Project Planning Document

Project Team:

Noah Pinter | nopinter@umich.edu
Derek Li | derekli@umich.edu
Chandramouli Krishnan | cmkrish@umich.edu
Dhanuj Gandikota | dhanujg@umich.edu

Project Briefing:

Goals and Impact

At a high level, the goal of this project is to create a website with an interface specifically targeted at users who are 65 and older. The site will act as a web dashboard that provides users with information surrounding COVID-19 in their local area. The 24-hour news cycle of modern media can often be difficult to keep up with even for the younger generations that are more "fluent" with computers and the internet. As one of the groups most vulnerable during the pandemic, it is essential that people 65 and older receive succinct, updated information about the state of the virus in their communities. A successful project would simplify the process of gathering news relevant to our user, delivering the information over an intuitive interface that is accessible to the hearing and visually impaired. Overall the strategic benefit of this project would be the disruption of the constant barrage of information that is normalized in our society by providing succinct summaries of recent news.

Over the course of the project, our group will evaluate the short term success of the project through a series of stories that will be determined at various stages along the development cycle. Our long term goal is to ultimately get a functional working product delivered by the end of the time period and our metric for measurement will be how many user stories we can successfully close out by the deadlines. Our short term goals include identifying smaller tasks that must be completed for the website to be a success, such as choosing a platform to host the website, designing the front-end, and deciding the best framework for our back-end web-scraping.

Background Information

       Our website is not the first to build an interface specifically designed for the elderly. When researching for this project, we found multiple articles describing successful aspects of applications aimed at older users[1]. These include tips such as refraining from using italicized text and choosing a color palette with enough contrast to make it readable. Additionally, we found the Web Content Accessibility Guidelines at www.w3.org, which we can utilize to ensure differently-abled users are capable of navigating the website. As we found these resources relatively quickly, we do not anticipate having to develop new technologies for this project. That being said, we anticipate learning the necessary skills for web-scraping and web application development to require significant time and effort. Also, we are inherently unaware of the challenges the elderly face when navigating a website, and identifying the needs of our users will be an additional obstacle.
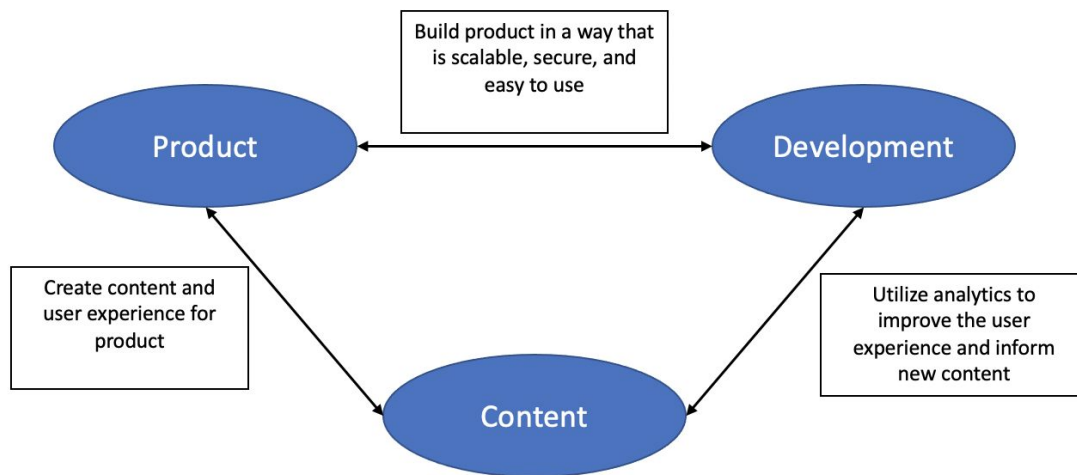
Team Members, Skills, and Organization

Team Members and Background:
1. Noah Pinter - Computer Science
2. Derek Li - Computer Science
3. Chandramouli Krishnan - Computer Science and Business Administration
4. Dhanuj Gandikota - Computer Science, Data Science, and EEB

       Our team brings together knowledge from the technology space as well as the natural sciences and business administration. This provides us the unique opportunity to combine skills in product management and development, web-systems engineering and data analytics expertise, and an informed science perspective. We want to leverage these skills in three core teams: product, development, and content. The product team will work closely with content to define and curate the information that we want to convey to our target audience along with creating first class user experiences through which this information will be delivered. This product vision will then be built by our development team, working closely with our product

---

[1] https://medium.com/morrama-design/designing-a-user-interface-for-the-elderly-an-overview-6e0382d701 14

team. The development team will use state of the art cloud technologies to ensure that the product is both scalable and secure while maintaining the high usability standards of the product team. The development team will also work closely with the content product teams to put into place analytics that can help inform future content and user experiences. This relationship is illustrated in the figure below.

Build product in a way that is scalable, secure, and easy to use

Product

Development

Create content and user experience for product

Utilize analytics to improve the user experience and inform new content

Content

We chose this structure because it allows for iterative development while keeping the end user at the center of the development process. It also focuses on our core goal which is to create an informative application for a demographic that is not technologically savvy. The major skill that we believe that our team needs to develop in the time that we work on building this project is the ability to to keep the user at the heart of technical and product decisions that are made. In order to do this, we are training through both coursework and practice to improve this skill. For example, one of our team members is currently working on the course SI 422 which focuses on User Experience Research to help provide both quantitative and qualitative insights that allow our team to be user-obsessed. From a technical perspective, the major skills that we believe that we need to acquire is experience with web security and scalability. While we all have some experience in building small scale applications in the web, none of us have experience operating at scale and in a setting where security is of paramount importance.

The current tentative teams that we will be working with are largely based on the background experience of the individual and thus the expertise that they can use to contribute to that team. Since all of us have a computer science background, we are all able to contribute to the engineering team. With a business background, Chandra will work on the product team and Dhanuj will work on the content team with his background in Natural Science. Noah and Derek

will serve on the product and content teams respectively, bringing their engineering perspectives to facilitate the best possible development experience. These teams are listed below.

Base Code Development:
1. Noah
2. Derek
3. Chandra
4. Dhanuj

Information Tailored Product Development:
1. Chandra
2. Noah

COVID Content Acquisition and Scraping:
1. Dhanuj
2. Derek

Project Management Strategy

a.

We utilize multiple tools for project communication and collaboration. **MMS** is utilized for instantaneous messaging between our scheduled meetings. Our scheduled meetings themselves will take place using **Zoom Premium** over video conferencing. File sharing will be executed through **Google Drive** in which we are able to edit documents and presentations together in real time. Finally code storage and sharing will be in through a shared cloud repository in **Github**. In addition we will utilize the "Live Share" feature of the **VS Code IDE** to perform code edits and modification simultaneously in real time on the same file.

We will also utilize a suite of tools/technologies in our project development itself. Our code will be written in the following languages; **Python, HTML, CSS, JavaScript**. To compile the web dashboard itself, we will interface our code files in Github through the usage of **Github Pages** in order to host our site on the internet. In order to fill the dashboard with relevant content, the front-end will be developed with the **Jinja** templating library as well as the **Jekyll** Website Structuring System in Github.

In order to obtain the necessary information to display in our project we will be collecting/scraping information from the necessary government sources and tools of the Center

for Disease Control (**CDC.gov**), the Environmental Protection Agency (**EPA.gov**), the Michigan Government (**Michigan.gov**) and the University Health Resources (**uofmhealth.org**). Our informational tools/assets must be reputable and direct sources in vaccine administration and rollout.

b.

From a technological perspective, we are lucky to have all of the tools/techniques be familiar with at least 2 or more members each. As such, only a few technologies will have to be learned by only 1-2 members at most, ex. (VS Code Live Share with Dhanuj & Chandramouli). Web development and dashboard visualization are familiar across all members of the group with collective group experience of EECS 485: Web Database Systems as well as previously published projects hosted within Github Pages.

Our primary group learning objective will largely lie with the utilization of the tools regarding the scraping of appropriate and relevant COVID information. Only one member has major experience relating to epidemiology and as such all members of the group will not only have to be familar with source repeatability, but also the terminology and processes behind vaccine rollout for the elderly. Learning to appropriately use and understand these resources will be of large focus within the group, supplemented by all of the member's experience in being able to identify and recognize primary sources and peer-reviewed conclusions.

c.

We met and have decided to do project progress reviews and therefore adjustments on a weekly basis. Not only does a weekly check-in work best with our schedules, but it optimizes the balance between getting work done on our own, and working together to shape the trajectory of the project. While we expect to follow the schedule and outlined project trajectory, it still remains important for us to check up on our milestone project progress on a weekly basis. Our initial milestones were chosen in order to maintain an even spacing of milestones across the entire project timeline. Thus a weekly check-in and milestone review will still allow for ample time between milestones to make adjustments and also not be too often such that it is detrimental to project flow.

d.

Across our four members, we have an ideal wealth of project management experience in order to ensure that our project operates smoothly. Chandramoulli not only holds a major in

Business, but has also operated as a project manager in Bond Consulting and has adequate knowledge of time management and project execution mechanics. Dhanuj operates as a project manager in Michigan Eco Data where a project that he managed resulted in a similar execution of an interactive web dashboard. Derek and Noah bring corporate experience as close observers and members of a small product team in Little Caesars Co. in which they worked closely with their Product Manager.
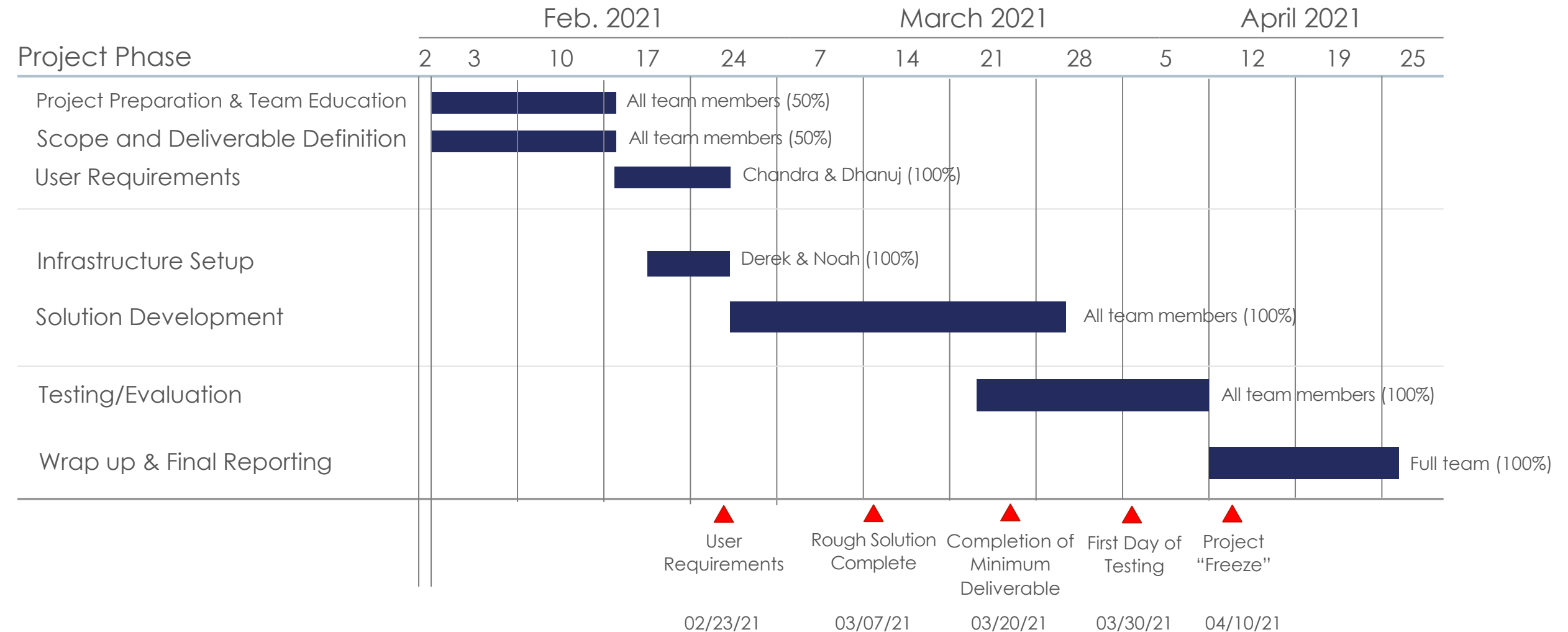
Literature & Technology Review

Literature Review: Eldery Technology Usage Studies

      Conducting research for this project demonstrated how necessary an informational website aimed at older users is. As of April 2012, 53% of adults aged 65 or older were online [1]. It seems safe to assume that this figure has only remained constant or increased over the past decade as computers and the internet have continued to permeate every facet of our culture. Additionally, over three-fourths of seniors own a desktop computer [2]. The notion that older people are not on the internet or do not want to be is simply false. The largest problem preventing seniors from engaging online is poor design made by typically much younger developers who either prioritize aesthetics over a smooth user experience or are unaware of seniors' needs. As a result, over 70% of seniors feel "less than comfortable" using technology [2]. As members of an increasingly digital society, it is important that older adults have resources that they feel confident using. Luckily, some best practices for this type of interface design have already been determined. For example, color contrast on a webpage should be maximized for readability and shades of blue or purple should be avoided [3]. Additionally, all text should be at least size sixteen font [4]. Even a glance at the COVID-19 informational page on the CDC website, found at https://www.cdc.gov/coronavirus/2019-nCoV/index.html, shows many shades of blue as well as rather small text (some of which changes from black to blue when hovered over). Clearly, this is not meeting the requirements of senior users. Our team feels confident that we can construct a better website with an interface meant for older users. Our relevant skills are listed in a later section.

Literature Review: Government Sources of COVID Information

      The Literature and sources that we are scraping for COVID information are all direct governmental sources, chosen for their access to information and lack of bias.

      Our initial and largest source will consist of the Center for Disease Control and Prevention's page for COVID-19 [5]. The CDC excels at delivering updates and information with regards to COVID prevention, symptoms, vaccination and testing from a *human-viral biological sciences scope*. As such, there is ample information and further links to their literature in which we can obtain detailed information on the procedures and science behind testing, quarantining,

maintaining social distance, etc [5]. such that they are being performed to their highest level of efficacy. In addition, the CDC website excels in tracking case data (case counts on the homepage with their own inbuilt data tracker) as well as specialized COVID info for ranging demographics/locations such as Children, Health Care Professionals, Public Transportation, etc.

Another source compiled from scientific literature is the Coronavirus page of the Environmental Protection Agency [6]. The EPA provides an additional interesting side of information largely focused on the *scientific, non-human factors of COVID*. The page comprises updates as well as articles/literature on topics relating to the interaction of biotic and abiotic environments in COVID. For example, the EPA page currently contains directives on Disinfectant Use, instructions on how to filter and clean Air from COVID, virus concerns with water/wastewater, and updates on antiviral products/materials [6].

In order to obtain more specialized location specific sources of COVID literature and information, we also look to local governmental websites such as Michigan.gov [7]. These sites are very well suited for the most recent information and updates for COVID spread/strategy on a local level. In addition, these sites excel and disseminate structural and legislative information that would pertain to our project consumers. Michigan.gov currently shows recent updates on vaccine deployment in Michigan, more details into gathering guidelines/ quarantine orders, as well as relevant directions on how to get locally tested/vaccinated [7].

Finally, our final source for live COVID information comes from the University of Michigan itself, being both a hospital system directly in charge of testing/ vaccination, and also a public academic based source of information. Michigan Medicine's webpage for the Coronovirus excels at not only delivering local directions for covid concerns, but also directions for proceedings in the perspective of a health system [8]. They are a primary source of vaccine deployment and thus their vaccination scheduling estimation is very accurate. On the page there are many specialized COVID articles regarding pregnancy, instructions after receiving the vaccination, how to care for someone with COVID, and symptom/treatment information [8]. This source will be invaluable as a final reference for COVID information in our dashboard.

Technology Review: Web Dashboard Construction Strategies

Web dashboards are graphical user interfaces that efficiently deliver information to a user. The data visualization and progress reports a dashboard provides will be essential in

minimizing confusion with elderly users that use our website. It will be important to develop a solid dashboard because it has the ability to generate detailed reports that show new trends, the ability to consolidate all reporting into one location, and the ability to gain total visibility across all informational sources instantly [9]. In doing so, users will require less clicks in order to navigate around the website and discover relevant information that pertains to them. Because the dashboard is the first impression a user will have of our web application, it needs to be as receptive and informational as possible.

In recent times, several existing products that employ web dashboards for coronavirus information have been developed which fall under the same category as our project idea. Examples of competing products include the Johns Hopkins coronavirus tracker [10] as well as UK government coronavirus tracker [11], each of which employ a unique approach to relaying updated information regarding the coronavirus.

A quick first glance at the Johns Hopkins website shows that the most crucial and relevant information is all displayed on the first page without the need to scroll. This includes categories of information such as new cases today, total cases globally, total cases in the U.S, and total deaths. There is also an option to click a link which provides a 60 second summary of today's covid situation in video format, as well as an option to query the latest covid data in a user's personal country or state. The colors are clear and the overall display is minimalistic but easy to navigate. With our own product, similar to the Johns Hopkins dashboard, it will be important to have the most relevant information on the front page as well as a small number of links that open up to other important pages. To improve upon this competitor product, our dashboard will ideally place more emphasis on directing users to pages that have geographically relevant covid info as well as pages with information regarding vaccinations which the Johns Hopkins page does not include.

Looking at the UK government website, it is easy to see that once again all of the most important and up to date information is displayed on the front page without the need for additional scrolling. Unlike the Johns Hopkins website, the UK page does prioritize vaccination information such as the total number of people who have received the first or second doses. What our product will do differently from the UK site is put more emphasis on easily directing users to information about how they can receive the vaccination wherever they are located instead of focusing on vaccination statistics about the general public.

The design process of the dashboard will be an important part of the development cycle and building upon existing products such as the previously listed websites will aid in our efforts.

We hope to create a dashboard that is as effective as the existing dashboards available on the web while also catering to the specific goals that we have set forth.

Internal Knowledge and Skills:

Below we have listed our relevant internal knowledge (expressed through coursework) as well as the technologies that we bring a strong level of knowledge in. Our collective experience ranges from *Data Management* to *Web Systems* to *UI Development* to *Epidemiological Ecology*. Our internal knowledge and skills prepare us well to execute this project.

- **Derek Li**
  - EECS 485: *Web Application*
  - EECS 484: *Databases*
  - EECS 481: *Software Development*
  - Skills: *HTML, CSS, JavaScript, Python*
- **Noah Pinter**
  - EECS 485: *Web Systems*
  - EECS 484: *Databases*
  - EECS 481: *Software Development*
  - Skills: *HTML, CSS, JavaScript, Python*
- **Chandramouli Krishnan**
  - EECS 485: *Web Systems*
  - TO 414: *Advanced Analytics*
  - SI 422: *User Experience Research*
  - Skills: *UX Research, HTML/CSS, JSX, Python*
- **Dhanuj Gandikota**
  - STATS 415: *Data Mining*
  - EEB 485: *Population Ecology*
  - Skills: *HTML/CSS, Json, Python, Jinja, Disease Ecology*

Bibliography

1. Finn, Kate. "Designing User Interfaces for Older Adults: Myth Busters." *UX Matters*, 7 Oct. 2013, www.uxmatters.com/mt/archives/2013/10/designing-user-interfaces-for-older-adults-myth-busters.php.

2. McClung, Abigail. "Creating Accessible Interface Designs for Seniors." *Atomic Object*, 18 June 2014, www.spin.atomicobject.com/2014/06/18/interface-design-seniors/.

3. Slavíček, Tomáš. "Designing a Mobile Interface for Older People." *Medium*, 25 Nov. 2014, www.medium.com/@tomasslavicek/designing-a-mobile-interface-for-older-people-1c9b70fd645c.

4. Campbell, Ollie. "Designing For The Elderly: Ways Older People Use Digital Technology Differently." *Smashing Magazine*, 5 Feb. 2015, www.smashingmagazine.com/2015/02/designing-digital-technology-for-the-elderly/.

5. Coronavirus disease 2019 (COVID-19). (n.d.). Retrieved February 18, 2021, from https://www.cdc.gov/coronavirus/2019-ncov/index.html

6. Coronavirus (covid-19). (2021, February 10). Retrieved February 18, 2021, from https://www.epa.gov/coronavirus

7. Coronavirus. (n.d.). Retrieved February 18, 2021, from https://www.michigan.gov/coronavirus/

8. Coronavirus (covid-19) Update. (n.d.). Retrieved February 18, 2021, from https://www.uofmhealth.org/covid-19-update

9. "Management Reports & Dashboard Best Practice." *Management Reports & Dashboard Best Practice Guide*, www.targetdashboard.com/site/Dashboard-Best-Practice/Management-Report-and-Dashboard-best-practice-index.aspx.

10. "Home." *Johns Hopkins Coronavirus Resource Center*, coronavirus.jhu.edu/.

11. "Official UK Coronavirus Dashboard." *Daily Summary | Coronavirus in the UK*, coronavirus.data.gov.uk/.