

The Lack of Language Representation in Web Applications and its Effects on Spanish Speaking Immigrants in the Northern Virginia Metropolitan Area

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

The United States is home to 47 million foreign-born people, as of April 2022 (Camarota & Zeigler, 2022). Historically speaking, those who immigrate to the U.S. are typically low-income, non-English speaking people who are looking to find safety from violence, financial success, or more prosperous opportunities. When coming to the United States, many are trying to adapt to American culture and transition from the nation they once lived into their current one. In today's modern world, technology has provided several resources that help with immigrant integration. However, when looking for online resources, many websites are primarily written in English. For immigrants with low proficiency in English, the language barrier limits how they connect with American culture and society digitally. In turn, this barrier further isolates immigrants from educational and economic growth. Seeing as this takes place in a digital landscape, specifically web applications, it begs the question of who creates this web applications and who are the ones in charge of content and other digital forms. Those who codify the interface that is client-facing are front-end developers. Accessibility measures are implemented in the front-end development process, but it is still not as widely implemented as it should be. There are several characteristics that fall under accessibility in a digital platform, with language being one of them. This introduces the question of how the lack of language accessibility through front-end development further marginalizes non-English speaking immigrants from American culture. Front-end development is the process that uses languages such as HTML and CSS to create user-friendly interfaces on web applications and such (Lindley, 2019). Spanning off from this topic, I will be diving deeper into analyzing how the language barrier in web applications impacts Spanish-speaking immigrants located in the Northern

Virginia Metropolitan Area. Internet accessibility is an important aspect of equitable technology. Accessibility standards must be considered not only in the physical world but also digitally.

Does Language Count for Accessibility?

Several studies have shown there is a lacking effort in front-end development on incorporating accessibility standards in the development process. For example, a previous study done by Miranda & Araujo (2022) analyzed different company approaches to accessibility requirements given their web technique. The results of the analysis found that many web developers only had basic understandings of accessibility measures and were unaware of company- issued accessibility trainings, or there was no role assigned to enforcing accessibility throughout the development process (Miranda & Araujo, 2022). From just these measures in this study, there is already an understanding that there is no clear role within some companies or software programs that requires that software developers implement accessibility. It has not been ingrained in a developer's training how important accessibility can be; with lack of acknowledgement from companies or clients, accessibility is viewed as second rate or unimportant (Miranda & Araujo, 2022). Following, a similar systemic review was performed on previously published literature regarding accessibility in software, with this information later formed into a questionnaire (Vollenwyder et. al., 2019). This questionnaire was given to 345 web practitioners, through which three primary reasonings were found behind the lack of accessibility: user advocacy, self-perception as specialist, and product quality (Vollenwyder et. al., 2019). These common reasonings create an environment that marginalizes several communities from gaining access to web content due to their abilities. It also continues to perpetuate this stigma and create a negative environment around adopting accessibility standards.

While these resources provide a shallower view of the importance of accessibility standards and implementation, an analysis of state emergency management websites were conducted to see their ability to communicate risks to non-English speaking citizens (Benavides et al., 2020). In cases of public risk and disaster mitigation, the government has adopted the internet as a form of communicating with citizens about emergency-related situations. A positive trending correlation was found between the number of immigrant deaths and the lack of multilingual risk communications (Benavides et al., 2020) This correlation led to a rapid development in multilingual e-government responses. As a result of not including language requirements as part of accessibility, lives were put at risk and even lost due to the lack of accessibility. This study provides an interesting parallel to the research question I pose. While I speak on providing multilingual options as part of the accessibility standards in front-end development, this incorporation in e-government emergencies provides an alarming truth. While this is a higher risk and niche situation, this study is a prime and important example of why considering immigrants and language barriers in the view of accessibility to be important.

As I discuss the implications of language accessibility, there is another viewpoint that impacts digital language accessibility. Many Latinx/Hispanic immigrants have children in the U.S. who are bilingual and assist their parents in understanding their digital needs. A paper written by researchers at the University of Washington studied Low-Income Latino families where there was at least one parent that was an English learner to understand how their children assist them in finding online information (Pina et al., 2018). This study interviewed 23 different families, first questioning the parents and children separately and then observing how the families did their online research. This study aimed to understand how children of English Language Learner (ELL) parents act as information brokers to their parents, and the significance

of this role on their families (Pina et al., 2018). Alongside this, the results of this study were also to understand how online resources could be improved to better support these families with their digital needs. This paper had several first-hand accounts of how children assist their parents with online tasks that include translating information for them. However, there was potential for translation errors to occur between parents and children, as children find it difficult to fully understand the needs of the parents when finding resources online (Pina et al., 2018). The accounts also discuss the hardships that children and their parents' face regarding healthcare, jobs, and completing regular tasks online (Pina et al., 2018). While this paper is viewing how language diversification online can help strengthen Latino immigrants' access to information, this paper also gives insight on an additional benefit of strengthening their digital literacy skills in a way that does not require them to heavily rely on outside resources.

By including different audience perspective into code, software developers can gain greater knowledge on accessibility and software through understanding user perspective and gaining technical knowledge that can expand their portfolio. It is clear immigrants are using technology to advance their placement in the United States, but with limited language comprehension, many digital resources are not fit for their use. Along these lines, it is important to note that several groups are affected by the lack of accessibility in web content that can range from accessing trivial information to life saving news. To comprehend the impact of language accessibility in front-end development, I will be conducting a series of interviews with Spanish speaking immigrants who live in the Northern Virginia Metropolitan Area. Seeing as how Latino/Hispanic immigrants are becoming the fastest growing population in the United States, I believe it would benefit the United States to invest in understanding language and digital barriers to uplift marginalized communities in the U.S. Through these interviews, I will be able to

analyze the individual experiences of Hispanic immigrants as well as the social and policy implications that come with integrating language standards in web applications.

Methods

To begin to understand the impacts of language accessibility in web applications and the impact this has on Spanish speaking immigrants, I conducted a series of interviews with three parent-child pairs from the Northern Virginia Metropolitan area. While it would be useful to ask around for volunteers for this study, my participants will instead come from family and friends who have Latinx/Hispanic-born parents and U.S.-born children. The children in these parent-child relationships are over the age of 18 and both parties have signed a consent form before beginning the interview process. The consent form was to establish informed consent and included a description of the project, what information was recorded, and how personal information would be handled. It was also made clear that patients had the ability to step away from the study at any time and steps to remove their given answers to the study would be taken.

Including the U.S. born child of these Latino/Hispanic immigrant children in these interviews provides a viewpoint on how these immigrants are adapting to a new society. Seeing as how their children are born in the U.S. and into this society, getting the children's viewpoints will give insight into how these language and digital difficulties affect the parents and how their needs are handled in comparison to how their children handle it, along with how it ultimately affects their relationships. The interviews were conducted through Zoom. I created a series of general questions (Appendix A) that were separated between the parent and the child. These questions went through three iterations and were intended to gather an understanding of the

general proficiency of language, technology use, and how the two have impacted a child and parents' relationship. The answers to these questions were recorded through Zoom. Once each parent-child pair was interviewed, then the recordings were transcribed, and I analyzed each set and found themes that had surfaced. Through this final stage, the resulting themes led to the discussion portion of the paper.

Results

After interviewing the three parent – child dynamics (two families total), I pulled out answers that fall under similar categories and have categorized them in the following: education and technology proficiency, language preference, language difficulties, and parent-child exchange of information. As I discuss the different parent-child responses, I am separating the parents and children as (P1, C1), (P2, C2), (P3, C2). P1 is the only Hispanic/Latinx parent C1 has. P2 and P3 are both Hispanic/Latinx and are the parents of C2. Both children were born in the United States with English as their first language and Spanish as their second.

Education and Technology Proficiency

In terms of education levels, P2 completed high school, P1 completed some university/college, and P3 completed university. When it came to rating their proficiency in technology on a scale where 1 is horrible and 10 is excellent, P3 rated themselves a 5, P1 an 8, and P2 rated themselves a 9 ½. However, when it came to their proficiency in finding information online, P3 rated themselves a 7, P1 rated themselves an 8, and P2 rated themselves a

10. Both trends of how the parent participants rated themselves in technology seem to both be in a positive upward trend and perhaps inversely related to their educational background.

Language Preference

In relation to what information is being looked up online, both P1 and P2 look up information primarily in English, while P3 looks up information primarily in Spanish. P1 and P2 stated they are now more comfortable using English in their everyday lives as they have been in the U.S. for a longer time and use English more often than Spanish. P3 on the other hand states that because they arrived in the U.S. in their mid-twenties, it has been more difficult for them to adapt to primarily using English. P3 also states that since they arrived in the United States in their 20s, it has been more difficult to adapt to English. While there are different comfort levels amongst the parent participants, all stated that their jobs and the people they work with all require them to speak English. For P1 and P2, this translates to them applying this English-speaking mindset to online searching and using English written websites. However, P3 will typically only look up and use English websites if the topic is simple.

Language Difficulties

When encountering difficulties with online resources, both P1 and P2 typically encounter problems with reading comprehension. They begin to address their issues by looking up synonyms in English. For P2 this solution is typically enough, but for P1 if they are not able to comprehend enough with English synonyms, they will look up the translated word in Spanish. P3 also follows a similar process as P1 when trying to comprehend words on English websites.

Following this discussion of comprehension of languages, P1 stated that reading comprehension is what makes it difficult to use websites, C1 emphasized this statement by saying that information on English websites should be written more plainly. C1 stated that if all the English websites had different UI (User Interface) and UX (User Experience) but the same style of plain wording, then P1 would not have an issue understanding the content. However, P2 felt that it was not the language that was always difficult to understand, but the UX/UI. They primarily had an issue with the layout of most English web applications, stating that is what made it difficult for her to find information.

Parent-Child Exchange of Information

During these interviews all parents mentioned that they would reach out to their American-born children for assistance with difficulties in language comprehension online. Seeing as they are children, this can impact the way that they view their relationships with their parents and how they view themselves and their abilities. For example, C1 is the oldest child in their family and P1 relies on their ability to translate or reword different pieces of information in addition to other translation and communication assistance. C1 states that when P1 asks them to help them understand information, C1 typically rewords information to words they know P1 understands, again connecting to the concept of simplified, plain English. However, C1 also mentioned that while it did not happen often, it was difficult for them as a child to translate information to P1 when they themselves felt underqualified to explain such information. In other words, they felt they were too young to understand what it was saying in English and were troubled when translating to P1 in Spanish.

Regarding C2, their relationship with their parents' language skills mainly impacted the way they developed their own language skills. C2 felt that as a result of incorporating both languages throughout their life, they find it hard to communicate in either language and typically use both resulting in a "Spanglish" language as many refer to it. When assisting in language translations, C2 must often consult with their older sibling or another American born speaker, to ensure they understood the meaning of English phrases. This reinforces C1's sentiments on lack of qualification for translating materials and relying on others for verification rather than trusting their own skill set.

Discussion

After looking at the common themes that were found from the interview, there are a few items that suggest possible improvements for web application and accessibility. Above, I mentioned two distinct issues that two of the parent participants had: complex wording and UX/UI issues. This insists that developers must be aware of different audience perspectives when evaluating the usability of a web application. Readability should be considered when writing information to be aware of the different abilities of their potential audience. C1 stated during their interview that some things are inherently complex subjects but putting them in plain language could potentially alleviate some of the stress that immigrants have when trying to understand online content. This would also provide a level of independence to the user, in this case a Latinx/Hispanic immigrant, to minimize asking for assistance in understanding the meaning behind phrases.

On the other side of this debate is UX/UI layouts. While this paper is mainly focusing on written language communication online, the mention of UX/UI is a part of the way in which information is communicated to a user. If a web application layout proves to be a hindrance to users, it could overshadow the information on the page. While this is not the subject of this paper, it could provide a base for future research.

Another subject that was somewhat repeated throughout the interviews were the significance of different dialects of Spanish and Spanish translation options. There are some web applications and search engines that give the option of translating information to a selected language, typically run through an automated translator. P1 stated that when given the option to translate web applications, they typically do not because of the likelihood that the Spanish dialect of the translation system is not their own. Just as there is American English and British English, there are several different versions of Spanish. A case study done on the British Broadcasting Corporation's (BBC) in which they examined the UI design problems with websites intended for bilingual and multilingual users (Miraz et al., 2014). In this study, they found that automated translations "failed to translate the focused meaning" in phrases which included "metaphors, cultural terms, or terms having multiple meanings" (Miraz et al., 2014). This reinforces the statements of the parent participants about understanding translations on websites and how automation is not fully considering the meaning behind translated words and are perhaps doing literal translations. For web developers to maintain equal distribution of information, they must also be aware of how diverse the Spanish language is and should not be grouped under one umbrella of Spanish dialect.

Finally, there is an educational potential in the way that parent participants are using English websites. All three parent participants mentioned that they speak English in their

everyday lives and will continue that practice by looking up information in English. This holds a connotation that they are using English web searches and web applications to practice writing, reading, and comprehending information in English, in addition to speaking it with other people in their places of work and in their daily lives. In doing so, they are strengthening their English skills and, in this case, have become more confident in their English and subsequently feel less secure in their Spanish.

While there are perhaps more themes in which I can dive into, these three specifically give a view into the technical side of this discussion. My findings illuminate how the measures taken in web applications have impacted the spread of information, and how it impacts the participants' language skills and the measures they take to adapt.

Conclusion

As I only interviewed two different families for this project, three pairs total, this is only a small sample of the Latin/Hispanic immigrant population in the United States. There are still many other factors that could be explored in understanding accessibility measures when it comes to immigrants (and more specifically Latinos) adopting web applications. Follow up studies could investigate the correlation between education levels and technological use in the Latinx/Hispanic community. While this study did include the parent-child dynamic, it could be useful to explore first-generation American-born Latinx/Hispanics and how these transactions of information have altered their own interactions with technology and perception of information. Language is a very powerful and useful tool that can help strengthen a person's independence and perception of the world. From these interviews, language accessibility can range from

language options to clearer wording of content. Measures can be taken to adjust how accessibility is viewed in web applications and be changed to make written information on web applications accessible to all regardless of background. By considering immigrants as a potential audience to web applications, online platforms can provide equal access to information that is blind to education, status, and nationality.

Appendix A

Parents:

- 1) On a scale from 1-10, with 1 being terrible and 10 being excellent, how would you rate yourself at using technology?
- 2) On a scale from 1-10, with 1 being terrible and 10 being excellent, how would you rate yourself at finding information online?
 - a. What do you typically look for online?
- 3) When you look up information on the internet, do you prefer to look at websites that are written in Spanish or in English?
 - a. Why do you prefer that language?
- 4) Do you ever feel like it is difficult to understand a website that is in English?
 - a. What do you do if you cannot understand something that written in English on a website?
- 5) Has there been a time when you got frustrated with using a website because it was difficult to understand due to a language barrier?

Child:

- 1) On a scale from 1-10, with 1 being terrible and 10 being excellent, how would you rate yourself at using technology?
- 2) On a scale from 1-10, with 1 being terrible and 10 being excellent, how would you rate your parent when using technology?

- 3) On a scale from 1-10, with 1 being terrible and 10 being excellent, how would you rate your parent at finding information online?
- 4) Has there ever been a time where you needed to help your parent with finding or doing something online information?
 - a. What are some of those things?
- 5) If your parent cannot understand the written information on a website, what do you do to help?
- 6) Was there a time that your parents overall language skills affected you in your life?

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