ServiceOntario Information Architecture Research

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Problem Description

The ServiceOntario website (serviceontario.ca) is a part of the Government Ontario website that provides access to government services. It is a critical tool for millions of Ontario residents to attain essential documents ranging from one-time events to day-to-day life. Some of the services provided by ServiceOntario include driver's license and health card renewal, birth certificates, business registration, and address changes, all of which are essential paperwork for residents of Ontario. Upon exploration of the ServiceOntario website and further research, it is clear that the way the information is being presented can benefit from a more user-friendly approach in terms of its organization of information, navigation system, and search functions. This will allow users to access information on service requirements and documents in a more time-efficient manner. Improving its information architecture and addressing its current challenges in IA design will have a positive impact on the experience of millions of users.

Upon landing on the main page of the ServiceOntario website, users are presented with an overwhelming amount of information. There are several headings, each of which have numerous subheadings, demonstrating a broad and shallow organizational structure. The manner in which the main page is organized overloads the average user's visual abilities and cognitive limits. Each page is also organized in a way in which an user would have to continuously scroll to locate relevant information. The organizational scheme follows an ambiguous, hybrid scheme that mixes topical organization and task oriented schemes which can be disorienting to one's mental model. In addition, the organization of external and internal links are indistinguishable which can be a source of confusion and frustration for the user.

When you first encounter the global navigation system, it is not intuitively recognizable because it is listed as if it were a site map. In our exploration of the website, we recognized a tendency to instinctively dismiss the local navigation on each page because the way it is laid out resembles a reference list. In addition, when an user begins from the global navigation, the user is often taken out to another government website without any notice. This creates an issue when the user wants to trace their search history or go back to the global navigation. Yet, the website requires that users return to global navigation as the options on this page cannot be accessed from any other pages. This navigation problem is further heightened by the fact that there are no breadcrumbs, which renders the exploration of other pages difficult. Users do not know where they are, how to return to where they came from, or how to navigate vertically within a page of the website.

There are two search systems in the website: one that retrieves information from the Government of Ontario website and another less prominently featured search system within the ServiceOntario website. Searching does not have any filtering options and the search results are unidentifiable between the ServiceOntario and other government websites. Having two search systems within one website may therefore be harmful to the user experience.

Context

ServiceOntario has a mandate "to provide centralized service delivery to individuals and businesses for a number of programs involving vital events, such as birth, marriage and death certificates; business services, including company registrations; personal property security registration and services; and land registration services" (2015 Annual Report of the Office of the Auditor General of Ontario). The program is dedicated to responding to customer needs and to serve them as quickly as possible in person and online, guiding through the processes

and providing accurate and up-to-date information, and to provide considerate, fair, and respectful services with real value to customers (2015 Annual Report of the Office of the Auditor General of Ontario). ServiceOntario manages over 47 million customer interactions annually and delivers approximately 80 services through one identifiable brand across multiple channels (online, contact centre, in-person, mail) (Government of Ontario, 2015). According to Ontario Public Service Employees Union (2013), the components of ServiceOntario directly operated by the province include:

- 87 public counters across Ontario
- Nine contact centers that answer 10 million calls annually
- Online services handling close to 10 million transactions annually
- Mailrooms processing 22 million items annually

Project Goals

The short-term goals in re-designing the IA of the ServiceOntario website is to organize the extensive amount of service information to enhance navigation and facilitate searches. In doing so, attempts to develop strategies to avoid infinite scroll, improve top-down navigation with clear organization of external and internal links, improve accessible navigation between global and local level, provide consistency in providing details on various services provided, and increase efficiency in searching will be executed. In the long-run, ServiceOntario continues to digitize what used to be hard copy documents to make them accessible and available to appropriate users anywhere at anytime. According to a current ServiceOntario UX Analyst (Appendix A), information is still in the process of being transferred to a digital form. For example, of the 104 pages long hunting regulations document, half of the information in the book is yet to be made available on the website. Despite the effort of the government to digitalize as much as possible, the process is far from being qualified as a smooth transition as there is data and documents that is challenging to be digitized.

Stakeholders

ServiceOntario employs about 2,400 people (Ontario Public Service Employees Union, 2013). From the organizational structure available in the Government of Ontario Employee and Organization Directory, relevant stakeholders in our information architecture redesign project have been identified. Key individuals from two divisions are involved in this project. From the Strategic Planning, Partnerships and Policy Division, Director from the Digital Planning Branch accompanied by Business Analysts from her team are invited. From the same Division, Manager in the Strategic Planning Branch will also join in with Business Analysts from her team. From the Business Improvement Division, under the Business Effectiveness Branch, Manager of the Service Design & Process Innovation and Project Management Office, along with his Business Consultants are involved. Finally, from the same branch and division, Manager of Reporting & Information Management will also be invited with his Business Consultants to the meeting with key stakeholders. Seats are reserved for user representatives and ServiceOntario staff who work front line with customers.

Intended Audience

The intended audience for the website is geographically limited to the residents of Ontario that seek fast and easy access to a range of information and government services such as government documents, certificates, and permits. The users of this information are both individuals and businesses. There is no age, gender, education level or other socio-

demographic criteria limiting the audience of the website. Most customers will visit the website on an occasional basis with specific questions and purposes.

Users of this system are on the website to seek information and to access government services and publications. They will use the website as a primary source of information for its convenience over physically going to a branch or calling a call center which often requires a long queue. Currently, limited services are available to be completed online such as license plate renewal, plate sticker renewal, order birth certificate. When performing eService, the user will enter their personal information on the online form, pay the service fee if relevant, then receive a proof of document and payment. For some services, ServiceOntario will physically mail the official documents to the customer's address upon completing the eService module. For services that are not available online, customers can find relevant information on the necessary documents to prepare prior to visiting a branch. The website also allows customers to find information regarding locations of branches and its service hours. Prior to their visit, the customer can download forms directly from the website. The replica of the forms are also available on site in each ServiceOntario branch. Additionally, customers can order and purchase publications.

Content Management

According to its Terms of Use (2015), one method of managing the current content is by the use of an archive label "to identify content that may not be the most recent or accurate version. This content is being maintained online for archival and research purposes. Also this labelling system will direct people to a more recent or updated version if one is available" (ServiceOntario). No information is available for the process of content creation.

Current Technology

The website uses many modern development technologies and frameworks (Appendix B) which can be considered technically up-to-date (Built with, 2017). The site is built with Foundation, a responsive front-end framework and uses code from the HTML5 Boilerplate project. It shows some content with an iframe (most likely for the Google Maps API). Other front-end languages used are CSS, used for styling, and JavaScript. In terms of JavaScript libraries, AngularJS injects the HTML, Modernizr ensures specific browser functionality in the stylesheet, JQuery handles events, perform animations, and adds Ajax interactions, and Moment JS is a date library for parsing, validating, manipulating, and formatting dates. Furthermore, nginx, a HTTP server and mail proxy server and the domain is verified with Microsoft Azure DNS. For responsiveness, there is a Viewport Meta Tag for the optimization of content on mobile and CSS Media Queries for specific CSS Displays on targeted viewports. In terms of analytics, Google Analytics is used to track audience and user behavior and Google Tag Manager is used to update GA tags. There is also code related to conferencing apps such as Adobe Connect and WebEx.

Content

Table 1. ServiceOntario Content Inventory

Content	Description	Format	Doc. Type	Source	Existing Arch.
Textual Information	Pages on serviceontario.ca that delivers information on services that is offered by ServiceOntario.	HTML page	Text	Various departments in Government of Ontario	Across all service description pages
Online Forms	Downloadable interactive pdf or word document. It is a replica of hardcopy forms that are readily available at a branch.	MS Word, MS Excel, Adobe PDF	Forms	Various departments in Government of Ontario	Central Forms Repository
Publication	Government of Ontario publications can be ordered for by telephone, mail, in-person (limited) and Publications Ontario eCommerce site as part of Service Ontario. They are available online in pdf or print versions which will be delivered in mail.	Adobe PDF, Books	Publication catalogue, Guides, Regulations, Books, Handbooks, Resource Kits	Various departments in Government of Ontario	Publications Home (Central Publications Repository)
Contacts/ Locations / Google Maps	Google Map exists as an external link. Every branch has a unique link to Google Maps with its branch address plotted on the map.	HTML page	Addresses, Contact information	Google Map	Locations and Contact
Social Media	Link to Facebook, Twitter, YouTube of ServiceOntario's English and French channels.	Photos, Videos, Textual posts, Hyperlinks	Social Media Posts	ServiceOntario Public Relations	Footer

External Links	Serviceontario.ca is part of Ontario.ca. It contains links to other Ontario's subsites such as Ministry of Transportation and Service Canada for related services.	Hyperlinks	Text	Various departments in Government of Ontario	Across all service description pages
Mail / Emails	Mail is generated and sent out to customers to inform them as a reminder to renew their government issued document. Mail is also sent out when the customer needs to receive the official document for a service that they completed online or in-person at a branch. Email is sent when a customer completes an application online.	Printed letters, Email messages	Receipts, Reminders, Shipping Info, Official documents / cards (e.g. license plate stickers, health card)	Unknown	N/A
Printed Marketing Material	Marketing materials on some services such as organ and blood donation are available in the branch and some are mailed out as promotional material.	Textual document, Images	Marketing Brochures, Pamphlets, Flyers, Posters	Unknown	N/A
Payment Application Module	Some services can be completed entirely online. For eServices in which charges apply, a payment application module subsite is used to collect the fee for the service.	Software application	Payment Module	Interac Online	Applicable eServices (Services that could be completed online)
FAQ	Part of each service descriptions include FAQ. Most commonly answered questions are listed with a response in text and hyperlink.	HTML page, hyperlinks	Frequently Asked Questions	User feedback and research	Across all service description pages

Images (Icons)	Image files of symbolic icons of subjects are available on global navigation.	Image	Representative Icons	Unknown	Across all service description pages

Content Analysis

All contents of ServiceOntario are available in two official languages. Some of its contents are available in 15 additional languages. This content analysis in Table 1 is specific to English contents only.

In terms of structural metadata, most pieces of content come from different sources, as the operation and information system of ServiceOntario is a part of the Government of Ontario. When searching for information, users will encounter textual information on the website as well as be taken out to an external link. Fluent communication from various departments and sources within the Government of Ontario is essential and must be demonstrated by the ServiceOntario website, whose services are very closely linked to those external agencies. External links offers direct access to those relevant external agencies. The content is also scattered across all the existent architecture categories except for publications, forms, and locations. There are discrete depositories for publications and forms. However, some informational pages have existing links to specific forms that are required as part of the application package to attain a government document. These connections are essential in increasing the accessibility of forms by eliminating the need to search in the forms repository for a service. Furthermore, each page of the textual information incorporates linked YouTube videos, a payment module, and a FAQ section. Users will not need to access these contents independently as they are applicable to the specific service on the particular webpage.

There is a healthy mix between online and offline contents. As demonstrated by the variation in its content formats, there are numerous forms for communicating and displaying information, which is appropriate for an agency like ServiceOntario. The topics vary in accordance with the multidisciplinary functions of the agency.

Administrative metadata could not be analyzed due to lack of information in content source, management, and ownership.

User Interviews

Description of Representative Users

To obtain an understanding of how users interact with the current information architecture, we conducted interviews with three representative users. Of these three participants, one has interacted with the ServiceOntario website extensively in the past year, one has used it occasionally (about three times in the past year), and one that has never interacted with the website before. The user with significant experience with the website is a government employee working in a branch related to ServiceOntario and as a stakeholder provided us a unique point of view. In terms of demographics, the participants were Ontarians and internationals residing in Ontario, ranging in age from 20 to 40 and of both genders. For the purposes of this project and based on the limitations stated in the assignment description,

the participants we interviewed are considered representative users of this research. The three users vary in age, sex, and nationality, with diverse backgrounds and previous knowledge and thus, are representative for the purposes of this project.

We also acknowledge that as we were limited to interviewing two to three interviewees, our research and summary of findings will reflect this limited perspective. If we had more time and were able to conduct additional user research, we would be able to obtain more representative results. As such, this research may not reflect the overall and general experience with the ServiceOntario website and we will proceed with using this data with this recognition.

Research Method and Protocol

We decided to conduct semi-structured interviews as this research method allows for both quantitative and qualitative data collection and provides additional opportunities for insight. We generated our interview questions so that they are specific, short, and organized as to avoid double-barreled questions. In order to address bias, we avoided learning questions and loaded questions that may communicate our own perspectives. We also tried to make our questions open-ended so that participants would feel more encouraged to share their thoughts and opinions. In addition, close-ended questions were included to provide us with additional background information for our understanding of the participants and their use of the website.

We conducted interviews in pairs, of which one of us asked questions while the other recorded observations and notes. Interviews took place in a quiet area where we tried to limit potential distractions. For the user who has never interacted with the ServiceOntario website, we gave the participant a series of tasks to complete and asked him to think aloud as we recorded his behaviours and actions.

At the beginning of our interviews, we introduced ourselves, informed participants of their confidentiality and anonymity, asked if we could record them, and ensured that their data will only be used for the purposes of this assignment and will be only accessed by the members of the team. We also let participants know that they can stop their participation at any point and provided them with details on how they can contact us for more information. In terms of our interview protocol, each of our three interviews ranged from 30 to 45 minutes. Table 2 below illustrates the structure of our interview.

Table 2. Interview Structure

Approximate duration	**Procedure**
3 minutes	Introduction (who we are, inform participants of why we're interviewing, ask for permission to record, inform their rights as participants of the research (right to stop at any time), how they can contact us, and give instructions)
5 minutes	Warm-up (introductory, background information)
15 minutes	Complete list of tasks (applicable only to the non-user)
15 minutes	Body of interview (more detailed questions relating to experience)

5 minutes	Cooling off (overall experience, ask for improvements)
2 minutes	Conclusion (thank the participant, ensure their privacy again, provide contact information)

For the participant with no previous experience with the ServiceOntario website, we asked interview questions number 1-6 prior to having the participant interact with the website by completing the tasks shown in Table 3. In regards to our observation protocol, we ensured that participant was not disrupted by listening tentatively and not interrupting as he communicated his actions. After completing the tasks, this participant was asked interview questions that were reorganized into a different order to better facilitate the conversation.

We also asked each of our interviewees probing questions such as “Could you tell me more about that?”, “How did you feel about this”, “What do you mean by that?”, and “Why?” or “Why not?” to encourage participants to elaborate.

Table 3. Tasks and Questions

a.	Please go to the ServiceOntario website.
b.	What is the first thing you notice on the website?
c.	Where can I find more information if I wanted to renew my driver’s license?
d.	What are my options to renew my driver’s license?
e.	Based on the information on the website, would my age impact my driver’s license renewal?
f.	If I wanted to change my sex designation, how can I go about finding more information on the ServiceOntario website?
g.	Tell me more about your process while you were navigating the site.
h.	If you needed to go into a branch how would you find that information on this website?
i.	If you needed more information what would you do?

Table 4. Interview Questions

1	Is there a ServiceOntario location near you?
2	When was the last time you visited a ServiceOntario branch?
3	When was the last time you used the ServiceOntario website?
4	Tell me about the last time you tried to find something on the website?
5	What was the purpose of your visit?

6	How did you find out about the ServiceOntario website?
7	How did you get to the ServiceOntario website?
8	Have you been able to find the information you were looking for?
9	Which sections on the website did you find most helpful?
10	What do you think are the most important features of the website?
11	What do you like about the ServiceOntario website?
12	What do you not like about the ServiceOntario website?
13	Was there anything about your experience with the website that you had difficulty with or frustrated you?
14	How did you work through these challenges?
15	From 1-10, how would you rate your current level of satisfaction with the website?
16	What suggestions do you have that would improve your experience of the website?

Summary of Results

For our interview analysis, we combined the observations we recorded and the interview responses to organize our findings into four headings: most valuable content and tasks, user frustration with current information architecture, ideas for improvement, and user satisfaction.

Most Valuable Content and Tasks. In terms of content and tasks, all three participants stated that they found the driving section most valuable and in particular, driver's license renewal. Of the three participants, two said that they also thought the health card renewal section was valuable because these were services that were most relevant to their lives and needs. The user who had never interacted with the website before specified that he thought the FAQ and Contact Information sections were especially helpful because he had difficulties navigating the website and would rather phone in to ask someone for assistance. One of the users noted that they liked the main page because it was simple and it laid out all the information in categories.

User Frustration with the Current Information Architecture. Each of our participants stated that there was visual clutter and an abundance of information they had to filter through both on the main homepage and on each of the sub-pages. The amount of information felt overwhelming for the participants to find relevant information. Two of our participants shared experiences where the information on the website was inaccurate and believed that the ServiceOntario website was an inefficient system for obtaining information (i.e. one participant was told to renew their driver's license online but upon doing so, encountered an error and was told to go into a ServiceOntario branch). Likewise, one of our participants demonstrated frustration with the hyperlinks because at times, the hyperlink was irrelevant to the information they were seeking. All participants experienced difficulty navigating the website when looking

for specific information, despite utilizing the subheadings, search bar, FAQs, and other strategies such as ctrl + F.

Ideas for Improvement. One participant stated that they would like to make ServiceOntario more concise in terms of the information being presented. They would create better distinctions between what sections are considered to be a part of ServiceOntario and what belong to other departments. This participant also suggested that the website should be available in other languages to promote accessibility for all users. Another one of our participants suggested for improved categorization and a clean information arrangement to help deal with the visual clutter. They also said that the information could be simplified and irrelevant should be removed. Another user likewise supported this notion in that they would condense the information by having only the sections used by the majority of the users on the main page.

User Satisfaction. Out of the three participants, two said that their current level of satisfaction on a scale of 1 to 10 was a 5, and one said 6. One of these participants rated the website a 5 because it felt cluttered and they had to spend a lot of time figuring out how to navigate the website, although eventually, they managed to get used to it. Another user also rated it a 5 and explained that the website is simple but there is too much information and that the experience is too time consuming due to difficulty in navigation. They noted that should they interact with the website again, they would likely call the contact number if they were unable to find the information they were looking for within a few minutes. The user that rated ServiceOntario a 6 says that while they like the use of graphics on the website, they find the amount of text and information overwhelming and is bothered by having to filter through it all.

Card Sorting

Description of Participants

In order to assess the content hierarchy of the ServiceOntario website from the user as well as non-user perspective, we selected three participants to conduct an open card sorting exercise. Our participants were students and staff members from the University of Toronto, ranging in age from 20 to 30, two of which were working professionals. Two of three participants had never participated in a card sorting exercise before, while one had some experience with it. Our selection was mainly based on the participant's familiarity with the current website and whether he/she had used it in the past. We selected one participant who was frequent user, one who had used the website on a few occasions, and one non-user. In addition, we considered a participant's willingness to actively engage in the exercise, while ensuring that our participants did not coincide with the interview participants.

Overview of Cards

We picked 40 items from all the service subjects available on ServiceOntario's website in order to acquire insight on how our participants think the services items should be grouped. Currently, there are eight main service categories in place and a total of 55 service items. We aimed to select limited items from each of the categories to produce 40 cards which were representative of the the current content load of each category. While all of the items names in light-content categories were included separately, this strategy required renaming of some of the current service items from heavy-content service categories. Based on our evaluation, the re-naming of the categories were executed to make sure all the item titles being selected were represented. Table 5 below shows all the cards prepared for the card sorting exercise.

Table 5. Cards Used in Card Sorting Exercise

OSAP: Ontario Student Assistance Program	Apply for an agency partnership license	First-time health card	Marriage certificate	Vehicle registration: plate/permit
Search for registered Private Career Colleges in Ontario (for students)	Apply for an agency sole proprietorship license	Switch to a photo health card	Birth certificate	Special permit

Register a Private Career College in Ontario (for colleges)	Apply for an individual license	Health card renewal, replacement and cancellation	Newborn registration (4-in-1 Newborn Bundle)	Get, renew or replace a garage license
Hunting license	Register or search for a personal property lien	Sex designation change	Ontario Photo Card	Get an accessible parking permit
Fishing license	Land registration	Change name (for adults)	License plate sticker renewal	Renew a driver's license: outside Ontario
Outdoors Card	Change your address	Change a child's name	Personalized license plates	Replace a lost, stolen or damaged driver’s license
Register as an employer	Organ and tissue donation registration	Change your last name	Sign up for email renewal reminders	Renew a G driver's license: 80 years and over
Apply for an agency corporation license	Change address: health card	Death certificate	Driver's license renewal	License plate sticker renewal: outside Ontario

Overview of Execution

The open card sorting exercise was conducted by two team members at the Inforum library of University of Toronto. The resources available for participants to successfully perform the exercise were cue cards with pre-written titles, blank cue cards, and markers. Our execution procedure was based on the guide written by Spencer (2004).

The first step in executing the card sorting exercise was to search for participants. We asked students and library staff members whether they would be willing to volunteer their time to participate. If they agreed, we asked them if they ever used the ServiceOntario website before to determine their qualification for participation. After evaluating their qualification, we debriefed them about the project and what they needed to do for the exercise using the following script:

“Thank you for participating in our card sorting exercise to study the information architecture of ServiceOntario’s website. We’re going to ask you to perform a task which will give us valuable insights into how we can improve the website’s IA.

In front of you is a stack of cards. These cards represent the content of ServiceOntario's website. Please try sorting the cards into groups that make sense to you. If you are unsure about where some cards belong, you can put them in an 'unclear' group. Once you have established your groups, we would like you to name each group using the blank cue card and paper.

Lastly, please be informed that if you want to leave at any point in the exercise, feel free to let us know and you may leave at any time. Do you have any questions regarding the exercise

Let's begin!"

During the exercise, one team member was in charge of being the 'host' of the exercise session while the other member was observing and taking notes. We made notes when participants raised questions about cards, hesitated about card placement, and demonstrated frustration. When participants finished grouping, we provided them blank cue cards and asked them to name each groupings based on the card items in each group. After participants named the groups, we invited them to share any questions or concerns about the card sorting exercise. We then thanked them for their participation and let them know how they can contact us if they have any additional questions in the future.

Analysis of Results and Summary of Findings

After the completion of our open card sorting exercise with the three participants, we conducted an analysis of the results to determine our findings of the content hierarchy for ServiceOntario's website. The analysis was conducted by collating the responses from all three participants, their suggested groupings, and their respective sorting of cards. Our card sorting data analysis method was guided by Lamantia (2003).

All participants suggested exactly eight groups by the end of their respective card sorting exercises with varying group labels. In order to conduct our analysis with the initial card count (Appendix) for each of these group labels, we generated a common terminology for each groupings. For example, participant 1 suggested 'driving registration & permits', participant 2 suggested 'vehicle registration', while participant 3 suggested 'driving' as respective group name. Another grouping name suggested by participants were 'land registration' and 'land & property'. Although there were some degree of variations in group labels, the participants' response suggested a common ground for the labels from the user as well as non-user perspective.

Nonetheless, only 16 of the 40 cards were sorted under the same group labels by every participant, giving a relatively smaller percentage of average agreement per category (Appendix). Out of the remaining 24 cards, 22 cards held an average agreement of 50%; which means that two out of three participants sorted the same card for a common group label. For example, participant 1 and participant 2 sorted the card 'sex designation change' under the group 'health & medical', while participant 3 had sorted this under 'personal information'. This suggests that some labels with functional verbs are ambiguous on the current website. Out of the remaining two cards, 'sign up for email renewal' was declared an outlier amongst all three participants, which could become a separate label for the future website design.

All three participants demonstrated confusion on categorizing different licenses and permit cards. For example, there was confusion in categorizing a 'fishing license card' and a 'driving license card'. Hence, all participants created a separate group for licences altogether as an

alternative improvement of organization. The remaining one card from the previous paragraph, ‘special permit’, was not categorized under any group label and could either be discarded altogether, or renamed to provide a better understanding for the future navigation system.

The card analysis exercise demonstrated that while most of the labels are understandable from a user as well as a non-user perspective, there are some cards that are more confusing than others, such as ‘licenses’. Although it was an open card sorting exercise, neither our team, nor the participants created additional labels for cards as there was an extensive list to choose from. Nonetheless, a few suggestions on the current labels from the participants could be useful in improving the overall information architecture of ServiceOntario. In comparison to the existing groups on the ServiceOntario website, the final results achieved from this exercise primarily differs in terms of labels, as well as their ‘cards’ (Appendix). The card sorting exercise provided us an understanding for our prospective navigation structural pattern that could be implemented to make ServiceOntario a more intuitively useful website.

Tasks

Completing an eService (Renewing License Plate Stickers)

The task of renewing license plate sticker was chosen because it is one of the most popular eServices that is offered by ServiceOntario. The user receives a letter in the mail when their license plate sticker approaches the expiry date. While it is possible to renew the license plate sticker both online and offline, the user chooses to complete the process online. This task is representative because it allows for interactions with the website that are applicable in many of the services offered by ServiceOntario. This re-design will resolve the difficulties of navigating and obtaining information caused by inconsistencies in the organization of information on each service page, as well as the processes of completing the service. In this task, the user needs to identify and understand the components needed to complete the task (i.e. licence plate number, permit number, insurance company name and policy number, odometer reading, and valid credit card or Interac® Online) prior to completing the online application process. The user will confirm that the pre-registered personal information (name, home address, and email) is up-to-date and input all the necessarily information to renew the license plate sticker for another one or two years. If the mailing address is in Ontario, the official license plate stickers are mailed within 5 business days.

Actor
- An Ontario driver who owns or leases a car and needs to renew the license plate sticker.

Pre-Conditions
- When renewal is available, a reminder letter is sent to the user by ServiceOntario by mail.
- The user has a pre-existing ServiceOntario online account.
- The user gathered the following information prior to beginning of the process:
    - Permit number
    - License plate number
    - Insurance company name and policy number
    - Vehicle’s odometer reading
    - Vehicle’s drive clean information if an emissions test is required for the vehicle.
    - The user has a credit card.

Basic Path:
1. The user chooses the renew license plate sticker online option.

2. The system prompts user to sign in, create an account, or continue without registering.
3. The user logs in with username and password.
4. The system displays registered name and home address and prompts to enter their license plate and permit numbers.
5. The user inputs license plate and permit numbers.
6. The system checks to find a vehicle.
7. The system prompts user to input name of insurance and policy number, the odometer reading, and drive clean information for the car.
8. The user inputs name of insurance and policy number, the odometer reading, and drive clean information.
9. The system checks information
10. The system displays two options for renewal term and the fee for each term.
11. The user chooses a renewal term.
12. The system prompts user to confirm their shipping address and then confirm their billing address and enter credit card information.
13. The user inputs credit card details.
14. The system checks credit card information.
15. The system confirms transaction.
16. The system emails receipt to the user.
17. The system displays a receipt.

Alternative Paths
1. If the user decides to visit a branch to complete the task
1.1 The user searches for closest location (Refer to task 3, step 1)

3. If the ID or password is invalid,
3.1 The system displays an error message.
3.2 The system returns to step 2.

6. If the license plate or permit numbers is invalid,
6.1 The system displays an error message.
6.2 The system returns to step 4.

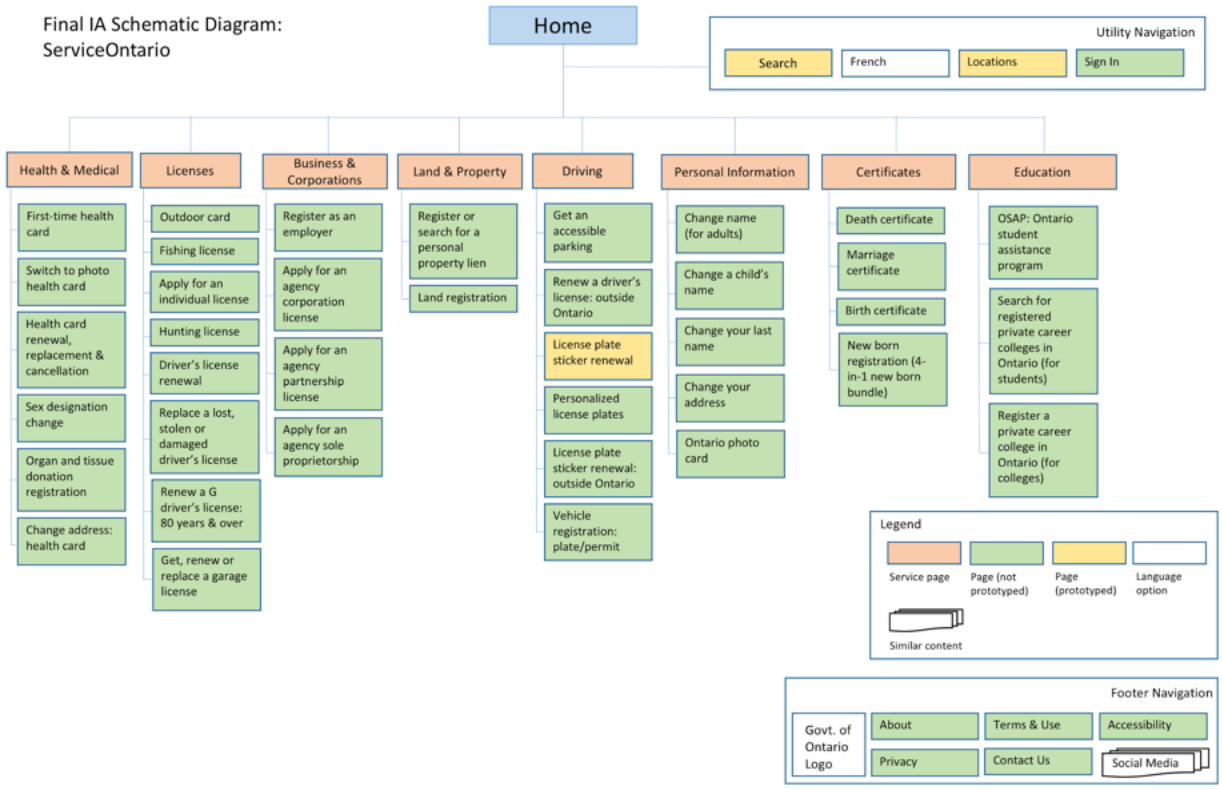
9. If the name of insurance and policy number, the odometer reading, and drive clean information is invalid,
9. 1 The system displays an error message.
9.2 The system returns to step 7.

Post-Conditions
- User receives the e-receipt by email.
- User receives the official license plate sticker by mail.

Scenario
Julia is a mom living in Vaughan. Her family has two cars, one of which is under the ownership of Julia. She often uses her car to take her two children, Tommy and Josh, to school and to go grocery shopping. As part of her daily routine, she goes to the mailbox at the end of her street to collect the mail. One morning, she receives a letter from ServiceOnatrio. Curious to know, she immediately opens the envelope and finds a single page letter, one side in English and the other side in French, regarding license plate sticker renewal. She realizes that her license plate sticker is approaching the expiry date in less than three months since she last renewed her license plate sticker last year. Upon skimming through the letter, Julia realizes that it is time for her to go pick up her children and decides to do this on another day. A month later, she

remembers about this letter that she has received a while ago but realizes that she has misplaced the letter. She turns on her computer and visits the ServiceOntario website to find out about the online renewal process. Upon reading the information on the licence plate renewal page, she realizes that she needs to collect data on her car's permit number, her insurance company name and policy number, and obtain an odometer reading. Julia returns to her car to gather the documents. She logs in with the account that she made last year to begin the online process. Julia confirms that all the auto-filled entries of her name, address, and email address are correct and proceeds to enter her license plate number, permit number, insurance company name and policy number, and odometer reading. Julia decides to opt-in for the two year option and makes the payment with her credit card. She receives the receipt in her email as proof of payment and she prints a copy of it. She receives an email stating that the new licence plate sticker will be sent to her home address in five business days.

IA Schematic Diagram



ServiceOntario is a governmental website that is frequently visited by the residents of Ontario for needs ranging from one-time events to day-to-day life. Some of the services provided by ServiceOntario include driver's license and health card renewal, birth certificates, business registration, and address changes, all of which are essential paperwork for Ontario residents. Therefore, it is crucial to organize each of these services to correspond to an effective service page header that is intuitively understood by the user. In order to achieve this, we based the design of our IA schematic diagram on results from the open card sorting exercises with

representative user groups. The categories defined, pages visualized, and navigational structure built for this diagram represents the most effective way the user can navigate the website.

Each of the top-level services in our global navigation represents a header service category offered by ServiceOntario. The services under each of these categories represent the list of all services offered under a given category. The arrangement of pages in this method helps us avoid cluttering the homepage, while directing a user towards the most relevant broad category. This in turn will prevent a user from having to go through each subcategory in order to find what they are looking for. This was one of the major issues that was apparent during our card sorting exercise, where it was pretty easy for a user to get lost within the website's top-down navigation as they felt overwhelmed by the amount of content.

In terms of the utility navigation, search has been leveraged as a single tool in the header of the homepage. Although this has not changed from the original positioning perspective of the search bar, it has been combined from two search bars into one single and efficient search bar. In addition, the sign-in, language option (French) and locations button have all found a place in the utility navigation as we feel it should be accessible to users on any page of the ServiceOntario website. A user might want to switch language, browse for a ServiceOntario location, or login/logout at any given time of their browsing session.

IA Elements

Organization

Organization Schemes. After careful consideration, a hybrid scheme was selected to organize the contents by combining the use of exact and ambiguous organizational schemes. This is following the recommendation that these two schemes should be used together for an optimal result, both for when users know precisely what they are looking for and when users have vaguely defined information needs. For example, finding the location of a ServiceOntario branch is a practice of known-item searching. Thus, it was more appropriate to use exact organization scheme . We decided to offer both alphabetical (Figure 1) and geographical (Figure 2) organization schemes for users to search for a branch alphabetically by city as well as geographically, by identifying nearby locations on the embedded Google map (Figure 2). The main home page (Figure 3) also has an alphabetical organization scheme of all the possible tasks users can perform on the website. These categories were concluded from the open card sorting exercises. Within these categories, we likewise adopted a topical organizational scheme based on the card sorting exercises. This was to accommodate browsing and associative learning in which users may not know exactly what they are looking for.

Organization Structures. Using a hierarchical organization structure, users are able to easily and quickly understand information environments, eventually to provide context that helps users feel comfortable within the structure. This aligns with a user's mental model of the environment's structure and their location to identify what they wish to find out as well as how to complete their interaction. We changed the former broad and shallow hierarchy of the main IA of the website to a narrower breadth to address the problem of cognitive limits overloading the users. The hierarchical categories are mutually exclusive to prevent information overload through cross-listing the same information over multiple categories.
Throughout the redesign of the website, balance between breath and depth were considered. For example, in the process of renewing license plate online, the information page is shallow to

limit the need for users to click through many levels in order to obtain relevant information (Figure 4). On the other hand, for the eService process, we considered the user's ability to visually scan the page and complete the request . The process is narrow and deep in order to take the user through the process step-by-step while integrating the approval process at each level for authentication and security purposes (Figure 5).

In addition, limited hypertext was used in this redesign. The extensive use of hypertext in the original website (Figure 6) was identified as an issue as it led users outside of the website and challenged users' placemaking of the environment. Therefore, the use of hypertext was limited in our redesign to stay within the page, to complement the hierarchical model, and to aid the navigation process (Figure 7).

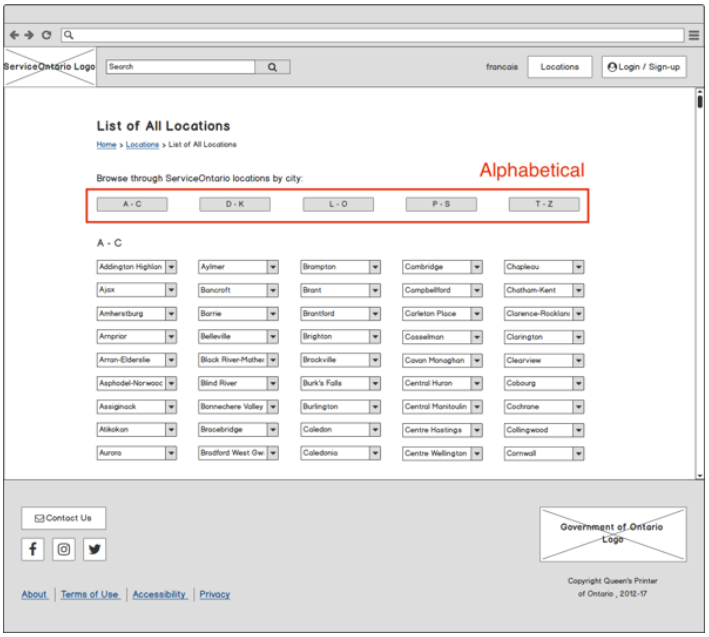


Figure 1. Alphabetical organizational scheme when finding branch

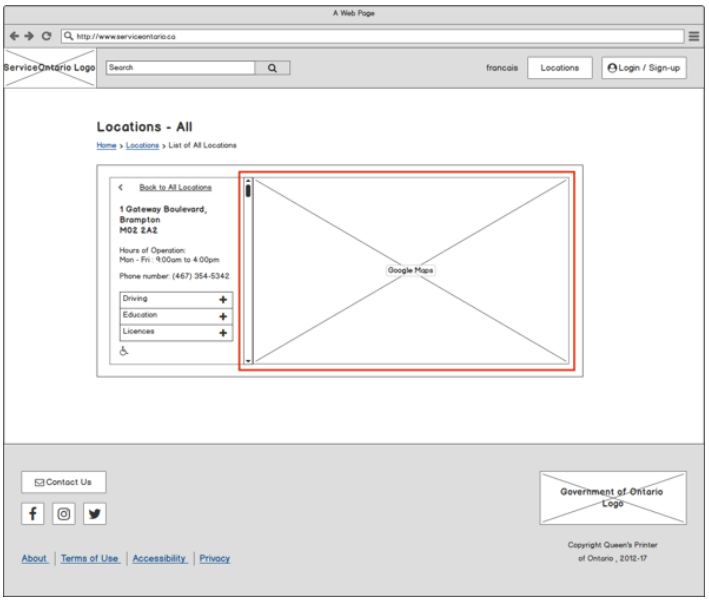


Figure 2. Geographical organizational scheme when finding branch

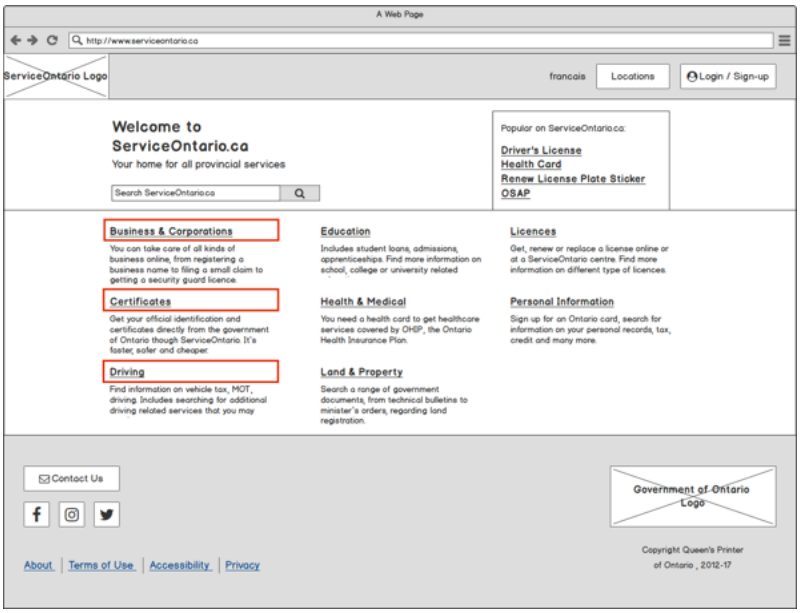


Figure 3. Alphabetical organizational scheme for Service Categories

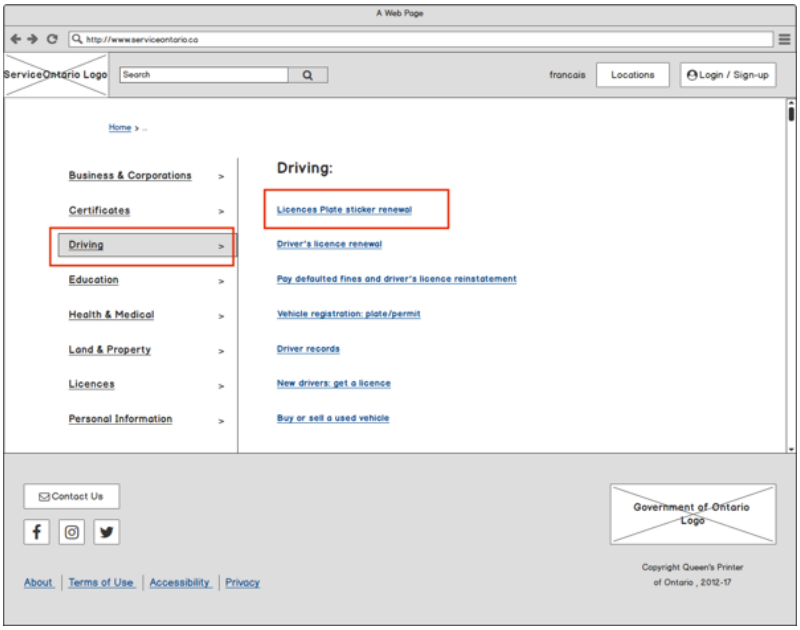


Figure 4. Shallow organization structure.

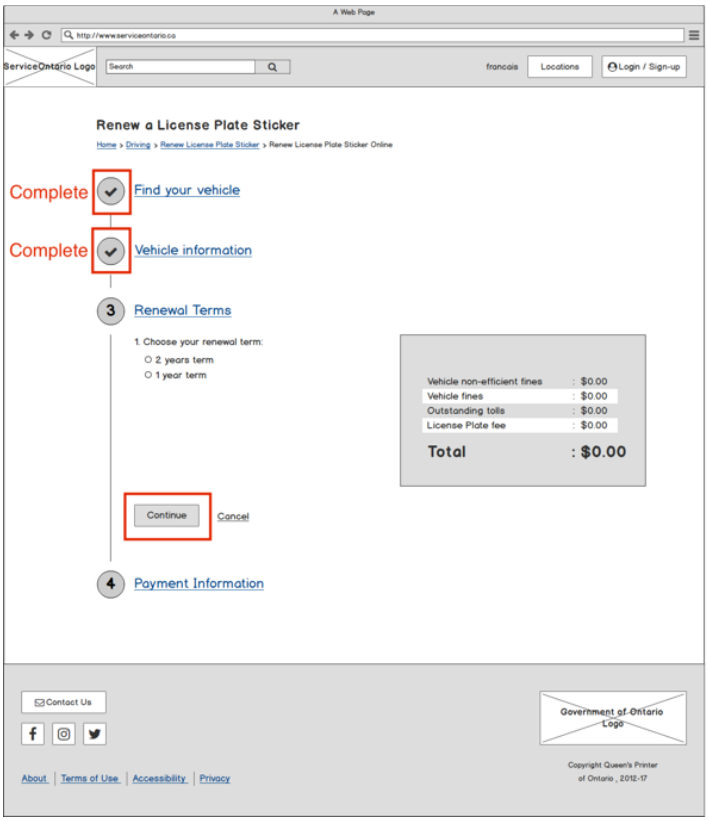


Figure 5. Narrow and deep organization structure

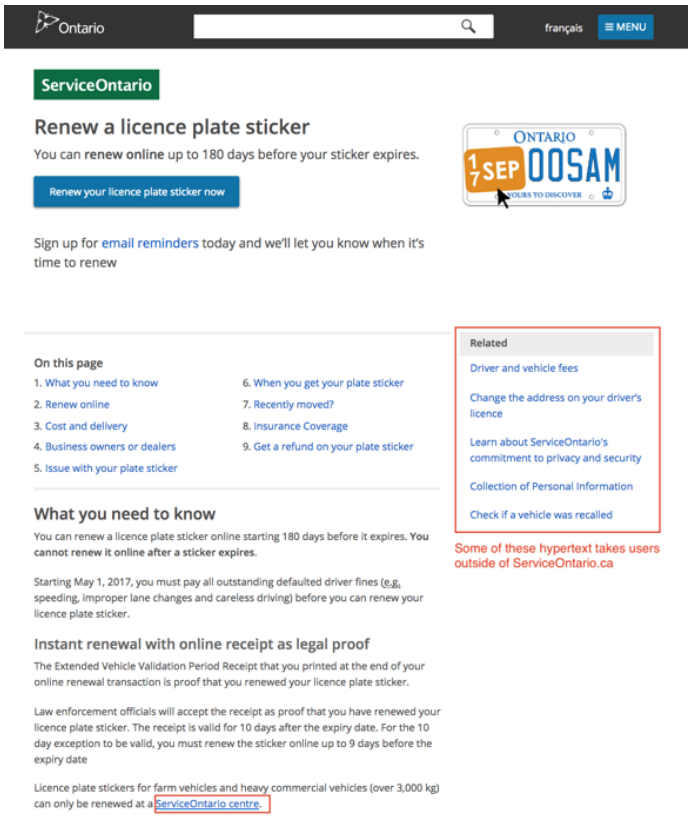


Figure 6. Current website with hyperlinks that take users to other websites

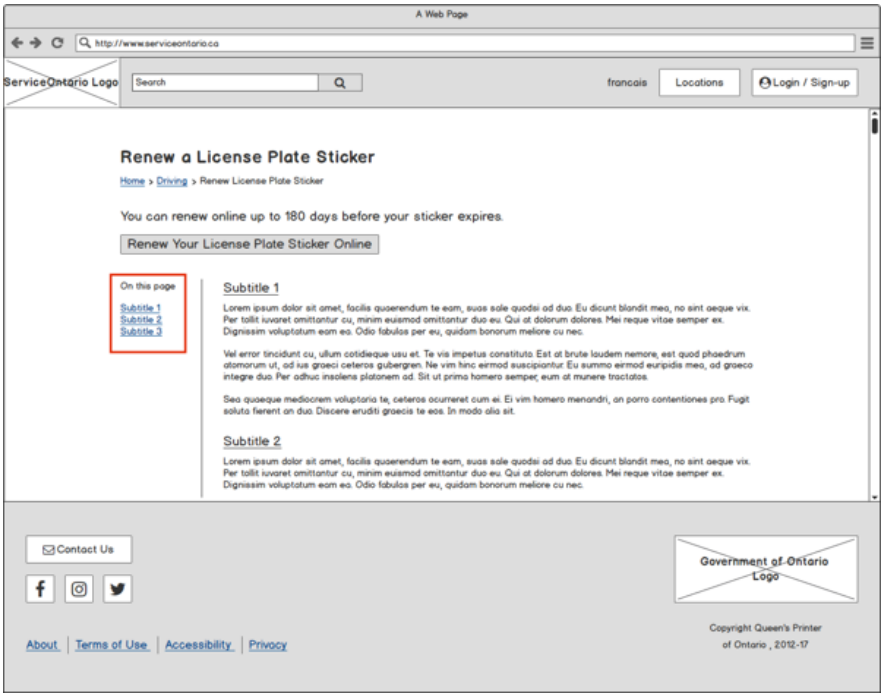


Figure 7. Sample use of hyperlinks

Navigation

Currently, the ServiceOntario website does not have a breadcrumb trail. This contributes to the feeling of getting lost which will lead to confusion and frustration in users' experience in the information environment. Based on our research, most users landed on a page by using a search engine. This accentuates the challenging for users to identify where they are. For example, in current website (Figure 8), if a user ends up on the Licence Plate Sticker Renewal page, the user is unable to return to its parent page. The user must first return to the home page then take a top-down approach. Figure 9 illustrates redesign incorporating a breadcrumb trail as a navigational aid to allow users to have a sense of place when he/she lands on a page through a search engine. In addition to using breadcrumbs to enhance placemaking process, we have also revised step process feature. In making the entire process visible while making each step available one at a time, users are able to get an overall view of where in the process the user is at the moment and where the user will be (next step).

The current Service Ontario website does not follow a global navigation scheme and essential navigation tools such as headers and footers are excluded on some pages. To address this issue, we created a global navigation system with navigation bars and fat footers for the users to have quick access to important services on all pages. Consequently, the user is not required to return to the homepage to access other services.

The ServiceOntario locations page on the current website displays a list of cities with different ServiceOntario branches. These cities are presented alphabetically but are displayed on one page with a long list to navigate through (Figure 10). We decided to modify this navigation process by grouping cities and using indexes in our redesign to facilitate a more cohesive navigation experience. As illustrated in Figure 11, user is provided with option to first select from range of alphabetical letters in which the city name begins with. As it is most likely that the user knows what they are looking for (in this case, the name of the city) they can click on a particular alphabetical groupings to be presented with more comprehensive list to recognize the city.

As seen in Figure 12, the ServiceOntario homepage originally has general categories (i.e. Driving, Health, etc.) with a series of up to 12 services listed under each category. To view additional services, users would click on the “Browse all services”, which led them to a page with the same layout as the homepage but more listings under each category (Figure 13). Based on our research, users experienced information overload and visual clutter due to the abundance of information presented on the homepage and all services page. To address this issue in our redesign of the homepage, we introduced new global navigation system by utilizing the headings from the card sorting exercise to categorize services and offering a description under each heading instead of a list of all services (Figure 14). Once users click one of the headings they are seeking information about, they will land on a page with all the services offered that pertain to that category. In implementing this modification, we reduce the amount of information users need to process on the homepage and eliminate the inefficiency of having another page with repetitive information.

Currently, the ServiceOntario website is indistinguishable from the Government of Ontario website. While on the ServiceOntario website, the home button location led users to the Government of Ontario website instead of the homepage of ServiceOntario (as seen at the top left corner of Figure 12 and 13, where the Ontario.gov logo is prominent and the ServiceOntario button is under). This was confusing for users who were navigating within the ServiceOntario website and looking for information solely pertaining to ServiceOntario. To solve this concern, we positioned the newly developed global navigation has increased the visibility of ServiceOntario logo while moved the Government of Ontario button to the footer.

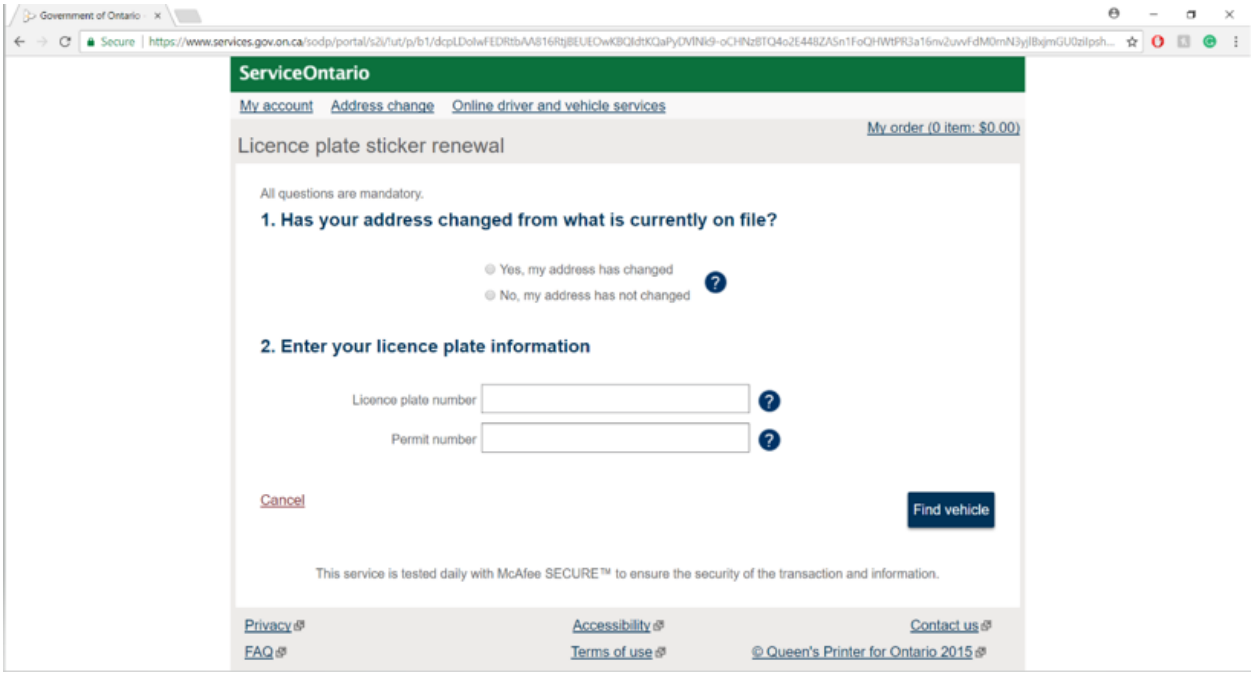


Figure 8. Current website without a breadcrumb trail

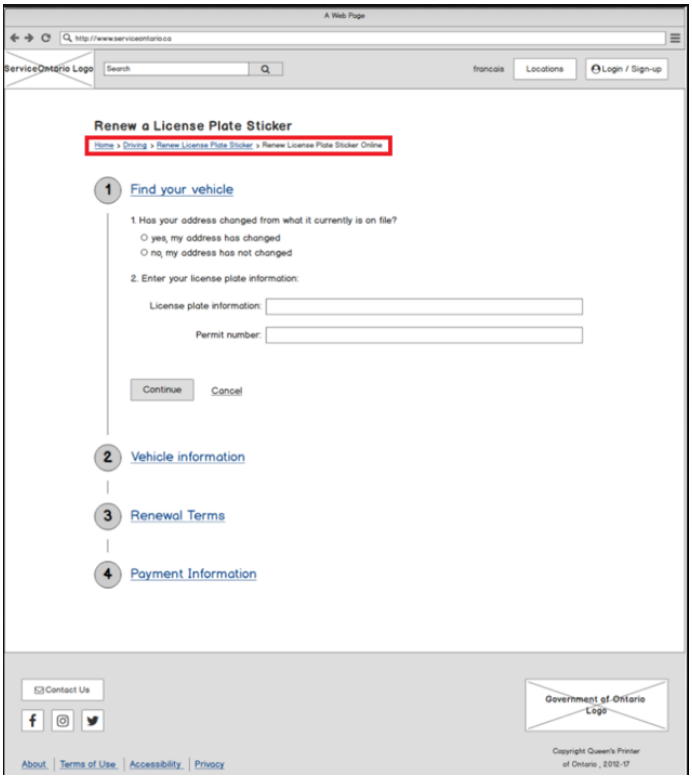


Figure 9. Breadcrumb trail in redesign

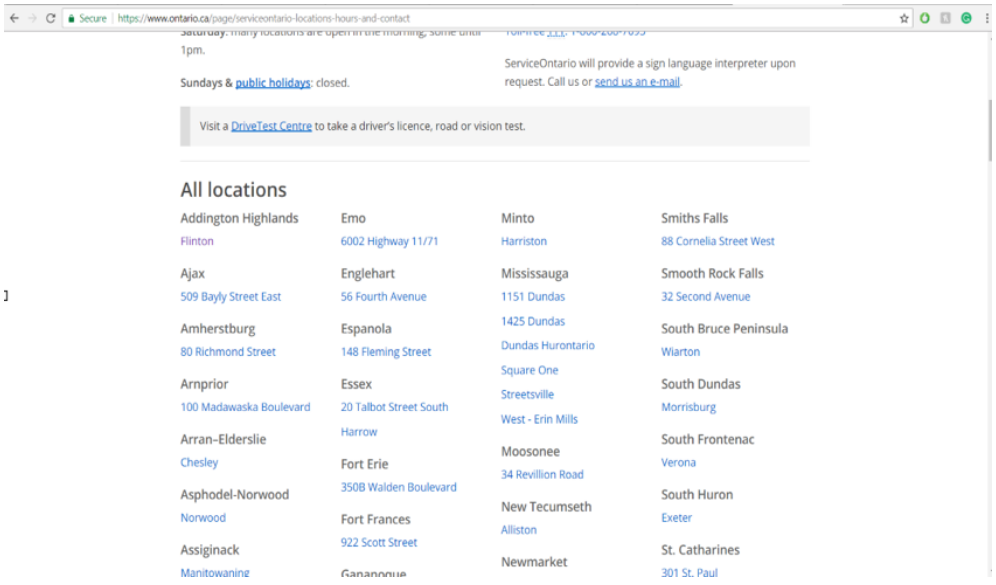


Figure 10. List of all cities displayed on one page

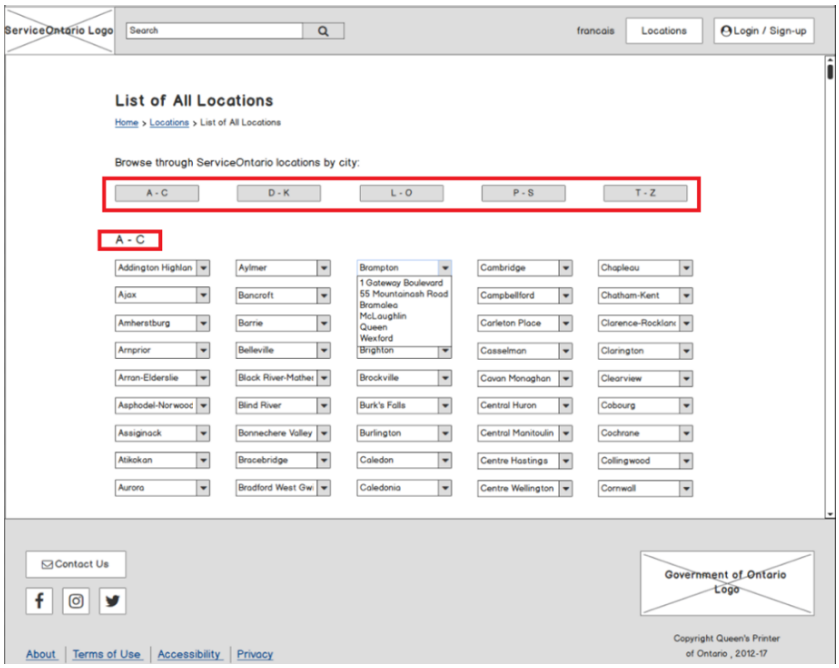


Figure 11. Updated website with alphabetical range option

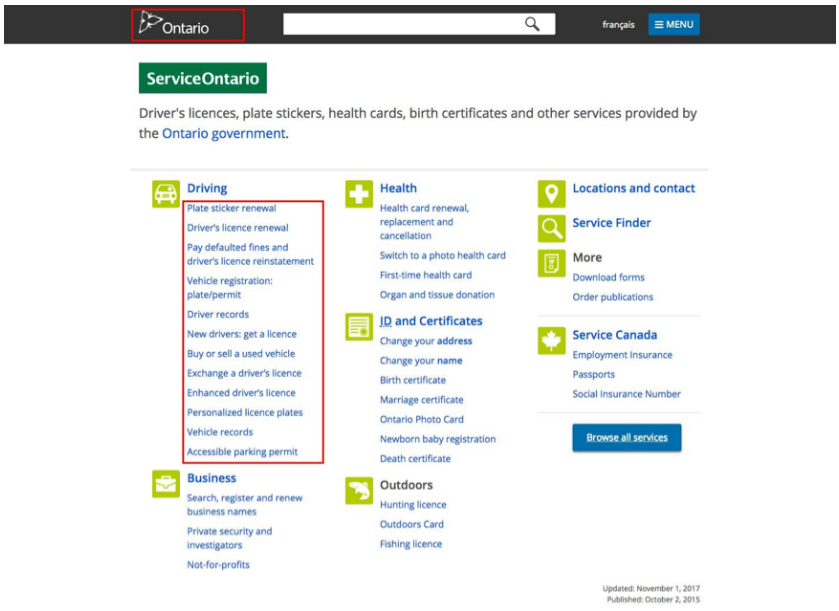


Figure 12. Homepage with list of services under each category header

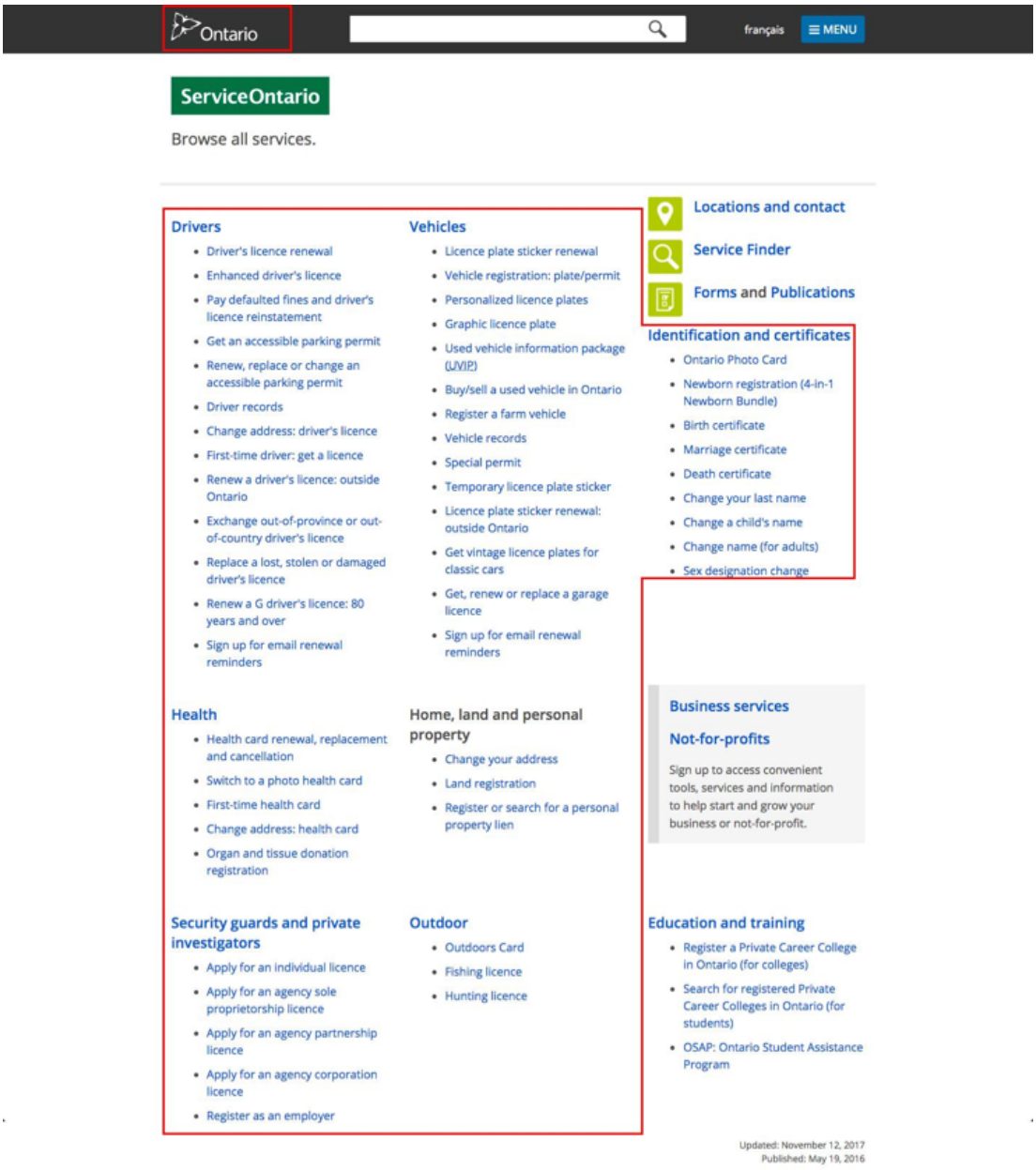


Figure 13. List of all services

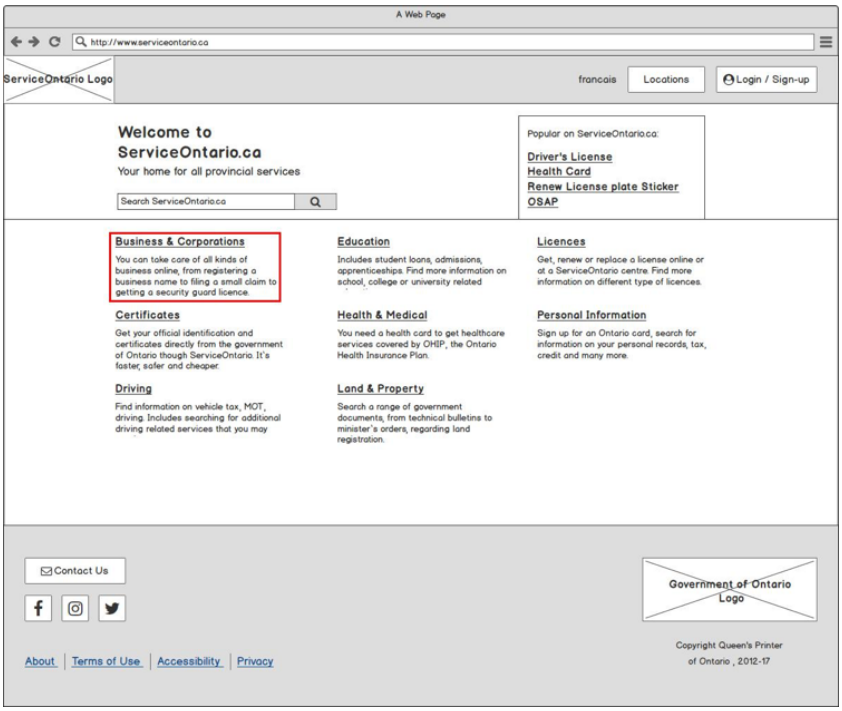


Figure 14. Updated homepage

Labelling

Based on our research and card sorting exercises, users did not express challenges with the labelling scheme on the current ServiceOntario website. The labelling system was demonstrated to be effective in communicating information and in describing categories, options, and links in meaningful language. Our redesign therefore did not make modifications in labelling and have kept the labelling system of the current ServiceOntario website.

Searching

On the current ServiceOntario website, the biggest pain point in searching was that there are two searchings tools and this produced confusion for users. The most obvious searching tools, located at the top of the website, (see Figure 15[1]) was not for ServiceOntario. Instead, the results were relevant to Government of Ontario. The second, less noticeable option, was located on the right hand side called ‘Service Finder’, and this feature provided results within ServiceOntario specifically (See Figure 15[2]). Based on our interview the users, without user’s careful examination, Service Finder was difficult to find and users would most likely use the Government of Ontario search function when looking for information specific to ServiceOntario. Additionally, in the current ServiceOntario website, the ‘Service Finder’ had to be selected, which would then open a new window to begin the searching process. To address these pain points and eliminate confusion, we also removed Government of Ontario’s search bar, and instead, only implemented ServiceOntario’s search bar on the website. As described previously in navigation redesign, the Government of Ontario’s website can be accessed through their logo in the footer. Users seeking for information for Government of Ontario are expected to visit ontario.ca directly first.

In the current ServiceOntario website, searching tool is only available on the home page. If the user wishes to search from other pages, they would have to go back to the homepage to use

the search function. In our redesign, the search function is accessible in the header on all pages.

While using the searching function on the current ServiceOntario website, the search result is presented as a list with infinite scroll (see Figure 16). We addressed issue by adding filtering options for users to further narrow down their search results (see Figure 17[5]). Filter options offered include service type, accessibility, and offline centre service. We also provided the total number of results and the number of pages so users are aware of how many results they are getting instead of scrolling infinitely(see Figure 17[4]).

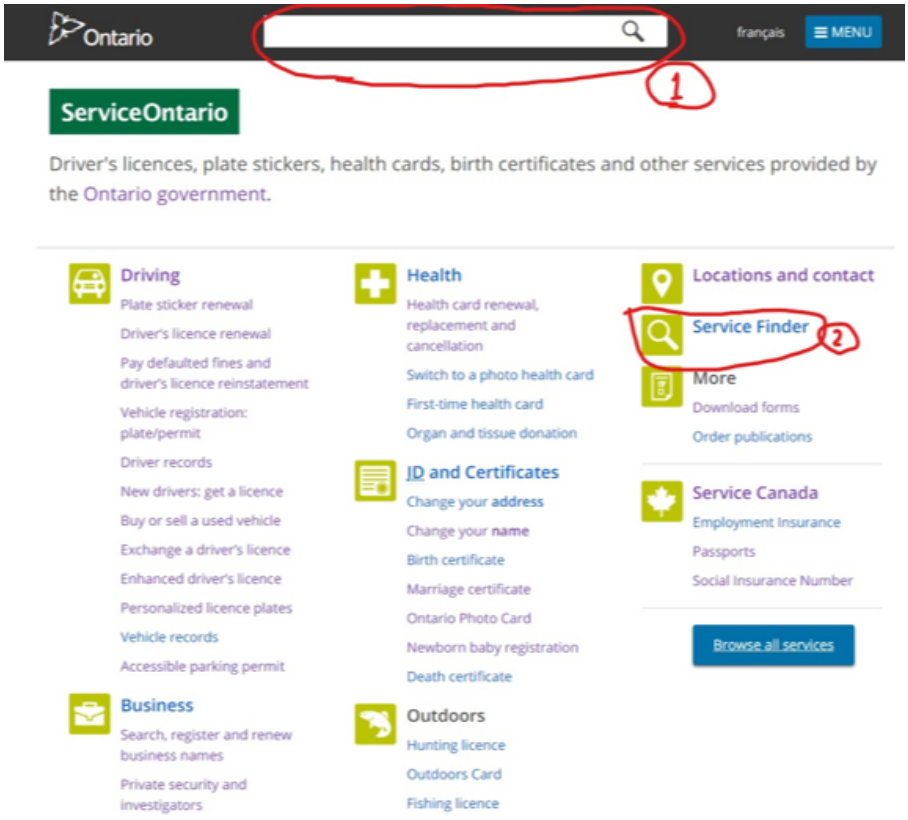


Figure 15. Current home page search bars location

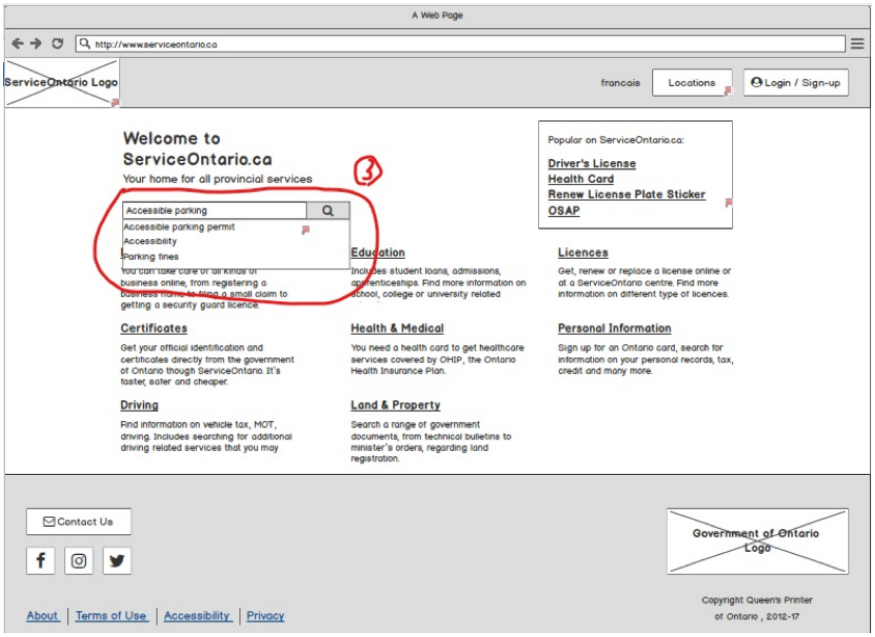


Figure 16. Final version homepage search bar location

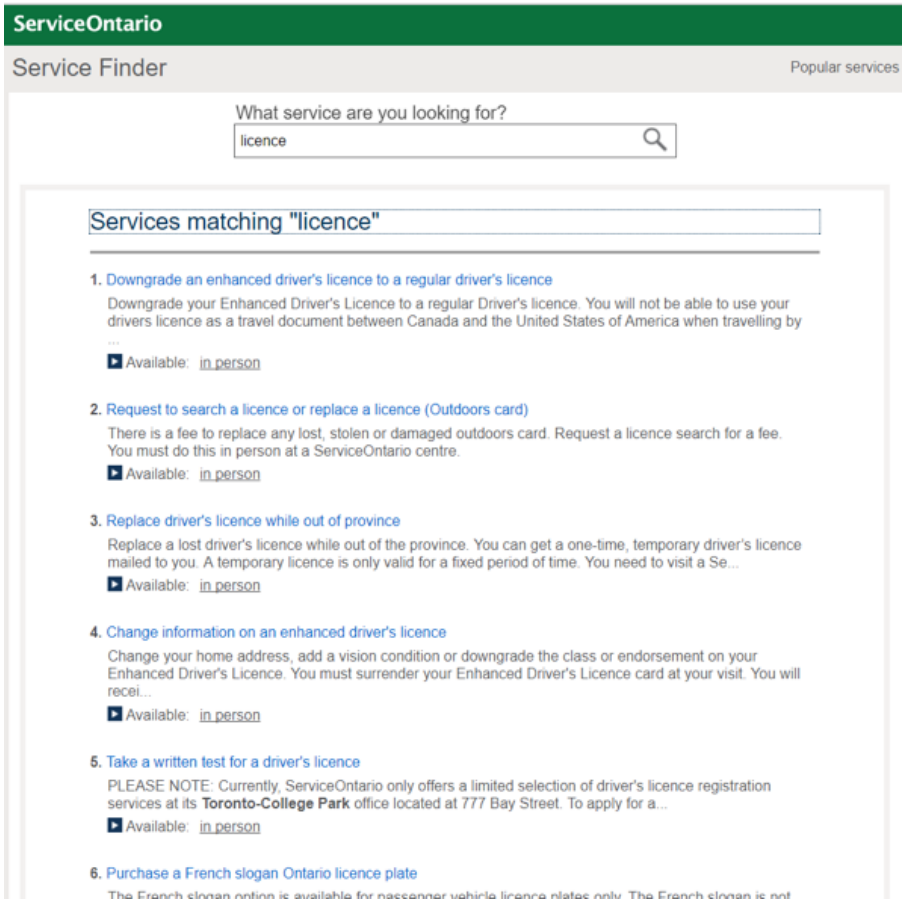


Figure 17. Current search result page

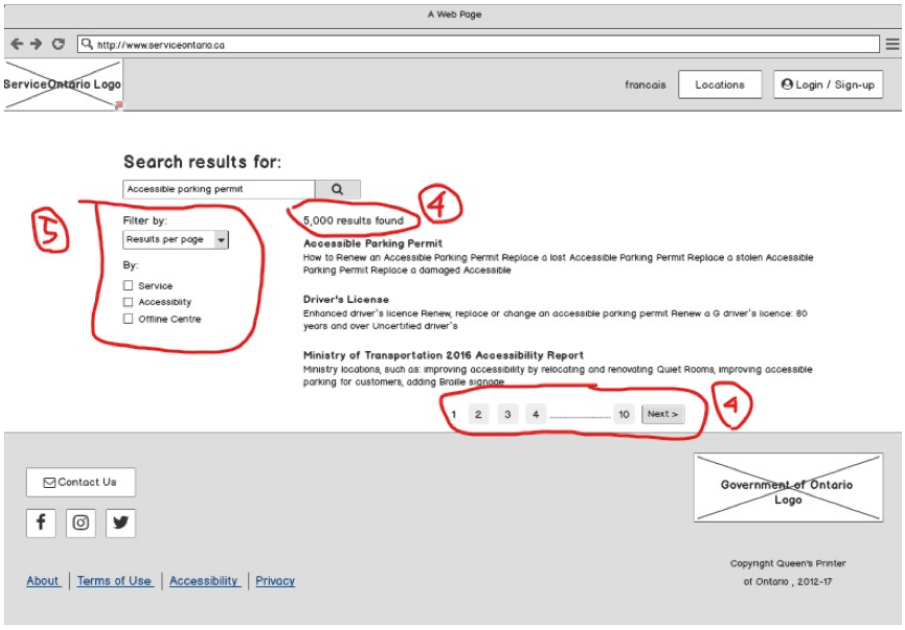


Figure 18. Final version of search result page

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Appendix A: Stakeholder Interview

Hello, my name is Saad and these are my partners Christina and Swaroop. We are students in the Master of Information at the University of Toronto. My team is studying the information architecture of the ServiceOntario website. We hope to conduct an interview to gain some insights on current IA of the website.

Would you be interested in participating in this interview? __*__Yes _____No

Thank you for your participation. This interview will take no more than 30 minutes. Please note that your answers will only be used within the context of completing our assignment for INF 2170 and that no personal data and confidential information will be recorded.

What is your role in the organization?
I worked as a UX Analyst in the Digital Communications department.

How many people are there in your team?
The UX team had four people.

How would you describe the work atmosphere in your department?
Everyone was friendly, and the work atmosphere was really good. We had scrum meetings every morning at 9 to keep each other updated on what work has been completed. We even went out for lunches and events. I had fun working with my team.

What does your team do?
My team focused on improving the Information Architecture and UX of the Government of Ontario website with the help of Google analytics and user feedbacks

How do you gather user feedback?
The website has a feedback option (not sure where). We looked at user feedback, google analytics (especially most viewed pages) and the ratings on a particular page (if you scroll down you will see a thumbs up and down button).

In your opinion, what are the key challenges current ServiceOntario website faces?
I am not sure about all the challenges but I can name a few of them.

1. The government is trying to digitize everything but there is a lot of data that you cannot digitize. There are processes that you cannot automate easily. The transition obviously isn't smooth.
2. The UX team has to go through many teams in order to make minor changes.
3. An example of how much data has to still go up on the website: I worked on the Hunting section of the website. There is a PDF file (104 pages) for hunting regulations. Half of the information in that book is still not on the website.

Did you work with in-house engineering/design team or is the work delegated to outside agencies?

Yes. Digital Communications is a separate department which includes Software developers, UX Designers and Content Management team.

What are the most common complaints you get about the current website or content you have online?
I have worked on the hunting and fishing website. The most common complaints were finding dates for hunting/fishing a specific species.

That concludes our interview. Thank you again for your participation.

Appendix B - Codes