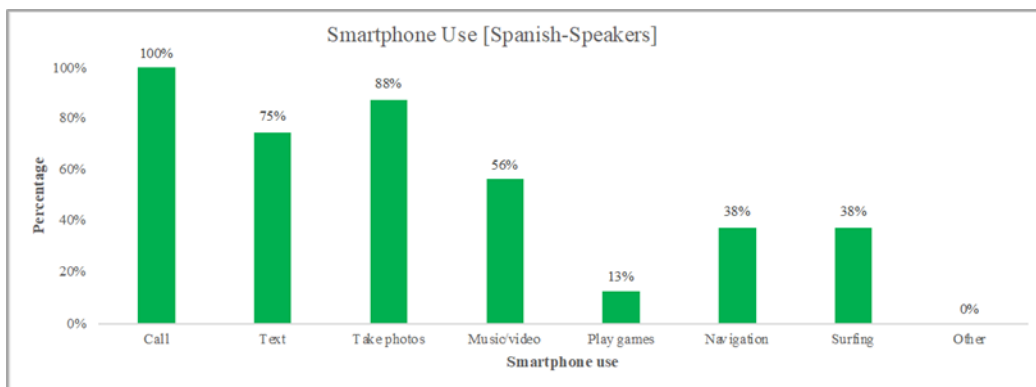
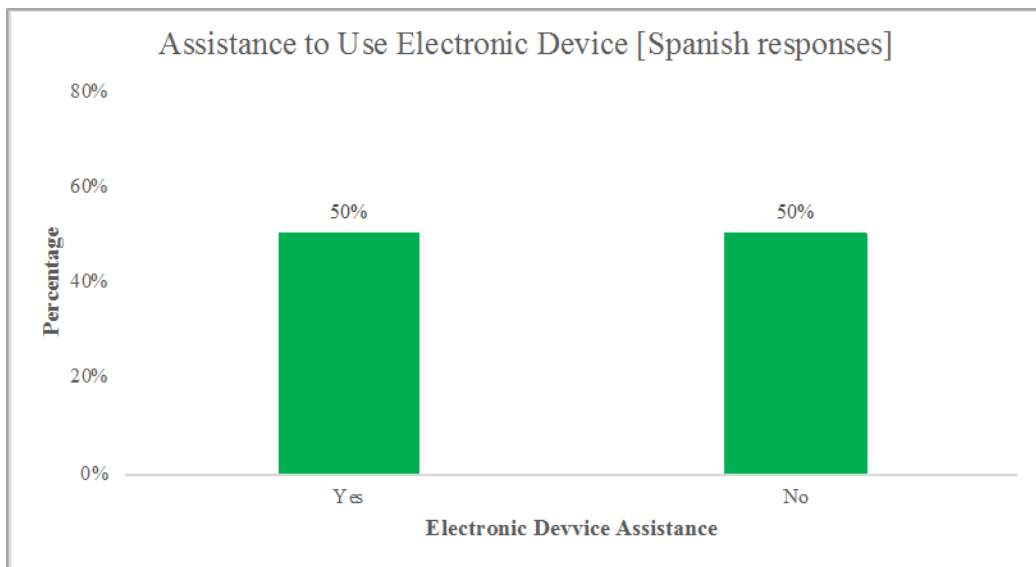
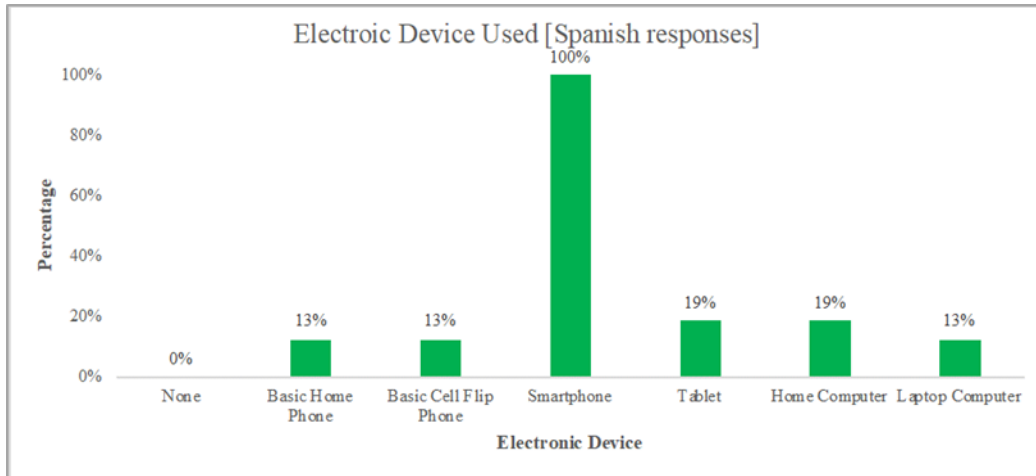
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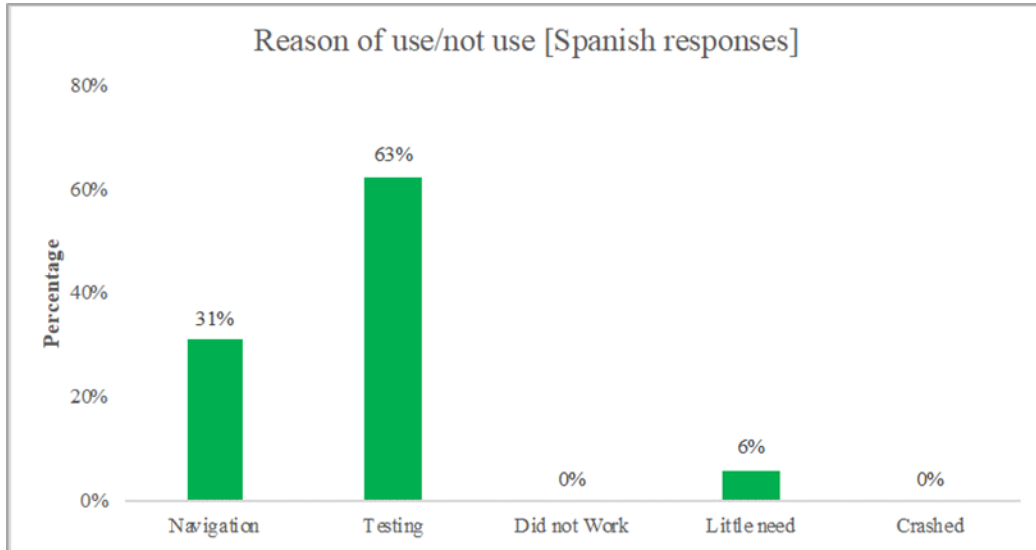
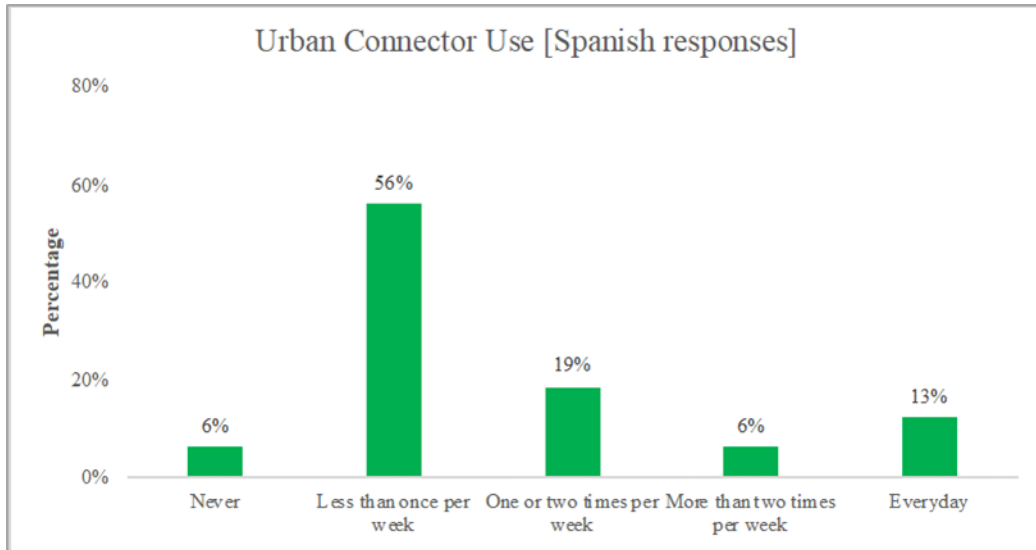
We don't need familiar places

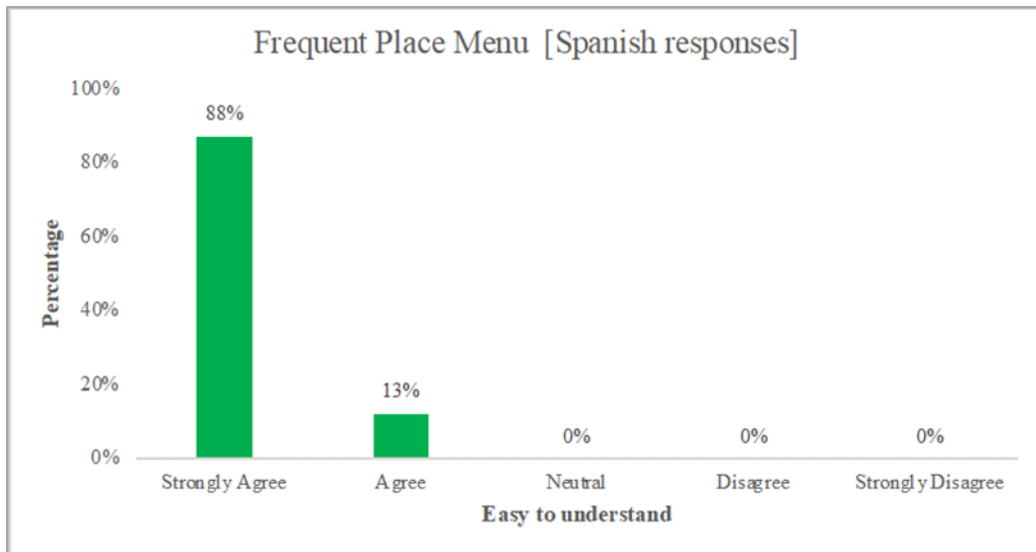
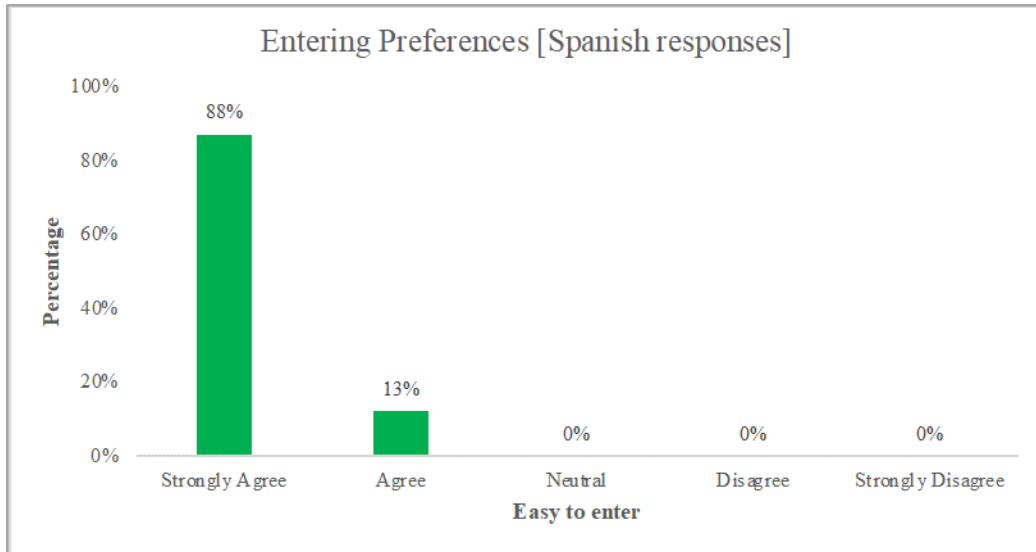
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## Spanish

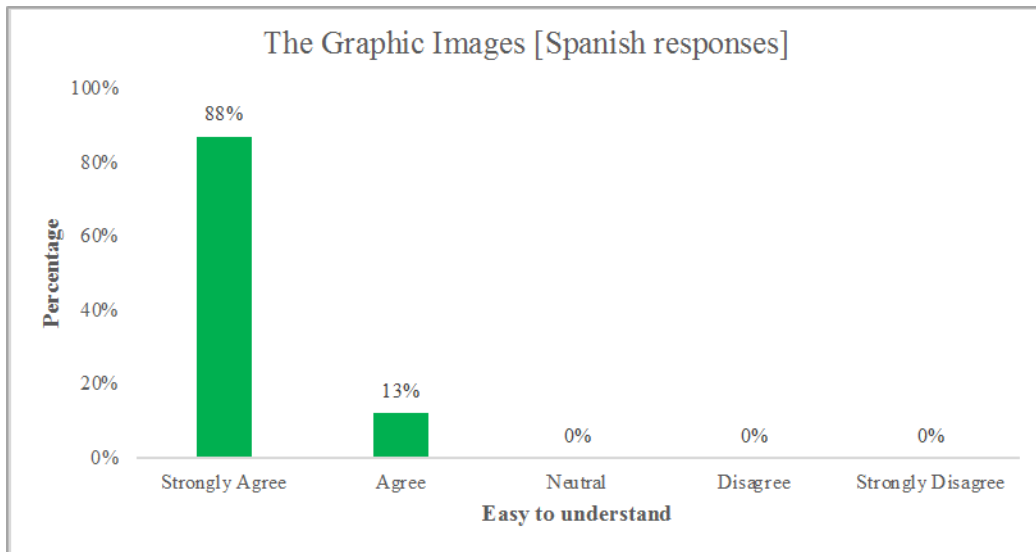
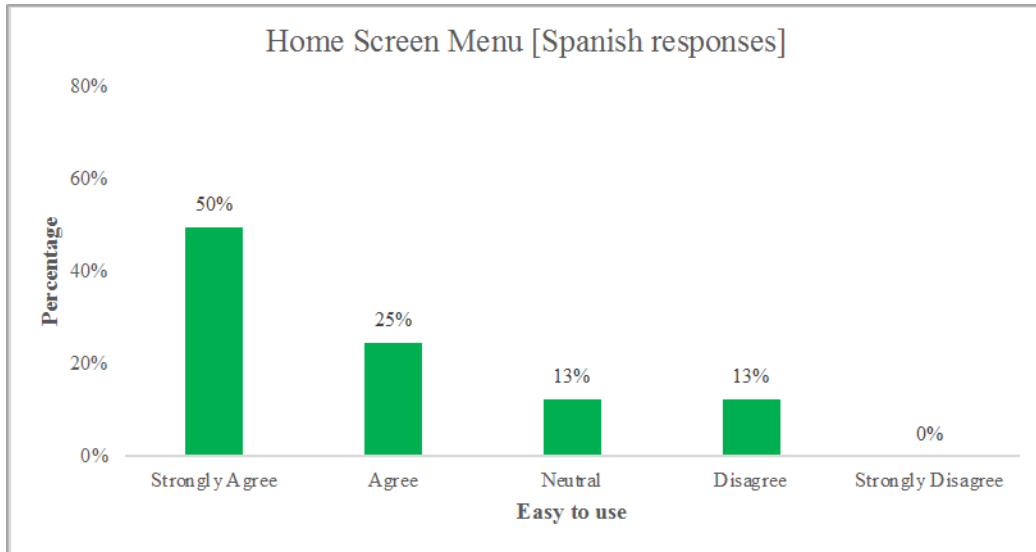


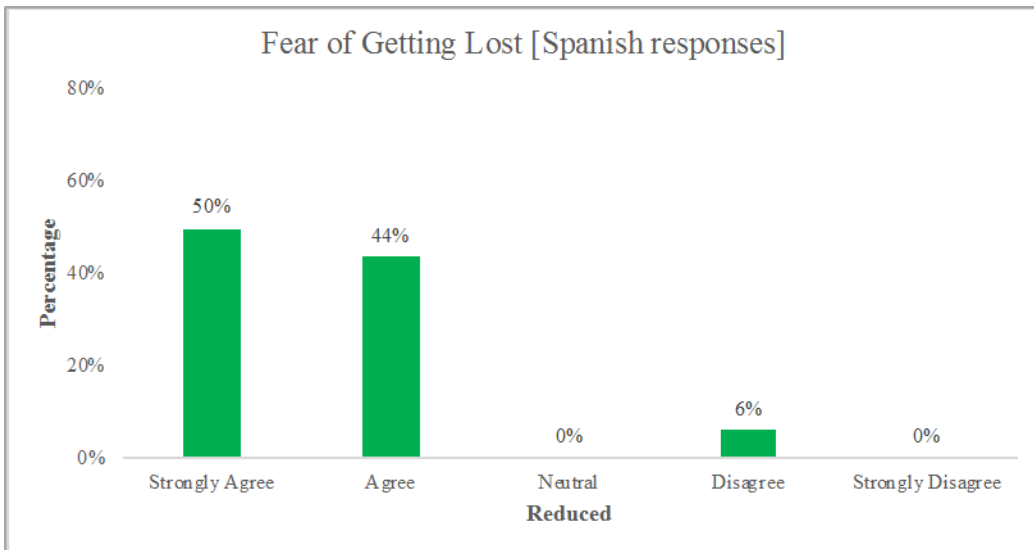
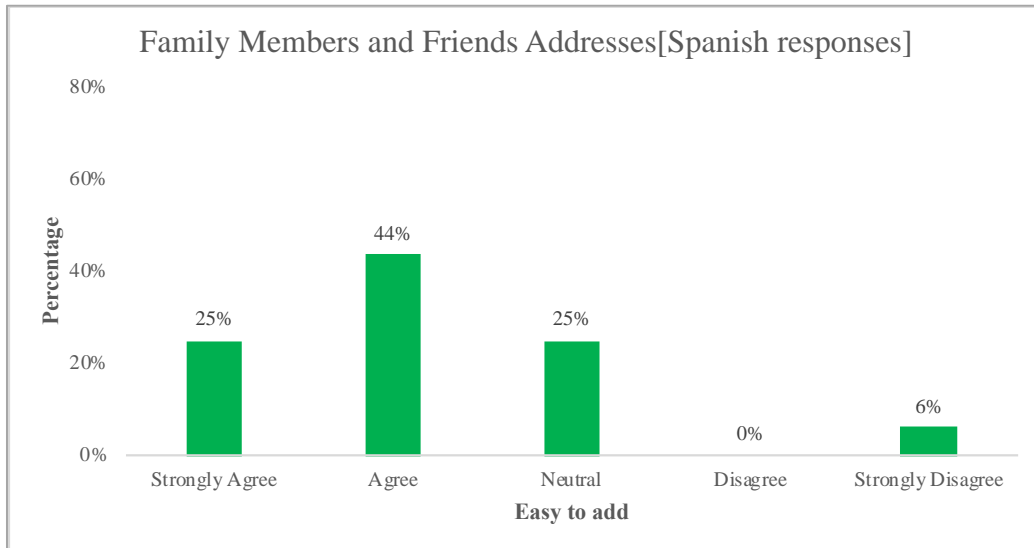


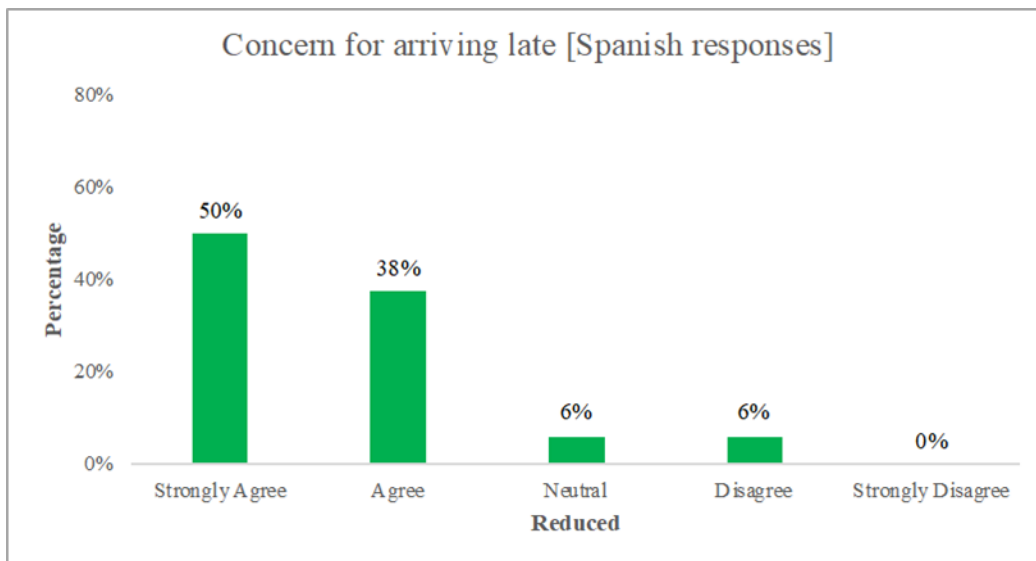
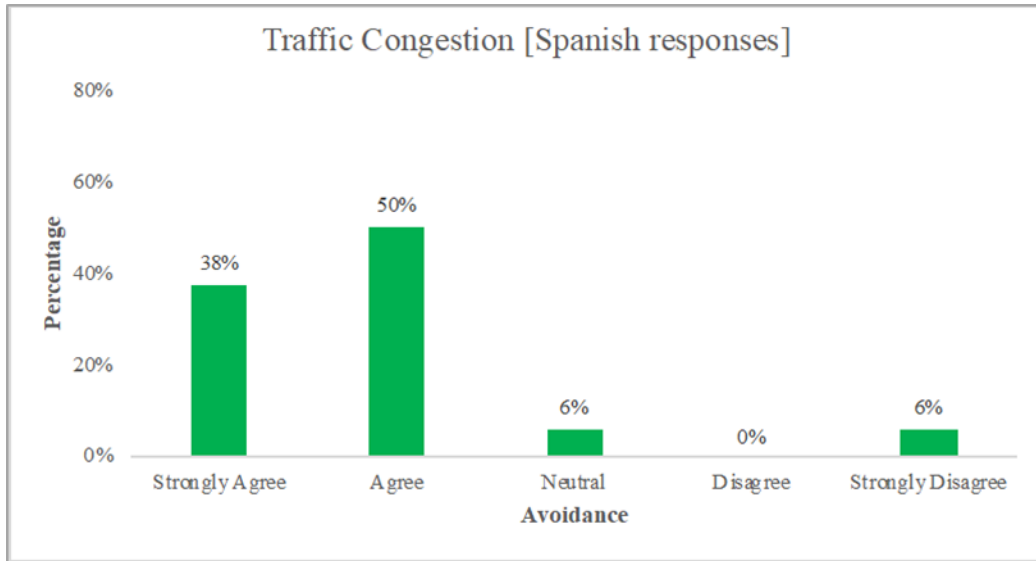


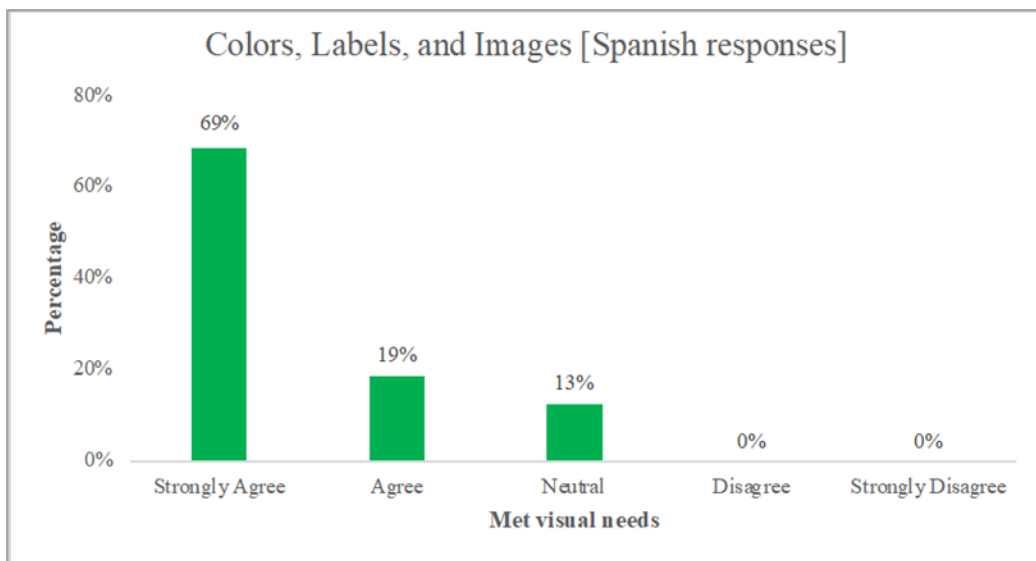
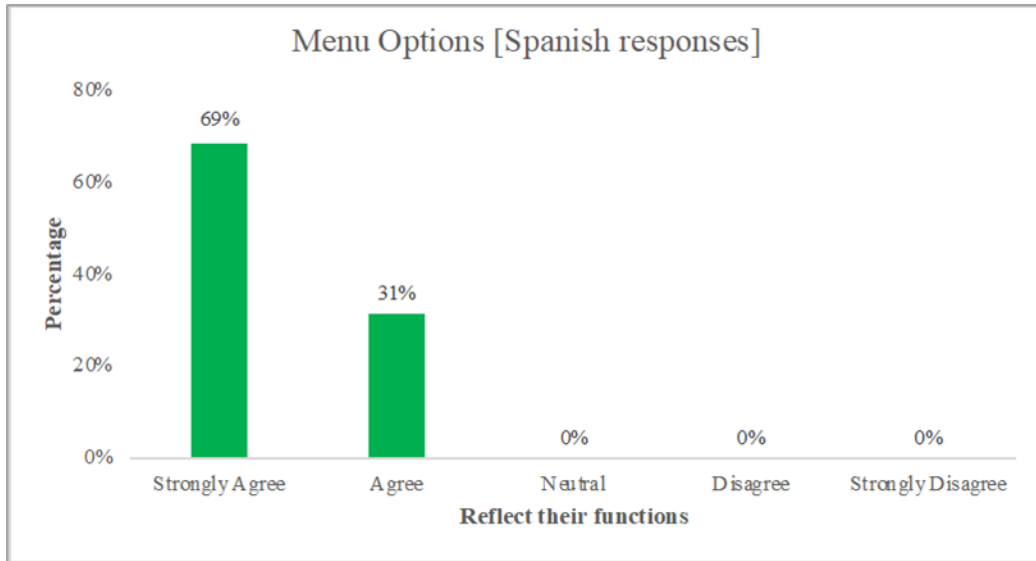


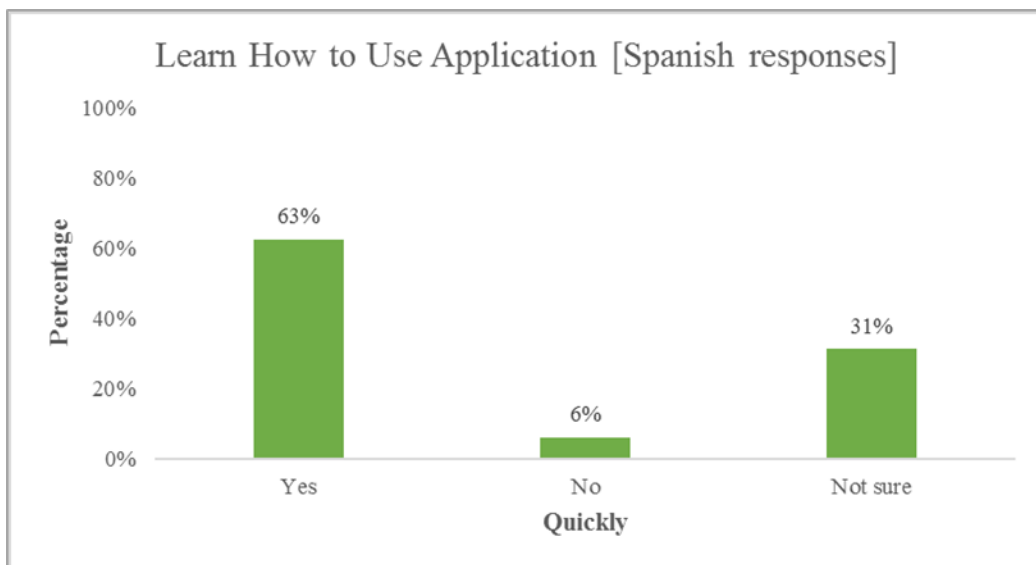
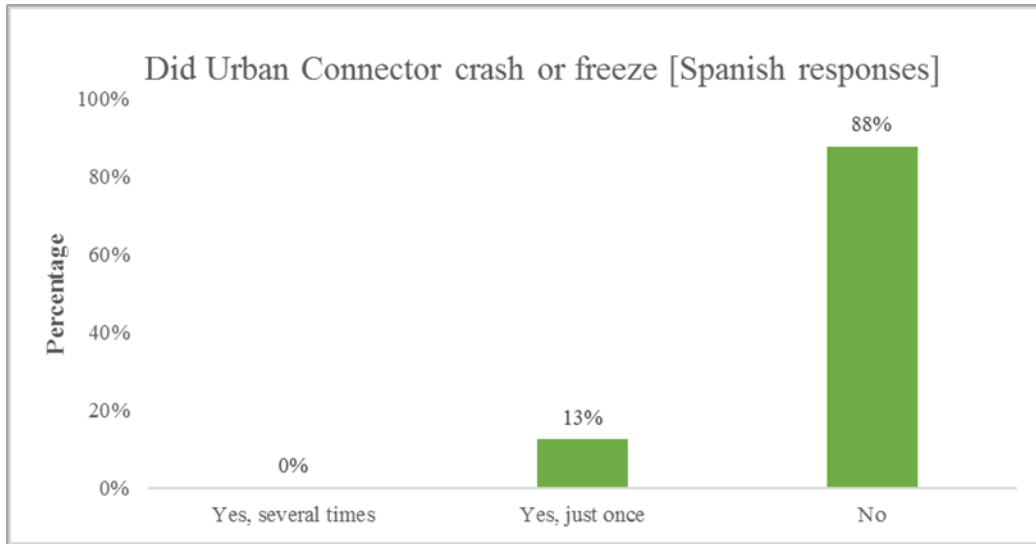


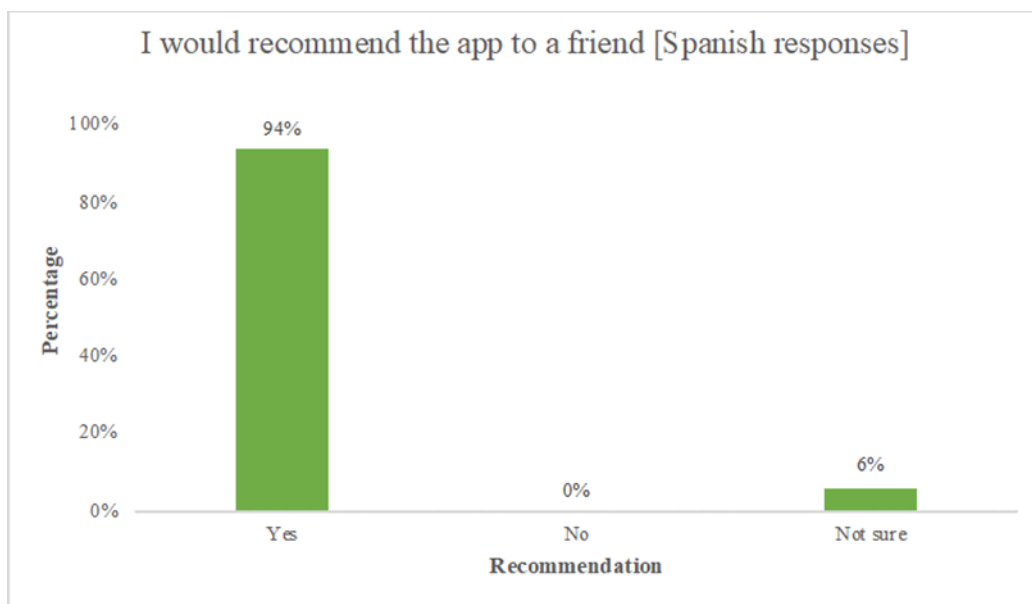
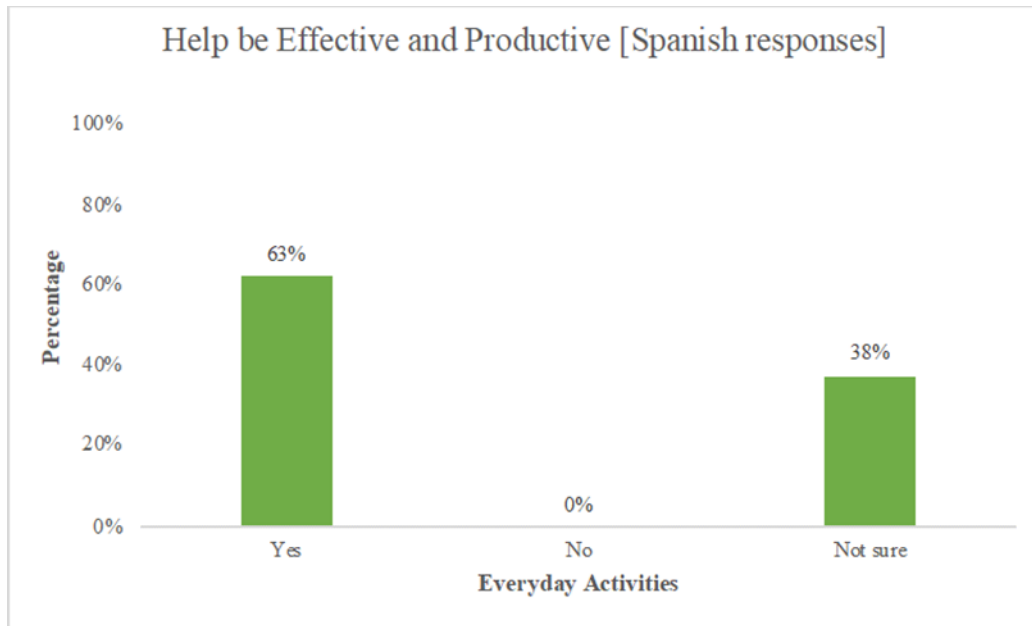












Spanish Responses
4.44/5.00

★★★★★

**Suggestions for improvement:**  
Events happening in the city, and parks

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Name the place instead of addresses More icons

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More icons like going to mall

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Write name of place instead of address More icons (doctor)

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Doctor icon

---

Open the icons

---

More options/ More icons such as fine arts, theaters, movies, events

---

Fix icons make it easier to put addresses on friend and family Name of place instead of address voice activation

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voice command

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Make it easier to see the buttons

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