A letter about the good and bad of search engines

By: Crystal Hooper

Dear Mom,

You've mentioned before how Dad doesn't enjoy using the internet and how he makes you do all the searches and then gets frustrated when the results aren't what he had in mind. I've learned some insights into why this is the case! In the information science class I'm taking for graduate school, my course readings and class discussions highlighted some issues that lie within relying on search engines. The sources themselves have biases built within, and the search terms selected can be misleading. Since Dad has asked many questions about how search engines work, I'll share my insights.

It's easy to assume that finding answers is intuitive. For each information seeker, though, there is an underlying question about their technology literacy and fluency. With you and Dad, you, Mom, are more literate in both computers and using the internet to gain answers. You perform search queries using common language via your laptop and smartphone, then use different websites and social media platforms to gain resources. The problem you're having with Dad is that there is a fluency problem in how to deduce what he truly needs, then retrieving and then presenting that information in terms he understands.

The fast results generated by search engines are thanks to search indexing. This is where information gets organized in a way to produce those rapid results after we enter a query. An added element that we, the users, have no control over, but the builders of search engines use is inverted indexing. By doing this, they reduce search

words to their most basic definition and the key pointers within the potential sites direct the search engine to display a result. This entire process for Google, for example, has a name, too; PageRank, which assigns each site a ranking based on content and previous users' views. Through PageRank, they scan all linked sites, making the results at the top of the search seemingly more valuable. Still, as I've warned you before, advertisements are often the first results on the list of results. Companies pay for these slots, buying a place in the top ten links shown. Just because it's the first result doesn't mean it's the best place to seek information. A few of my classmates posted in our discussion boards about how intrusive it feels when you shop online and find ads targeted to your spending habits for weeks afterward. This is one way to personalize the virtual experience for each user, but it also poses a problem as an invasion of privacy.

There are additional tools built within the search engines, too, that preview the site, which might reduce some of your frustration. By reviewing the cached version of the website, you can scan for out-of-date information or if the site contains nothing of interest. Something irritating you've mentioned before is when searching the same thing and then getting different results. I wonder if this is because you were using your phone and had changed locations. Search engines are smart, and if you searched an auto parts store, the top results could get ranked based on proximity in distance to that shop, changing which result was first on the list in subsequent searches. If you keep searching and get the same results, maybe your device search history has remembered websites you've visited amply, and the device is making your life easier by bringing that result back around. The opposite can be true, too. If you keep searching for the same

thing and don't spend any time on websites, the results will keep varying, hoping the search engine found what you're looking for this time around.

Part of the problem, as we've deduced in previous conversations, is in selected keyword terms. The search engine will interpret words, a process known as "crawling," and find a match on a webpage. Schema is the name of this microdata overview that's getting performed by the search engine. Search engines really depend on websites using adequate tagging to direct users to their pages. The next step that occurs before we see results is reviewing the freshness of the page and examining how other users have interacted with it. The duration that a user spends on the page, how many clicks they perform while active on that site, and the language of the page all play a factor in determining its relative worth to find answers from your search query.

All of this processing points to the algorithms built to take care of this back-end searching, making it easier for you to select a result. Not all algorithms get built equally, however. Because of the phrases used, the results might sometimes lead you to choose a link that goes in the opposite direction of what's needed. Yes, there are thousands of potential links to click on, and personal stories galore from comments sections and social media, making it more difficult to narrow the search. This ties back to that tagging I mentioned previously. I've heard you say that the more you clicked and read, the less you understood. Between all the back-end development scanning the viability of your search terms to the results, it makes a bit more sense why that feeling is justified. I think of this phenomenon as a developing news story; you can refresh the page and search endlessly, but until the proper tagging and narrative gets written, you go in circles.

Of course, you might have a go-to site, too, haven't visited it in a while, and now can't access it. In these instances, an error on the page might exist, or the site might contain duplicate content better found in more recent searches you've conducted. It's possible your computer browser has a built-in blocker, too, telling the search engine not to direct you to that site. In that last instance, the tagging by the developers added within the site might not exist or it could be too similar to another page the algorithm determined will yield a better result.

Now, you might wonder, how do the search engine and website developers expect how you'll use their sites? This is a significant question! Design thinking projects masters will brainstorm solutions to problems that the users of products experience. These design thinkers focus their work on empathy, defining problems, and ideation to challenge assumptions, they then develop prototypes and test proposed solutions. When design thinkers fully immerse in the user being successful when using their tools, they create a successful environment. There are also user experience (UX) designers, who anticipate the user's motivation to retrieve data. They focus on the efficiency and pleasure of a site. This is where search engines shine. In a UX designers' eyes, there's no one solution to create a web tool that works for everyone, which justifies why there are so many options to get information and ways to organize it. Then there's another group, the user-centered designers (UCD), that creates platforms that users find valuable. UCDs follow an interactive process to test products in small numbered focus groups to determine needs via surveys, observation, and interview users to gain insights. This means that people like us are the focus groups! I'm not sure about you, but in all of my employers, they have upgraded their software at some point. It's exciting

to test a new project management tool and I jump at the chance to take part! In UCD mindset, the human-computer interaction is the driving factor examined to better the information retrieval process.

As a class project to understand these concepts, we worked in small groups to create usability studies. In my group, we analyzed an online car parts retailer. The four of us admitted we know how to operate a car and could navigate the website successfully. However, we all found the process cumbersome. There is a swath of valuable information on that website, but the developers organized it in a manner that is not pleasing to view, nor is it a quick process to finalize an order. Now granted, the site might have gotten designed for someone like Dad, who is an expert mechanic and novice website visitor. In that mindset, then the site scores high in usability. To a younger web audience or novice car operator, though, it is clunky and outdated. It's important to remember who the audience of any website is and to consider the overall objective coming across.

Accessing the internet and turning to websites to find answers has rapidly become the primary way to search for information. The quality of results gets affected by how we, the users, engage with the websites and use the material discovered. Now that you know a bit more about how search engines work, you've become more fluent in how to use them! Keep in mind that implementing search engines, retrieval of data, and usefulness of these systems are ever-changing and highly dependent on outside influences. Yes, it's fast to get results online, but the source and validity must always get reviewed for its true worth.

These conditions in search terms, usability, and technology literacy, are the things I'll consider when creating workplace tools for my colleagues. I must also remember that although computers and web searching is easy for me, it's not for everyone. The information and help I'm offering is only valuable if I've curtailed it to the person's capability level who asked for assistance. We can all get better at computers and work smarter, but it surely helps to understand how it works to get those results.