Digitizing Consent Forms for Hearing and Speech Nova Scotia
DGIN 5201: Digital Transformation

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Digitizing Consent Forms for Hearing and Speech Nova Scotia

1. Introduction

Hearing and Speech Nova Scotia supports, advocates, and has expertise in addressing communication challenges within the province. It is a nonprofit organization dedicated to enhancing the lives of individuals affected by hearing loss and speech disorders, thereby becoming a cornerstone for the Nova Scotian community for several decades. With a mission deeply rooted in providing comprehensive services, resources, and education, HSNS serves as a vital lifeline for those navigating the complexities of communication disorders.

Although this organization has a longstanding history spanning several decades, it is currently seeking to enhance its operational processes and procedures to elevate both customer and staff experiences by integrating cutting-edge technologies into its healthcare systems.

Key areas of concern highlighted in customer feedback include:

Absence of annual membership renewal reminders.

Challenges in locating legal guardians to sign the consent forms for minors.

Language barriers for users/guardians who do not comprehend English or French.

Excessive paperwork and potential risks associated with easily accessible health information.

Reliance on outdated technologies such as fax machines.

2. Value Proposition Canvas

The Value Proposition Canvas (see Figure 1) is created

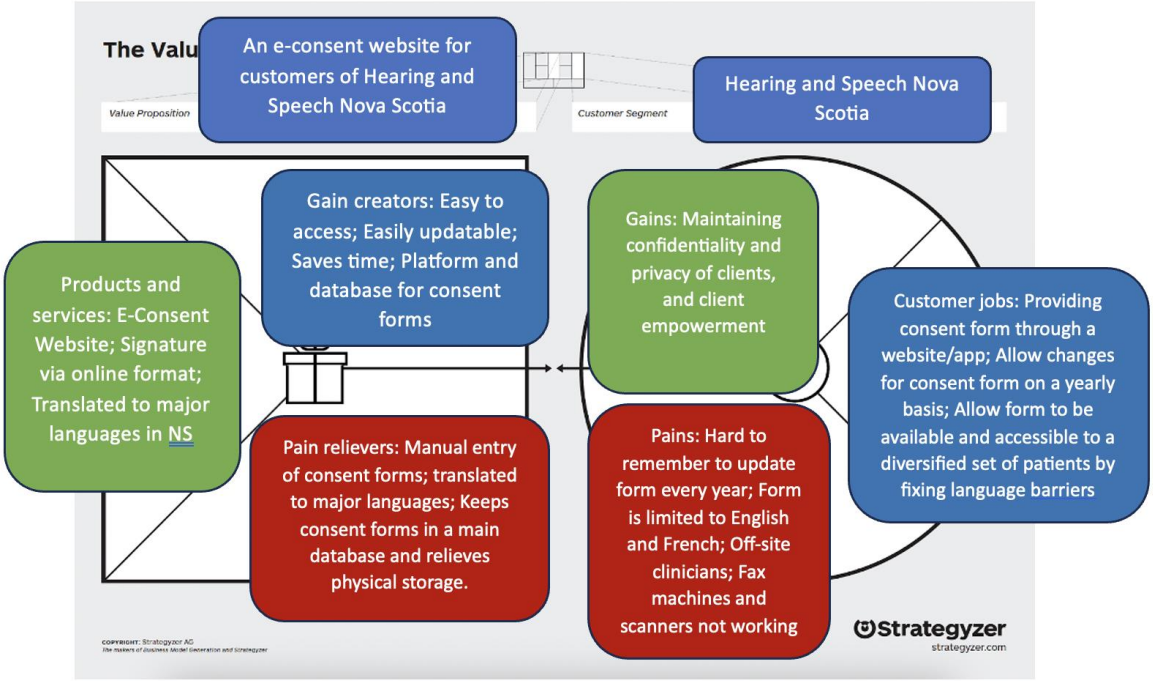

Figure 1. Proposed and updated value proposition canvas for Hearing and Speech Nova Scotia.

The Value Proposition canvas for our project(Figure 1) is explained as follows:

Customer Segment:

Our Target customers are the Staff and Customers of Hearing and Speech Nova Scotia.

Value Proposition:

- E-Consent website tailored for individuals with hearing and speech impairments.
- User-friendly interface, virtual signature options, and translation services for forms in major languages spoken in Nova Scotia.

Customer Jobs:

- Facilitating access to consent forms through a website or app.
- Allowing for annual changes to consent forms.
- Ensuring accessibility of forms for diverse patients by addressing language barriers.

Pains:

- Difficulty in remembering to update forms annually.
- Limited availability and reliability of fax machines and scanners.
- Ensuring safety and security during the transportation of consent forms.
- Restricted accessibility due to forms being available only in English and French.

Gains:

- Improved confidentiality and privacy.
- Empowerment through control over consent.
- Convenient access to consent forms in multiple languages.
- Streamlined process for updating forms annually.

Gain Creators:

- Easy accessibility.
- Simplified updating process.
- Time and effort-saving benefits.
- Establishment of a platform and database for consent forms.

Pain Relievers:

- Elimination of manual entry for consent forms.
- Translation of forms into major languages spoken in the province.
- Secure storage of consent forms in a centralized database, reducing the need for physical storage space.

Products and Services:

- E-Consent website.
- Online signature functionality.
- Translation services for major languages spoken in Nova Scotia.

3. User Feedback

Our value proposition matches what we have envisioned particularly in terms of simplifying access to the e-consent form and ensuring secure storage in a centralized database, eliminating the need for physical storage space., virtual signature options, and translation services for forms in major languages spoken in Scotia including English, French, Chinese and Arabic.

Before starting our project, we conducted a Survey to understand the various pains in terms of health forms to integrate the findings into our prototype and refine our understanding.

The link was shared with our classmates and friends via the following link - https://forms.gle/7Uqi1PR49kHdQQWe9 .

The findings of our survey are as follows:

→ About half disagreed, and a quarter agreed on the ease of using integrated technology, indicating comfort or willingness to learn.

→ 62.5% prefer online services for their ease, speed, and time-saving benefits.

→ 75% expressed concern about personal data protection, urging transparency and robust safeguards.

→ Similarly, 75% cited external pressure in decision-making while signing consent forms, potentially compromising consent authenticity.

→ Desirable modern features include sign language integration, digital signatures, and online consultations.

4. Prototype - Frontend

Our final prototype consists of three pages – A signup page, a login page, and the e-consent form page.

4.1 Sign-Up Page:

Upon accessing the landing page, users are prompted to sign up. The healthcare number is required to be used in the username field during this process, which will be stored in our database for authentication purposes. Users are instructed to input their healthcare number, and any other entry in this field will result in an error message prompting them to enter their healthcare number. During the signup process, users can input their email address and the OTP will be sent to the registered email for authentication purposes.

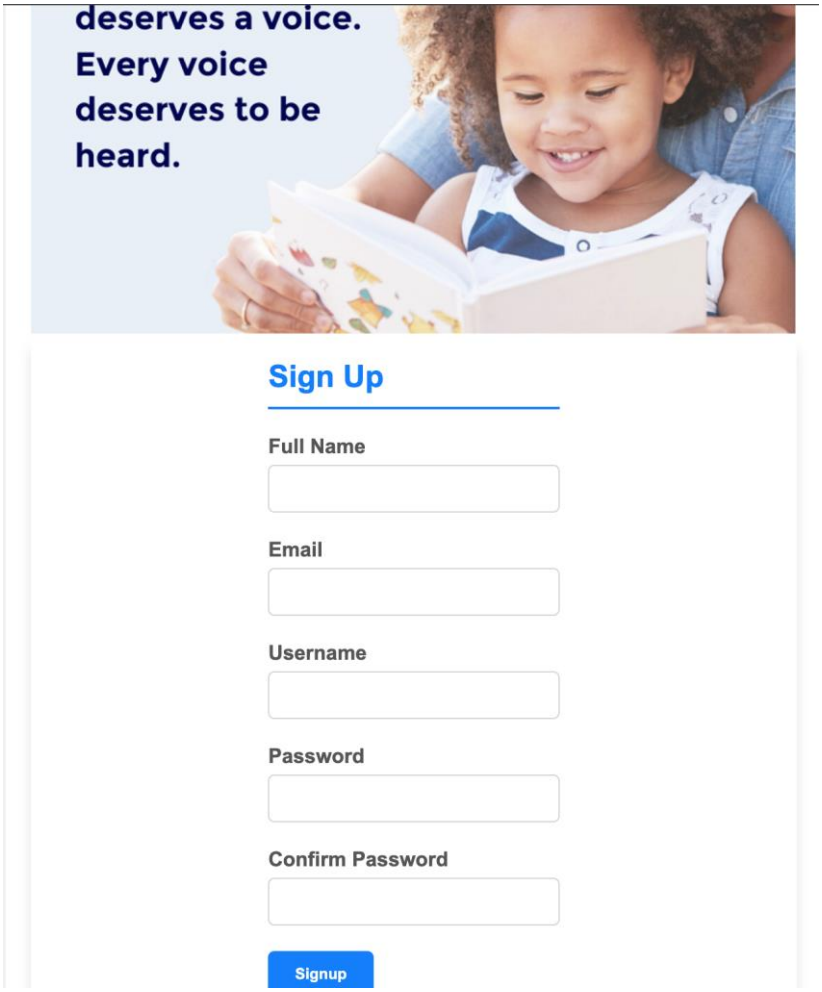

Figure 2: The Sign-Up Page

4.2 Login Page:

After completing the sign-up process, users can log in using their respective healthcare number as the username. Upon logging in, users are directed to fill out a consent form.

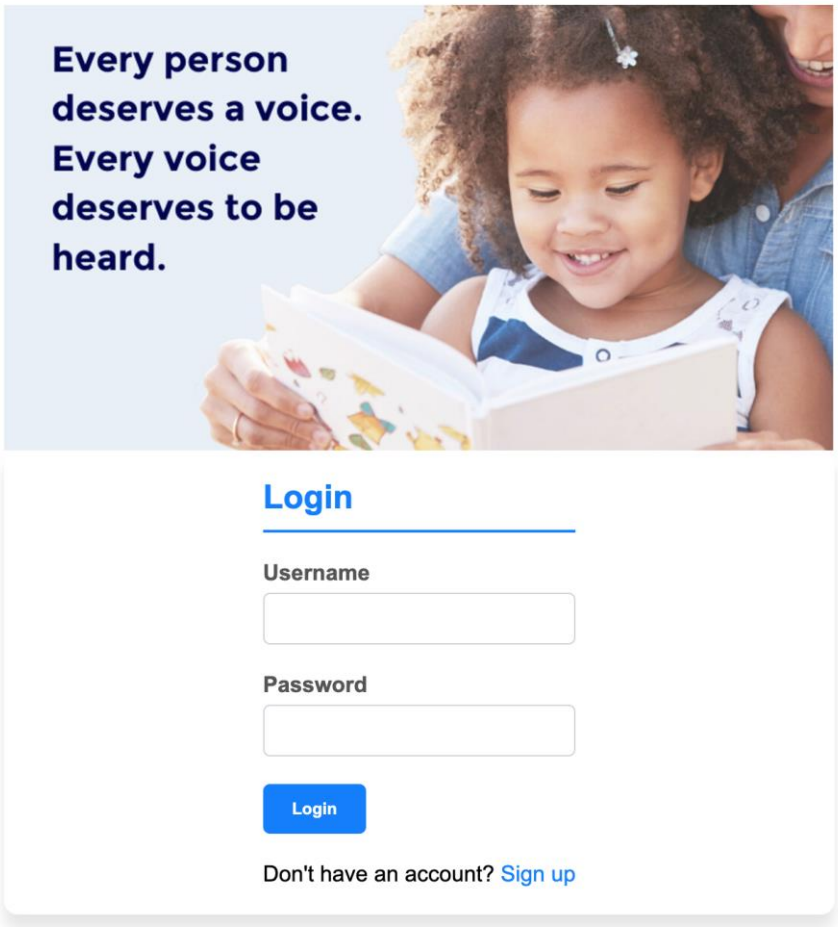

Figure 3: The Login Page

4.3 E-Consent Form:

The consent form is available in three languages: English, French, and Chinese. Users can select their preferred language to fill out the form and then submit it. Upon submission, a one-time password is generated and sent to the registered email address for authentication. Users are then redirected to their home page after a brief delay, indicating the completion of the demonstration.

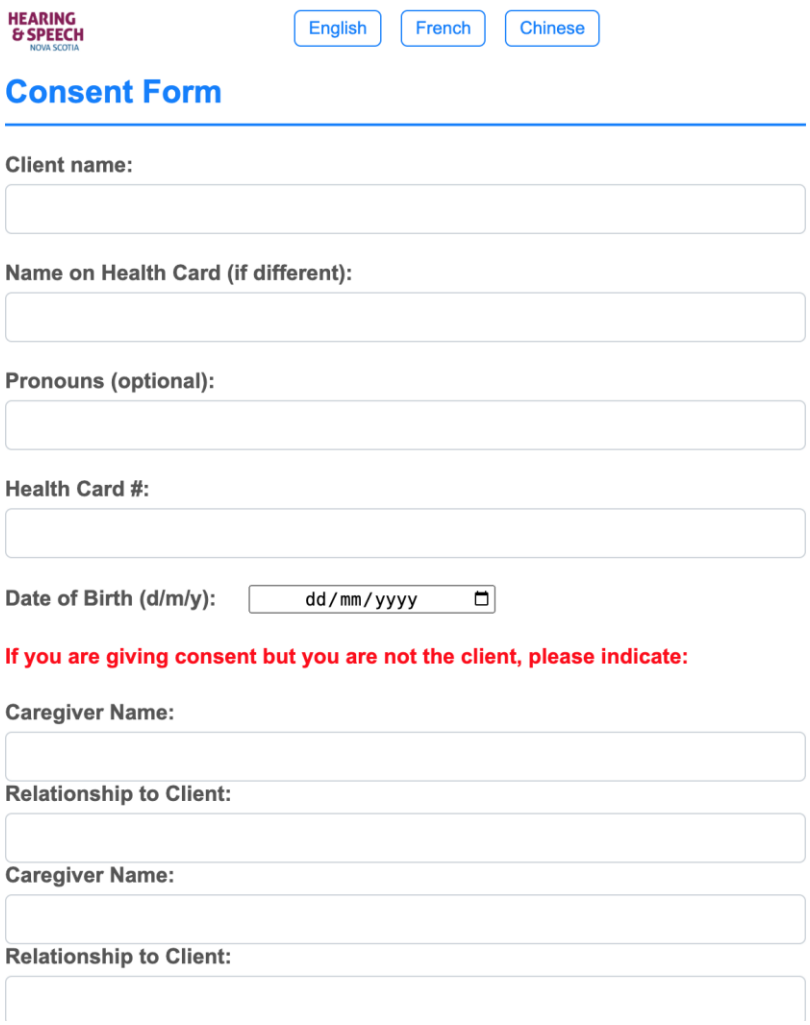

Figure 3: The E-Consent Page

5. Prototype – Backend

We created 5 tables to store the information generated from our website.

5.1 Users Table - The below table (Figure 4) was created to store the signup page details.

Field	Type	Null	Key	Default	Extra
userpassword	varchar(100)	YES		NULL	
userid	varchar(255)	NO	PRI	NULL	
email	varchar(255)	YES		NULL	
fullname	text	NO		NULL	

Figure 4: User Table

5.2 **Clients Table** – The below table (Figure 5) was created to store only the client_id attached to its respective client name for easy and fast accessing of client information.

Field	Type	Null	Key	Default	Extra
client_id	int(11)	NO	PRI	NULL	auto_increment
client_name	varchar(100)	YES		NULL	

Figure 5: Clients Table

5.3 **consent_form_details Table** – The below table (Figure 6) was created to store the e-consent form details filled in by the client.

Field	Type	Null	Key	Default	Extra
id	int(11)	NO	PRI	NULL	auto_increment
clientName	varchar(255)	YES		NULL	
nameOnHealthCard	varchar(255)	YES		NULL	
pronouns	varchar(255)	YES		NULL	
healthCardNumber	varchar(255)	YES		NULL	
dob	date	YES		NULL	
caregiverName1	varchar(255)	YES		NULL	
relationship1	varchar(255)	YES		NULL	
caregiverName2	varchar(255)	YES		NULL	
relationship2	varchar(255)	YES		NULL	
infoShareConsent	text	YES		NULL	
communicationConsent	enum('Yes','No')	YES		NULL	
emailCommunicationConsent	enum('Yes','No')	YES		NULL	
email	varchar(255)	YES		NULL	
textCommunicationConsent	enum('Yes','No','Not Applicable')	YES		NULL	
electronicHealthRecord	text	YES		NULL	
consentDuration	varchar(255)	YES		NULL	
changeInfo	text	YES		NULL	
clientSignature1	varchar(255)	YES		NULL	
clientDate1	date	YES		NULL	
clientSignature2	varchar(255)	YES		NULL	
clientDate2	date	YES		NULL	

Figure 6: consent_form_details Table

5.4 **consent_records Table** – The below table (Figure 7) was created to store the filtered information such as the basic client information along with date until the consent is valid and legal authority confirmation.

Field	Type	Null	Key	Default	Extra
consent_id	int(11)	NO	PRI	NULL	auto_increment
client_id	int(11)	YES		NULL	
share_info	enum('Yes','No')	YES		NULL	
communicate_email	enum('Yes','No')	YES		NULL	
email_address	varchar(100)	YES		NULL	
contact_via_text	enum('Yes','No','Not Applicable')	YES		NULL	
consent_valid_until	date	YES		NULL	
date_signed	date	YES		NULL	
legal_authority_confirmation	enum('Yes','No')	YES		NULL	

Figure 7: consent_records Table

5.5 **main_table_client Table** - The below table (Figure 8) was created to store client details along with the code sent for verification.

Field	Type	Null	Key	Default	Extra
Client_Name	text	NO		NULL	
Client_Number	varchar(255)	NO		NULL	
Email_Id	varchar(255)	NO		NULL	
Code	int(6)	YES		NULL	

Figure 8: main_table_client Table

6. Project Management

Our team comprises four members, with a balanced distribution of technical and business skills: two members possess technical expertise, while the other two specialize in business aspects. Accordingly, we allocated tasks to leverage each member's strengths effectively.

The project was structured into three distinct sprints:

6.1 **Initial Skeleton Phase:** Rowena was tasked with creating a Google form to facilitate user feedback assessment and documenting the processes. Meanwhile, Inderdeep was responsible for setting up the database, which involved creating three tables: one for storing login data, two for consent form details, and a third for administrative information. Pallavi undertook the development of the homepage and the creation of the multi-lingual form (offering options in English, French, and Chinese). Lida played a pivotal role in documenting all our processes and ensuring timely updates through multiple catch-up calls.

6.2 **Development Phase:** This stage entailed refining our project and assigning tasks accordingly:

- Rowena focused on translating the form into Arabic and segmented the HTML, CSS, and JavaScript from the main code and provided support for any necessary modifications to the existing database tables.

- Pallavi assumed responsibility for integrating supplementary features, including implementing the One-Time Password (OTP) functionality, to augment the website's capabilities. Additionally, she oversaw the management of the Admin page.
- Inderdeep dedicated efforts to the form submission segment of the project, prioritizing the validation, translation, and storage of user inputs into the database.
- Lida spearheaded the management of the sign-up page, tasked with storing user details in the database and verifying the linkage of all users to their respective health card numbers.

6.3 Testing Phase:

During the testing phase, we conducted a comprehensive trial of our working prototype to evaluate the functionality of all features as per our intentions. Pallavi took charge of resolving any exceptions or errors encountered along the way. Meanwhile, Rowena compiled the final report consolidating all documented processes, while Lida was responsible for crafting the final presentation and demo.

Given the time constraints of the project, we exercised caution in decision-making processes. Employing effective project management techniques, we segmented tasks into manageable components and collaborated closely. Each team member completed their assigned tasks and shared them with others for further refinement, welcoming constructive feedback to iteratively enhance our work. We embraced each other's strengths and weaknesses, fostering a collaborative environment.

Reflection on Milestones and User Testing

The milestone achievements were evaluated based on our objectives, and while some were met, others required further refinement. User testing provided valuable insights into user experiences, confirming alignment with envisioned pain points and gains. Users are expected to benefit from pain relievers and gain creators incorporated into the prototype, with evidence supporting their effectiveness.

Our prototype effectively demonstrates the functionality of our E-consent website, particularly in securely authenticating users and facilitating the consent process. We acknowledge the need for further refinement and testing to ensure a seamless user experience and robust security measures.

Despite minor challenges, such as the search for a suitable third-party API for translation purposes, which ultimately proved elusive, we remained steadfast in our commitment. Although we aimed to implement a single form with multi-language functionality, we ultimately settled for offering the consent form in three languages.

Our experience with user testing proved invaluable in validating our assumptions and refining our product to meet the needs of our target users effectively. Through rigorous testing sessions, we gathered valuable feedback on the functionality and usability of our prototype, allowing us to identify areas for improvement and make necessary adjustments. Users' experiences during testing reflected both anticipated pain points and gains, providing insight into areas where our product excelled and where further refinement was needed.

During testing, users encountered pain points such as difficulty remembering to update forms annually, limited availability of fax machines and scanners, and language barriers with consent forms. However, our prototype addressed these challenges by implementing features such as integration with electronic health record systems to eliminate reliance on outdated technology and multilingual support for consent forms. Additionally, users experienced gains such as enhanced confidentiality and privacy, empowerment through consent control, and simplified form submission processes. Feedback from testing sessions provided concrete evidence of these benefits, reinforcing our confidence in the effectiveness of our design decisions and the value our product offers to users.

Future Work:

Given additional time, our project scope would have expanded beyond a mere segment for Hearing and Speech Nova Scotia. We would have undertaken a comprehensive overhaul of their entire website, incorporating the following pages into our redesign plan.

1. Home Page:

The Home Page serves as an introduction to the website, providing users with an overview of its purpose and functionality. It outlines the consent collection process, informing users about the steps involved and the importance of their participation. A prominent call-to-action encourages users to either log in if they have an existing account or create a new one to access the platform's features. Additionally, it integrates seamlessly with the Hearing and Speech Nova Scotia's pre-existing website, ensuring continuity and ease of access for users.

2. Patient Dashboard:

Upon logging in, patients are directed to their personalized dashboard, tailored to their individual needs and preferences. The dashboard prominently displays upcoming appointments, consent status, and any relevant notifications to keep patients informed and organized. Moreover, it includes a live dashboard creation feature for both patients and staff, allowing real-time tracking of consent form approvals, upcoming appointments, and relevant notifications.

3. Consent Form Management:

- Consent Form List: Users can browse through a comprehensive list of available consent forms, organized for easy navigation. More languages are added for consent forms, ensuring inclusivity and accessibility.
- Form Details Page: Each form is accompanied by detailed information, including its purpose and available language options, enabling users to make informed decisions.
- Form Submission Page: Users can conveniently complete and submit consent forms directly through the website, streamlining the process and eliminating paperwork.

Additionally, there is a notification system to recommend/update forms yearly, ensuring compliance and accuracy.

4. Language Selection:

The website offers language customization features, allowing users to select their preferred language for form instructions and content, ensuring accessibility and inclusivity.

5. Profile Settings:

Users have the ability to manage their profile settings, including updating personal information, changing passwords, and adjusting language preferences to enhance their user experience.

6. Notifications and Reminders:

The platform sends timely email or SMS reminders to users, notifying them of upcoming appointments or incomplete consent forms, promoting engagement and compliance.

7. Privacy Policy and Terms of Use:

Prior to using the platform, users are required to review and consent to the Privacy Policy and Terms of Use, ensuring transparency and compliance with data processing regulations.

8. Clinician Portal:

The Clinician Portal features a separate login page tailored specifically for clinicians, granting access to consent records, form management tools, and patient interaction tracking capabilities.

9. Integration with Existing Systems:

Backend functionality enables seamless integration with the organization's existing electronic health record system, facilitating data synchronization and enhancing workflow efficiency. It also maintains a proper database for legal guardians' details of minors, ensuring regulatory compliance and safeguarding patient information.

10. Billing and Payment (if applicable):

Users may have the option to view billing statements related to consent services, providing transparency and facilitating payment processes if applicable.

11. Feedback and Improvement:

A feedback form is available for users to report any issues encountered or suggest improvements, fostering a collaborative environment for ongoing enhancement and optimization of the platform.

Conclusion:

In the past few weeks, our team has made remarkable progress in developing e-consent forms for Hearing and Speech Nova Scotia. Despite juggling other coursework commitments simultaneously, we have come a long way in a relatively short period. Throughout this journey, we've encountered challenges and overcome obstacles with determination and perseverance. However, reflecting on our accomplishments, we acknowledge that with more time at our disposal, we could have implemented additional features and functionalities, including those

mentioned in the previous points. Nevertheless, as Leonardo da Vinci once said, 'Simplicity is the ultimate sophistication.' Despite time constraints, our dedication and collaborative effort have enabled us to lay a solid foundation for the project, and we are proud of the strides we have made thus far. Moving forward, we remain committed to delivering a high-quality product that meets the needs of Hearing and Speech Nova Scotia and its constituents.

References

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