

APPENDIX

A.Existing solution for VIP

Format Type	Tool	Target Users	Characteristics
Physical	Braille books	Blind users	<p>congenitally blind users, acquired blind individuals seldom read Braille books, due to decreased finger dexterity and the challenges of learning Braille (compared to listening to audiobooks).</p> <p>Very limited resources (both in numbers--5% in total books, and types)</p>
	Braille display	Mostly for Blind users	<p>More flexible compared to braille books</p> <p>A series of dots can be raised to form Braille characters. Braille displays are usually augmented to standard keyboards. Blind people use the keyboard as an input device and the Braille displayer to read what is on the screen.</p> <p>The range of price is from US\$1,500 to US\$15,000.</p>
	Large printed materials	People with partially impaired vision/low visual acuity	<p>Limited resources</p> <p>Need to wait for print and delivery</p>

Format Type	Tool	Target Users	Characteristics
Digital	Screen magnifier	Low vision	<p>Help partially sighted people to view the contents on a computer screen at various levels of magnification.</p> <p>They are able to magnify a line, a word, or an icon as large as the computer screen allows.</p> <p>It can also change the background color and textual color to help those having trouble distinguishing a certain color combination.</p> <p>(Some computer operating systems, such as Microsoft Windows 98 and above, offer built-in accessibility options, including a magnifier.)</p>
	Screen reader:	All kinds of VIPs	<p>Since voice reading don't damage eyesight, they are the most common forms of assistive technology</p>
	Talking books and newspaper	All kinds of VIPs	<p>Are used with speech synthesis hardware to convert the text on the computer screen into speech.</p> <p>Some screen readers work two-ways, both reading and writing. People who cannot use a keyboard or mouse because of limited mobility may use this</p>

Format Type	Tool	Target Users	Characteristics
			two-way software.
	Voice recognition software:	All kinds of VIPs	

B. Test steps of First Test

Stage 1: Pre-reading - Decide on which book to read

0. introduction and consent

Firstly, background information and the procedure are introduced to participants, and kindly request their verbal consent for recording.

1. Basic information and scenario setting

Participants were asked for basic information, their reading context and goal, and informed about the reading stage and scenario they were currently in: "You are currently planning to..."

2. Browse book titles, select, and listen to summaries

Users sequentially listened to book titles and clicked to enter when they heard a title they were interested in continuing to learn about. They selected the book summary and listened to it.

- Satisfaction level with the current summary (Likert scale), why?(interview)
- What they like and don't like about the summary in terms of their own goals and needs.
- Inquire whether they want to continue learning or decide to continue reading (give up) this book?

3. Adjust the summary

After receiving the first summary, if the user wishes to adjust the summary, I would ask them

- Intentions to adjust the length? Why? (Interview)

Options: 50/100/150/200 words

- Intentions to adjust the format? Why? (Interview)

Options: keywords/bullet points/paragraph

Or other options?

- Intentions to know more? (Yes/No), why? (Interview)

Options: points provided by Chatdoc

Or other options?

- Other intentions? (interview)

4. Listen to the refined summary

- Satisfaction level with the current summary (Likert scale)

- What they like and don't like about the summary in terms of their own wishes, goals

5. Repeat steps 3 and 4 until the user is satisfied with the summary.

Stage 2: Mid-reading - Non-linear exploration

0. introduction and consent

Firstly, background information and the procedure are introduced to participants, and kindly request their verbal consent for recording.

1. Basic information and scenario setting

Participants were asked for basic information and informed about the current reading stage: "You have selected a book you wish to read. Please read freely according to your usual habits, Please let me know when you want to skim through the text.'

2. Non-linear exploration

When non-linear exploration is needed, users select the chapter/section for summarization, and listen to the summary.

- Satisfaction level with the current summary (Likert scale)

- What they like and don't like about the summary in terms of their own goals and needs.

3. Adjust the summary

- Intentions to adjust the length? Why? (Interview)

Options: 50/100/150/200 words

Or other options?

- Intentions to adjust the format? Why? (Interview)

Options: keywords/bullet points/paragraph

Or other options?

- Intentions to know more? (Yes/No), why? (Interview)

Options: key points provided by Chatdoc

Or other options?

4. Listen to the refined summary

- Satisfaction level with the current summary (Likert scale)
- What they like and don't like about the summary in terms of their own wishes, goals
- Other intentions? (interview)

5. Repeat steps 3 and 4 until the user is satisfied with the summary.

C. Verbal Consent for Interview

Verbal Consent for interview

Opening statement

You are being invited to participate in a research study titled 'An AI text summarization tool to improve visually impaired individual skimming reading'. This study is being done by yuqing wu from the TU Delft for a master graduation project.

The purpose of this interview is to understand your daily reading habits and experiences., and will take you approximately 30 minutes to complete. The data will be used for analysis and design.

We assure you that your answers in this study will remain confidential. We will collect your age, vision condition, occupation, and your opinion and experience on daily reading. To minimize any risks, we will ensure that the analysis result of this survey is entirely anonymous, and no IP addresses or other Personal Data will appear. All the data collected will be stored safely, and confidentiality will be secured by anonymising the data.

Your participation in this is entirely voluntary, and you can withdraw at any time. You are free to omit any questions. If you have any questions or concerns regarding this study, please feel free to contact the corresponding and Responsible Researcher, YThank you for your participation in this study!

(Due to the reading difficulties faced by visually impaired individuals, I will read this section aloud, gather the participant's feedback, and tick the responses on their behalf.)

PLEASE TICK THE APPROPRIATE BOXES		Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICIPANT TASKS AND VOLUNTARY PARTICIPATION			
1. I have read and understood the study information dated [], or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.		<input type="checkbox"/>	<input type="checkbox"/>
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.		<input type="checkbox"/>	<input type="checkbox"/>
3. I understand that taking part in the study involves a 30-minute online interview. I also understand that what I said in the interview will be noted down and transferred into a script.		<input type="checkbox"/>	<input type="checkbox"/>
4. I understand that the study will end in 30min.			
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)			

D. Interview Notes

[illegible]

E. Project Brief





IDE Master Graduation Project

Project team, procedural checks and Personal Project Brief

In this document the agreements made between student and supervisory team about the student's IDE Master Graduation Project are set out. This document may also include involvement of an external client, however does not cover any legal matters student and client (might) agree upon. Next to that, this document facilitates the required procedural checks:

- Student defines the team, what the student is going to do/deliver and how that will come about
- Chair of the supervisory team signs, to formally approve the project's setup / Project brief
- SSC E&SA (Shared Service Centre, Education & Student Affairs) report on the student's registration and study progress
- IDE's Board of Examiners confirms the proposed supervisory team on their eligibility, and whether the student is allowed to start the Graduation Project

STUDENT DATA & MASTER PROGRAMME

Complete all fields and indicate which master(s) you are in

Family name	yuqing	IDE master(s)	IPD <input type="checkbox"/>	Dfi <input type="checkbox"/>	SPD <input checked="" type="checkbox"/>
Initials	Wu	2 nd non-IDE master			
Given name		Individual programme (date of approval)			
Student number	5787270	Medisign	<input type="checkbox"/>		
		HPM	<input type="checkbox"/>		

SUPERVISORY TEAM

Fill in the required information of supervisory team members. If applicable, company mentor is added as 2nd mentor

Chair	Jeff.Love	dept./section	SDE/HCAI	<div>! Ensure a heterogeneous team. In case you wish to include team members from the same section, explain why.</div> <div>! Chair should request the IDE Board of Examiners for approval when a non-IDE mentor is proposed. Include CV and motivation letter.</div> <div>! 2nd mentor only applies when a client is involved.</div>
mentor	Stella Boess	dept./section	AED	
2 nd mentor				
client:				
city:	Delft	country:	Netherlands	
optional comments				



Personal Project Brief – IDE Master Graduation Project

Name student Yuqing Wu

Student number 5787270

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title Multimodal interaction with integration of AI for visually impaired users in a library

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

CONTEXT:

Today, the library is no longer just a place to store paper or electronic documents; rather, it tends to be more proactive in offering and tailoring information for individuals and communities and in supporting community efforts to capture, structure, and share knowledge (Omisore & Samuel, 2014). Many libraries are currently working to explore new ways of interaction and spatial layouts to respond to this goal and enhance the reading experience.

At the same time, as society develops, the needs of minorities become a concerning subject, with the European Accessibility Act now being implemented, libraries should also take the responsibility of contributing to promoting equal access to information.

DOMAIN AND STAKEHOLDERS:

This project focuses on the intersection of technology and accessibility, catering to the specific needs of visually impaired readers. The primary stakeholders include visually impaired library users, librarians, and the library.

OPPORTUNITIES AND LIMITATIONS:

With the advancement of technology (e.g. AI, gesture and speech control technology), we can fully expect to facilitate barrier-free and equal integration of visually impaired individuals into reading environments and communities, as part of inclusive library design.

As for the limitations, considering user data privacy, interpretability and trustworthiness of AI, while ensuring an inclusive reading experience, we aim to avoid creating a reading experience that feels "deliberately tailored for visually impaired individuals."

→ space available for images / figures on next page

Personal Project Brief – IDE Master Graduation Project

Problem Definition

*What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.
(max 200 words)*

PROBLEM DEFINITIONS:

Currently, traditional libraries provide relatively limited accessibility for visually impaired individuals. Typically, libraries utilize homogenized aid equipment tailored for visually impaired users, such as Functional Screen Readers and Optical Character Recognition (OCR) Scanning Software (NLS at the Library of Congress - National Library Service for the Blind and Print Disabled (NLS) | Library of Congress, 2024). However, these solutions only address the issue of reading availability at a basic level. In reality, reading encompasses deeper experiences and broader activities, including comfort, security, and engagement (Blog: What Makes an Ideal Reading Environment?: Read Naturally, Inc., n.d.), as well as the social need to exchange reading experiences with others, which are often overlooked. Therefore, this project aims to revolutionize this experience by introducing a multimodal interaction integrated with AI to provide visually impaired users with a comfortable, secure, and personalized reading environment, fostering a sense of inclusivity and joy in the act of reading. This project aims not only to address a specific problem but also to contribute to the broader discourse on creating universally accessible and enriching library experiences.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design a prototype of a multimodal interaction with integration of AI to create a pleasant, secure and personalizable reading experience for visually impaired individuals in a library

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

My graduation project plan is divided into four phases:

Phase 1: Research. Utilizing user-centered research methods to conduct qualitative and quantitative analysis, including but not limited to desktop research, interviews, focus groups, etc., to identify user needs and values, understand the current situation of Dutch libraries

Phase 2: Ideation/concept development. Combining needs and opportunities, Determining design directions and exploring the potential integration of AI with the product.

Stage 3: Prototype design and iteration. Make a prototype to test and iterate to enhance the reading experience for the visually impaired with integration of AI

Stage 4: Evaluation/validation and presentation.

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a **kick-off meeting**, **mid-term evaluation meeting**, **green light meeting** and **graduation ceremony**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief.
The four key moment dates must be filled in below

Kick off meeting	2.19
Mid-term evaluation	4.15
Green light meeting	6.25
Graduation ceremony	7.15

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	
For how many project weeks	
Number of project days per week	

Comments:

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.
(200 words max)

The enthusiasm for this project stems from my love for libraries. In my childhood, I have spent long hours every weekend in the library. Reading has been a crucial means for me to explore the world and understand myself. The library is also a must-visit spot for me wherever I travel. Throughout this journey, I've discovered that libraries can accommodate various scenarios and functions related to reading. An advanced library should be human-centered, inclusive, prioritizing user experience. I believe that interaction design, system design, and technology-driven design can significantly contribute to the enhancement of libraries. Upon encountering this topic, I realized that not everyone naturally enjoys the benefits that libraries offer. For visually impaired individuals, reading is an effective and convenient way to expand their inner world, and I aim to enable them to experience an accessible and inclusive reading experience without barriers through design. Throughout this process, I hope to put into practice the design principles and methodologies I've learned from IDE. Simultaneously, I intend to accumulate knowledge relevant to my current envisioned career path as an AI product manager. This includes aspects such as user research, problem identification, product positioning, technical implementation, and more.

F. Project Plan

