HCI Summary Report of the Video Survey Web Page Design for Deaf Literacy

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Table of Contents

1.0 Introduction

The HCI summary report introduces the HF activities and the outcomes for designing an online video survey web page for deaf Ontarians. The report aims at finding the potential design issues and providing helpful recommendations to the design. The objective is to create an accessible web page design for target users.

The designed interface is an online video survey web page. There are one introduction video and twelve videos with corresponded questions in the survey. Target users are Ontarian with hearing problems. Users will use the website to finish and submit the survey. The interface needs to design in an accessible way for deaf users.

The HF activities include OPEX review, function analysis, tasks analysis, and HSI review. Each review helps to learn the human factor design issues and provides recommendations from high level to detail level. The findings and conclusions will give a blueprint for the future UI design.

2.0 HF Activities:

2.1 OPEX

2.11 OPEX Review Introduction:

The OPEX review analyzes the HF issues and provides recommendations at a high level. The goal is to understand the current human factor design issues in survey design for deaf users. The OPEX review adopts the competition analysis and online forum to learn about the existed HF issues in competitors.

2.12 OPEX Review:

Issues	**Source**	**Note/Comments/Recommendation**
Users with hearing problems have a hard time understanding textual content	“Workers who are deaf often lack the ability to communicate effectively in written language due to weak English reading and writing skills that often	Survey content should be more visualized for users to understand.

	characterizes individuals who are deaf ." (Appelman et al., 2012; Dallas Hearing Foundation, 2014; Houston et al., 2010; McKee, Schlehofer, & Thew, 2013) "American Sign Language (ASL) is a different language than English, and it has its own grammar structure. Individuals who use ASL as their primary language may not be fluent in English, so making written content clear and simple to understand is important" (online article from Level Access)	Use words, phrases, and concepts familiar to the user in the survey.
Lack of fast way to track the survey process	Competition analysis with Monkey Survey.(the survey designed for deaf users is always a long one-page webpage without any process bar)	Make things visible. *(Norman's 7 principle 1988)*
Missing navigation	Competition analysis with Monkey Survey.(The survey designed for deaf users is always a long one-page webpage. Users need to scroll up all the way to	Design should reduce short-term memory load. *(Shneiderman's 8 Golden Rules 1987)*

	find the answers they want to change.)	
Missing review page for users to fast review all the answers	Competition analysis with Monkey Survey (user need to scroll back and font to review their answers before submitting the survey)	Design should help user recognize, diagnose and recover from errors.*(Nielsen's 10 usability Heuristics 1994)*

2.2 Function Analysis:

2.21 Introduction:

The function analysis is to learn about the potential functions needed in the web page design. The review gives the structure and information of functions that matter to human factor design. The main functions include learning the survey, navigating in the survey, inputting and submitting answers.

2.22 Function Analysis Review:

Goal	**Function**	**Describe the function**	**Allocation**	**Information Requirement**
Start the survey	Learn about the survey	Allow user to understand the survey and how to finish the survey	User	1. What is this survey for 2. how to start the survey
Navigate to different question pages	Navigation	Support user to navigate to question page in the survey	Machine	1. Where this function will navigate to
Finish the survey	Input answer	Allow user to input data via clicking or typing	User	1. Survey question 2. Multiple options

Change answers	Edit answers/ correct mistakes	Allow user to change input and output	User	1. Survey question 2. Multiple options 3. Pervious answers.
Review answers	Review inputs	Allow users to review and all answers	User	-selected options -All the questions
Submit the survey	Submit	Allow user to output data	User	-Feedback after submission.

2.3 Task analysis:

2.31 Task Analysis Introduction:

The task analysis develops on top of the function analysis. The review shows corresponded touch points, required information, potential human errors, and comments in each task. It helps to understand specific potential HF issues and resolutions before implementing the design idea.

2.32 Task Analysis Review:

Function	**Tasks**	**Touch points/Interface**	**Information requirement**	**Human errors**	**Comments/Recommendations**
Start the survey	1.Land on the survey page 2. Watch the survey introduction video. (or read	Interface: 1. Survey home page Touch points: 2. video start button	-Survey Introduction (video and text)	N/A	N/A

	the textual survey introduction) 3. Start the survey	3. start survey button			
Navigation	1.Find the navigation bar. 2. Select the question want to navigate to	Interface: Navigation bar Touch point: 1. Question button	-Where is the navigation bar -Where this button will navigate to	Navigate to the unwanted page	1. Provide go back function 2. Make navigation available all the time
Finish the survey	1. Review and understand the question. 2.Select or type the answer. 3.Submit the answer or skip the question. 4.Repeat steps to finish the next question.	Interface: 1.Question page Touch point: 1.Video play button 2. option button 3. input field 4. submit button or skip button	1. Survey question 2. Options for the survey	1.Select the unsuitable answer. 2.Typing mistake. 3. Skip the question by mistake	1. Make re-select or re-type always available in the survey. 2. Provide go back function to edit pervious answer.
Change answers	1. Locate to the question page. 2. Re-select or re-type the answer	Interface: 1.Question page Touch point: 1.option button or input field	-Survey question. -Multiple options. -What is the pervious selected option.	1.Select the unsuitable answer. 2.Typing mistake. 3. Forget press the	Set error warming reminder

		2.submit button		submit button	
Review answers	1. Review the answers	Interface: 1. Review page Touch point: 1. Edit button 2. Delete button	-All the questions and corresponded answers	1. Delete answers by mistake	Provide pop-up window to confirm delete action.
Submit the survey	1. Submit the survey	Touch point: 1.submit button	-Feedback after submission	N/A	N/A

2.4 HSI Analysis:

2.41 HSI Introduction:

Human system interface analysis reviews the design components that matter to human factors. The HSI review provides related design standards and guidelines to support integrating HCI in the design process.

2.42 HSI Analysis Review:

Design components	**Standard and guideline**	**Resources**
Form	Provide feedback for interactions, such as confirming form submission, alerting the user when something goes wrong, or notifying the user of changes on the page. Instructions should be easy to identify. Important feedback that requires user action should be presented in a prominent style.	W3C (https://www.w3.org/WAI/tips/designing/#provide-clear-and-consistent-navigation-options)

	Use whitespace and proximity to make relationships between content more apparent. Style headings to group content, reduce clutter, and make it easier to scan and understand.	W3C (https://www.w3.org/WAI/tips/designing/#provide-clear-and-consistent-navigation-options)
	The design should always keep users informed about what is going on, through appropriate feedback within a reasonable amount of time.	Usability checklist from Nielsen (https://www.nngroup.com/articles/ten-usability-heuristics/)
	Users often perform actions by mistake. They need a clearly marked "emergency exit" to leave the unwanted action without having to go through an extended process. EX • Support Undo and Redo. • Show a clear way to exit the current interaction, like a Cancel button. • Make sure the exit is clearly labeled and discoverable.	Usability checklist from Nielsen (https://www.nngroup.com/articles/ten-usability-heuristics/)
buttons	Maintain consistency within a single product or a family of products (internal consistency).	W3C(https://www.w3.org/WAI/tips/designing/)
	Ensure that interactive elements are easy to identify.	
Navigation bar	Provide clear and consistent navigation options	W3C(https://www.w3.org/WAI/tips/designing/)
	Ensure that navigation across pages within a website has consistent naming, styling, and positioning. Provide more than one method of website navigation, such as a site search or a site map. Help users understand where they are in a website or page by providing orientation	

	cues, such as breadcrumbs and clear headings.	
	• Pages have clear titles and are organized using descriptive section headings • There is more than one way to find relevant pages within a set of web pages • Users are informed about their current location within a set of related pages • There are ways to bypass blocks of content that are repeated on multiple pages • The keyboard focus is visible, and the focus order follows a meaningful sequence • The purpose of a link is evident, ideally even when the link is viewed on its own	W3C-web accessibility design(https://www.w3.org/WAI/fundamentals/accessibility-principles/#standards)
	Minimize the user's memory load by making elements, actions, and options visible.	Usability checklist from Nielsen (https://www.nngroup.com/articles/ten-usability-heuristics/)
Input field	Ensure that all fields have a descriptive label adjacent to the field. For left-to-right languages, labels are usually positioned to the left or above the field, except for checkboxes and radio buttons where they	W3 (https://www.w3.org/WAI/tips/designing/#provide-clear-and-consistent-navigation-options)

	are usually to the right. Avoid having too much space between labels and fields.	
	Only the minimum amount of personal information necessary should be collected in a system. The retention and disposal periods for that information should be clearly defined, enforced, and communicated to data subjects. Personal information gathered for a specific purpose should not be used for other purposes without the person's consent.	ACM Standards(https://www.acm.org/code-of-ethics)
Questions	design should speak the users' language. Use words, phrases, and concepts familiar to the user, rather than internal jargon. Follow real-world conventions, making information appear in a natural and logical order	Usability checklist from Nielsen (https://www.nngroup.com/articles/ten-usability-heuristics/)
Video	Provide visible controls to allow users to stop any animations or auto-playing sound. This applies to carousels, image sliders, background sound, and videos.	W3C (https://www.w3.org/WAI/media/av/users-orgs/)
	Many people who are Deaf can read text well. They get the audio information from transcripts or captions. Some people prefer sign language.	
	Provide a place in the design for alternatives for images and media.	W3C (https://www.w3.org/WAI/tips/designing/#provide-clear-and-consistent-navigation-options)
	Brief descriptions of non-text content such as audio and video files. Labels for form controls, input, and other user interface components.	W3C—web accessibility design (https://www.w3.org/WAI/fundamentals/accessibility-principles/#standards)

3.0 Conclusion

The OPEX review gives an insight into existed human factor design issues. The function analysis and task analysis review functions, touchpoints, and related potential problems further. HSI review provides design recommendations to resolve the potential design issues.

The report shows that deaf users have particular needs while interacting with a web page. As their reading and writing skills are restricted, visualizing the design components could improve the HCI experience. Some deaf users might not be very familiar with the web environment. Therefore, simplifying the user flow will be helpful. Functions to prevent human errors are significant in the HF design as well. More design recommendations are listed below.

3.1 HF Issues and Design Recommendations

Potential human factor Issues	**Design Recommendation**	**Examples/Details**
Users met literacy barriers in understanding the content.	1. Visualizing design components. 2. Speak users' languages. 3. Providing descriptions.	1.Apply users' familiar icons to visualize contents. 2. Grouping related contents together. 3. Use words, phrases, and concepts familiar to the user in the survey. 4. Giving textual descriptions to video.
Users are unfamiliar with the web environment.	1. Design simple user flow. 2. Provide error prevention methods and error correction.	1. Let survey question happens one by one.

	3. Provide introduction to begin the survey.	2. Visualize the survey process. 3. Provide go back function. 4. Re-select and re-type functions are always available before submitting the survey. 5.Show error reminder. 6. Provide a survey introduction at the beginning. 7. Provide a review answers option at the end.
Users have difficulties in navigating to different questions.	1. Provide easy navigation.	1. Visualize the navigation bar with descriptive text and icons. 2. Make navigation available all the time.