



# Accessible Grocery Food Packaging for people with vision impairments

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# Abstract

This thesis investigates how information on Canadian food packaging can be made accessible to people with vision impairments. Accessible packaging will allow them to shop for groceries independently, make informed purchase decisions, and use the products more efficiently.

This thesis uses two approaches. One was to redesign existing food labels to make them accessible to people with mild or moderate vision impairment through the appropriate use of typography, color, images, illustrations, and patterns. The second approach focuses on the addition of Braille and a text to speech feature to meet the needs of people with a severe vision impairment or blindness. Along with accessibility, the aesthetic appeal of the packaging has been a critical consideration throughout the research.

Communication design based studio explorations form the core of this thesis. Other methods such as observation, precedent review, personal reflection, case studies, literature review, and interviews with visually impaired participants, experts, and design professionals drive the explorations. The final outcome of the research is a prototype of a sample accessible grocery food brand with a variety of products. Considerations and challenges that shaped the prototypes are also discussed.

The research provides a resource for designers and businesses within and outside Canada interested in working within the field of accessible grocery food packaging.

**Key Words:** Accessible Design, Inclusive Design, Visual Impairment, Packaging Design, Communication Design



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To Ma and Papa

We designers get so caught up in making the pack jump off the shelf that we overlook the pack's legibility for different audiences.

## Preface

As a packaging designer, my professional journey began in 2013 when I landed a job at 'DMA Yellow Works', a well-known package design agency in Mumbai (India). I have been fascinated by the world of packaging ever since. I enjoyed putting together various colors, typefaces, and visuals/ photographs to make a product stand out on the shelf. Over the years, I have worked with countless big and small brands, designing packaging for products in various categories — food, health, beauty, pharmacy, pantry, and household.

Back home in India, my mother usually cooks for the family. She is now 60, and her eyesight has diminished in the last ten years. As a result, she finds it difficult to read text printed in a small size. She struggles to read the instructions printed on the back of prepared food packaging and often asks another family member or me to read out the instructions. It makes her dependent on another person to carry out the task of cooking successfully.

As a packaging designer, this bothers me deeply. The packaging is usually designed for sighted people and is resultantly inaccessible for people who are visually impaired.

I suffer from moderate hearing loss. I am well aware of the emotional and mental impacts of navigating private and public spaces like classrooms, workplaces, banks, stores, and restaurants that are not fully inclusive. As a result, the subjects of inclusivity and accessibility hold personal significance for me. My journey and struggle with disability have strengthened my motivation to integrate accessibility in packaging design.

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# Glossary of Key Terms

## 1. Accessible (Adjective) <sup>1</sup>

Capable of being used or seen  
“the information on the packaging is accessible”

<sup>1</sup><https://www.merriam-webster.com/dictionary/accessible>

## 2. Visual Impairment (Noun) <sup>2</sup>

Visual impairment or low vision is a severe reduction in vision that cannot be corrected with standard glasses or contact lenses and reduces a person’s ability to function at certain or all tasks.

<sup>2</sup><https://medical-dictionary.thefreedictionary.com/Partially+sighted>

# 1. Overview

## 1.1 Vision Impairment

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## 1.2 Rationale

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## 1.3 Context

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## 1.4 Scope of Project

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## 1.5 Research Question

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This chapter gives an overview of the causes and classifications of vision impairment. It contains statistical data about vision impairment in Canada and establishes the need for accessible food packaging. It also briefly outlines the current initiatives and opportunities in the field of accessible design. Lastly, it defines the scope of my research and design explorations in the larger context of accessible food packaging.



# 1.1 Vision Impairment

## In Canada alone, 1.5 million people are visually impaired

Canadian National Institute for the Blind, 2017

According to the **World Health Organization (2018)**, at least 2.2 billion people worldwide have a vision impairment or blindness. That amounts to about 28% of the world population.

A reduced vision that cannot be corrected by glasses or contact lenses is termed visual impairment.

There are many causes of vision impairment, such as uncorrected refractive errors, cataracts, age-related macular degeneration, glaucoma, diabetic retinopathy, corneal opacity, and trachoma. Depending on the cause, vision loss is different for different people. Many free to use vision simulating websites such as **visionsimulations.com**, **visionaware.org**, and **myeyedr.com** approximate the experience of vision loss caused due to various reasons. Myeyedr also allows the viewer to adjust the vision loss's severity using an easy to operate control bar. **Figures 1-5** depict the simulated vision for different kinds of vision loss retrieved through **<https://www.myeyedr.com/eye-health/vision-simulator>**. The online simulators helped me visually understand the difference between vision loss caused by each of these reasons (**Figure 1-5**).

Image from: <https://www.myeyedr.com/eye-health/vision-simulator>

**Fig. 1**

Simulated vision with Presbyopia from myeyedr.com

Image from: <https://www.myeyedr.com/eye-health/vision-simulator>

**Fig. 2**

Simulated vision with Cataracts from myeyedr.com

Image from: <https://www.myeyedr.com/eye-health/vision-simulator>

**Fig. 3**

Simulated vision with Glaucoma from myeyedr.com

Image from: <https://www.myeyedr.com/eye-health/vision-simulator>

**Fig. 4**

Simulated vision with Astigmatism from myeyedr.com

Image from: <https://www.myeyedr.com/eye-health/vision-simulator>

**Fig. 5**

Simulated vision with Macular Degeneration from myeyedr.com

The severity of the visual impairment is, however, different in each case. Normal vision is termed as 20/20 vision or 6/6 vision. 6/6 vision means that you can see from 6 meters what an average person also sees from that distance.

The **World Health Organization (2018)** uses the following classification for vision impairment:

- Mild: presenting visual acuity worse than 6/12
- Moderate: presenting visual acuity worse than 6/18
- Severe: presenting visual acuity worse than 6/60
- Blindness: presenting visual acuity worse than 3/60

The classification means that a person with a mild vision impairment cannot see from 6 meters what an average person sees from 12 meters. Similarly, a person with severe vision impairment finds it hard to see from 6 meters what an average person sees from 60 meters.

It is evident from the above classification that a person with mild vision loss can see more clearly than a person with a severe vision impairment. People with mild and moderate vision impairment are still able to rely on their vision to some extent. Assistive devices such as magnifying glasses can further support their vision. A significant percentage of the aging population with diminishing vision falls under these two categories. People with mild vision impairments find it difficult to distinguish between products on the grocery store shelf and read tiny information on labels due to low color contrast and poor typography choices **(Andreen & Neely, 2005)**.

On the other hand, people with severe vision impairment or blindness cannot depend on their vision at all. They use assistive devices like text to speech readers or braille to read printed text. They depend on family, friends, or store staff to shop for

groceries. This dependence can have mental and emotional impacts.

The challenges and needs of both groups are very different, and hence the same design approach cannot be used for the two.

## 1.2 Rationale

Packaging design is used to effectively communicate the function, contents and usage of the product to potential consumers **(Klimchuk & Krasovec, 2013)**. The main function of packaging design is to “create a vehicle that serves to contain, protect, transport, dispense, store, identify, and distinguish a product” **(Klimchuk & Krasovec, 2013)**.

As previously mentioned, people with mild vision impairments find it difficult to distinguish between products on the grocery store shelf and read tiny information on labels due to low color contrast and poor typography choices **(Andreen & Neely, 2005)**. On the other hand, people with severe vision impairment or blindness cannot access the written information at all.

Information on food packagings like nutritional value, health benefits, ingredients, net weight, expiry date, cooking, and food safety instructions is crucial in making an informed purchase decision and using the product. According to a survey conducted by the **Canadian Council of Food and Nutrition (2008)**, 68% of Canadians primarily obtain nutrition information through food product labels. It is also essential to know if the product contains allergens that can be fatal. In a study conducted with 1,454 Canadians accidentally exposed to food allergens, the majority attributed the exposure to inappropriate labeling (47%) and failure to read labels (28.6%) **(Sheth, S. S., Waserman, S., Kagan, R., Alizadehfar, R., Primeau, M.-N., Elliot, S., ... Clarke, A. E., 2010)**. In addition, appropriate food safety instructions lead to the prevention of food-borne illnesses caused due to improper storage and cooking.

Hence it is crucial to make the vital information on food packaging accessible to people with visual impairments. Accessibility will allow them to be independent and make informed purchase decisions.

“Accessibility and inclusivity address key challenges in people’s lives, transform them, and hence make the world a better place.”

Koetting, S. L. (2019)

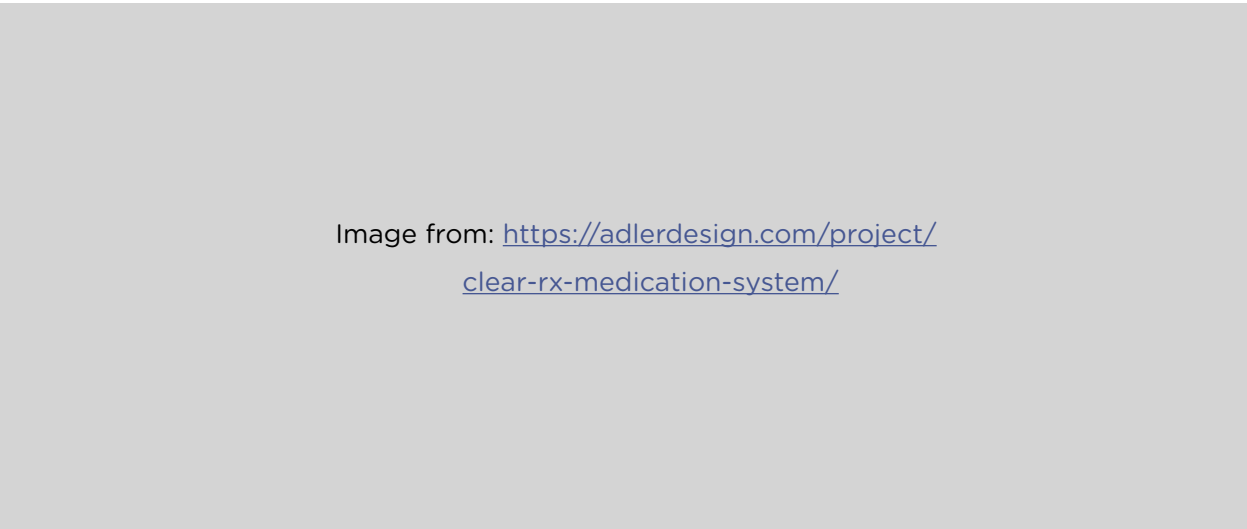
# 1.3 Context

In 2014, the Government of British Columbia announced the “Building a Better B.C. for People with Disabilities” plan, aiming to make British Columbia a truly inclusive province. **(Ministry of Social Development and Poverty, 2014)**. According to the 2018 progress update, a part of the act aims at improving the consumer experience for people with disabilities **(Ministry of Social Development and Poverty, 2018)**.

In line with the act, innovations have been made in area of accessible medicine packaging in BC. ASIC (Access for Sight-Impaired Consumers), a British Columbia based independent, consumer-driven advocacy coalition, has been working with retail pharmacies to attach an inexpensive RFID (radio-frequency identification) to any medicine container. The essential information encoded on the RFID label can then be read by placing the prescription bottle on the ScripTalk Reader and pressing a button. The ScripTalk Reader is provided free of charge by many pharmacists throughout B.C **(Ministry of Social Development and Poverty, 2018)**.

Similarly, there have been considerable developments in other parts of the world. Deborah Adler has designed accessible prescription packaging for Target called “Clear Rx” **(Deborah Adler Design, N.d)** which has an easy to read label **(Figure 6)**. It displays essential medical information in the front and clear instructions with icons at the back.

The health and beauty industry is also striving to create accessible packaging. On World Sight Day (October 10, 2018), Herbal Essence introduced tactile markings on their shampoos



**Fig. 6 (above)**  
Clear Rx Packaging by  
Deborah Adler Design



**Fig. 7 (left)**  
Accessible skincare  
packaging by  
Victorialand Beauty

and conditioners to make them more inclusive for visually impaired people. Shampoos are denoted by 4 raised vertical lines and conditioners by raised circles in the same spot **(Anne, Q., 2018)**. Victorialand Beauty, a U.S.A. based skincare company also uses raised tactile symbols on the caps of their packaging — a moon for the night cream, droplet for the face oil, a wavy line for the moisturizer and a triangle for the eye cream

**(Victoriland Beauty, N.d) (Figure 7).** Cleanlogic, a quality bath and body accessories brand based in the U.S.A., uses Braille on its packaging where possible to help blind and visually impaired individuals. **(Cleanlogic, N.d) (Figure 8).**

New strides have been made in the area of accessible food packaging as well. In 2017, Kellogg’s launched “Love Note” Braille stickers and record-able audio boxes for its Rice Krispies Treats so children who are blind or have low vision can also get messages from their families **(Tobin, B., August 2018) (Figure 9).**

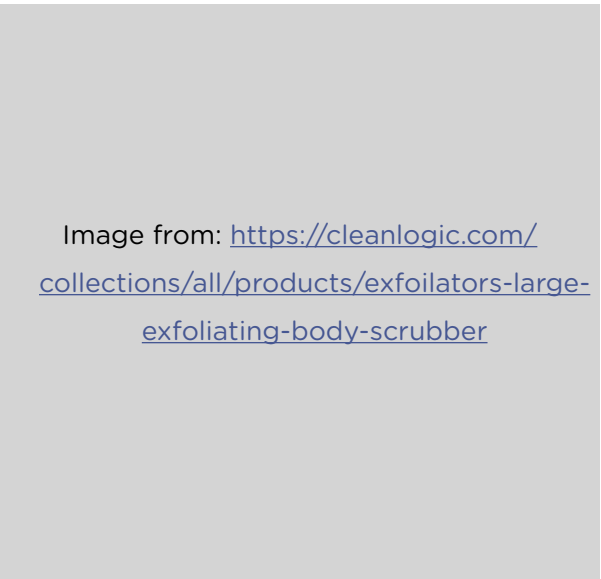
Additionally, on World Sight Day (October 10, 2020), Kellogg’s collaborated with the Royal National Institute of Blind People (RNIB) to create Coco Pops boxes for blind and partially sighted people. These trial boxes were launched in almost 60 co-op stores across the UK. The boxes have information in Braille as well as a unique on-pack NaviLens code that can be scanned using a smart phone from upto three meters. The NaviLens technology is a UK-first technology and plays back labelling and allergen information to the user upon scanning **(Kellogg’s UK., 2020) (Figure 10).**

Likewise, accessible design is an emerging practice in the field of web design. The **World Wide Web Consortium (2019)** outlines extensive accessibility guidelines for the web. The Association of Registered Graphic Designers of Ontario has produced a handbook recommending some general print and web accessibility guidelines for Graphic Designers **(RGD Ontario, 2019) (Figure 11).**

Apart from the above instances, there have been numerous other noteworthy innovations in the area of accessible packaging design for the visually impaired.

Having said that, accessible packaging design solutions, are still not very widely used. There is a lot of scope especially in the

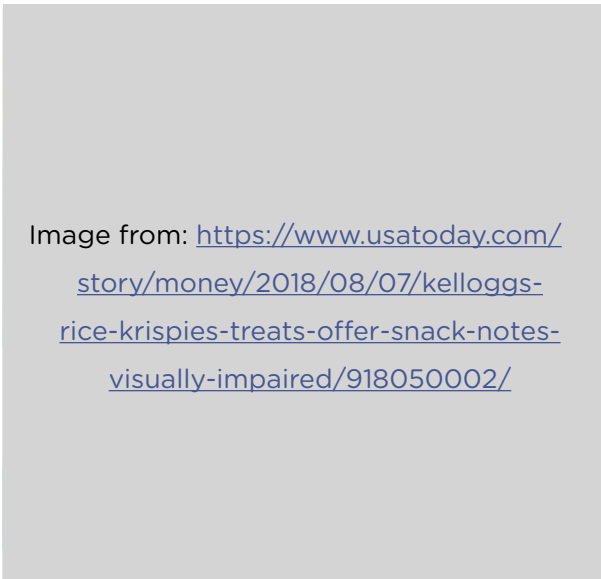
area of food packaging. Most food packaging in grocery stores is not accessible to people with vision impairments. My research identifies this as an opportunity and focuses on the area of accessible grocery food packaging.



**Fig. 8**  
Braille incorporated on Cleanlogic packaging



**Fig. 10**  
Kellogg’s UK accessible Coco Pops packaging for World Sight Day 2020



**Fig. 9**  
Kellogg’s Rice Krispies Treats - Braille Love Notes



**Fig. 11**  
Accessibility: A Practical Handbook on Accessible Graphic Design by RGD, Ontario (2019)

## 1.4 Scope of Project

Packaging design is a broad discipline that covers both the label and the structure of the packaging. For this thesis's scope, I have chosen to focus only on the packaging label, which is crucial in conveying important product information to the buyer.

Even though the research considers global packaging trends and examples, I have specifically studied Canadian food labeling requirements and policies. The findings of the research, however, can apply to packaging design outside Canada as well.

The challenges faced by people with different kinds of disabilities are varied. For this project, I have chosen to focus only on the needs of people with vision impairment.

Vision impairments range from mild to severe. Though people with mild vision impairment do not have a 20/20 vision, they can still depend on their vision. However, people with a severe impairment cannot use their sight for most purposes and rely on assistive devices that use other senses such as touch and hearing. I try to meet the needs of people with different levels of impairment. Hence one part of the research focuses on enhancing the label design of packaging for people with mild vision impairments to easily recognize products on the shelf and provide better access to essential information on the label. The other part focuses on additional features that are required by people with severe vision impairments.

## 1.5 Research Question

How can information on food packaging be made more accessible to people with various levels of vision impairment?



## 2. Design Research

### 2.1 Design Methods and Methodology

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### 2.2 Current Grocery Food Packaging

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### 2.3 Engaging with the Vision Impaired Community

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### 2.4 Existing Accessibility Guidelines

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In this chapter, I first give an overview of the methods used in this research. I then speak at length about my process of reviewing current food packaging in the grocery store. I also discuss the challenges faced while recruiting visually impaired participants during the COVID pandemic and throw light on some insights from participant interviews. I finally talk about a few existing web and print accessibility guidelines.

## 2.1 Design Methods and Methodology

This thesis uses a “research through design” approach. “Research through design” implies a “practice-based inquiry that generates transferable knowledge” **(Durrant, Vines, Wallace, & Yee, 2017)**.

Communication design based studio prototypes of accessible food packaging form the core of this thesis. Observation, literature review, precedent surveys, case studies, personal reflection, and interviews with visually impaired participants, and design professionals guide the prototypes.

In this chapter, I briefly describe the methods used during the research. I discuss them in greater detail throughout the thesis.

The entire research was roughly divided into three phases.

### Phase 1: Exploratory Research

The initial part of the research was focused on understanding the behavior, concerns and needs of visually impaired shoppers.

I started by observing and analyzing the existing food packaging in grocery stores, using approximate simulation, that is, without my glasses on. This helped to map out issues with current packaging and also identify scope for improvement.

Literature review of academic papers and journals outlining the problems, preferences and requirements of visually impaired shoppers also supplemented my observational visits to the store.

To understand the experience of visually impaired shoppers first-hand, I aimed to conduct virtual semi-structured participant interviews in the summer of 2020. Similar to an ergonomic analysis, the interview was to be followed by a food packaging analysis with the participants. Additionally, I had also planned a photo documentation exercise to understand the perception of beauty and aesthetics amongst the participants.

However the COVID pandemic made it difficult for me to get in touch with participants and I had to move ahead with the research without speaking to the participants.

To gain qualitative and experiential insights even without participants, I started following popular YouTube channels run by visually impaired people — **The Blind Life (Seavey, D. n.d.)**, **Live Accessible (Morales, C. n.d.)**, **Visually Impaired Designer Angela. n.d.)**. These channels allowed me to learn about the latest technology and resources available for people with vision impairments.

Additionally, I attended basic introductory sessions about vision impairment conducted by two non-profit organisations.

### **Phase 2: Precedent Study**

Precedent reviews and case studies followed the first phase of research. I surveyed the innovations in the field of accessible packaging design for people with vision impairments. I also looked at latest food packaging trends on popular packaging design websites such as **The Dieline (<https://thedieline.com/?>)** and **Packaging of the World (<https://www.packagingoftheworld.com>)**.

I studied the extensive **World Wide Web Consortium (2019)** accessibility guidelines for the web and the general print and web accessibility guidelines for Graphic Designers by

RGD Ontario **(2019)**. My aim was to try to apply accessibility guidelines from other areas to food packaging. It was also imperative to study the Canadian packaging guidelines.

### **Phase 3: Prototyping and User Testing**

Phase 3 of the research focused on prototyping and evaluative research. I worked on several packaging prototypes through the course of the research. My packaging prototypes attempted to balance accessibility, aesthetic appeal and marketability. I started with prototypes of individual products and then proceeded to designing smaller product ranges. I eventually created a sample accessible grocery food brand spanning across various categories.

The prototypes were evaluated and re-worked based on self-reflection and feedback from professors and classmates. I also got in touch with an accessibility designer who worked on *Accessibility: A Practical Handbook on Accessible Graphic Design* by RGD, Ontario **(2019)**.

Even though I was not able to speak to any participants in phase 1, I was aware of the importance of engaging with the vision impaired community. Fortunately by this phase, I was also able to get in touch with 2 blind participants and 3 participants with a mild vision impairment. Their feedback and insights were imperative in shaping the final prototype.



# 2.2 Current Grocery Food Packaging

To apprehend the challenges of people with vision impairment, I visited the grocery store without my glasses on. I have short-sightedness (Myopia) with a power of -3.25 in both eyes. Without glasses, things at a distance appear blurred. Since Myopia is correctible by wearing glasses, contact lenses, or laser surgery, it is not considered a visual impairment. However, this experiment aimed to understand how the world appears to the visually impaired through approximate simulation.

I usually shop from **Joti's No Frills** (W. Broadway) and decided to stick to the same store for this experiment. I walked around the store and observed various packages both from a distance and up-close. From a distance, it was not easy to identify individual products. Too many colors, illegible fonts, low contrast between the colors and typography, and product images with a low depth of field made it increasingly difficult for me to differentiate between items. The soup can aisle was filled with packaging containing overwhelming images and tiny product names (**Figure 12**).

Ten minutes into the experiment, my eyes started to hurt, and I began to feel increasingly uncomfortable. It was hard to imagine the challenges faced by visually impaired people when scouring through the rows on inaccessible packaging.



**Fig. 12**  
Soup can aisle at Joti's No Frills



Even up-close, I found it difficult to read the information on many products. The Classico Florentine Spinach and Cheese Pasta Sauce use capital letters for the information and a center alignment and very tight line spacing (leading). Even on the back, the ingredients are listed in a capital case in a faint yellow font (Figure 13). Kraft also uses a capital condensed font in a wavy manner to list down the ingredients at the bottom of its Pizza preparation kit. The White font also has low contrast against the Orange background (Figure 14). Knorr’s Beef Instant stock mix uses various fonts in different orientations, which is hugely inconvenient to read (Figure 15). President’s Choice — The Decadent Chocolate Chip Cookie uses chocolate beans in the background, making the text difficult to read. Additionally, the image of the cookies is not visible against the busy background from a distance (Figure 16).

In summary, the following recurring issues were observed in the current food packaging labels

- Low contrast between background and typography
- Use of illegible typefaces
- Use of typography in extremely small sizes
- Lack of consistency in typography size, weight and orientation
- Inappropriate type setting - kerning and tracking
- Use of typography on cluttered images

These observations were validated by **Visually Impaired Designer’s (2020)** insightful YouTube video “**WHAT MAKES GOOD PACKAGING DESIGN? | Packaging Design for Beginners - What Not To Do**”. The video contains an in-depth survey of inaccessible grocery food packaging.



**Fig. 13**  
Classico Florentine Spinach & Cheese Sauce — back side of packaging



**Fig. 14**  
Kraft Pizza Preparation Kit — front side of packaging



**Fig. 15**  
Knorr Beef Instant Stock Mix — back side of packaging



**Fig. 16**  
President's Choice The Decadent Cookie — front side of packaging

Additionally, there is a serious lack of accessibility in food packaging for people with a severe vision impairment or blindness who cannot read the printed text at all. In a Polish study conducted with 250 blind and visually impaired participants, the following points were suggested to facilitate a better shopping experience **(Kostyra, E., Żakowska-Biemans, S., Śniegocka, K., & Piotrowska, A., 2017)**.

- Helpful shop staff
- Braille on products
- Label Readers
- Larger font sizes
- Consistent placement of products on shelves

## 2.3 Engaging with the Vision Impaired Community

I used the method of approximate simulation at various stages in the project — preliminary research, prototyping and testing. However, I understood the importance of speaking to visually impaired participants in conjunction with my other methods.

I hoped to engage a small but substantial number of 5 visually impaired participants since I was aware that it would be difficult to get in touch with participants in the middle of the COVID pandemic. It made sense to engage with participants in Canada or the U.S. as I was referring to Canadian packaging guidelines and studying grocery packaging in Canadian stores.

I had planned a virtual semi-structured interview with participants to understand the participants' challenges with grocery shopping and food packaging in the summer of 2020. The interview was to be followed by a packaging analysis session. As a part of this, participants would be asked to pick 5 packaged products from their kitchen and then discuss them in terms of aesthetics and accessibility.

Apart from the interview, I also wanted to carry out a small photo documentation exercise with participants to understand their perception of beauty and aesthetics. Here, participants would be expected to take photographs of 5 visuals/objects/ packaging that they found visually appealing and then discuss their choices in depth over a virtual interview.



Since I was dealing with a vulnerable population, I ensured that there would be minimal physical or mental risks to participants and also outlined a plan for mitigating any potential risks that may arise from my research. The Research Ethics Board of Emily Carr University of Art + Design approved my virtual participant engagement plan.

As anticipated, the COVID pandemic made it challenging to get in touch with participants from the confines of home. I first reached out to visually impaired artists and designers on platforms like Instagram and YouTube. Only a handful responded. While the respondents seemed interested initially, they stopped communicating after I sent out the consent-form outlining the participant activities. This sudden withdrawal was quite disheartening. I assume the participants did not have enough time to participate in all activities. Additionally, it was challenging to communicate effectively and build a meaningful connection with participants in a virtual space. As an independent student researcher, I also did not possess the same credibility as a prominent research organization.

After my initial tries to reach out to individuals, I approached non-profit organizations working with visually impaired and blind people. To my surprise, they were quicker with their responses. I was successful in recruiting two blind participants who worked in one of the organizations. Within the organization, the two participants offered training to visually impaired youth in areas such as leadership, team building, public speaking, communication, life skills, personal budgeting, and career planning. Since they had limited time on their hands, I went ahead only with a semi-structured interview.

Both participants preferred in-store shopping since it offered more choices compared to online shopping. Additionally, online shopping is expensive for a handful of things. They usually

shopped from a familiar store but wanted the agency to shop even in an unfamiliar store without any assistance.

## The participants stressed the need for the product name to be printed in Braille to figure out each product by merely holding it in hand.

Apart from the blind participants, it was also imperative to speak to people who had mild vision impairment. It was a lot harder to find people in this category. I finally decided to focus on people whose vision had started to diminish due to age. I had much better access to this group, both in Emily Carr and back home in India. I was able to speak to three participants, two of which were professors at Emily Carr University of Art + Design. The third one was a family member from back home in India. Since I knew all three participants on a more personal level, I was more comfortable and found it easier to ask them questions in greater detail. They were also more responsive and engaged in the study.

All three participants found it challenging to read tiny text on the packaging. One participant mentioned that the aesthetics of the packaging influenced the purchase decision.

Both groups of participants re-iterated that accessible packaging will increase their independence considerably. It will also allow them to make well-informed food purchases.

Insights from the semi-structured interviews were vital in shaping my final prototypes.

As planned, I was eventually able to engage with a total of 5 visually impaired participants. Microsoft's Inclusive Design principles emphasize that solutions designed for a smaller group can in fact benefit a much larger audience (**Microsoft, 2019**). However, I feel that the research can benefit from a larger sample size in the future.

From my experience, I felt that it was easier to interview people with a mild vision impairment in a virtual space. Even sharing my designs was more convenient as I could easily zoom into a portion of the screen. However, the process was more challenging with blind participants. I was only able to describe my ideas to them in a virtual space.

## 2.4 Existing Accessibility Guidelines

After clearly realizing the need for accessible packaging and finding its lack thereof, I set out to study existing accessibility guidelines. While there are innumerable accessibility guidelines for the web and print, I was disappointed by the unavailability of guidelines specific to packaging. As a result, my approach was to adapt web and print accessibility guidelines to packaging design.

The **World Wide Web Consortium (2019)** outlines extensive guidelines for the web. It suggests adding text descriptions for non-text content such as images, graphics, icons, and buttons. There should be sufficient contrast between the foreground and background color to ensure the legibility of information. The contrast can be determined by converting the artwork to Grayscale. Additionally, color should not be used as the only identifying element as vision impairments can also affect people's perception of color. In contrast to this guideline, most packaging designs use color as the sole element to differentiate between flavors/ variants in the same product range. The **World Wide Web Consortium** further recommends that text and images should be re-sizable. While this system works for digital communication, it is impossible to resize pictures and text as per the viewer's preference in printed communication. Furthermore, the user interface and navigation should be consistent on different pages to avoid disorienting visitors. There is usually no consistency between the placement of essential information on even packaging belonging to the same brand. Data is usually laid out as per the format of the packaging and the available space.

**Accessibility 2: A Practical Handbook on Accessible Graphic Design**, produced by the **Registered Graphic Designers of Ontario (2019)**, outlines practical guidelines and resources to make Graphic Design more accessible for different audiences. The handbook explains ways to make better typography choices for accessibility by considering character height and width, stroke contrast, weight, apertures, and counter forms (**Figure 17-19**). It also discusses typesetting considerations such as tracking, leading, alignment, and letter case. The book recommends commonly used typefaces such as Arial, Calibri, Helvetica, Times New Roman, and Verdana for people with vision impairments.

Apart from the above typefaces, the **American Council of the Blind** also recommends typefaces such as Tahoma, Futura, and Gotham Rounded in at least an 18 point size and line spacing of 1.5 for large print documents. A left text alignment works best for vision-impaired readers. Double bolding or underlining can be used to emphasize specific words. The use of color or italics does not work for low vision readers.

The above guidelines provided a starting point for my design explorations.



Image from: [https://www.rgd.ca/database/files/library/\\_RGD\\_AccessAbility2\\_Handbook\\_AbleDocs.pdf](https://www.rgd.ca/database/files/library/_RGD_AccessAbility2_Handbook_AbleDocs.pdf)

**Fig. 17**  
Accessible Typography  
from Accessibility 2:  
A Practical Handbook  
on Accessible Graphic  
Design by RGD Ontario  
(2019), page 22

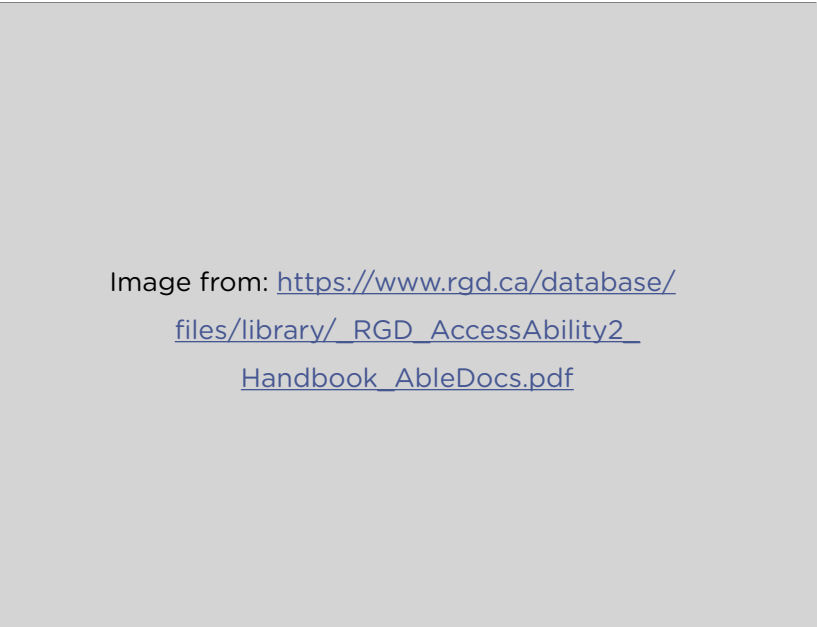


Image from: [https://www.rgd.ca/database/files/library/\\_RGD\\_AccessAbility2\\_Handbook\\_AbleDocs.pdf](https://www.rgd.ca/database/files/library/_RGD_AccessAbility2_Handbook_AbleDocs.pdf)

**Fig. 18**  
Accessible Typography  
from Accessibility 2:  
A Practical Handbook  
on Accessible Graphic  
Design by RGD Ontario  
(2019), page 23



Image from: [https://www.rgd.ca/database/files/library/\\_RGD\\_AccessAbility2\\_Handbook\\_AbleDocs.pdf](https://www.rgd.ca/database/files/library/_RGD_AccessAbility2_Handbook_AbleDocs.pdf)

**Fig. 19**  
Accessible Typography  
from Accessibility 2:  
A Practical Handbook  
on Accessible Graphic  
Design by RGD Ontario  
(2019), page 24

# 3. Design Outcomes

3.1 Packaging for people with mild and moderate vision impairment
3.2 Packaging for people with severe vision impairment and blindness
3.3 Final Prototype

This chapter describes the process of developing studio-based packaging prototypes for people with different levels of vision impairment. I make revisions to the prototypes based on insights gathered from interviews with participants and design professionals. I then present the final packaging prototype for an accessible grocery food brand.

## 3.1 Packaging for people with mild and moderate vision impairment

3.1.1 Functional Packaging
3.1.2 Functional + Aesthetic Packaging
3.1.3 Functional + Aesthetic + Appetizing Packaging

According to the **World Health Organization (2018)**, people with a visual acuity worse than 6/12 have a mild vision impairment. Those having a visual acuity worse than 6/18 have a moderate vision impairment. People with mild and moderate vision impairments are still able to depend on their vision. They are able to read the packaging label on food products to some extent. As such, my first step was to improve the graphics of the existing food packaging to make it more accessible to this target group. The following three sections outline my experiments in this direction.



# 3.1.1 Functional Packaging

Having studied the existing accessibility guidelines for web and large print documents, I attempted to re-design a few food products using some of those guidelines.

Based on my previous visit to the grocery store, two categories were chosen at random for this re-design exercise — chicken drumsticks and prepared pasta packaging. Both have a distinct packaging format. Chicken drumsticks are packed in a tray with a transparent cling film on top, whereas ready-to-eat pasta comes in an opaque box or pouch. Since the pasta is available in different flavors, it is challenging to distinguish between them.

Packaging design decisions are also partly driven by the product placement on store shelves. Chicken drumsticks are placed flat in the cold storage section. Many times, multiple packs are stacked on top of each other (Figure 20). It is not easy to read the tiny information from a distance, and it is necessary to pick up the item to read the expiry date and quantity. Most packs use a small vertical label on the left. The chicken is visible through the rest of the transparent cling film. The President’s Choice pack has a lot of tiny information on the label (Figure 21). The expiry date and net weight placed on separate labels are relatively hard to locate and read.



**Fig. 20**  
Stacked Chicken drumsticks packs at Joti’s No Frills (W. Broadway, Vancouver)



**Fig. 21**  
President’s Choice Chicken drumsticks pack



For the re-design, I used a Black tray against which the chicken was visible. The vertical format of the label was retained (Figure 22). To ensure maximum contrast and legibility against the Black background, I chose Yellow as the packaging’s primary color (Arditi, A.). I used Helvetica typeface for the text as recommended by the Journal of Visual Impairment and Blindness (Russell-Minda, E., Jutai, J. W., Strong, J. G., Campbell, K. A., Gold, D., Pretty, L., & Wilmot, L., 2007, p.13). The product name, expiry date, and net weight were printed in large font size on the label, and a distinct price tag was placed on the right. Additionally, the label also contained a drumstick icon indicating the number of drumsticks in the pack.



**Fig. 22**  
Re-design of Chicken drumsticks packaging

The ready-to-eat pasta packs contained photographs with a low-depth of field and poor contrast against the background color. Such images appear fuzzy to people with vision impairment (Figure 23). Additionally, script fonts on the pack make it challenging to read essential information.



**Fig. 23**  
Prepared Pasta aisle at Joti’s No Frills (W. Broadway, Vancouver)

The pasta packs were re-designed using the same principles as the chicken drumsticks packaging (Figure 24). Product images were replaced with icons to ensure clarity even from a distance.



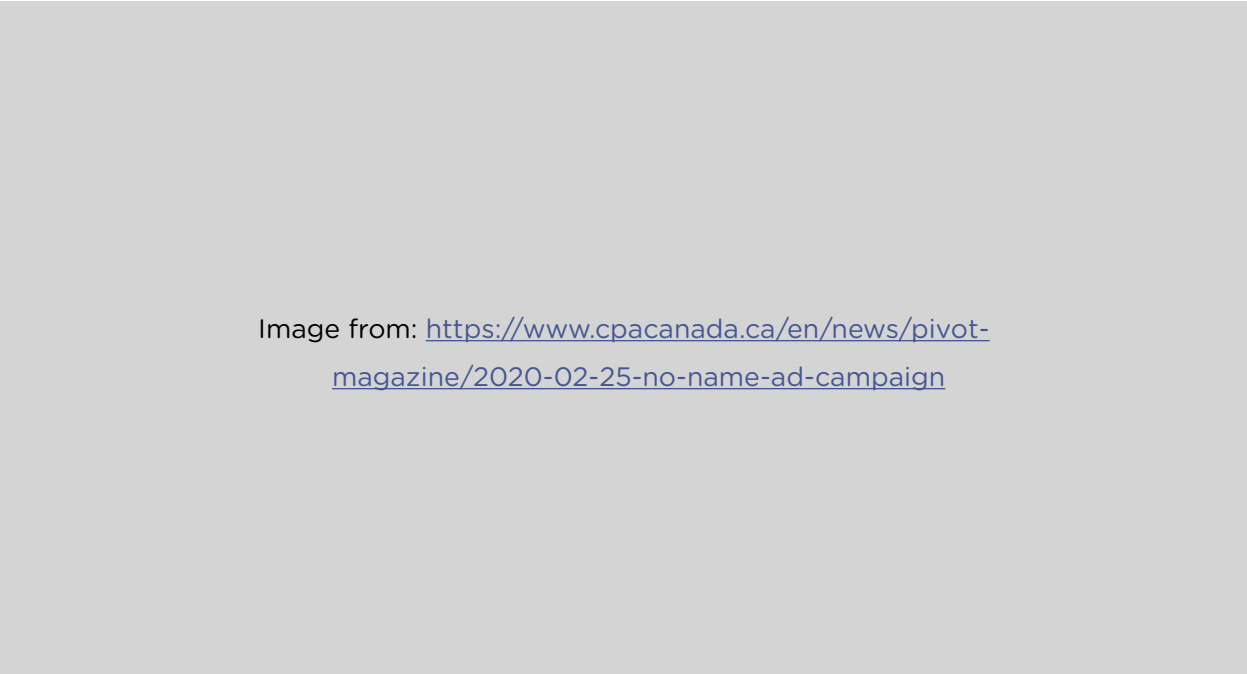
**Fig. 24**  
Re-design of prepared  
Pasta packaging

The re-design unintentionally resembled the Canadian food brand — **No Name**. The No Name brand also uses a Yellow and Black color scheme. It follows a similar Swiss design aesthetic (Figure 25). “Swiss Designs are clean, minimalistic, and objective. The Swiss-style rejects the “privilege and subjectivity of the artist.” and “embraces modernity and the clarity and anonymity of machine-based design” (Bigman, A., 2016). The New York City Subway signage system is a famous example of the Swiss-style (Figure 26). However, packaging design differs significantly from signage design. While signages are supposed to be strictly functional, packaging design needs to be aesthetically appealing and marketable.

In **Really Good Packaging Design Explained (Bronwen Edwards, & Al, E, 2009, p. 13)** Marianne Klimchuk defines excellence in packaging as “translating a design strategy into one that can be processed, produced, and be profitable; that is eco-friendly, innovative, and marketable; that represents quality, safety, protection, function, reliability, effectiveness; and that is cogent, attention-grabbing, and appealing makes really good design that much more laudable”.

Great packaging “tells a story” and “gives the brand a sense of place”.

Rob Wallace in Really Good Packaging Design Explained (Bronwen Edwards, & Al, E., 2009)



**Fig. 25**  
No Name Brand Packaging from www.cpacanada.com

The Swiss-style focuses on sameness, and hence an accessible packaging system based on it will not create sufficient visual distinction between various brands on the grocery store shelves.

Being mindful of this inherent difference between packaging and other forms of Graphic communication, I thus decided to focus on both the functionality and visual appeal of the packaging.

Image from: <https://www.zdnet.com/article/bob-noorda-co-designer-of-nyc-subway-systems-iconic-look-dies-at-82/>

**Fig. 26**

New York city subway signs from  
[www.zdnet.com](http://www.zdnet.com)

## 3.1.2 Functional + Aesthetic Packaging

For this project, my goal was to develop accessible packaging that is aesthetically appealing. I also wanted to work on multiple products within the same category instead of focusing on single products. This is because the product range in the food category is diverse and complex.

A food item usually comes in various flavors and types. For instance, there are different milk varieties, such as plain milk, almond milk, soy milk, chocolate milk, etc. Plain milk is also available with varying percentages of fat. It is essential to apply a consistent visual aesthetic across all products belonging to the same category. Additionally, there should be uniform visuals among different categories belonging to the same brand. The uniform, recognizable visual elements that are unique to a brand are termed the packaging architecture.

**Packaging architecture  
“helps build consumer  
relationships with brands  
because it leverages  
emotional responses”.**

Mininni, T., 2013

**Knorr** has a simple packaging architecture with two colored bands behind the logo. The top band indicates the category color, and the lower band indicates the flavor of the product within each category. An image is then placed below the two bands. There is consistency in the photography style within each category. The soup category has a top-view photo of the soup in a white bowl (**Figure 27**). Ingredients suggestive of the flavor are attractively placed around the soup. The seasoning range also contains a top view image of food in a bowl. Additionally, it contains a see through window (**Figure 28**).



**Fig. 27**  
Knorr soup range from [www.knorr.com](https://www.knorr.com/ca/en/knorr-products.html) (Canada)



**Fig. 28**  
Knorr soup range from [www.knorr.com](https://www.knorr.com/ca/en/knorr-products.html) (Canada)

It is essential to consider packaging architecture and work towards an accessible packaging system that works well across a diverse range of products. To explore this in detail, I picked the **Kraft Shredded Cheese** packaging. Kraft offers Mozzarella and Colby Jack cheese in a shredded and finely shredded format (**Figures 29 and 30**). It also offers Mild and Sharp Cheddar cheese in the same formats (**Figure 31 and 32**).



**Fig. 29**  
Kraft shredded and finely shredded Mozzarella cheese packaging from [myfoodandfamily.com](https://www.myfoodandfamily.com)



**Fig. 30**  
Kraft shredded and finely shredded Colby Jack cheese packaging from [myfoodandfamily.com](https://www.myfoodandfamily.com)



Image from: <https://www.myfoodandfamily.com/brands/kraftcheese/products/20002/shredded-cheese>

**Fig. 31**  
Kraft shredded and finely shredded Mild Cheddar cheese packaging from myfoodandfamily.com

Image from: <https://www.myfoodandfamily.com/brands/kraftcheese/products/20002/shredded-cheese>

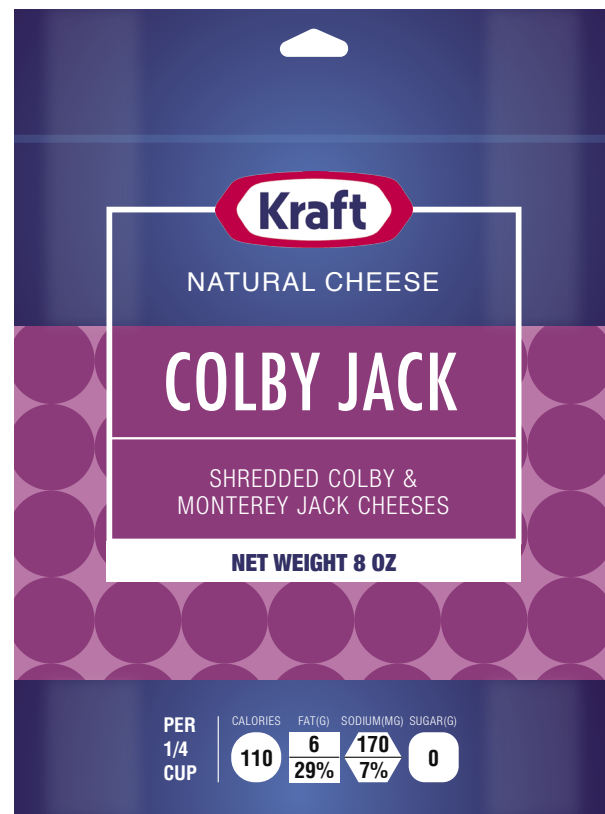
**Fig. 32**  
Kraft shredded and finely shredded Sharp Cheddar cheese packaging from myfoodandfamily.com

The transparent window on the packaging is not effective in creating a clear differentiation between the different cheese. Additionally, a simple color-based distinction might not work well for people whose color perception is affected due to their vision impairment. The finely shredded variety is marked by illegible text.

I attempted to create a more robust visual distinction between the various types of cheese in the complex shredded cheese range. I retained the iconic Blue color associated with the Kraft brand and stuck with each cheese type’s original colors. To move away from a singular distinction model based on color, I used a unique pattern for each type of cheese. Denser versions of the same patterns were used for the finely shredded packs. The current typeface was replaced by Helvetica (**Figures 33-36**).



**Fig. 33**  
Re-design of Kraft shredded and finely shredded Mozzarella cheese



**Fig. 34 (Left Top)**

Re-design of Kraft shredded and finely shredded Colby Jack cheese

**Fig. 35 (Left Bottom)**

Re-design of Kraft shredded and finely shredded Mild Cheddar cheese

**Fig. 36 (Above)**

Re-design of Kraft shredded and finely shredded Sharp Cheddar cheese

The re-design solved the readability issues with the original packaging. The patterns helped create a more substantial distinction between the various types of cheese and added an aesthetic appeal to the packs. On sharing and discussing my design with an accessibility designer, I realized that the re-designed pack did not look as appetizing as the original due to eliminating the grated cheese image and the see-through window.

## A significant goal of food packaging is to make the product look mouth-watering.

Food packaging differs from other categories such as health and beauty products in this manner. This absolute criterion cannot be overlooked when designing accessible food packaging. Hence, moving forward it was also important to focus on making the product look appetizing.

### 3.1.3 Functional + Aesthetic + Appetizing Packaging

After my previous experiment with a small shredded cheese range, I was eager to explore an accessible packaging system that could work across multiple products and categories.

In North America, big grocery retailers also have their brands. For instance, Walmart has its food brand called **Great Value** (Figure 37). Additionally in Canada, big brands like **President's Choice** (Figure 38) and **Western Family** (Figure 39) have hundreds of products spanning various categories.

Image from: <https://www.walmart.ca/brand/great-value/1019684>

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**Fig. 37**

Great Value products

Image from: <https://www.presidentschoice.ca/products?navid=products>

**Fig. 38**  
President's Choice products

Image from: <https://www.westernfamily.ca>

**Fig. 39**  
Western Family products

Great Value, President's Choice, and Western Family have a consistent typeface across all their products. All three brands market themselves as friendly and affordable. President's Choice and Western Family use White as their primary color combined with patches of other colors. Great Value packaging is also predominantly White. However, the color changes for specific products.

After studying the three brands in detail, I set out to design a fresh accessible grocery food brand consisting of necessary products such as bread, soup, milk, and packaged salads that are consumed by most people. I decided to start my explorations with bread packaging.

I looked at the current Great Value bread packaging. Essential information is inappropriately placed at the bottom (**Figure 40**). The photographs of the White and Brown bread sandwiches on the respective packs are not distinct from each other. These issues needed to be addressed in the new design.

Image from: <https://www.walmart.ca/en/ip/great-value-100-whole-wheat-bread/6000191270627>

Image from: <https://www.walmart.ca/en/ip/great-value-enriched-white-bread/6000191270624>

**Fig. 40**  
Great Value Brown and White bread



Like the precedents, I, too, decided to stick to a standard typeface across all products. Consistent typography can often act as a recognizable brand element. I referred to the **Accessibility 2: A Practical Handbook on Accessible Graphic Design (2019)** for guidelines on choosing the appropriate typeface. After experimenting with a few typefaces (**Figure 41**), I zeroed in on the typeface **P22 Mackinac Pro Bold** from **Adobe Typekit** for the product name, which was both legible and visually appealing. In Canada, mandatory information on the packaging label needs to be printed in both English and French (**Government of Canada, C.F.I.A., 2015**). Numbers, however are considered bilingual and can appear only once.

Whole Wheat  
Blé Entier

Embury Text Black

Whole Wheat  
Blé Entier

P22 Mackinac Pro Extra Bold

Whole Wheat  
Blé Entier

Alverata Black

Whole Wheat  
Blé Entier

Ivy Journal Bold

Whole Wheat  
Blé Entier

Menotext Bold

Whole Wheat  
Blé Entier

Antique Olive Bold

**Fig. 41**  
Typeface explorations for the product name

I worked on a simple layout for the product name, which could be consistently applied to other categories (**Figure 42**). The eye symbol on the left served as the logo for my accessible brand.



**Fig. 42**  
Basic wireframe for bread packaging

I deliberately set apart the textual information from the rest of the visual elements to ensure maximum clarity and legibility. Drawing from my previous experiment, I chose a pattern and color based system to establish a clear distinction from the Brown, White and Multi-grain bread on multiple levels (Figure 43). Since the bread is visible through the see-through packaging, I did away with the sandwich photo. Instead, I added the photo of appropriate ingredients in a scoop to make the pack visually appealing and appetizing.



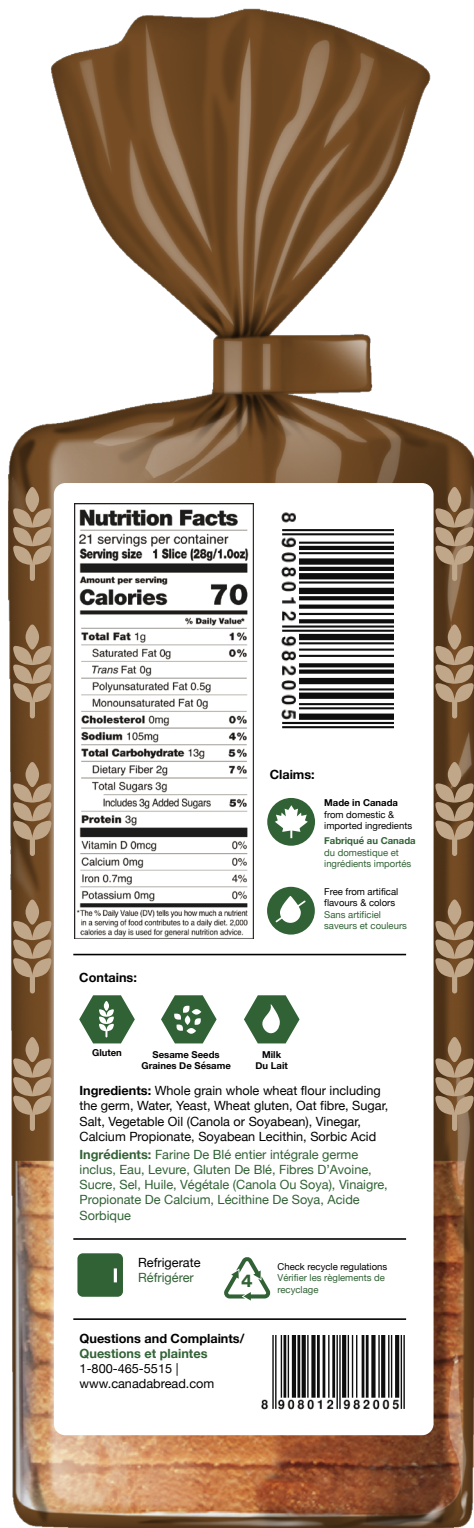
**Fig. 43**  
Bread packaging design

This time it was equally important to focus on the back of the packaging. The packaging’s back usually contains mandatory information such as nutritional facts, ingredients, brand claims, storage instructions, manufacturer name, and address. Apart from the nutritional facts table, there is no consistency in the order and layout of the information on different products.

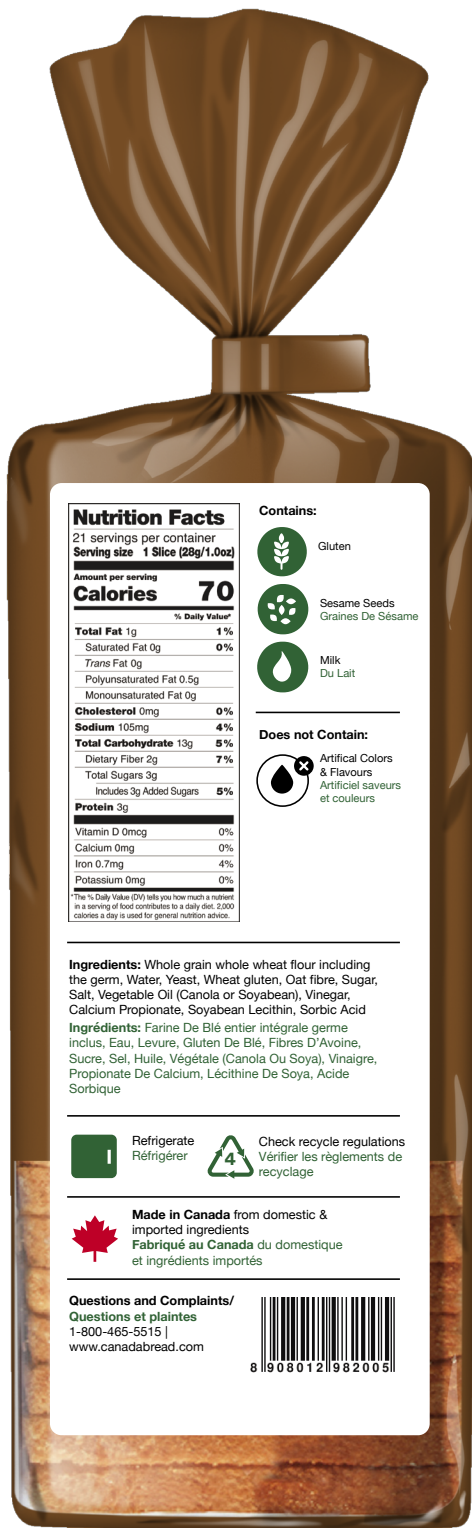
I attempted to design a system that could be applied consistently across various products. To reduce dependence on the tiny printed text on the back, I explored a visual system (Figure 44).

Icons of varying shapes were used for different categories of information — circles for claims, hexagon for allergy-causing ingredients, and squares for storage instructions.

To further reduce the number of visual elements, I regrouped the information. The allergens and claims section were combined to create a primary section that visually summarized the product’s contents. (Figure 45).



**Fig. 44**  
Design of the back of the bread pack



**Fig. 45**  
Revised design of the back

Based on the same system, I also worked on canned soup packaging (**Figure 46**). Since the cans are not see-through, it was essential to add a photograph of the soup to make the pack look tempting. A table-cloth inspired pattern was used to create a homely vibe. It was challenging to adjust the layout on the back of the bread packaging to the soup can's size and shape (**Figure 47**).



**Fig. 46**  
Soup Packaging Design



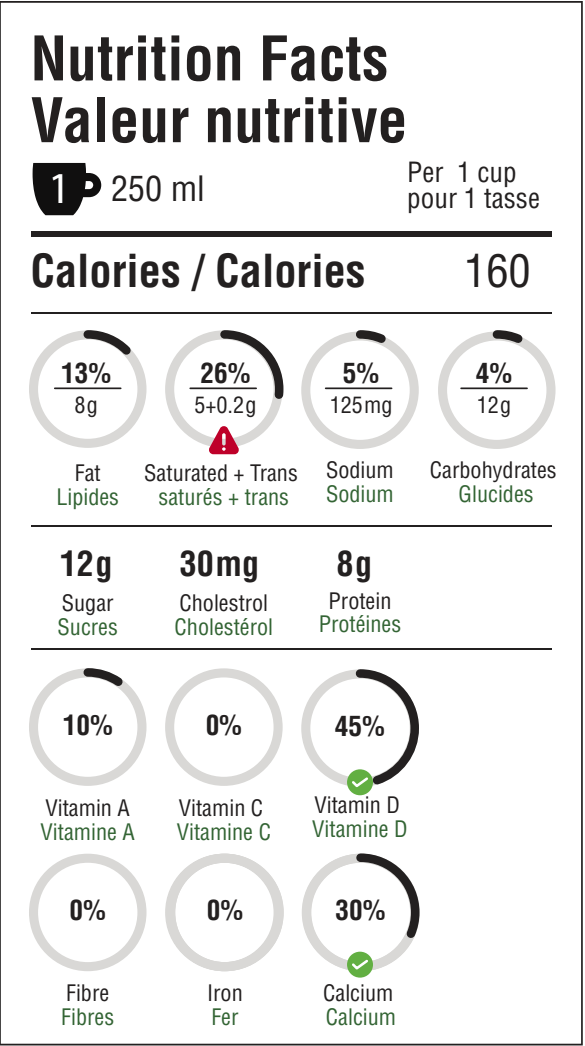


**Fig. 47**  
Design of the back of the soup packaging

I also relooked the design of the nutritional facts table (**Figure 48**). A standard format of the text-based table is consistently used on all products. Like the rest of the information, I explored a visual format for the table (**Figure 49**). The re-design makes it easier to compare nutrient values by using a pie-chart like a format. It also has room for warning signs to indicate higher than prescribed levels of an ingredient.

Nutrition Facts Valeur nutritive	
Per 1 cup (250 ml) / pour 1 tasse (250 ml)	
Amount Teneur	% Daily Value % valeur quotidienne
Calories / Calories 160	
Fat / Lipides 8 g	13 %
Saturated / saturés 5 g + Trans / trans 0.2 g	26 %
Cholesterol / Cholestérol 30 mg	
Sodium / Sodium 125 mg	5 %
Carbohydrate / Glucides 12 g	4 %
Fibre / Fibres 0 g	0 %
Sugars / sucres 12 g	
Protein / Protéines 8 g	
Vitamin A / Vitamine A	10 %
Vitamin C / Vitamine C	0 %
Calcium / Calcium	30 %
Iron / Fer	0 %
Vitamin D / Vitamine D	45 %

**Fig. 48**  
Existing format of nutritional information table



**Fig. 49**  
Revised visual format of nutritional information table

## 3.2 Packaging for people with severe vision impairment and blindness

### 3.2.1 Addition of Technology

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According to the **World Health Organization (2018)**, people with a visual acuity worse than 6/60 have a severe vision impairment. Those having a visual acuity worse than 3/60 are considered blind. People with severe vision impairments and blindness cannot depend on their vision at all. Hence their challenges are very different. Their challenges and requirements are hence, very different from those of people with a mild or moderate vision impairment. The following chapter outlines my attempt to modify my previous design explorations to accommodate the needs of people with severe vision impairment and blindness.

### 3.2.1 Addition of Technology

People with severe vision impairment or blindness usually depend on the assistance of store employees for grocery shopping. However, store employees might not always be helpful or available. This lack of agency in grocery shopping leads to a feeling of dependence.

When shopping independently, they use assistive technology on their smart-phone.

Applications such as **Tap Tap See** and Google's **Lookout** identify grocery store products by pointing the phone camera and then playing aloud an audio description of the product.

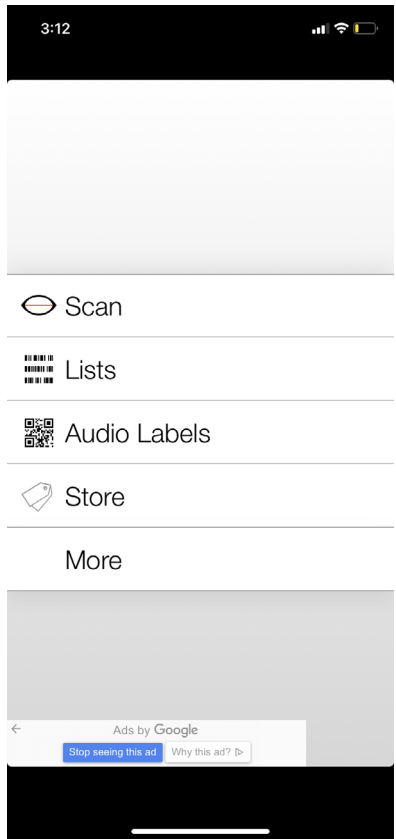
Other applications such as Microsoft's **Seeing AI (Figure 50)**, **KNFB reader**, and **Digit Eyes (Figure 51)** convert text printed on the back of the packaging to audio using the text-to-speech technology. In a Polish study conducted with 250 blind and visually impaired participants, 2/3 found label readers useful (**Kostyra, E., Żakowska-Biemans, S., Śniegocka, K., & Piotrowska, A., 2017**).

However, these applications read out the text line by line. This method is useful when reading a document or other organized pieces of text such as pamphlets or receipts. When it comes to food packaging, people might not necessarily want to listen to the information line by line. Only a particular section of information such as ingredients or nutritional facts might be of interest. In such a case, it is somewhat cumbersome to listen to the entire audio.



**Fig. 50 (left)**

iPhone interface of  
Seeing AI app



**Fig. 51 (right)**

iPhone interface of  
Digit-Eyes app

This gap in the existing technology provided an opportunity for my design explorations. I wanted to create an interface that would give visually impaired users the agency to choose the specific information of their interest. Such technology also needed a scan-able aspect on the pack.

QR codes have been used for a few years to encode data usually scan-able by a smart phone. During the COVID pandemic, QR codes have been used increasingly in restaurants to access the online menu, limiting the spread of the virus through hand-held menus. I felt the size and function of QR codes would perfectly fit food packaging. Additionally QR codes are a more accessible and familiar option, particularly for those who are not technologically savvy.

I revised the bread and soup packaging to add a QR code on the back (**Figure 52**).

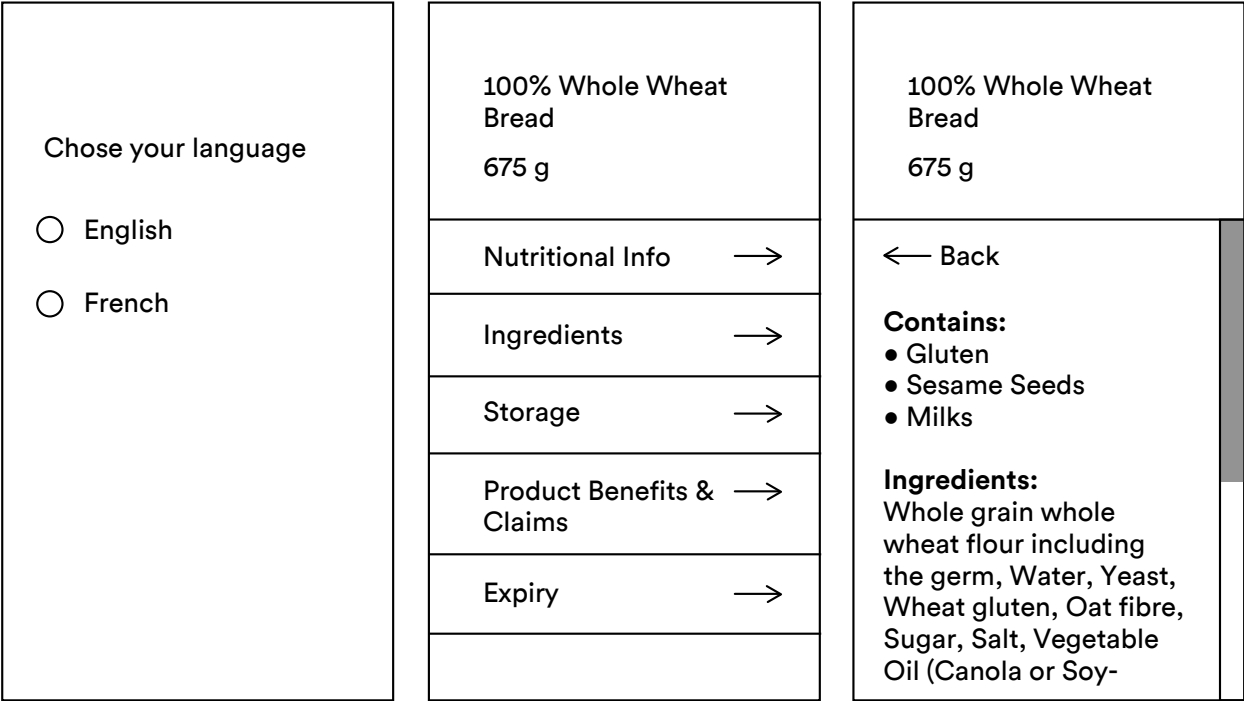


**Fig. 52**

Addition of a scan-able  
QR code on the back  
side of the packaging

I also developed a rough wireframe for the interface, which would appear upon scanning the barcode (Figure 53). Upon scanning the code, all information will be displayed on the screen and also read aloud. Users will be able to make a language selection in the beginning. They will then hear the product name and be able to make a specific selection post that.

A US and Canada based company called SmartLabel® uses a similar concept. A scan-able QR opens a web link that allows consumers a way to digitally access more detailed product information. However, it is inaccessible to people with vision impairment as the information is displayed only in text format and the design of the web page does not allow it to be fully read by a screen reader application.



**Fig. 53**  
Wireframe of the interface that appears on scanning the QR code on the packaging

### 3.3 Final Prototype

The final prototypes were based on interviews and user-testing with 2 blind participants and 3 participants with a mild vision impairment (Refer to section 2.3). I also considered feedback received from classmates, professors, and design professionals and accordingly made revisions to the previous prototypes.

**Front of the pack:**

Firstly, I added a horizontal line to create a clear distinction between the English and French product names. Product names were also added in Braille to allow people with severe vision impairment and blindness to recognize products merely by holding it in hand quickly. I referred to the sizing and spacing guidelines stated by the **Braille Authority of North America (Dixon, J., 2010)** while incorporating Braille on the pack.

**Back of the pack:**

The blind participants were excited about the QR code and mentioned that it would make their grocery shopping experience much better. However, it was essential to add a tactile element to indicate the QR code placement on the pack. A small triangular tactile element was added near to the QR code. Even participants with mild vision felt that the QR code would be a quicker way of accessing essential information on the packaging.

Participants with a low vision impairment preferred the visual nutritional table as it was easier to scan through quickly. Hence the nutritional table on the back was replaced accordingly.

The revised designs are displayed on the following pages (Figures 54 and 55)



Fig. 54  
Revised bread packaging

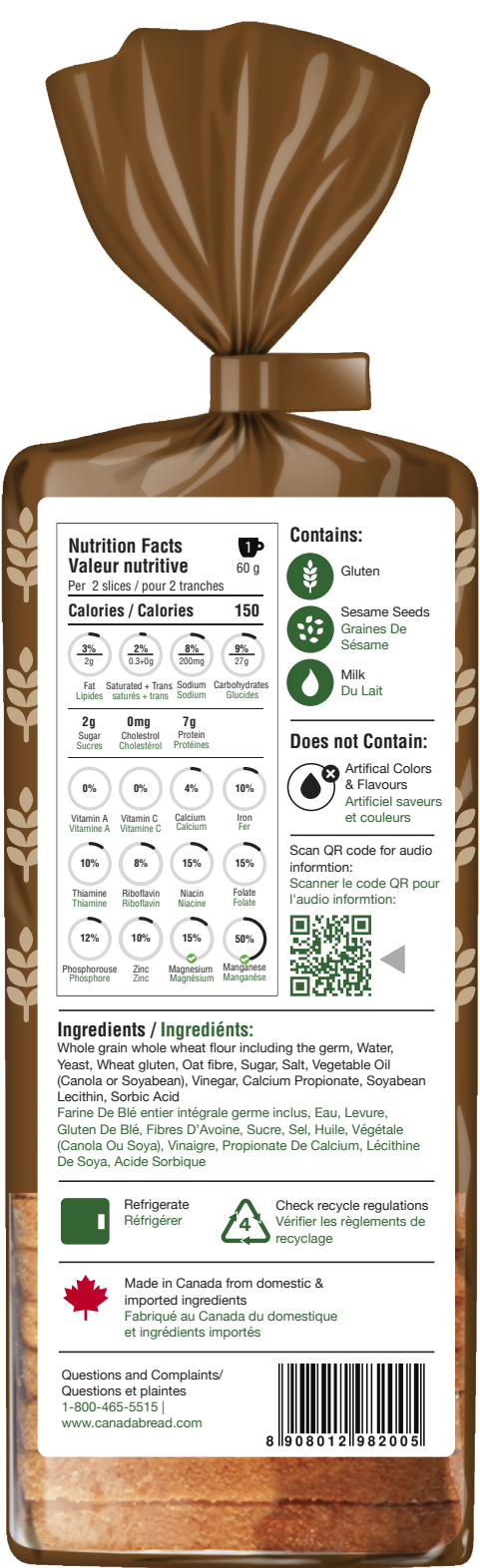




Fig. 55  
Revised soup packaging





An alternative proposal could be to place the QR code on grocery store shelves along with the price tag instead of the packaging (Figure 56). This consistent placement would help quickly locate the QR codes. However, access to information would also be limited to the store in this case.

Fig. 56  
Alternative QR code placement



I further extended the accessible packaging system to a few more products such as Milk and packaged salad. (Figures 57-60).

Fig. 57  
Milk packaging



Fig. 58  
Milk packaging (continued)

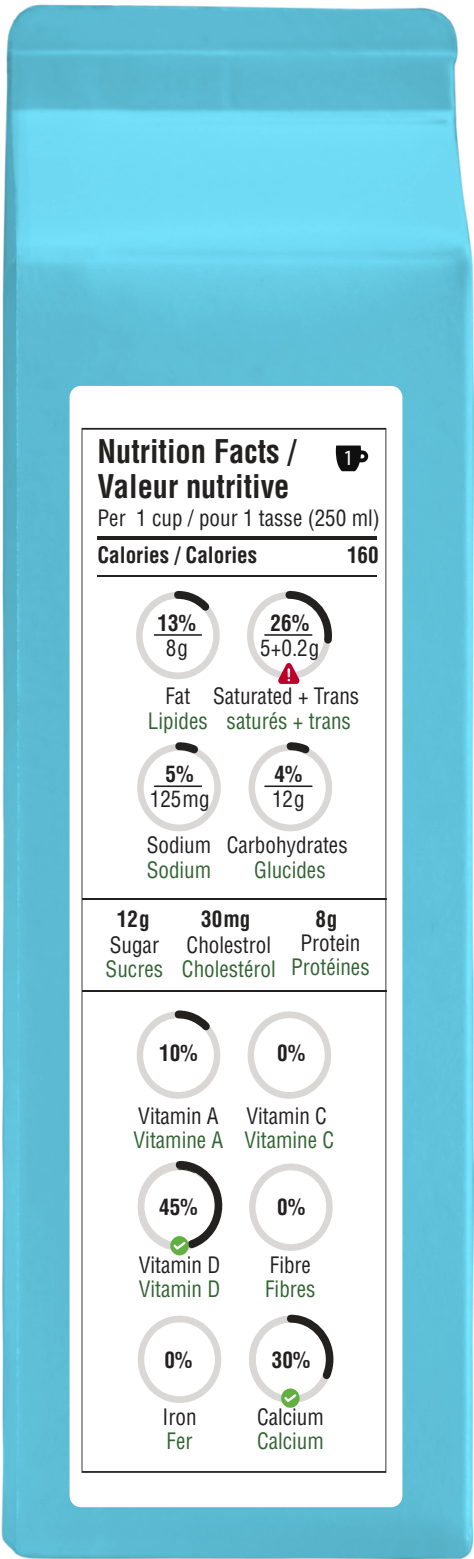




Fig. 59  
Salad packaging







**Fig. 60**  
Collective packaging

I also worked on a high fidelity mockup of the application used to scan the QR code (Figure 61). The interface is simple and straightforward to suit a visually impaired audience. Black, White, and Yellow were chosen as the primary colors to ensure maximum contrast between the background and foreground

All information on the application is read out loud. Each button in the application is a two-click button. On pressing the button once, the application reads aloud the text contained within it, followed by the word ‘button’. This feature allows visually impaired users to recognize a button and then click it again. Two-click buttons are commonly used in mobile applications for people with vision impairments and are familiar to most users.

On opening the application for the first time, users can choose their preferred language. Based on suggestions from the studio faculty and classmates, I also expanded the language offerings to include more languages such as Hindi, Chinese, etc, to engage the multi-cultural audience in Canada. This feature can also benefit all shoppers whose first language is not English or French.

Next they point the phone in the direction of the QR code. The phone keeps beeping until they locate the QR code, at which point the application says “QR code detected”. It then reads out loud the name of the product. Listed below are buttons for different categories of information —Nutritional Table, Ingredients, Claims, Cooking Instructions, Expiry, Contact and Brand. Users can click and choose the information they want to access.

Users can set a reminder for the expiry of the product within the ‘Expiry’ section

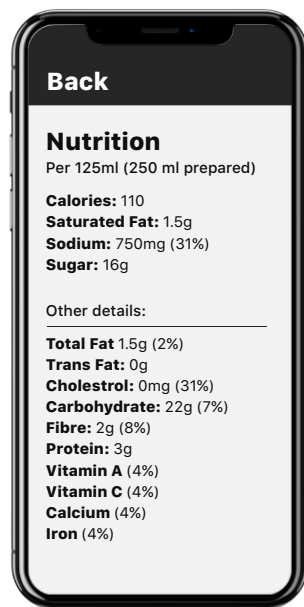
The ‘Brand’ section allows the user to know more about the brand behind the product. This could help foster a stronger connection and loyalty between the user and the brand.

More screens of the application can be seen in Figures 62-68.

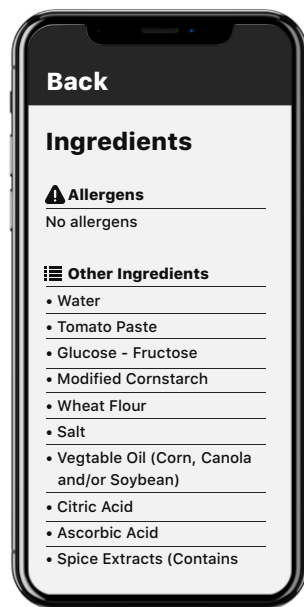
The management of this application could be done by a third-party. This third party can handle the data for various brands. This database of different brands can also be helpful to shoppers who are not visually impaired. It can enable people to filter and search products based on their preferences.



**Fig. 61**  
Basic interface of the mobile application to scan the QR code



**Fig. 62**  
Nutrition Facts screen



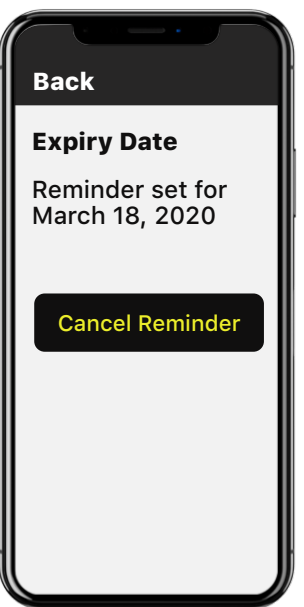
**Fig. 63**  
Ingredients screen



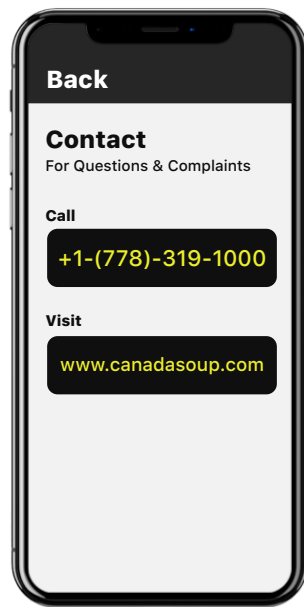
**Fig. 64**  
Claims screen



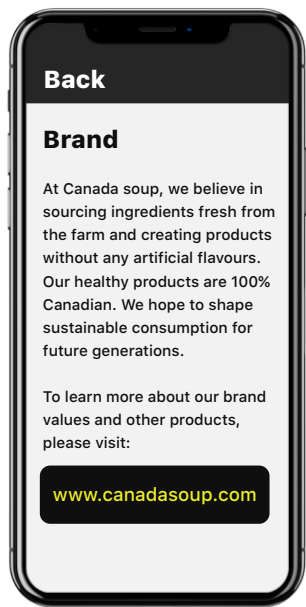
**Fig. 68**  
Expiry screens



**Fig. 65**  
Cooking Instructions screen



**Fig. 66**  
Contact screen



**Fig. 67**  
Brand screen

## 4. Conclusion

### 4.1 Reflection

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### 4.2 Future Directions

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In this chapter, I write down personal reflections about accessible packaging design encountered through the course of this project. I also outline the immediate and long-term next steps in the direction of this research.

## 4.1 Reflections

Through this research, I have developed packaging prototypes that attempt to tackle challenges with different vision impairment levels. First, I focused on the graphics of the packaging to meet the needs of people with mild vision impairment. Later, I added Braille and a scan-able QR code on the packaging for people with severe vision impairment or almost no vision.

Here are some of my key reflections during the research:

- Several organizations, both big and small, are making accessibility a top priority. Microsoft's recent Xbox adaptive controller is one such example. However, more organizations need to take this step. My current grocery food packaging survey revealed that most of the products were inaccessible to people with vision impairments. It is high time organizations and designers start to consider different audiences' needs when designing their products. Lack of accessibility makes the lives of disabled people even more challenging.
- It is crucial to speak to the concerned audience about their challenges. Often their needs and demands are more straightforward than what designers assume. During my research, I assumed that it is essential for all information on the packaging to be displayed in Braille. However, upon speaking to the blind participants, I realized that it was sufficient for them to have only the product name in Braille. Once they had identified the product, they could



use their smartphones to access all other information. Designers should be careful not to over-complicate simple needs of their target audience.

- It is challenging to design one single solution to appeal to people with different levels of vision impairment. However, during my research, I realized that the text-to-speech converting QR code used for people with severe vision impairments can also benefit people with low vision impairments. I now feel it is better to start designing for the most challenging audience. That can indirectly benefit people with minor challenges as well. The **Accessibility 2: A Practical Handbook on Accessible Graphic Design (2019)** also recommends designing for the outliers. Additionally, the QR code can also be useful to people who speak languages other than English and French. This unintentional value reinstates the fact that the value of accessible design is much wider than one perceives at the onset.
- The space of accessible design can be overwhelming to navigate. The design challenges are complex and numerous. It is genuinely impossible to tackle every single one of the challenges in one go. Hence it is best to start small. Often small steps can lead to a significant impact. In my opinion, when it comes to accessible design, “less is more.” For instance, the addition of a simple QR code on packaging can be of great assistance to people with varied kinds of vision impairment. Being a disabled person myself, I can vouch for this. A simple set of subtitles when watching a movie makes the experience so much more pleasant.
- Accessible design principles can vary from general design principles. Most food packaging is designed to stand out on grocery store shelves. Similarly, in other

creative practices, designers attempt to create something unique and path-breaking. However, when it comes to accessibility, familiarity and consistency are essential. It is easier for visually impaired people to find products on grocery store shelves if they are always placed in the same area consistently—similarly, hard of hearing people find it easier to hear familiar voices than new ones. General design principles should hence be adapted accordingly to accommodate the needs of people with disabilities.

- Often accessibility is an after-thought. In examples, such as the Kellogg’s Choco Pops, Braille and a QR code were plastered onto the existing design of the pack. Accessibility and inclusion should be considered from the beginning of the design process in order to make the right design decisions in terms of color, typography, illustrations and photography.

## 4.2 Future Directions

My research is a qualitative research which focuses on the role of Graphic design in accessible food packaging. During the course of the research, I was able to engage with only 5 visually impaired participants. Microsoft's inclusive design principles emphasize that solutions designed for a smaller group can in fact benefit a much larger audience (**Microsoft, 2019**). However, I still feel that the research can benefit from a larger sample size in the future.

The immediate next steps will be to test the prototypes' tangible mockups and refine them based on participants' feedback and insights. Additionally, I wish to reach out to a few of the existing grocery food brands such as Western Family, Great Value, President's Choice with my accessible design proposal. The proposal will demonstrate that it is possible to make current packaging accessible with minor additions. Hopefully, this might stimulate them to re-design their existing packaging to make it more accessible for different audiences.

The material requirements and cost of printing Braille on the packaging also need to be studied along with gathering data about the Braille literacy level of people with vision impairments in Canada. Similarly, the technology needed to develop a fully functioning text to speech app needs to be looked into.

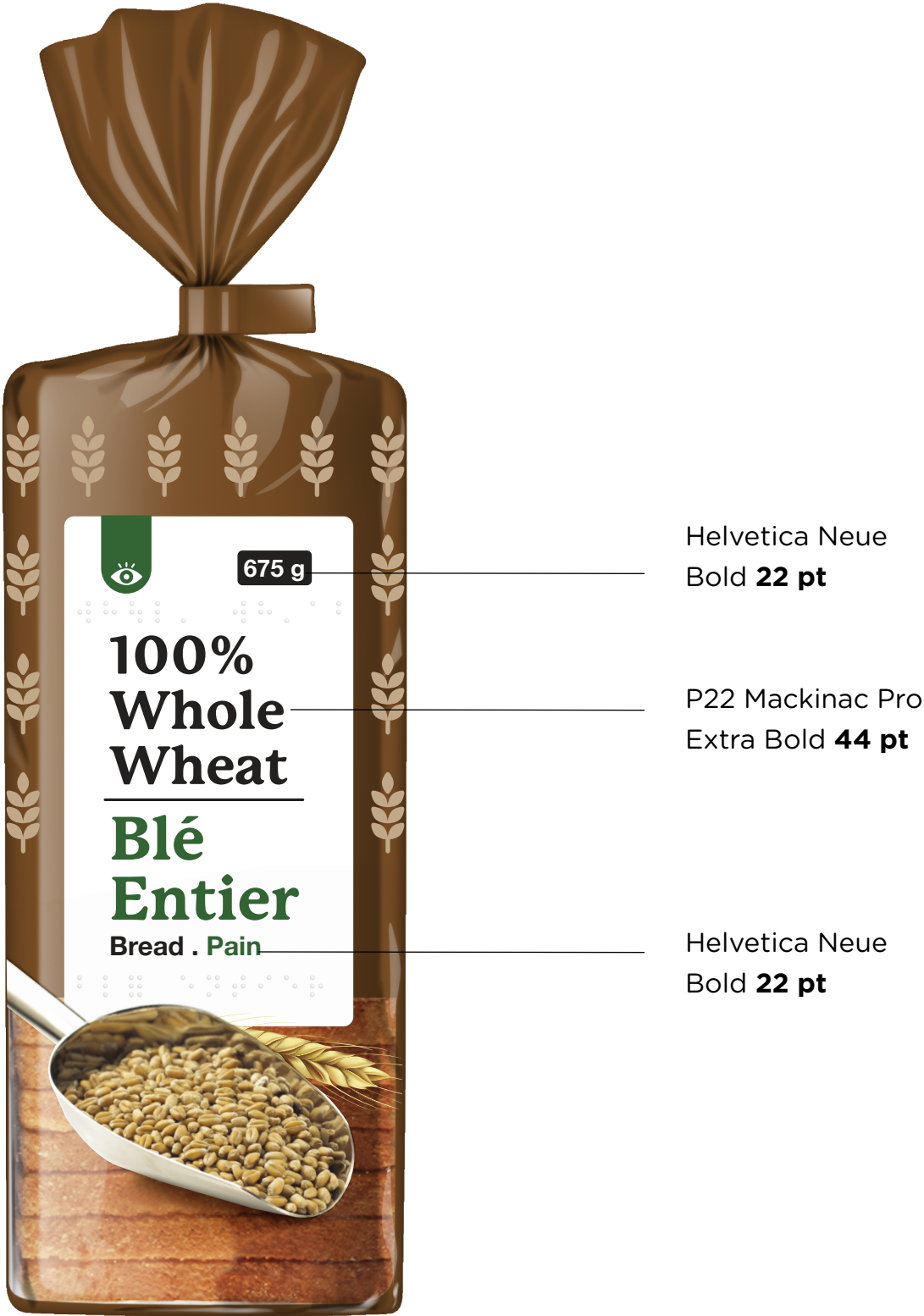
I have considered the label of the food packaging for this thesis. The structure and material of the pack itself is equally important when it comes to accessible design. It can promote easy carrying, storage and usage of product and also allow for the written information on the pack to be more organized. Hence this area also needs to be investigated.

Additionally, optimal placement and arrangement of products in the store are also essential for better accessibility. Accessible wayfinding systems will only complement accessible packaging design. This is another direction that needs to be explored up to fully address accessible packaging design.

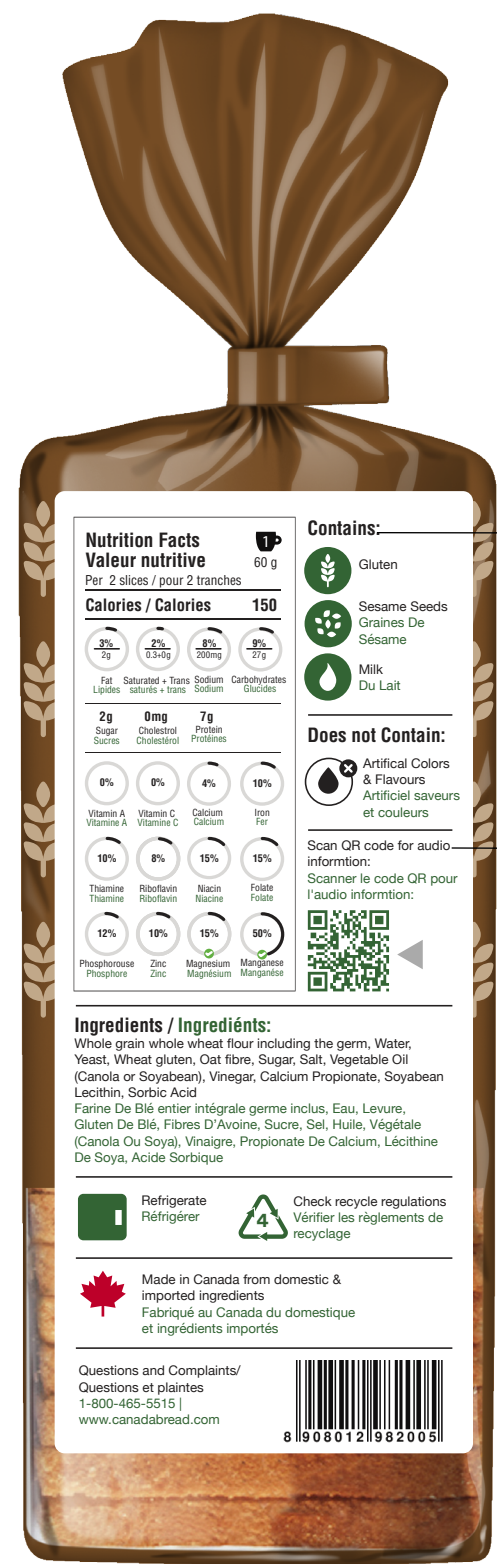
Presently, the literature available on accessible packaging design is limited. This design research can serve as a resource for designers, researchers, and organizations interested in this area. I also believe that accessible design should be an essential subject in design education to ensure its widespread application. This research can help initiate a curriculum on accessible packaging design. Even though the prototypes are based on Canadian packaging guidelines, the learnings can be applied to packaging design worldwide.

# 5. Appendix

**Fig. 1**  
Bread packaging typography specifications (front)



**Fig. 2**  
Bread packaging typography specifications (back)



Headings:  
Helvetica LT Std  
Bold Condensed **13 pt**

Body Text:  
Helvetica Neue  
Regular **9 pt**

**Fig. 3**  
Soup packaging typography specifications (front)



Helvetica Neue  
Bold **9 pt**

P22 Mackinac Pro  
Extra Bold **20 pt**

Helvetica Neue  
Bold **9 pt**

**Fig. 3**  
Soup packaging typography specifications (back)



Headings:  
Helvetica LT Std  
Bold Condensed **7 pt**

Body Text:  
Helvetica Neue  
Regular **6 pt**

**Fig. 3**  
Milk packaging typography specifications (front)



Helvetica Neue  
Bold **18 pt**

P22 Mackinac Pro  
Extra Bold **34 pt**

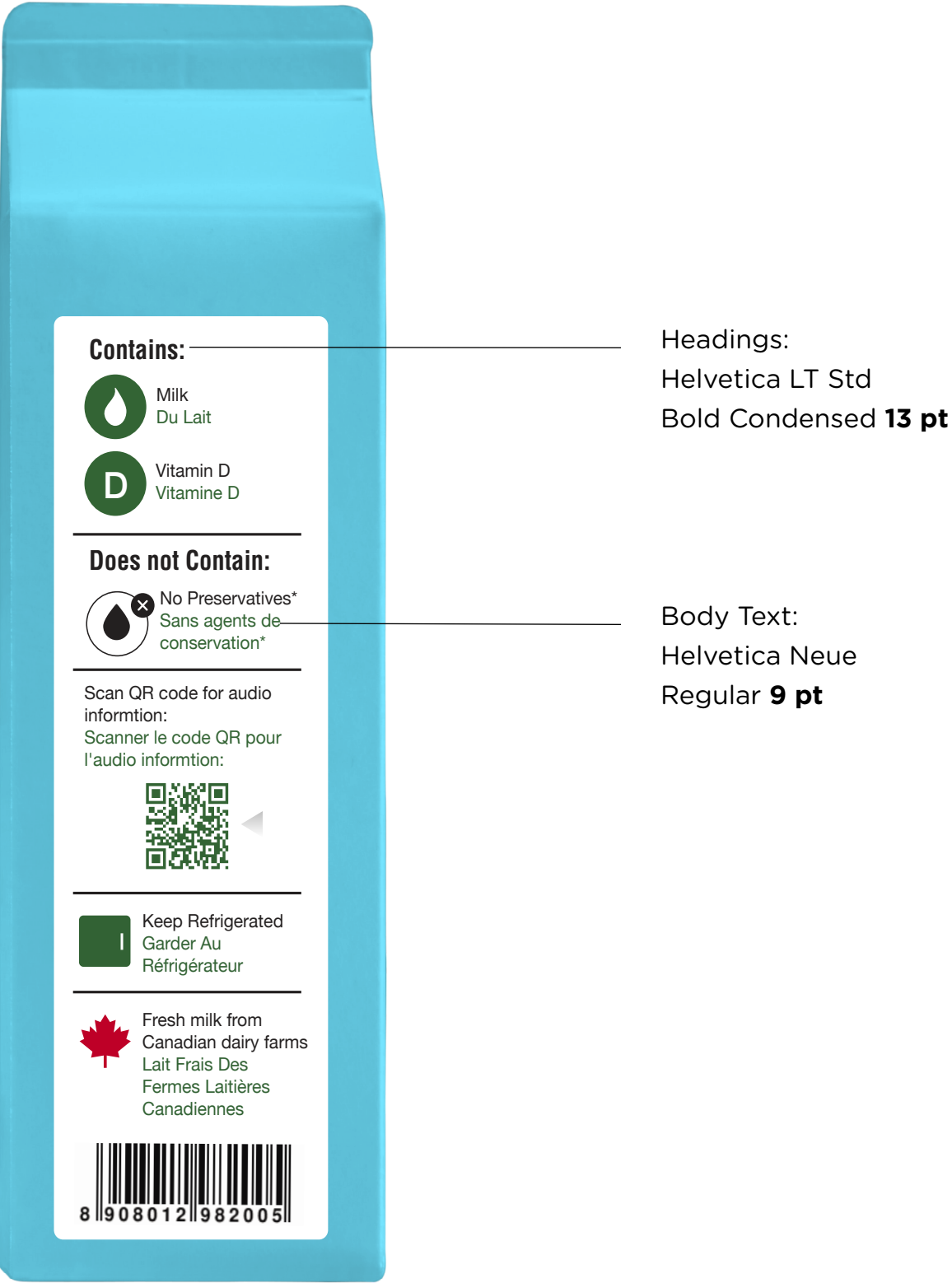
P22 Mackinac Pro  
Extra Bold **18 pt**

Helvetica Neue  
Roman **100 pt**

Helvetica Neue  
Bold **28 pt**



**Fig. 3**  
Milk packaging typography specifications (side)



**Fig. 3**  
Salad packaging typography specifications (front)



## 6. Bibliography

American Council of the Blind. (n.d.). Best Practices and Guidelines for Large Print Documents used by the Low Vision Community authored by the Council of Citizens with Low Vision International An Affiliate of the American Council of the Blind Arlington, VA | American Council of the Blind.<https://acb.org/best-practices-and-guidelines-large-print-documents-used-low-vision-community-authored-council>

Andreen, J., & Neely, G. (2005). Grocery shopping for persons with a visual impairment. Retrieved from website: <http://www.anopic.com/jonas/jonasandreen/filer/groceryshopping.pdf>

Angela. (n.d.). *Visually Impaired Designer* [YouTube Channel]. YouTube. Retrieved March 11, 2020 from <https://www.youtube.com/c/VisuallyImpairedDesigner/featured>

Anne, Q. (2018, October 11). A small tweak to Herbal Essences shampoo bottles is a big win for inclusive design. <https://qz.com/quartz/1418531/inclusive-design-procter-gamble-updates-herbal-essences-shampoo-bottles-for-blind-customers/>

Arditi, A. (n.d.). Effective Color Contrast - Designing for People with Partial Sight and Color Deficiencies - Lighthouse International - Lighthouse International. [https://pages.mtu.edu/~nilufer/classes/cs3611/interesting-stuff/designing-with-colors-1/color\\_contrast.htm](https://pages.mtu.edu/~nilufer/classes/cs3611/interesting-stuff/designing-with-colors-1/color_contrast.htm)

Bigman, A. (2016, August 23). What exactly is Swiss Design, anyway? <https://99designs.com.au/blog/design-history-movements/swiss-design/>

Bronwen Edwards, & Al, E. (2009). Really good packaging explained : Top design professionals critique 300 package

designs & explain what makes them work. Beverly, Mass.: Rockport.

Canadian Council of Food and Nutrition. (2008). Tracking Nutrition Trends VII. Mississauga, ON: CCFN.

Canadian National Institute for Blind. (2017). Blindness in Canada. Retrieved from CNIB website: <https://cnib.ca/en/sight-loss-info/blindness/blindness-canada?region=bc>

Deborah Adler Design. (n.d.). Clear Rx Medication System. <https://adlerdesign.com/project/clear-rx-medication-system/>

Dixon, J. (2010). Size and Spacing of Braille Characters. Retrieved from <http://www.brailleauthority.org/sizespacingofbraille/sizespacingofbraille.pdf>

Durrant, A. C., Vines, J., Wallace, J., & Yee, J. S. R. (2017). Research Through Design: Twenty-First Century Makers and Materialities. *Design Issues*, 33(3), 3-10. [https://doi.org/10.1162/desi\\_a\\_00447](https://doi.org/10.1162/desi_a_00447)

Government of Canada, C. F. I. A. (2015, April 14). Requirements - Bilingual food labelling. Retrieved February 9, 2021, from [www.inspection.gc.ca](http://www.inspection.gc.ca) website: <https://www.inspection.gc.ca/food-label-requirements/labelling/industry/bilingual-food-labelling/eng/1328121549968/1328121616816?chap=1>

Great Value. (2020). <https://www.walmart.ca/en/great-value/N-1019684>

Klimchuk, M.A. & Krasovec, S.A. (2013). "Packaging Design: Successful Product Branding from Concept to Shelf."

O'Reilly. Retrieved from <https://learning.oreilly.com/library/view/packaging-design-successful/9781118358603/>

Knorr® Dry Soups. (n.d.). <https://www.knorr.com/ca/en/knorr-products/knorr-dry-soups.html>

Knorr® World Seasonings. (n.d.). <https://www.knorr.com/ca/en/knorr-products/knorr-world-seasonings.html>

Koetting, S. L. (2019). 5 Strategies for Accessible Beauty. *Global Cosmetic Industry*, 187(10), 36-39.

Kostyra, E., Żakowska-Biemans, S., Śniegocka, K., & Piotrowska, A. (2017). Food shopping, sensory determinants of food choice and meal preparation by visually impaired people. Obstacles and expectations in daily food experiences. *Appetite*, 113, 14-22. <https://doi.org/10.1016/j.appet.2017.02.008>

Kraft Shredded Cheese. (n.d.). <https://www.myfoodandfamily.com/products/10150/cheese-and-dairy-products/kraft/shredded-cheese>

Micallef, S. (2020, February 25). Inside the marketing brilliance of No Name. <https://www.cpacanada.ca/en/news/pivot-magazine/2020-02-25-no-name-ad-campaign>

Microsoft. (2019). Microsoft Design. Retrieved from Microsoft.com website: <https://www.microsoft.com/design/inclusive/>

Ministry of Social Development and Poverty. (2014). Building a better B.C. for people with disabilities - Province of British Columbia. <https://www2.gov.bc.ca/gov/content/governments/about-the-bc-government/accessibility>

Ministry of Social Development and Poverty. (2018). 2018 progress update—building a better B.C. for people with disabilities - Province of British Columbia. <https://www2.gov.bc.ca/gov/content/governments/about-the-bc-government/accessibility/report-library/2018-progress-update#consumer-experience>

Mininni, T. (2013, February 1). Building a package design architecture that holds up. <https://www.packagingdigest.com/packaging-design/building-package-design-architecture-holds>

Morales, C. (n.d.). *Live Accessible* [YouTube Channel]. YouTube. Retrieved March 11, 2020 from <https://www.youtube.com/c/LiveAccessible/featured>

Myeyedr Vision Simulator. (n.d.).<https://www.myeyedr.com/eye-health/vision-simulator>

No Name Brand. (n.d.). [https://www.noname.ca/en\\_ca/](https://www.noname.ca/en_ca/)

Nusca, A. (2010, January 25). Bob Noorda, co-designer of NYC subway system's iconic look, dies at 82. <https://www.zdnet.com/article/bob-noorda-co-designer-of-nyc-subway-systems-iconic-look-dies-at-82/>

President's Choice®. (n.d.). <https://www.presidentschoice.ca>

RGD Ontario. (2019). Accessibility: A Practical Handbook on Accessible Graphic Design Second Edition. Retrieved from <https://www.rgd.ca/resources/accessibility/access>

Russell-Minda, E., Jutai, J. W., Strong, J. G., Campbell, K. A., Gold, D., Pretty, L., & Wilmot, L. (2007). The Legibility of Typefaces for Readers with Low Vision: A Research

Review. *Journal of Visual Impairment & Blindness*, 101(7), 402–415. <https://doi.org/10.1177/0145482x0710100703>

Seavey, D. (n.d.). *The Blind Life* [YouTube Channel]. YouTube. Retrieved March 11, 2020 from <https://www.youtube.com/c/theblindlife/featured>

Sheth, S. S., Wasserman, S., Kagan, R., Alizadehfar, R., Primeau, M.-N., Elliot, S., ... Clarke, A. E. (2010). Role of food labels in accidental exposures in food-allergic individuals in Canada. *Annals of Allergy, Asthma & Immunology*, 104(1), 60–65. <https://doi.org/10.1016/j.anai.2009.11.008>

Tobin, B. (2018, August 7). Kellogg's Rice Krispies Treats launches braille snack notes for visually-impaired kids. Retrieved from USA Today website: <https://www.usatoday.com/story/money/2018/08/07/kelloggs-rice-krispies-treats-offer-snack-notes-visually-impaired/918050002/>

Vision Simulations (n.d.).<http://visionsimulations.com>

Visually Impaired Designer. (2020) *WHAT MAKES GOOD PACKAGING DESIGN? | Packaging Design for Beginners - What Not To Do* [Video]. YouTube. <https://www.youtube.com/watch?v=P5XwBn-Ojao>

World Wide Web Consortium, w3c\_wai. (2019). Accessibility Principles. Retrieved from Web Accessibility Initiative (WAI) website: <https://www.w3.org/WAI/fundamentals/accessibility-principles/>

Western Family. (n.d.). <https://www.westernfamily.ca>

Vision Aware. (n.d.).What Is It Like to Have Low Vision? A New Sight Simulator Can Help You Understand. (2017, March 13). <https://visionaware.org/blog/visionaware-blog/what-is-it-like-to-have-low-vision-a-new-sight-simulator-can-help-you-understand/>

World Health Organization. (2018, October 11). Blindness and vision impairment. <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>