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A Survey on Video Relay Service Application Interface Preferences

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Abstract

Before the invention of the telecommunication relay services (TRS), Deaf Americans who wanted to use public communication systems, such as the telephone network, faced issues of confidentiality and inconvenience because they needed assistance from a hearing person. With the introduction of telecommunication devices such as the teletypewriter (TTYs) and Video Relay Services (VRS), deaf Americans gained a measure of functional equivalency with their hearing peers. This research reports on an iterative survey and redesign to create a high fidelity user interface design based on their responses and to discover more about user's VRS usage.

Keywords

Deaf, Hard of Hearing, Video Relay Services.

Background

Around ten percent of people worldwide and in the United States, including senior citizens, have hearing losses and can benefit from functional equivalency in telecommunications (U.S. Census Bureau, 2015). In the United States, the government provides Telecommunications Relay Services which is mandated by Title IV of the Americans with Disabilities Act (ADA), which resulted in substantial progress in inclusion.

An important component of the Telecommunications Relay Services is the Video Relay Service (VRS). The Video Relay Service provides functional equivalency for people whose preferred visual communication is American Sign Language. VRS connects the deaf signer with a hearing speaker through a sign language interpreter who translates sign to speech and vice versa in real-time. These services have come a long way with the introduction of higher bandwidth infrastructure and better compression methods for a more satisfying user experience. In addition to that, the use of mobile phones and "smart devices" have increased the portability and possibilities of using VRS with higher mobility.

VRSs are widely used by deaf and hard of hearing as an accessible computing application that provides functional equivalency. Users sign to an interpreter who then speaks to the intended audience to relay the communication. Speaking users' speech is then translated into sign language so the deaf user can comprehend it. Previous work provided by Minoru Yoshida (Minoru 2009) concluded that a technical background was needed to configure and use VRS devices. That study was conducted in 2008 and technology such as portable devices have become ubiquitous in everyday life possibly making parts of the study invalid at this time. It examined stationary videophone technology used on either televisions or other displays, while videophone capable mobile phones are now widely available and used. The newer, mobile option forms the focus of this study.

Methodology

Survey Development and Implementation

We did an initial user survey, a round of design iteration, and then a final survey of feedback on the newly designed prototypes. The eligibility of participants is contingent on year born, hearing loss, and consent to participate. Additional requirements for survey participants

include previous experience with VRS, the ability to articulate themselves and full completion of the survey after it is started.

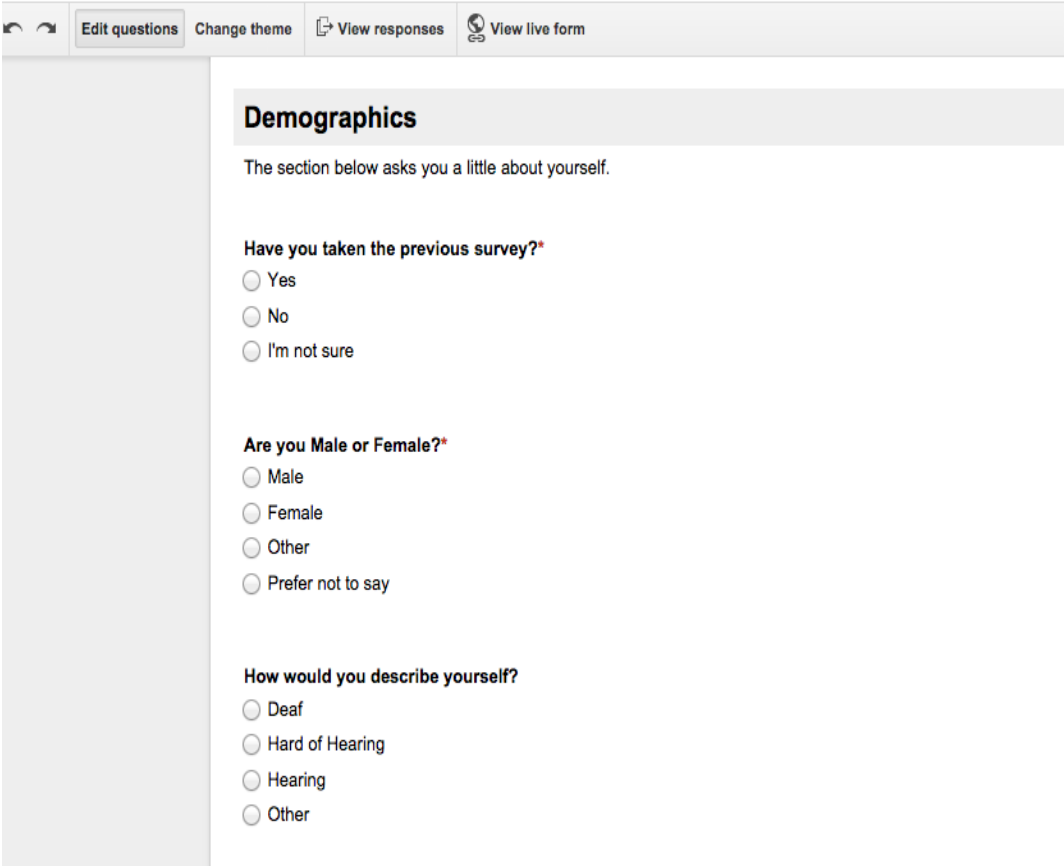

Fig. 1. Screen capture of survey #1.

Information required within each survey includes gender, year born, and other questions involving the preferences they may or may not have concerning specific features and portrayals of these features. Participants self-volunteered to take the survey through a link available on multiple social media platforms such as Facebook, e-mail, and word of mouth.

Fig. 2. A sample image to support a survey question.

The attached message is a small amount of information regarding the study rationale and future impact. Participants submit the survey results for storage in the Google Forms database, which then presents data visually by a series of charts and pie graphs.

Results

Descriptive Statistics

This section provides information on the distribution of descriptive statistics including gender, year born, level of hearing loss and years of VRS experience. The results are separated into two groups depending on which survey that was taken.

Gender Distribution

Each survey found it difficult to create an equal balance between the two genders. The first survey was only able to capture 3 females and the second the same.

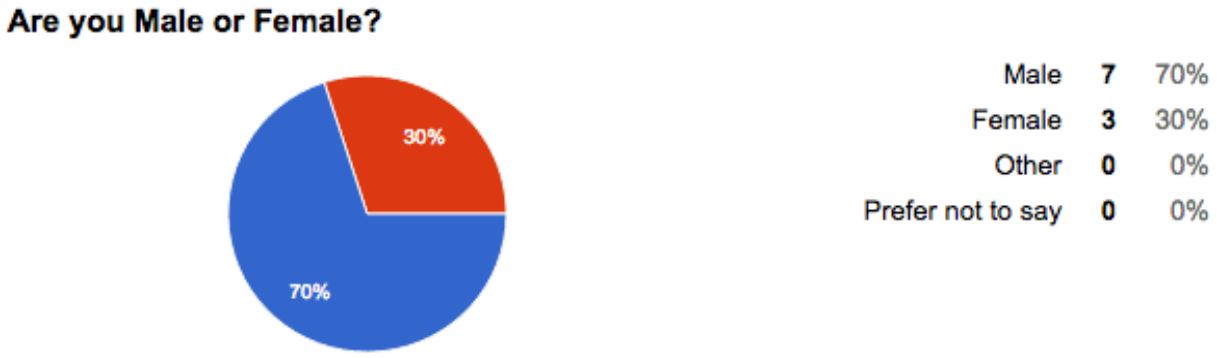

Fig. 3. Gender Distribution from Survey #1.

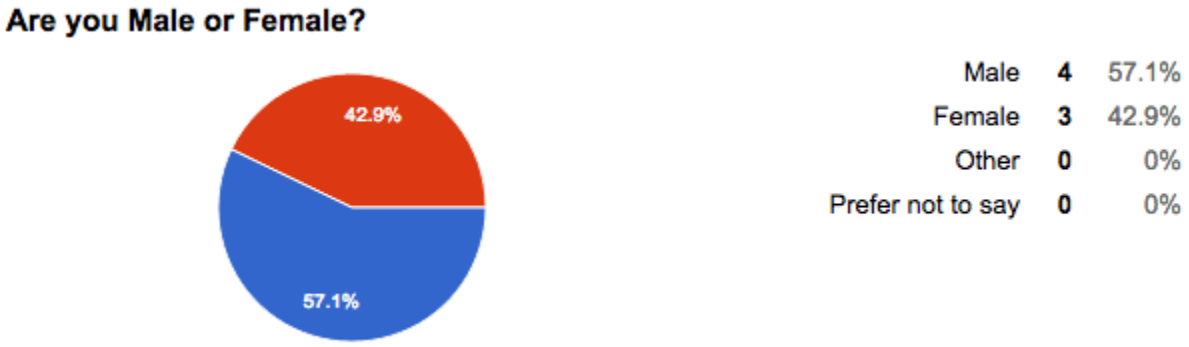

Fig. 4. Gender Distribution from Survey #2.

Year of Birth

The question asked of participants was "What year were you born? While the answer formats varied from the participants' age, to the year born, I was able to determine the year of birth for those who answered incorrectly. Survey 1 presented a majority of participants, 9 out of ten responding, being from the age of 18 to 45, and while survey number 2 had respondent's age as an optional question, the range was 1990 to 1994.

Multiple Choice Questions

After analyzing the first survey, we came to find that users more typically use VRS on their personal computers and use the service around 3 times per week if not less. Participants

responded positively to any suggested feature being added including call time, multiple views, separation of call history, and choosing from a list of functions for in call settings.

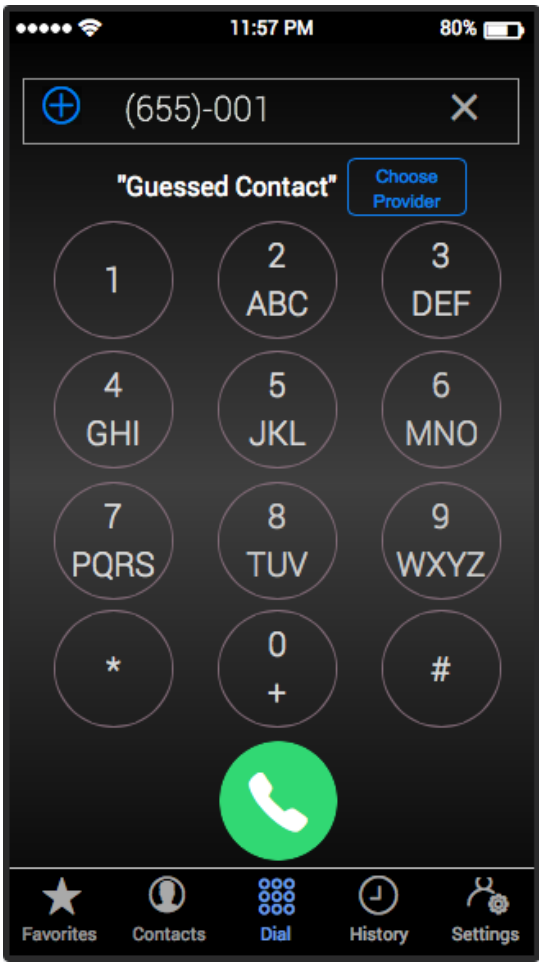

Fig. 5. Second Iteration of predicted contact design.

Once the second survey was implemented, the diagrams and examples were updated to show that the data from the first survey was applied. Participants were then asked to rate and give an opinion on each design. Figure 4 shows the feature allowing the use of the dial pad to guess the contact that the user is most likely calling. Users were presented a prototype as such as asked how clear it was in portraying that, and how much they liked it.

Feedback on most designs was positive. While some prototypes were clear to understand, some users did not agree with the color scheme and contrast, which did not apply to this study as

much as their opinion on each feature. All around there was mostly satisfied responses so this allowed us to continue with the final phase of design iteration, the final prototype.

Final Prototype

The final prototype was developed using all the feedback and suggestions from the participants of the first two studies. Using Human Computer Interaction (HCI) guidelines and applying some of Norman's Principles, we developed an interactive prototype through the program "JustinMind". This allowed functionality to be shown through simulations and simulated button selecting.

Discussion

Data received in the initial survey showed that three VRS companies were on par with each other in terms of popularity. Data also showed that a majority (90%) of participants used one VRS company primarily, the other 10% used more than one. Yet not having data on why each individual used a specific carrier or multiple, one can only use assumptions.

The participants' total length of VRS use had two means. One being less than five years, and the other more than five years. This is perhaps skewed due to the small sample size and the mean age of the group interviewed being 28.5. A majority of the group was under the age of 30, so it could be possible that the group was later to adopt VRS due to being a younger age.

Data showed signs of participant confusion in terms of how certain features we presented. In figure 6, many respondents voiced opinions of confusion due to the size of the middle user icon. They were unsure of how to perceive that and if the size of that was a factor affecting the applications use. After reviewing the first survey, it was determined that it was fine to leave the icon as is due to the use as a metaphor and not so much as a representation of the final product.

Fig. 6. Example of VRS call using "video in video."

Another interesting observation is that users primarily used VRS on their personal computers, then smartphones, and finally with a videophone device. There was no correlation between year born, length of time using VRS technology, and what type of device was used primarily. The preferences on starting the VRS application to a specific function was not unexpected. 40% were interested in the dial pad being the first option at startup, and another 30% were more interested in having their favorites in place of that. Data received in the second survey showed that users can have many different preferences and opinions on many features.

Conclusion

The results of this study has implications for deaf and hard of hearing signers who use VRS services. The consumers clearly prefer a more visual and intuitive interface. They also prefer a large screen size. At the same time, the deaf and hard of hearing participants had widely varying preferences, and it would be best to design the software to provide a limited set of

options so that they can enjoy fully access without feeling overwhelmed or in charge of the electronic equipment.

Acknowledgements

We thank our participants for their time and feedback.

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