USER INTERFACE DESIGN FOR INTERACTIVE LARGE PUBLIC DISPLAY

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ABSTRACT

Walking into a building without any direction of where to go can be overwhelming for most people. Most buildings do not have a directory or bulletin board stating where rooms and events are located. The Reynolds building at the University of Guelph is no exception to this. There is nothing displaying basic information for visitors. Placing an interactive large public display on the first floor of the Reynolds building will solve this issue by providing users with basic information. This paper outlines all the steps and activities conducted over a four-month period to design a user interface for an interactive large public display.

KEYWORDS

Interactive large public display; public display user interface; interactive display; large public display

INTRODUCTION

Large interactive displays are incredibly useful in providing important information. Therefore, placing an interactive public display in the Reynolds building at the University of Guelph would positively impact and enhance an individual's visit to the building. A user interface for an interactive large public display was designed and findings were analyzed and recorded over a time period of four months. The study revealed that change blindness [4] and interaction blindness [3] are common issues that occur during interactions with large public displays. The study also revealed that users prefer a simple design that is intuitive to use. The end result of this project was a wireframe mock-up of a user interface design for an interactive large public display.

I. PROJECT SCOPE AND OBJECTIVES

The goal of this project was designing a user interface for an interactive large public display that may reside in the main lobby of the Reynolds building at the University of Guelph in the future. The main intent of the design was for the interactive large public display to provide important information that may be required by people visiting the building, in an accessible, user friendly way that incorporated existing knowledge on designing public interactive displays.

An assumption made in the project was that the display be used by undergraduate students, graduate students, faculty members, and visitors to the School of Computer Science (SoCS), which is housed in the Reynolds building. Another assumption, based on advice from literature [1], was that multiple people may want to interact with the interactive large public display

concurrently. Thus, the design should allow multiple interactions simultaneously. Finally, due to the nature of the display, and the short-lived nature of information kiosk-type interaction behaviour [2], the interface was designed to keep interactions brief.

The project produced a wireframe of the final design for the interactive large public display on the digital wireframing tool Balsamiq[1]. Over the course of four months, research was conducted to determine what content the interactive large public display should exhibit and who it should be accessible to. Basic user testing and redesign were conducted to craft a final design of the interactive large public display as part of the software engineering process. The display will provide visitors with the information related to the School of Computer Science, office locations and office hours for professors and faculty members, lab schedules, and other useful information.

II. SUMMARY OF SOFTWARE ENGINEERING ANALYSIS AND DESIGN METHODS

An iterative design process was followed to construct the final design for the interactive large public display. First, the problem was defined, and background research was conducted in the form of a verbal informal survey to determine what information undergraduate students, graduate students, faculty members, and visitors wished was presented to them when they enter the Reynolds building. Based on the results of the survey, a list of requirements was specified (refer to Appendix A).

The next phase of the design process consisted of drafting multiple designs and assessing their effectiveness by referring to the list of requirements. One of the activities that was completed was the Design Sprint Method Crazy Eights (refer to Appendix B). The purpose of this activity was to generate different designs in a short period of time. This activity involved splitting a piece of paper into 8 different panels and spending 8 minutes to craft 8 different designs. This design activity helped outline important features to include within the final design of the project. This activity was conducted with project collaborator Connor Geddes and results were discussed to outline any similarities and desirable features amongst all sixteen versions.

These ideas were then consolidated into several alternative designs for the user interface. However, due to striking similarities between alternate designs, only one of these designs was translated into a paper prototype (refer to Appendix C). After a final design was constructed, the first phase of testing was conducted through a paper prototyping session. Five participants took part in the testing of the paper protype. The design was tested with undergraduate students who are not a part of the School of Computer Science (SoCS) at the University of Guelph and undergraduate who are a part of the School of Computer Science (SoCS). Participants were asked to complete the following tasks: find the email for X faculty member, find X faculty member's email and office location, access the Guelph Women in Computing (GWICS) page, go

[1] https://balsamiq.com/

to the workshops and events page to find events hosted by Guelph Coding Community (GCC), and find a map of campus. Observations made during the paper prototyping sessions were recorded. These included how long participants took to complete tasks, how easily participants were able to complete the tasks, and their overall comments and suggestions.

After the paper prototyping session, the interface design was refined according to the user feedback collected during the testing sessions. Several versions of the design were created and after discussing these designs with my supervisor Professor Stacey Scott and project collaborator Connor Geddes, a second design was created. This design was then translated into the digital wireframing tool Balsamiq (refer to Appendix D). Using a digital wireframing tool made it easier to implement changes, as well as create design alternatives. A digital wireframing tool also presents a more realistic image of the final product. This makes it easier for testers to test the design, as they get a more realistic feel of the final product.

Testing

Due to social distancing measures put in place because of COVID-19, conducting user feedback testing sessions was done remotely using Chrome Remote Desktop[2]. This allowed the tester to take control of the laptop screen, where the wireframe was located. Testers were School of Computer Science undergraduate students and individuals who had never been to the Reynolds building or the University of Guelph campus before. Participants were required to complete the following tasks: find lab schedules, locate a map of campus, find events happening in the next week, find undergraduate entrance scholarships, find the undergraduate calendar for the years 2019-2020. Again, observations were recorded of how long participants took to complete tasks, how easily participants were able to complete the tasks, and their feedback. Once this was round of user feedback testing was completed, the feedback was analyzed and possible changes that could be made in the future were identified. However, due to time constraints, these design recommendations were not implemented in the final design.

III. DESIGNED SOLUTION

Before constructing a design of the interactive large public display, it was crucial to determine what content was going to be displayed on the interactive large public display. After gathering requirements and having several meetings with project supervisor Professor Stacey Scott and project collaborator Connor Geddes, it was determined that the interactive large public display would display a slideshow of School of Computer Science related news, workshops, and events, an interactive map of Reynolds, schedules for conference rooms and labs, award winning students, staff, and alumni, professor office locations and office hours, a list of professors' emails and basic information, a list of deadlines and important dates, and links to the School of Computer Science related and University of Guelph social media accounts.

[2] https://remotedesktop.google.com/support/

After conducting research and studying what characteristics effective interactive large public displays portray, it was determined that the interactive large public display for the Reynolds building could include face detection to detect infrequent and frequent visitors (to adjust the information displayed or highlighted as appropriate), a proximity sensor, animations, elements to show interactivity, and a zoom function to make text size bigger or smaller. Many of these design alternatives were discussed in the Preliminary Design Report and discussed among the project team throughout the duration of this project. The large interactive public display also should allow more than one person to interact with the display at the same time. All of these elements were decided upon in an attempt to make the display more inviting and to attract people passing by to interact with the display and to provide accessibility for different types of users.

Functions that were determined to be inappropriate for the interactive large public display were audio, the ability to book conference rooms, search functionality, height adjustment, and access to the uoguelph.ca/computing website. This display would be situated near a quiet area with tables and for students to work. Implementing audio functionality would pose a direct disturbance in the environment. The interactive large public display would be presented on a commercial Smart Board screen. Due to the screen being large and expensive, it is not feasible nor safe for users to be able to manually adjust it according to their height. However, during installation, a suitable height would be selected to accommodate the majority of users to best balance reading and interaction needs. The interactive display would also allow users to scroll and select menu items at different vertical positions. Providing full access to the www.uoguelph.ca/computing website would likely result in longer interactions with the display and as the website is not optimized for large display use, it would not be implemented directly within the design. Although, some of the information it contains was incorporated into the interactive large public display design.

Initial Design (Paper Prototype)

While considering all the requirements and crucial elements, a first iteration of the design as crafted and a paper prototype of it was created (refer to Figure 1). The paper used in the user feedback sessions was created on a large craft paper measuring 25 inches x 20 inches. A large paper was used to give users a sense of the display size. It included a rectangle in the centre of the screen that was split into different panels and two side bars on each side containing buttons that display titles and link to specific information. An icon-based scrollable system menu was provided along the left and right edges of the display. All functionalities are present on both menus and could be accessed (if not currently visible or reachable) by using the scroll bar. The main screen was split horizontally into two equal rectangles. The bottom rectangle was then split into four panels (refer to Figure 1). Each panel displayed a title at the top centre of the panel. Whenever a user wishes to interact with the interactive large public display, they should approach the screen and touch these interactive panels. Whenever a user selects one of the icons from the icon-based scrollable system, the related information would appear in the closest panel, depending on which side menu (left or right) was used. When the interactive screen on the left side was not being used, it displayed an interactive Map of Reynolds. When the interactive screen on the right side was not being used, it displayed a slide show of pictures from different

events hosted by the School of Computer Science and important information and announcements (refer to Figure 2).

Between the two interactive screens were two more panels. One of these panels displays scholarships, Undergraduate and Graduate Teaching Assistant (UTA) opportunities, and Undergraduate and Graduate Research Assistant (URA) opportunities (refer to Figure 1). A scroll bar is present on the right side to allow users to scroll vertically. The other panel contains faculty information. This is presented in the form of a list displaying the faculty member's name, office number, and email. Once again, a scroll bar was available on the right side to allow users to scroll vertically. It was crucial to display faculty information in a position where it is easily noticed and accessible as the informal survey done at the beginning of this project revealed that most undergraduate students visit Reynolds to meet to their professors.

The top half of the rectangular screen was split into five panels. The first panel displays events and workshops. In this iteration of the design, the events are not ordered in a specific manner. Posters for events are stacked vertically and a scroll bar is present to allow users to go through posters for the different events being held. The panel beside this displays a slideshow showing pictures from events and workshops held by Guelph Coding Club, SOCIS, Guelph Women in Computing, and Student Developer Club (refer to Figure 1). The next panel showcased tweets from Twitter and posts from Facebook and Instagram. Each social media is displayed within its own box and the boxes are vertically stacked. Within these boxes, would be a slideshow that goes through posts from the social media account. Again, a scroll bar is present to allow users to scroll through the different social media accounts and posts. The next panel shows pictures of lab room schedules in a vertical manner. These pictures could be clicked on to make them bigger for easier visibility. The last panel shows pictures of conference room schedules. These too could be clicked on to enlarge them. The top of this panel displays the date and time and the bottom of this panel contains a search button where keywords could be entered to search for information.

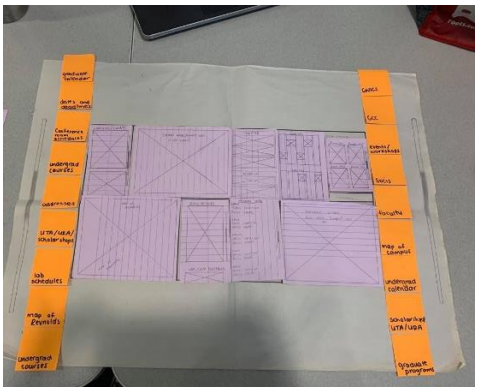

Figure 1: Paper prototype design

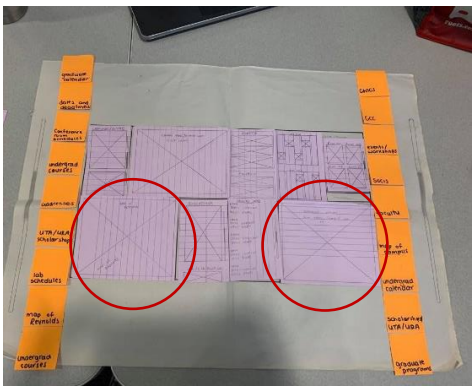

Figure 2: Right and left interactive screens

The icons on either sides of the screen contained the buttons for Guelph Women in Computing, Guelph Coding Community, Developer Student Club, events and workshops, School of Computing and Information Science, faculty, map of campus, undergraduate calendar, graduate calendar, Scholarships and UTA/URA, graduate programs, dates and important

deadlines, undergraduate courses, addresses, lab schedules, and map of Reynolds. These icons could be clicked on and the information relating to the button being selected would be presented on one of the two interactive screens. After this design was tested and user feedback was received, a few more iterations of the design were crafted, and a final design was produced and translated to a digital wireframe prototype.

Refined Design (Wireframe Mock-up)

The final wireframe design (refer to Figure 3) was similar to the paper prototype version. The interactive large public display still displays different panels in a larger rectangular screen with icons listed vertically on either side (refer to Appendix W). The icon-based scrollable system menu is still the same from the paper prototype except the scrollbars have been changed to up and down arrows (Refer to Appendix P). The large rectangular screen was still horizontally split into 2 equal parts and smaller panels lay across the main screen. One of the most noticeable differences between the iteration the paper prototype was created for and the iteration the wireframe was created for simplicity. This was done to make the overall product less overwhelming for users to interact with.

The bottom left and right panels are still the main interactive screens. The left interactive screen still displays a map of Reynolds however, the right interactive panel now displays publications and research papers written by School of Computer Science students, faculty, and alumni and by Canadian researchers. A scrollbar is also present on the right side of the screen to allow users to scroll through different publications (refer to Appendix D). A silhouetted hand is present on both interactive screens (refer to Appendix V). The hand would move around the individual panel in order to show interactivity and occasional “Touch Me” messages would pop up on the individual panels to show that the display can be interacted with. The panel that displayed a map of Reynolds also has a scrollbar which allows users to zoom in and out of the map.

Between both interactive screens lies the Faculty Information panel (refer to Figure 3). This panel was changed from being presented in a list order to now displaying icons with pictures of faculty members. When a faculty member is selected a pop-up screen should appear on the Faculty Information panel displaying the faculty member’s name, email, office location, and office hours (refer to Figure 4). The Faculty Information panel also features a search bar. When the search bar is clicked on, a keyboard should pop up and faculty members can be searched for their name. The top half of the screen now only contains the panels for Room Schedules, Social Media Updates, events and workshops and a slideshow to display pictures.

Lab schedules and conference room schedule panels were combined to make one panel titled Room Schedules (refer to Figure 3). This panel presents pictures of all lab and conference rooms with the names on the bottom of the pictures. When a room is selected a pop-up should appear with a picture of the room’s schedule for the week. A scrollbar is present on the right side of the panel to allow users to scroll through all the rooms. To the right of this panel is the Social Media Updates panel. This panel displays Twitter and Instagram updates from different accounts including SOCIS, GCC, GWICS, and the official University of Guelph account. Each account is

given its own heading and has an inner scroll bar to scroll within the feed for that specific account. All accounts are arranged in a vertical manner with a scrollbar available to scroll through the different accounts. Next, is the Events and Workshop panel (refer to Figure 3). This panel displays posters for events being held by SOCIS, SOCS, GCC, GWICS, and DSC. The posters are arranged in order from dates. If an event is occurring the day of, a tag on the poster will say 'Event happening today!" Once again, a scrollbar is present for users to scroll through different events. The last panel on the top right is a slideshow displaying pictures from events, School of Computer Science news, awards won by students, faculty members, and alumni, and more. The search functionality was also removed. The title "Welcome to Reynolds" was added to the top centre of the screen.

The icons either sides of the screen contain the buttons for GWICS, GCC, DSC, events and workshops, SOCIS, faculty, map of campus, undergraduate calendar, graduate calendar, Scholarships and UTA/URA, graduate programs, dates and important deadlines, undergraduate courses, addresses, lab schedules, and map of Reynolds (see Appendix W). These icons can be clicked on and the information relating to the button being selected would be present on one of the two interactive screens. After this design was tested, a few more iterations of the design took place and a final design was produced and translated to a digital wireframe prototype.

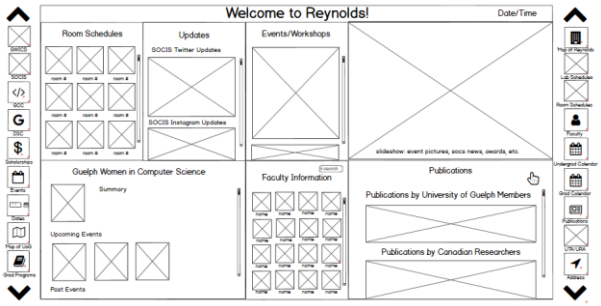

Figure 3: Wireframe Mock-Up

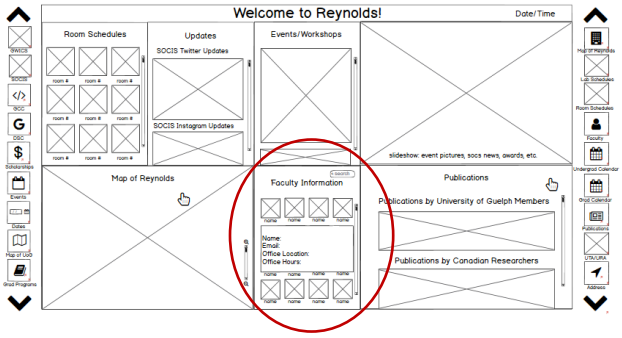

Figure 4: Faculty Information Pop-Up

IV. SUMMARY OF DESIGN VALIDATION

An iterative approach was taken to design the interactive large public display. The process began by gathering requirements and creating an initial design. The MuSCoW method (refer to Appendix A) was followed to sort requirements according to their importance in meeting the project goal. Throughout this entire process, many versions of the interface were created and modified as user feedback was collected.

Weekly meetings were held over the course of four months with supervisor Professor Stacey Scott and collaborator Connor Geddes to discuss design ideas and functionalities. Testing a paper prototype version of the design was the most significant activity for gathering user feedback. The paper prototype design was the first design that was reviewed by users and potential stakeholders. Thus, it generated a considerable amount of feedback. Although testing

the wireframe did not generate as much feedback as the paper prototype, it allowed a final version of the design to be drafted.

User Feedback on Design Concepts

Testing a paper prototype version of the design was the most significant activity undertaken for gathering user feedback on the interpretation and implementation of the original design requirements. The paper prototype design was the first design that was reviewed by users and potential stakeholders. Thus, it generated a considerable amount of feedback. Although testing the wireframe did not generate as much feedback as the paper prototype, it allowed a final version of the design to be drafted.

The paper prototyping session revealed that users felt that the display was too overwhelming and needed to be simplified. This concern was addressed by removing the 'Scholarships' panel, removing the second slideshow, and combining the panels 'Conference Room Schedules' and 'Lab Room Schedules' into one. For the purpose of improving simplicity, scroll bars were removed from either side of the icon based scrollable system menu and were replaced with up and down arrows (refer to Appendix W). Another concern that was expressed during the paper prototyping session was the 'Faculty Information' panel was not built for efficiency. This concern was addressed by replacing the list of faculty members and information with icons with pictures of faculty members. This made the design simple and intuitive to use. Testers during the paper prototype session also expressed that it was difficult to identify which parts of the display were interactive and which parts were static. To solve this, a moving silhouetted hand was placed on the two interactive screens. This also addressed interaction blindness. Interaction blindness occurs when the user is unable to recognize that a display is interactive or to understand how to interact with it [3]. The hand should move around and is accompanied by a text pop-up bubble that displays the phrase "Touch Me".

During the paper prototyping sessions, concerns and suggestions were also made that could not be addressed for the final design. One user communicated that it was confusing to have multiple people interact with the interactive large public display at the same time and wished that only one person could interact with the display at a time. This concern obviously could not be addressed as one of the primary requirements of the interactive large public display is to allow multiple users to access and interact with it at the same time. Users also conveyed that titles were not clear enough. This resulted in longer task completion time. Due to limitations in the wireframing software, this could not be addressed however, however this feedback should be addressed in future iterations of the project.

V. DESIGN RECOMMENDATIONS

After testing the final wireframe design and consulting the initial list of requirements, several steps can be taken to further development of the interactive large public display. Titles and headings should be presented in an eye-catching and clear manner. This could be done by exploring different fonts, font characteristics, and font sizes. All headings and titles should also

be made the same to preserve uniformity. Changing all scroll bars to up and down arrows allowed for more simplicity within the design. Search functionality within the 'Faculty Members' panel should be implemented to allow for users to search for faculty members by entering a name. Search functionality should be kept as simple as possible in order to ensure brief interactions with the interactive large public display.

The icon-based scrollable system menu on both sides of the main screen should be reordered according to categories or in alphabetical order. Research and testing should to be conducted to determine which is more effective and which allows users to look up desired information more efficiently. The icon-based scrollable system menu also needs to be redesigned in a manner where icons are the largest in the centre and decrease in size as the icons extend up and down. The largest icon in the middle would be the one that would be selected. If this is implemented, the up and down arrows can be removed and replaced with manual scrolling.

A big issue that needs addressing is change blindness. Change blindness occurs when a user is not able to recognize a change in a visual environment [4]. Testing the wireframe revealed that users had a hard time noticing when the display changed screens. This may be resolved by adding different animations. Animations cause sudden movement which alert the user that change has occurred or is occurring. Another feature that should be addressed is showing interactivity through using hand silhouettes. The hand silhouettes should show the user that the screen can be interacted with. However, it should be done in way that is not ostentatious and it should not block information being displayed on the screen.

A significant portion of the requirements revolved around the idea of catering to individual users. One way this may be done is by implementing a sensor which records individuals' faces, how often they interact with the display, and what information they look at when they interact with the display. This is a high-level function and poses a potential privacy threat. Therefore, research would have to be conducted to explore different ways to collect facial information. Implementing this feature within the interactive large public displays would provide users with a personalized experience as when they walk up to the display, they would be greeted with the information they most often look up. Infrequent and new users would be shown general information such as Faculty Information, a map of the building, and lab schedules.

A potential solution to resolve interaction blindness would be by implementing a motion tracking sensor to detect proximity or specific movement. The Xbox Kinect device may be installed on top of the display to act as a motion sensor. The purpose of the motion sensor would be to draw more people to the interactive large public display. When a user may be in close proximity to the display, an animation would occur to alert the user of the interactive display. Animations would have different intensities which would be based on proximity. One potential problem this may pose is that when there is a visible motion sensor, such as the Kinect device, people may think that the display is to be interacted with in the same manner. To address this, further research and studies would have to be conducted to implement a motion sensor feature effectively.

Final next steps would include creating a high-fidelity prototype with sample content being displayed on the interactive large public display. This would allow for stronger user feedback as users would be able to see the final product. The design should also be exhibited on a commercial Smart Board screen, where the actual final product may be displayed. Again, this allows for users to interact with a physical, real-life product and thus, they may be able to provide better feedback. The interactive large public display's effectiveness to invite people passing by to interact with the display should also be tested. This may be done by placing the display in the location that it is to reside, the main floor of the Reynolds building, for an extended period of time. This would allow designers to get information on who the target audience may be and what information they may look for. Allowing the display to be tested over a significant period of time may also support large scale testing.

VI. LIMITATIONS OF DESIGNED SOLUTION

Limitations presented themselves during each stage of the project. Limitations during testing phases prevented proper feedback from being generated. In the requirement gathering of the project, one limitation that occurred was the inability to survey all stakeholders. Stakeholders for the interactive large public display included undergraduate students, graduate students, alumni, faculty members, and visitors. Alumni were not surveyed because there were no alumni available at the time.

Limitations with Paper Prototyping

One of the biggest drawbacks with paper prototyping was not being able to display a realistic version of the large interactive public display. The final display may be presented on a smart board screen that is standing upright. However, the paper prototype that was placed horizontally on a desk was much smaller than the actual display is going to be. One of the main features that the large interactive public display should have is the ability to grab the attention of people passing by it. This could not be tested with the paper prototype. Testers had to explicitly told to visualize that this interactive display is standing upright in the Reynolds building. Another crucial feature the large interactive public display should have is the ability to present itself as an interactive display. This could not be demonstrated on paper. Again, testers had to be were told that this is an interactive display. However, they were not told how the display was interactive. Paper prototypes are also extremely simple, it was not possible to incorporate intricate details. There was no actual content displayed on the paper prototype and as a result, it was challenging for testers to visualize a final product, especially because this was their first time viewing and learning about the product. This also limited interaction. Due to the absence of interactions and animations, it was difficult for testers to completely interpret the final interface.

Limitations with Wireframe Mock-Up

Although the wireframe version of the design solved addressed a few of the limitations posed by the paper prototype, it presented limitations of its own. A crucial feature of interactive large public displays is the ability to attract the attention of people nearby, so they come interact with

the display. This highly significant feature could not be tested with a digital wireframe. The digital wireframe was a simple version of the final interface without colour or content.

Colour and the content being displayed play an important role in determining the overall quality of a user interface. Therefore, the wireframe version of the interface could not provide feedback on the overall quality of the display. The issue of change blindness also could not be addressed with a wireframe. Some of the feedback received from testers was that they were unable to tell when the information was being changed on the screen. One way to ensure that change blindness does not pose an issue may be by populating the interface with content and testing it. Interaction blindness was partially being tested for by adding a hand symbol to the interactive screens. However, in order to thoroughly check for interaction blindness within the display, animations would have to be present. This would include transitions and a moving silhouetted hand.

Low and medium fidelity prototypes allow for rough feedback on the type of content being displayed and how easy it is to access the information, but they are not close enough visually to a working design for testers to move through them intuitively. They prevent fully functional interactivity and may make it harder to communicate complex operations. Consequently, this may leave designers clueless about how visual design will influence how users may interact with the product. In order to resolve these issues, a high-fidelity prototype would need to be created and large-scale testing would need to be carried out. Due to time constraints, this could not be included within the scope of this project however, it would be an appropriate next step.

Limitations with Testing

The testing process of the wireframe was compromised due to pandemic imposed by the COVID-19 disease and the social distancing measures placed. All testing of the wireframe was done online using Chrome Remote Desktop. This made it difficult to assess how testers were feeling about interacting with the display, as their facial expressions could not be seen. As an attempt to tackle this issue, testers were asked to express their thoughts vocally as they were interacting with the display interface.

VII. CONCLUSIONS

Public displays are extremely useful in portraying important information. In an attempt to solve the lack of guidance available in the Reynolds building at the University of Guelph, an interface for an interactive large public display was created. Over the last 4 months, research was conducted, and various designs were crafted and tested to generate appropriate user feedback on the best practices and features that should be implemented within the final design of the large public display. Low and medium fidelity prototypes were created in the form of paper prototypes and wireframe mock-ups. This work produced a final wireframe mock-up design of an interface for the interactive large public display which may reside on the first floor of the Reynolds building.

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APPENDIX

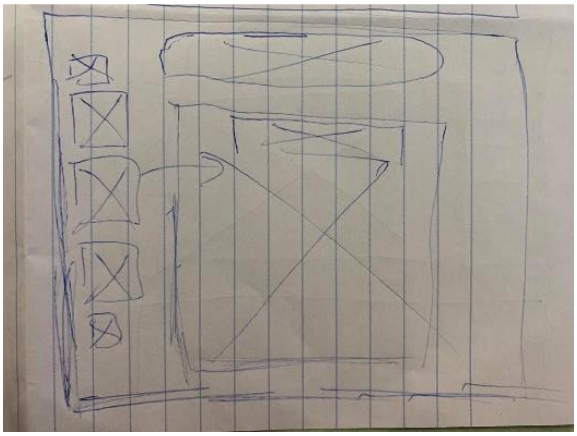
Appendix

Appendix A - List of Requirements

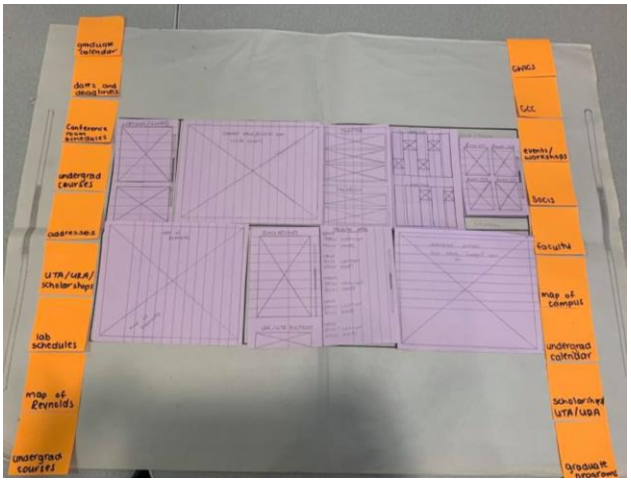
#	Category	Requirement
1	Must	At least 2 users must be able to interact with the large public interactive display at one time.
2	Must	The large public interactive display must display the office numbers of professors and faculty members.
3	Must	The large public interactive display must display office hours for professors and faculty members.
4	Must	The large public interactive display must display lab schedules.
5	Must	The large public interactive display must display when the labs in the basement are open.
6	Must	The large public interactive display must display workshops hosted by Guelph Women in Computer Science, Guelph Coding Community, and School of Computer Science.
7	Must	The large public interactive display must display events hosted by Guelph Women in Computer Science, Guelph Coding Community, and School of Computer Science.

8	Must	The large public interactive display must display the time and location of workshops hosted by Guelph Women in Computer Science, Guelph Coding Community, and School of Computer Science.
9	Must	The large public interactive display must display the time and location of events hosted by Guelph Women in Computer Science, Guelph Coding Community, and School of Computer Science.
10	Must	The large public interactive display must display email addresses and basic information of all faculty members
11	Must	The large public interactive display must display an interactive map of Reynolds
12	Must	The large public interactive display must allow user to book conference rooms.
13	Must	The large interactive public display must have search functionality
14	Must	The large interactive public display must be easy to use.
15	Must	The large interactive public display must display all SOCS announcements
16	Must	The large interactive public display must provide accessibility for visually impaired users
17	Should	The large interactive public display must display important dates and deadlines.
18	Should	The large interactive public display should have a motion sensor implemented
19	Should	The large interactive public display should have a face detection sensor implemented
20	Should	The large interactive public display should have a link to the uoguelph.ca/computing site
21	Should	The large interactive public display could display both graduate and undergraduate calendars
22	Should	The large interactive public display should have a map of campus.
23	Should	The large interactive display should display all the undergraduate courses offered.
24	Should	The large interactive display should display a list of SOCS scholarships available.
25	Should	The large interactive display should display a list of Teaching Assistant positions available
26	Should	The large interactive display should display a list of Research Assistant positions available
27	Should	The large interactive display should tailor display information for infrequent and frequent visitors
28	Should	The large interactive display should display all the graduate courses offered.
29	Could	The large interactive display could show the mailing address of Reynolds
30	Could	The large interactive display could display the address of the University of Guelph
31	Could	The large interactive display could display a daily riddle for users to solve.
32	Could	The large interactive display could let students place their own advertisements.
32	Won't	The large interactive display won't have audio playing

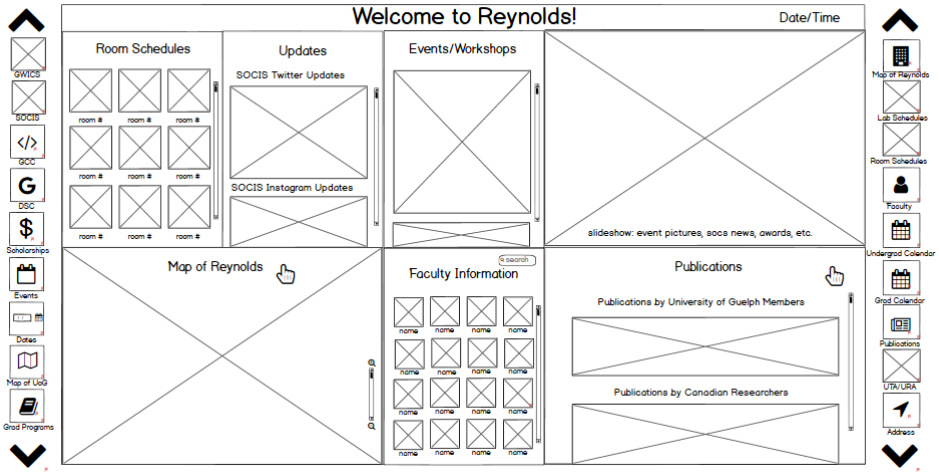
Appendix B – One Design Produced by Crazy Eights Design



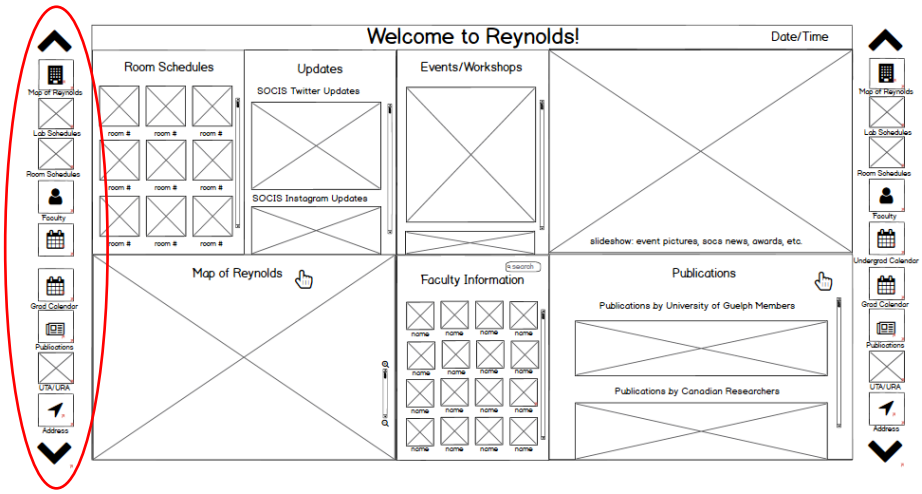
Appendix C – Paper Prototype Design



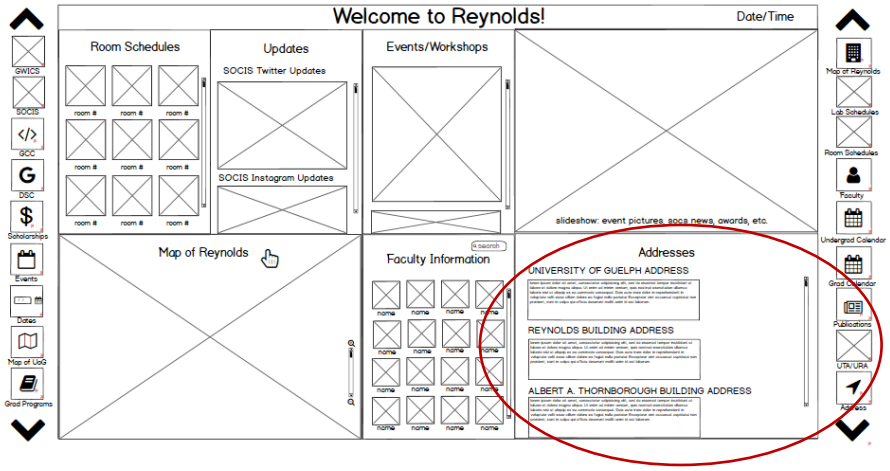
Appendix D – Wireframe Mock-Up Main Screen



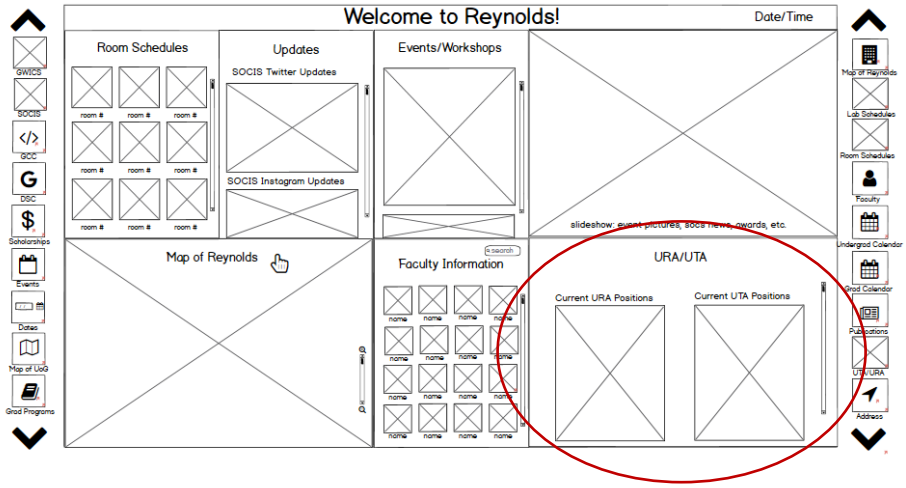
Appendix E – Wireframe Mock-Up: Selecting Bottom Left Arrow



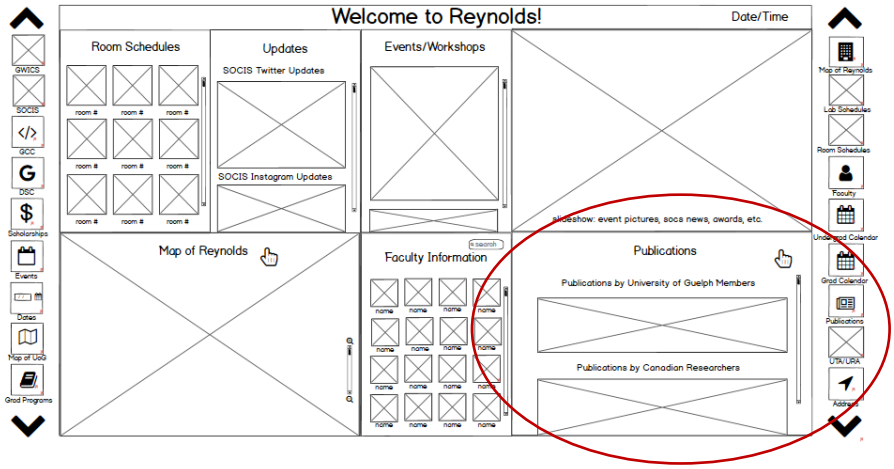
Appendix F – Wireframe Mock-Up: Selecting Addresses



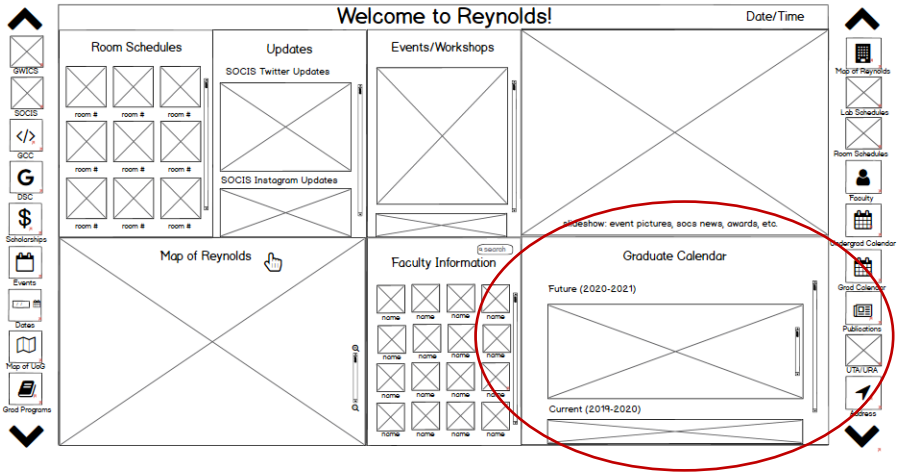
Appendix G – Wireframe Mock-Up: Selecting UTA/URA



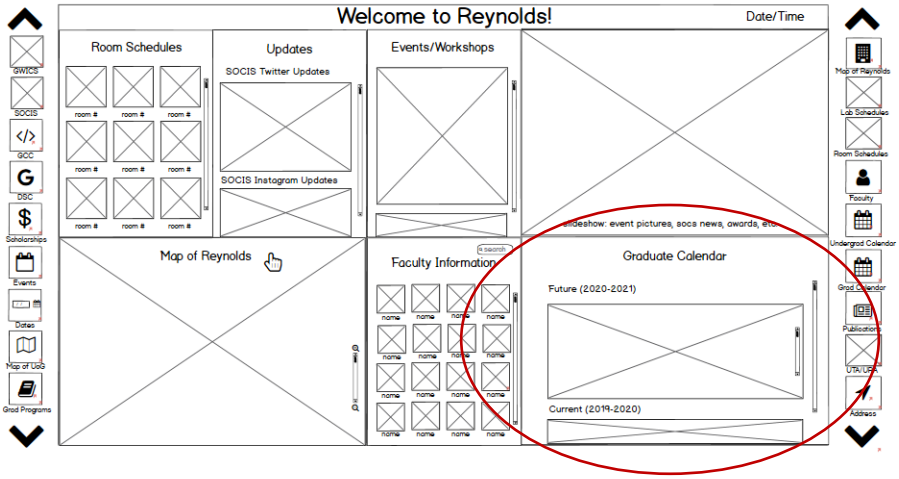
Appendix H – Wireframe Mock-Up: Selecting Publications



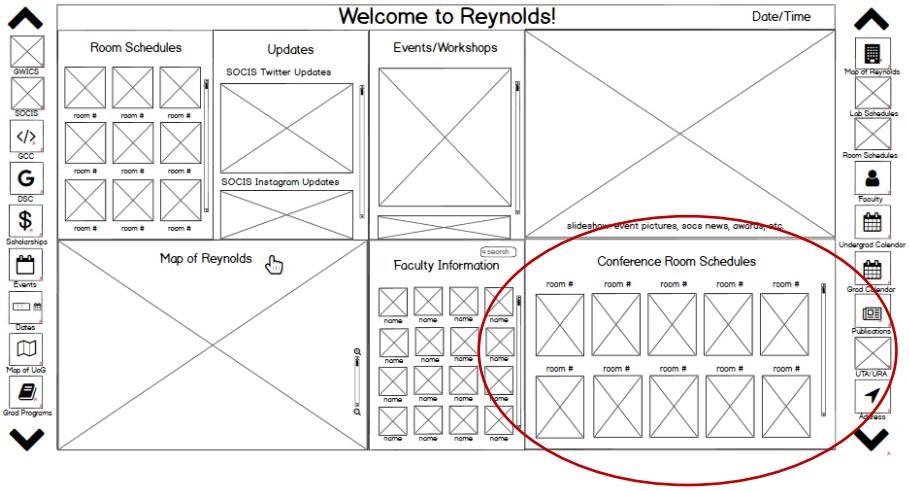
Appendix I – Wireframe Mock-Up: Selecting Graduate Calendar



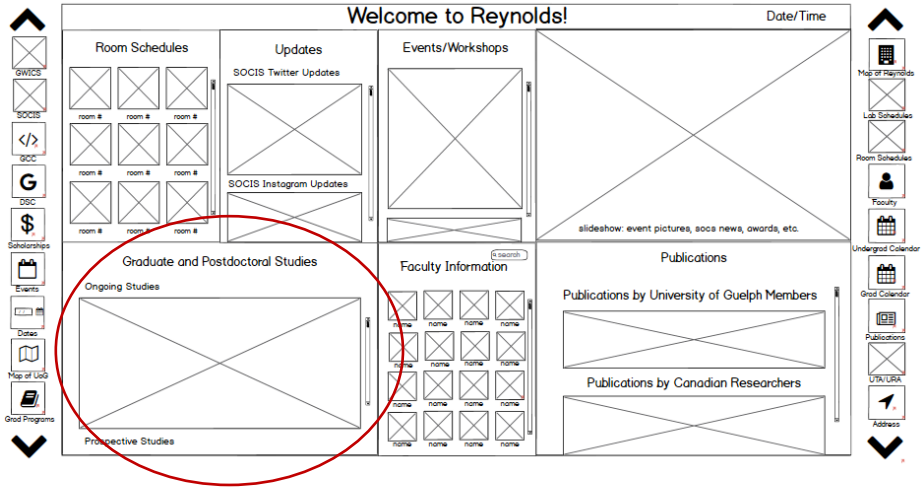
Appendix J – Wireframe Mock-Up: Selecting Undergraduate Calendar



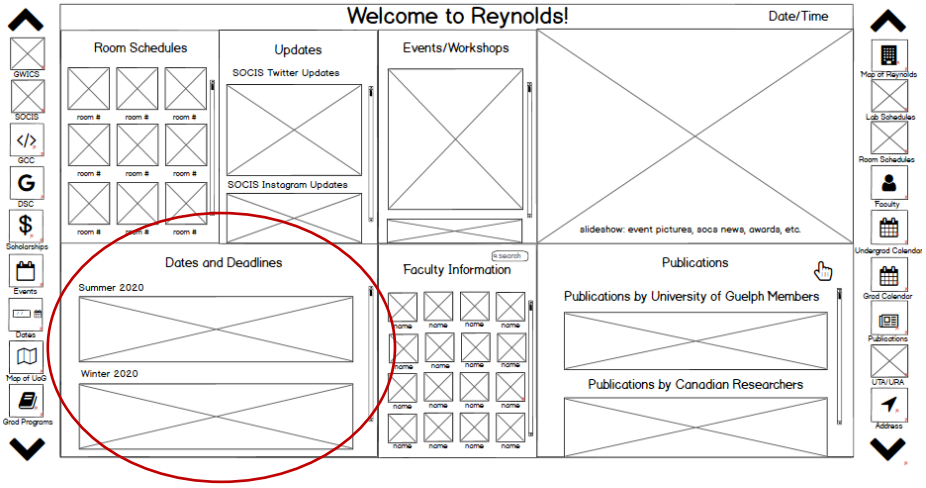
Appendix K – Wireframe Mock-Up: Selecting Conference Rooms



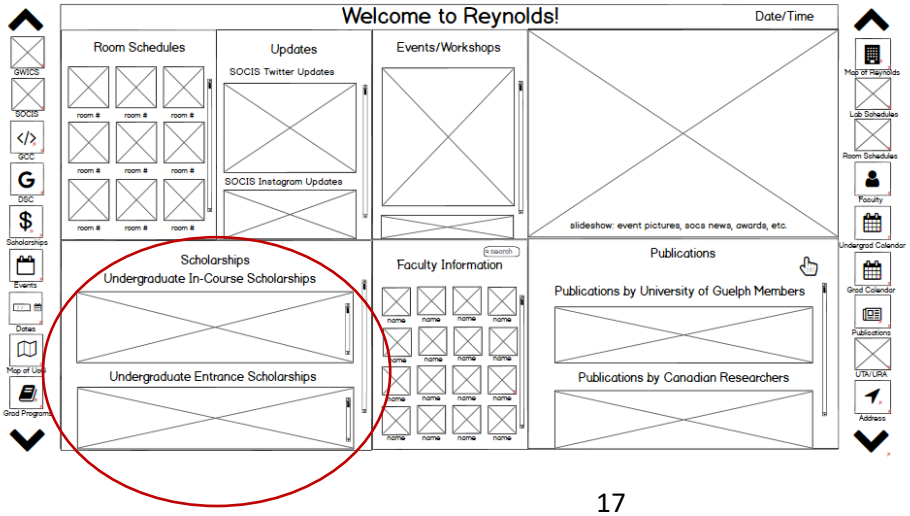
Appendix L – Wireframe Mock-Up: Selecting Graduating Programs



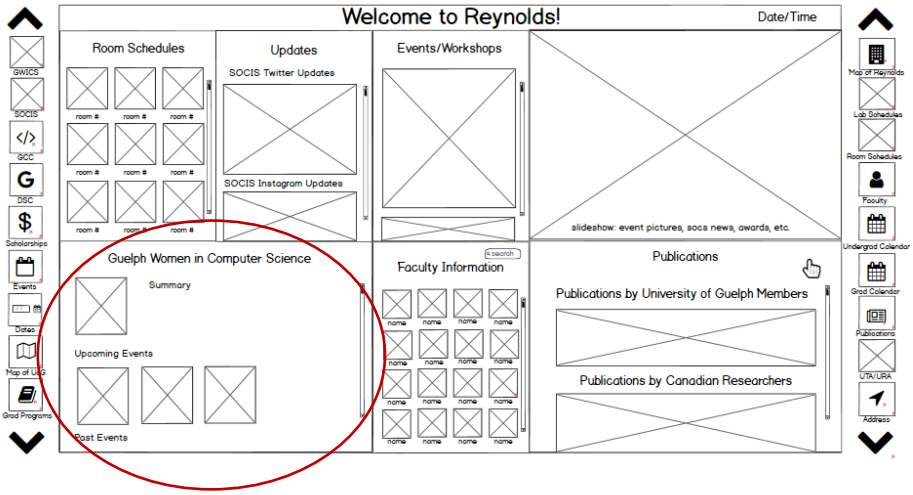
Appendix M – Wireframe Mock-Up: Selecting Dates and Deadlines



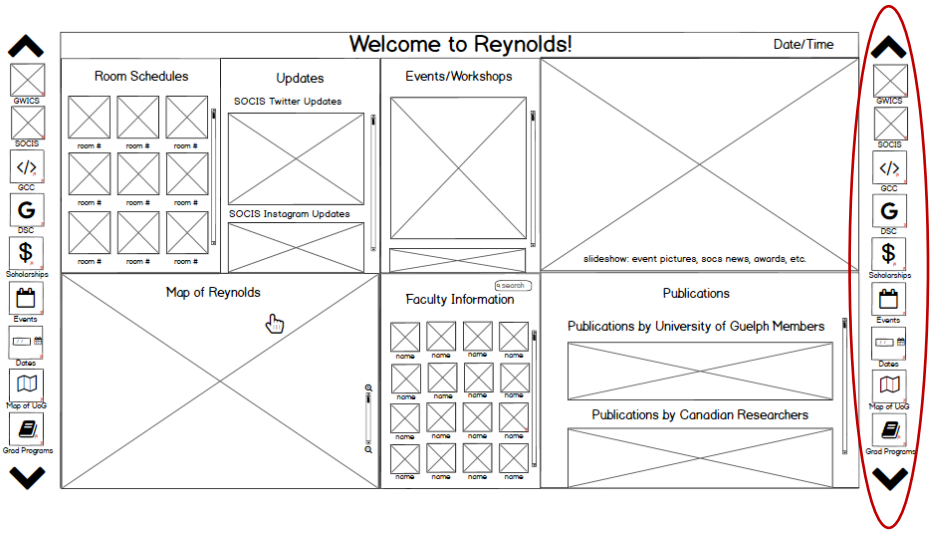
Appendix N – Wireframe Mock-Up: Selecting Scholarships



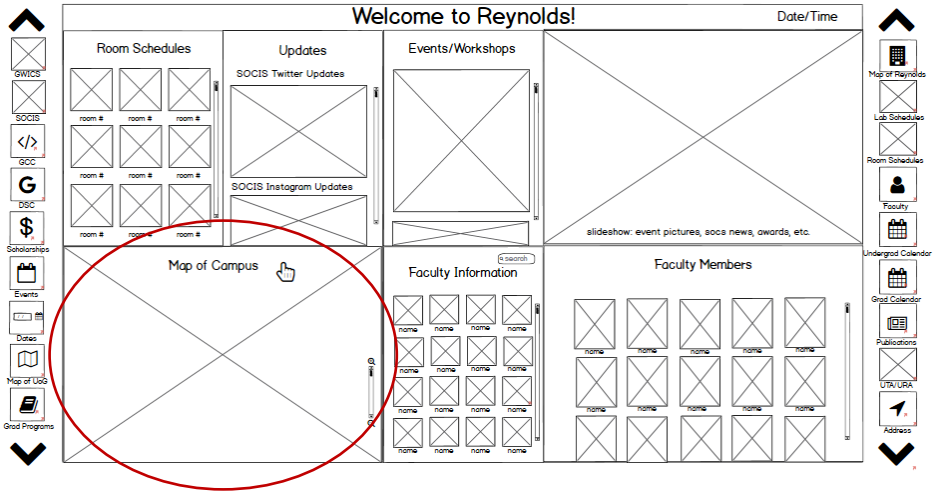
Appendix O – Wireframe Mock-Up: Selecting GWICS



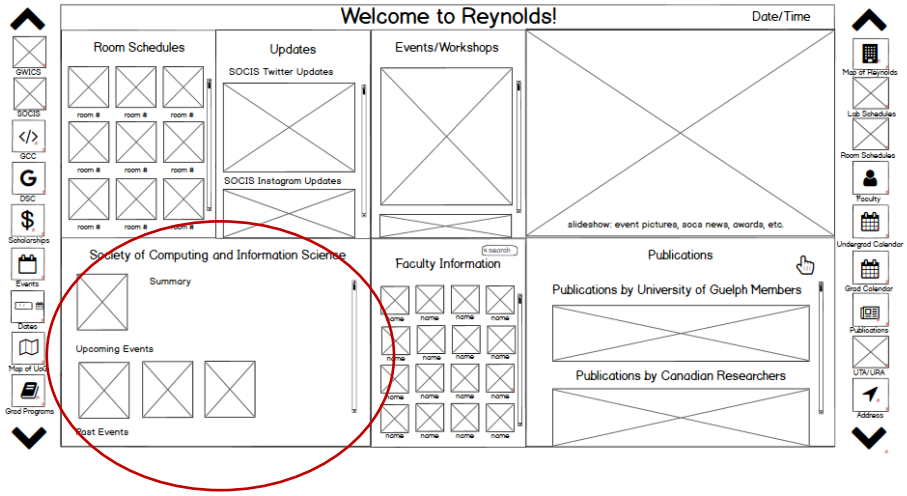
Appendix P – Wireframe Mock-Up: Selecting Bottom Right Arrow



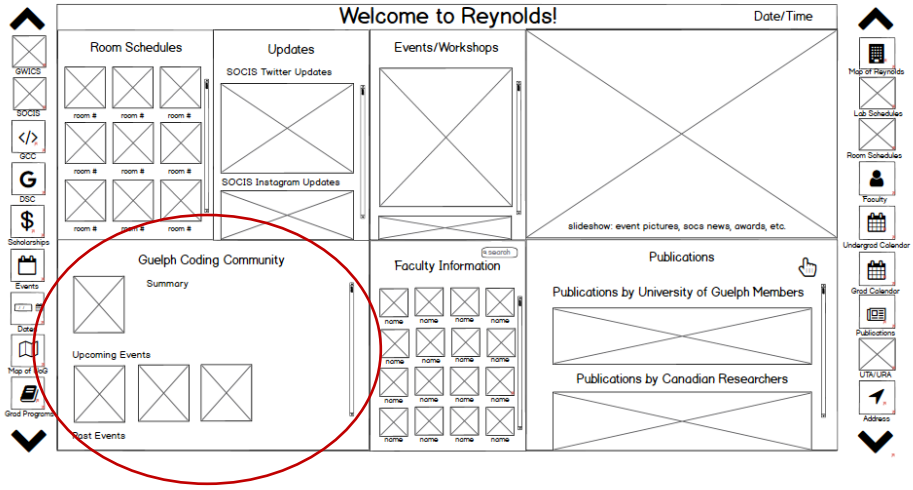
Appendix Q – Wireframe Mock-Up: Selecting Map of Campus



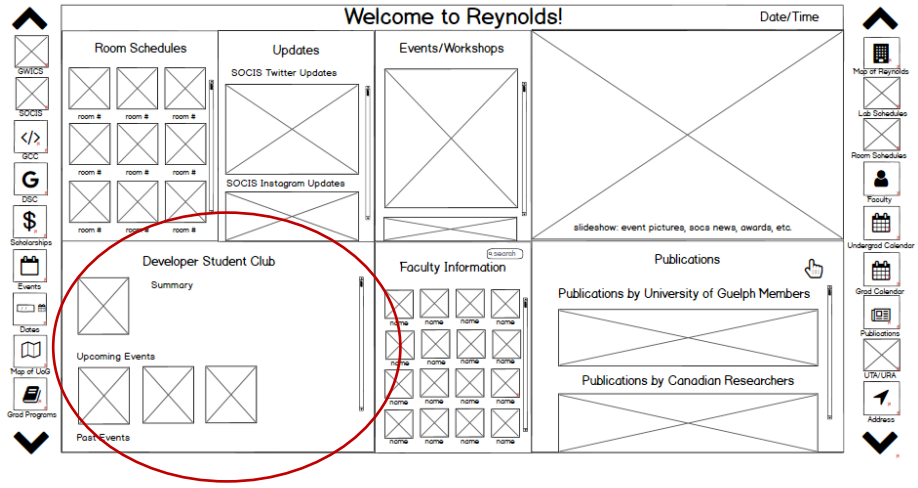
Appendix R – Wireframe Mock-Up: Selecting SOCIS



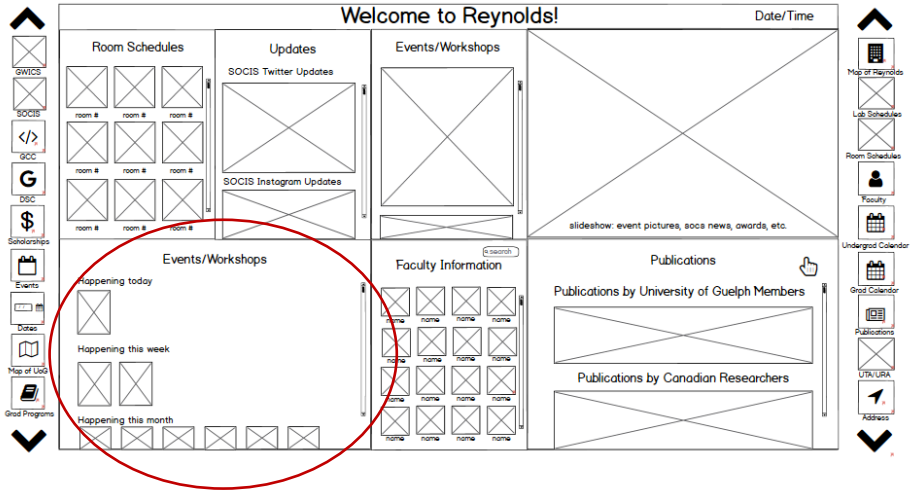
Appendix S – Wireframe Mock-Up: Selecting GCC



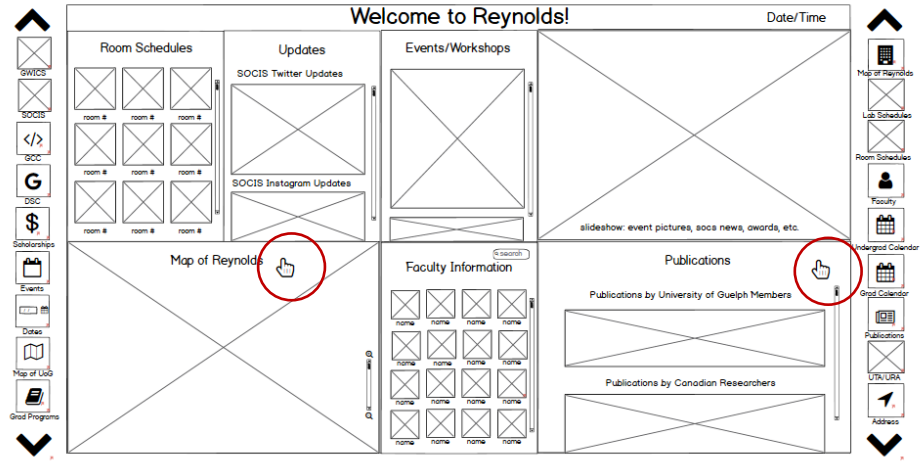
Appendix T – Wireframe Mock-Up: Selecting DSC



Appendix U – Wireframe Mock-Up: Selecting Events and Workshops



Appendix V – Wireframe Mock-Up: Silhouetted Hand Symbol



Appendix W – Wireframe Mock-Up: Icons