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7. "Unlearning" Search in Order to Learn it: A Critical Approach to Search Algorithms in the Library Classroom.

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Do you remember the first time you heard or read about the concept that the searching one does on the Internet—using Google or any other search engine—or using any other type of database or search tool is not neutral? The questions or points of confusion it brought up? Even, potentially, the realization and awareness it generated in you of your own privilege and bias?

Librarians and other information professionals who subscribe to the philosophy and practice of critical librarianship—that is, librarianship based on critical theory and principles of social justice—have come to take the bias of search algorithms (and thus, the search engines and databases these algorithms power) as a given (Pagowsky & McElroy, 2016; Noble, 2018). This concept and its ramifications can initially be difficult for people to understand and fully take in, however, and not necessarily because the person hearing about it does not want to learn or is somehow opposed to the ideas of critical information literacy and social justice. Rather, it can be difficult because it is a concept that is in direct opposition to an idea that is formative to the way most of our students, our faculty, and we ourselves as librarians, understand the digital world. That is: the idea that a search box—especially the Google search box that has become so ubiquitous in our lives—is a blank space; that it is an objective receiver of information that simply brings back whatever we put into it; that the results it presents are objective and neutral and based purely and objectively on math.

These types of foundational beliefs generally form before we are even aware of them, and certainly before most of us have the tools to analyze them critically. Our human tendency toward confirmation bias when presented with new information (i.e. being more likely to believe something that confirms what you already think to be true, and less likely to accept information that goes against what you already believe to be true), as well as other "habits of learning," make such beliefs extremely difficult to "unlearn" (Mezirow, 1990). "Unlearning" is a term that in recent years has been applied to businesses and organizations, but has its roots in psychology and transformative learning theory as applied to the individual (Matsuo, 2019). In this context, it does not mean forgetting "beliefs, values, knowledge, and routines," but rather recognizing them to be obsolete and replacing them with something new—hopefully beginning to form new habits in the process and thus engaging in transformative learning (Matsuo, 2019; Mezirow, 1990).

It takes time and repetition to successfully re-evaluate, dislodge, and finally replace such formative beliefs. This is obviously a complicated proposition for the library classroom where we generally have neither time nor a chance at repetition, with most of our classes being limited to a single, short session. Teaching search algorithm bias in the library classroom, though difficult, is not impossible, however. In fact, I believe it is incumbent upon us as twenty-first century librarians to help our students and patrons understand the world of information they are bombarded with every day in a critical way. It is important to recognize that it is not easy though, and that with every session you might only chip away at that formative belief in your students that is 18+ years in the making. And that is okay, because every little bit helps—every time someone helps a person chip away at that formative belief, they are bringing them closer to a new, more nuanced, and more critical understanding of the concept.

With all that in mind, this chapter discusses strategies for how to teach students that search algorithms are not neutral and what this fact means for their research—both academic and otherwise—and the use of the Internet in their everyday lives. I use as an example a class where I am lucky enough to have nearly two hours with students and can therefore use all the strategies together, which allows me to build on the concepts and therefore give them a better chance at sticking. I know from personal experience that librarians do not always have the luxury of a long session, but the strategies and ideas discussed in this chapter can still be used to sow the seeds of critical learning, even in more truncated sessions. While the principles and theories of critical librarianship inform these strategies, there is very little discussion of theory. For more information on the theory of critical librarianship, please consult the sources in the Reference section of this and other chapters. The mission of this chapter is a practical one: to empower working librarians to bring social justice and critical information literacy into the classroom using real-life examples, discussion prompts, classroom activities, and assignments.

Introducing the concepts

The way you introduce the concept of search algorithm bias—that is, the idea that search algorithms, and by extension search engines, reinforce the oppressions and inequalities that exist in our society—into your library instruction sessions will depend on various factors, including the subject and level of the class, your relationship with the instructor of record, and your goals for the session. In all library sessions in which I talk about source evaluation, I include a conversation about search algorithm bias. I usually begin this conversation talking about authority as a measure for source evaluation. This discussion generally includes topics such as: what authority means in this (academic research) context, how authority is determined and/or created, whose voices are given authority and why, whose voices are left out of this process, and the context of privileging certain information sources over others in certain spaces (i.e. the Internet, academia, etc.). The depth of this conversation varies greatly depending on the level of the class, the amount of time I have, and the learning outcomes for the session.

The class in which I am able to delve the most deeply into this cluster of topics is a class called Communication and Social Change. It is an upper-level (most likely Year 3 in the UK) Communication Studies class, for which the instructor and I have worked together closely over the past few years. This partnership with the instructor of record for the class is crucial to the success of the library session. Every situation is different, but if it is at all possible, I encourage you to cultivate relationships with instructors who can support you in this type of teaching. It helps tremendously to have buy-in from the instructor when you want to delve into these types of challenging and non-traditional (for library instruction) issues. The instructor might have to help you manage the discussion with their students, with whom they have a more established relationship than you do, and if they are going to do that then they themselves must understand the concepts and be on board with what you are teaching.

The learning goals for the session with the Communication and Social Change class are to discuss, and help students begin to understand:

- The power and impact of information,
- How bias manifests in search results, and
- How to control/counteract this bias while searching.

Before students come to the library, we prepare them for the session by introducing them to the work of scholar Dr. Safiya Noble. Dr. Noble is an Information Scientist whose research focuses on the bias of search algorithms and the social impact that bias has, especially on people of color. Students have an assigned reading by Dr. Noble to do before the library session. Initially, this was her article called *Google Search: Hyper-visibility as a Means of Rendering Black Women and Girls Invisible* (Noble, 2013). Moving forward, however, we plan to use a selection from Noble's recently published book *Algorithms of Oppression: How search engines reinforce racism* (Noble, 2018). When assigning this reading, the instructor sets the expectation that the students will have read the homework before they come to the library for class. This is crucial to making the library session an authentic part of the students' learning in the class, which in turn increases their motivation to engage with the content of the session.

The assigned reading from Noble introduces the concept of search algorithm bias to students, which is likely a new idea for most, thus beginning the challenge of unlearning their formative ideas about search. To further prepare them for this mental work, I open the library session with a conversation about confirmation bias, "the tendency to search for, interpret, favor, and recall information in a way that confirms one's preexisting beliefs or hypotheses" (Plous, 1993). I make sure not to ascribe shame to having confirmation bias, pointing out that it is a perfectly natural, expected human tendency. I do make clear that it is something to be resisted, however, because in order to learn new things (which is, after all, what they're all there to do!) we must have an open mind to new information and ideas, even if (especially if, I would argue) it conflicts with our preconceived notions. I am also careful to impress upon students that this does not mean they must agree with a certain viewpoint by the end of the session—neither the author's, nor mine, nor their instructor's, nor any other students' in the class—but that I am expecting them to approach the topic with an open mind, resisting confirmation bias.

After discussing confirmation bias and answering any questions, we watch a short video of Dr. Noble giving a TEDx Talk describing her research[7]. My goal in showing this video is to provide more context for Dr. Noble's work and to put a human face on the concepts they read about before class. In this video, she talks the audience through how her research began, from her search for "black girls" that resulted in a first page that was nothing but porn, and explains her ideas and why they are important—both to her personally as a mother and aunt, and to our society at large. I find this video to be helpful in creating empathy and understanding in students of the origins and intentions behind these ideas, which might be challenging for them.

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[7] https://youtu.be/UXuJ8yQf6dI

Discussing algorithmic bias

After watching Dr. Noble's TEDx Talk we discuss the concepts introduced first in the homework reading and then in the video: that search algorithms are not neutral and that rather they reinforce oppression and inequalities already present in our society, including sexism and racism. We also discuss what we can and/or should do about it, both in terms of the search engine company's role, and our own role is as individual citizens of a country in which these companies conduct business, and as individual consumers of their product.

This discussion is often the most challenging part of the library session—both for the students as learners and for me as the facilitator. These topics tend to bring up strong reactions and opinions, despite the preparatory work done beforehand. A key strategy that I have employed to deal with the challenges inherent in facilitating this type of discussion is preparing beforehand for common questions, counterpoints, and arguments. This certainly does not mean that I do not listen to the students in the moment, or that I have pat responses. Having thought beforehand about these common responses, however, does help me remain levelheaded and authoritative as a teacher. Remember, though you are a librarian and a teacher, you are also a human being. That inescapable fact can sometimes mean that these important, and sometimes deeply personal issues of inequality and injustice can be as challenging and difficult for you as they are for your students. This being the case, do whatever preparatory work makes you feel more comfortable and confident in leading the discussion. This could mean preparing ahead of time for certain questions, like I do, or it could mean role-playing with colleagues beforehand, talking a walk, or meditating in your office—whatever helps you both take care of yourself and be the best teacher you can be.

Showing instead of telling

One common reaction that I prepare for, is for students to not believe that the bias Dr. Noble describes actually happens with search results, or to believe it only happens for a certain, small number of keywords and is not a broad problem, and therefore not important. When this reaction arises in the discussion, I respond by showing instead of telling. I do some sample searches that demonstrate the phenomenon in order to show how common it really is. There are many, many examples of keywords you could search for (both in a regular Google search and/or in an image-only search) that will bring back results that are biased in various ways. A few examples that have worked well for me in this situation include some that Dr. Noble discusses, and some that I have happened upon with classes through brainstorming:

- "beautiful" (discuss: nature of results—more women than anything else)
- "beautiful women" (discuss: race, size, even hair color and length)
- "manager" or "business manager" vs. "female manager" or "woman manager" (discuss: race, gender)
- "boss" or "bosses" vs. "female boss" or "woman boss" (discuss: positive vs. negative connotations/tone)

Once you show one or two examples and students see evidence of bias within live searching, they will often start coming up with ideas for other words to search. They instinctively understand which keywords and phrases might produce/expose this bias. This helps establish that they do, indeed, know and understand that bias is a real thing that is a broad problem in society, and seeing these biases replicated on-screen in real-time helps counteract the argument that it is not a similarly large problem online.

Answering common arguments with open questions

For other arguments that commonly arise during this discussion, and do not lend themselves as well to demonstration as the first example, I try to respond with open questions instead of simply explaining the answer from my perspective or repeating Dr. Noble's words. Responding to a question or challenge with another question in this context does something crucial: it takes me slightly out of the position of authority and "giver-of-answers," and instead puts the power to answer back into the students' hands. When I do this, other students usually take up the slack I am letting out and do the explaining themselves. This flipping of power—from teacher to students—is a key part of critical pedagogy, and in my experience, it leads to better outcomes during this discussion. The questioning or argumentative student is often more responsive to the explanations and experiences of their peers, and their peers are in turn empowered by holding that position of authority in the classroom.

Below are examples of common arguments paired with questions that you, as the librarian-teacher, could ask to keep the conversation going and put the power to answer back in your students' hands:

- Argument: The algorithm is just math; it is simply based on the popularity of the results. There is only so much that Google and other search engines can control.

  Questions: who creates the algorithm? Is it possible the people who write the algorithm have biases?

  Possible prompts: News story about Google "anti-diversity memo": https://www.bbc.co.uk/news/business-40845288

  It is true that the dominant perspective is being presented—Noble says that 75% of people click on porn when they search for "black girls." But then what about the perspective of the other 25%, should what they want or expect to see simply be ignored?

  Are there examples people can think of Google and other search engines demonstrating the ability and willingness to control and change search results?

  Possible prompts: Right to be forgotten applies specifically to the EU: https://www.bbc.co.uk/news/technology-49808208; Yahoo agrees to ban auctions of Nazi memorabilia in France: https://www.theguardian.com/technology/2001/jan/04/internetnews.media; Current results when searching "black girls" vs. when Noble first did it in 2009.

- Argument: This is a capitalist society and Google is just a company trying to make money.

Questions: Can you think of companies or industries that we regulate or put controls on? Industries that we regard, as a society, to be harmful to humans when left unregulated?

Possible prompts: Power companies (wild fires), gas/coal/chemical companies (environmental regulations), nuclear companies (safety regulations), banks and credit companies (lending and other financial regulations)

- Argument: Who cares? Why should we care? Why is this important?

  Questions: Do you agree with Dr. Noble that representation on Google is important in terms of reflecting and therefore deepening social values and helping people form opinions? If so, do you agree it is harmful? How is it harmful? What are the possible implications?

  Possible prompts: Study by the ACLU that showed Amazon facial recognition software to be less accurate on darker-skinned people: https://abcnews.go.com/Technology/wireStory/researchers-amazon-face-detection-technology-shows-bias-60630589 ; Health care prediction algorithm biased against Black patients: https://news.uchicago.edu/story/health-care-prediction-algorithm-biased-against-black-patients-study-finds

Interrupting microaggressions

Last, but certainly not least, an important component of managing this discussion during your library session is being willing and able to interrupt microaggressions when and if they arise (Joseph, 2019). Microaggressions as a term originated in the 1970s with the work of Dr. Chester Pierce to describe the “everyday subtle and often automatic ‘put downs’ and insults directed toward Black Americans” (Sue, 2010). In addition to these academic roots, it is a phenomenon that has certainly long been well known to members of all marginalized groups in our society. It is important in this context because, as discussed, the idea of algorithmic bias can be challenging for students with a high level of social privilege who might not be aware of that privilege. It is common for students in this position to feel defensive and to argue against the ideas from this defensive posture. The argument/questions examples above can help you deal with these challenges as an instructor who is trying to keep the discussion moving and on-topic. However, this discussion may be difficult in a different way for students in your class who are members of marginalized or oppressed groups.

It is your job, as the figure of authority in the classroom, to ensure that all students feel safe in that environment. Obvious slurs or other inappropriate language or comments are in some ways easier to deal with—you know exactly what it is when you hear it and hopefully feel justified in dealing with it swiftly and decidedly. Microaggressions are more difficult to respond to because they are often nuanced, may or may not be intentional, and may be interpreted differently by different people. This is another place where it is helpful to have the prior buy-in and cooperation of the instructor of record for the course, who will know the students better as individuals and might be better able to assess their intentions. When marginalized students see you and/or the faculty member address microaggressions for what they are—as the sources of authority in the classroom—it will help them to feel safer participating in the class discussion. This should be done intentionally and strategically in order to balance the needs of all students in the classroom. Because it also does not help the offending student understand, learn, and grow if your response leaves them feeling defensive or attacked.

There are various methods in academic, professional, and popular literature for dealing with microaggressions. There are also various strategies depending on what your "social location" is in situation, for example, whether you are a perpetrator, witness, or target (Thurber & DiAngelo, 2018). I will not attempt to cover the available methods comprehensively, nor make a pronouncement on which are the best. Ultimately, as with everything when it comes to your teaching praxis, you should use what feels comfortable and works for you.

My preferred method for handling microaggressions comes from a conference workshop I attended given by Dr. Ralina Joseph, because it approaches the concept from the perspective of an educator. Dr. Joseph provides three different methods for addressing and interrupting microaggressions: Questioning, Declaring, and Punting. In her work, Dr. Joseph emphasizes that knowing your own intention in interrupting the microaggression will help you decide which strategy to employ. In the classroom, our intention is to teach and help students grow. With this intention in mind, I tend to employ the Questioning strategy most often.

Questions can be either neutral, reframing, or strategic. For example, the offending student can be asked to elaborate on what they said or asked why they think what they said is the case. While it is impossible to predict all of the microaggressions that might arise during the course of a class discussion like this one, there are some that arise fairly often. One example is when students from certain groups or identities are called upon to speak for their entire race, gender, or other identity. In this example, you could use the Questioning method by asking the student to "Say more about what you think hearing [student's name] experience will tell us," or "Do you think that [student name]'s experience will be the same as everyone who shares this identity? I'm curious to know how you arrived at that conclusion." Asking questions could help raise the speaker's own awareness about what it is they are implying with their comment, and it also has the possibility of allowing them to explain themselves more fully if it was indeed a misunderstanding. It also keeps the interaction firmly in the realm of a discussion in which the goal is to learn and it ideally allows the whole group to learn from the experience.

If the Questioning approach does not have the desired effect or threatens to derail the entire discussion, you may consider moving on to the Punting method, which redirects the conversation to be addressed at a different time, perhaps after class. If you decide to punt, however, it is important to actually circle back and revisit the conversation so that the microaggression is not left unaddressed, leaving the marginalized student to feel dismissed. I rarely use the last method, Declaring, in the classroom as its aim is to "call out" the offending person and is the strategy most likely to lead to that student feeling defensive and shutting down. There is certainly a time and place for this strategy, however, especially if the comment is egregious.

Intervening when you witness microaggressions takes practice and thoughtful reflection. I have barely scratched the surface of Dr. Joseph's work here, and encourage all librarians who practice critical pedagogy in their library instruction to take her workshops, read her work, and consider practicing her methods in the classroom (see References for links).

Learning activities during the library session

After the allotted time for discussion, I guide the students through a searching activity. I do often have to cut off the discussion prematurely, because it could take up the entire 90-minute class session if I let it. I usually limit discussion to about 45 minutes, however, and then we move on to an activity in which students practice controlling their Internet search results using intentional keywords, the Google Advanced Search form, and alternative search engines such as DuckDuckGo. This activity begins to show students how they can get around the biases in search engine results, now that they are aware such biases exist. I find it is important for students to complete this activity within class time, as it helps answer the question, “what do we do about it?” and makes them feel empowered, rather than simply leaving them demoralized, frustrated, and angry at the injustice of search algorithm bias—feelings the discussion often engenders.

This is not to say, however, that students move smoothly or linearly from discussion to activity and onward. Remember that this is a work in progress. You are likely introducing students to important concepts that they might need time and repetition to understand. This is another reason why it is important to have that relationship and shared understanding with the instructor of record for the course, so that they can follow-up with students and answer questions after your library session is over.

For the searching activity, I provide students with a topic to search—usually a current event that has been in the news and/or pop culture and that in some way involves race, gender, and/or social justice. Some examples of topics I have used for this class in the past include: the controversy surrounding NFL quarterback Colin Kaepernick and his choice to kneel during the national anthem, which has been discussed in U.S. news and pop culture almost constantly since 2016; and the video of a Catholic school student wearing a Trump campaign “Make American Great Again” hat confronting an indigenous activist, which went viral in early 2019. Though these specific topics will likely not be relevant for you—either because you live in a country other than the U.S., or because too much time has elapsed—it is my hope they will help you in generating more relevant and current ideas. Once I introduce the topic, I ask for the first words that come to mind on that issue, which tend to represent the way the dominant perspective (usually mainstream media) discusses the topic. For the first example above, the NFL kneeling controversy topic, these keywords were “NFL national anthem protest.” We do an Internet search together as a class for the keywords that immediately surface and discuss briefly what perspective seems to be represented in the results. I then challenge the students to find a different perspective on the topic. Sometimes, the alternative perspectives are obvious, and students begin searching right away. Sometimes, they need to talk a bit about what other perspectives or stakeholders there might be for an issue, and how to use different keywords to find these other perspectives. I make a point of saying that the perspective they are searching for does not have to be one that they agree with, reminding them of our conversation about confirmation bias, but rather that it needs to be different from what resulted from our first search.

I let them work for 5-10 minutes, and then we talk about what keywords or methods they used to search for a different perspective, and what their results were. Students are consistently surprised, and sometimes outraged, by how different their results are just from using keywords that are intentionally chosen to find a different perspective. Continuing with our example topic of the NFL kneeling controversy, one of the students in the class in which I used this topic happened upon the phrase and hashtag "#TakeAKnee." It turned out that this is the chosen phrasing of Colin Kaepernick's supporters and African American activists, who point out that the quarterback is not protesting the national anthem, but rather police brutality against people of color, and that the idea of "taking a knee" was first suggested to him by a military veteran. When searching for the phrase "#TakeAKnee," students were shocked to see how differently media outlets and writers who used this phrasing discussed the topic. As we discuss what students find, I write the keywords they use up on the board so that by the end we have a substantial list of keywords that could be used to find alternative and non-dominant perspectives on the topic at hand. During this activity, I also introduce them to the Google Advanced Search form and demonstrate how it can be used in combination with keywords to exert even more control over their searches. This is also the time to introduce students to an alternative search engine, such as DuckDuckGo, in order to escape some of the problems inherent in a Google search that may not exist elsewhere—such as advertising disguised as results.

If there is time in the class, I repeat the same activity using a library-provided database. After searching for our same topic in the database, we discuss what biases these types of databases might have and how this could affect what students can find within them. We talk about who is in the academy, whose voices are privileged there, and who tends to be left out of that space. We also discuss the amount of time it takes to publish academic texts and how that might impact the types of perspectives that are found in a database that mainly indexes academic texts. We discuss how this search algorithm bias is similar to and different from Google or other Internet search engines. Finally, we discuss how we might get around these biases, or at least expand the results we see in these databases, using the advanced tools the databases provide, citation-chaining authors from non-dominant groups, using open access scholarship, etc. These conversations around academia, peer review, and open access scholarship take more time and a higher-level understanding of their context for students to unpack. Thus, I generally only get into this secondary activity in classes in which I have a second session with the students.

It is important to point out that in these discussions about bias and challenging/critiquing the dominant idea of authority, I still teach students about source evaluation. Just because we are looking for an alternative and non-dominant perspective, does not mean that anything goes when it comes to credibility. A common critique of critical pedagogy, and more specifically of the "Authority as Constructed and Contextual" ACRL Information Literacy frame, is that proponents are advocating for no authority at all, or that there be no "truth" or standard of credibility (in other words: absolute relativism). I am not a proponent of absolute relativism—and neither, I would argue, are proponents of critical pedagogy and the ACRL framework, for that matter—and this is not what I teach students in this class. Rather, I agree with Andrea Baer that in teaching students that authority is constructed and contextual we are both "appreciating difference and [also] affirming generally shared principles for understanding our material and social worlds" (Baer, 2018).

I teach that there are other authorities, and other ways to construct authority, than the ones which dominate our social discourse—namely, the mainstream media and academia. I do tell students, however, that it is important to be skeptical (I call it "strategic" or "informed" skepticism) when approaching any source of information, and to let that skepticism guide their critical evaluation. When a source from a non-dominant or marginalized perspective does not fit the standard mold for an authority, (e.g. it is not published in an academic journal or in a mainstream source, its author does not have a PhD, etc.) I tell them to consider other ways one might evaluate its authority. We talk about "other indicators of credibility that are agreed upon across communities," such as backing up claims with evidence, finding multiple sources to corroborate an in-person account, and reading laterally to find other sources that can help establish the credibility, track record, or reputation of the original source (Baer, 2018). Just because we are trying to find non-dominant perspectives does not mean we do not need to worry about credibility. It does mean that we should be asking critical questions about *how* we assess that credibility.

This is a concept that students know intuitively. They know that it is fine for them to use Wikipedia in their everyday lives, but that most of their university instructors do not want them to use it for class assignments (wrongly, in my opinion, but that is an issue for another chapter—see the chapter on Wikipedia in this very volume). They understand that there are different types of authorities and that the context in which they are using information matters and can change how, and how much, they evaluate and assess that information for authority and credibility. It can sometimes be challenging, however, for them to let go of the ideas of authority and credibility (which reinforce the dominant culture) that they have likely learned since they were children—such as the idea that peer-reviewed sources are always best in every situation, that a source written in the first-person point of view is always suspect, etc. Remember that this is a work in progress, so do not be demoralized if students have a difficult time with these concepts—remember that you are simply helping them take one more step toward unlearning and evolving their understanding of these issues.

Assignment after the library session

At the end of the library session (or afterward if time is an issue), the class instructor gives students an assignment that relates to and expands upon what was covered during the session. The instructor and I worked together to create the assignment and have revised and refined it for each class, but the basic idea is that students research a topic of their choosing and are required to submit various types of resources from alternative and/or non-dominant perspectives. They must turn in a set number of 1) books from the library, 2) academic articles from the library-provided databases, 3) websites, and 4) social media posts. I then turn these resources into a physical and virtual library display.

There are two pieces of text students turn in with their chosen sources for this assignment. One is public-facing and explains what perspective the source is from and why it is important for people to know about that perspective. The second is internal, in that only their instructor and I will see it, and it explains how they evaluated the source and why they decided it was credible. During the most recent iteration of the class, we added an additional component to the assignment asking students to reflect on the experience of finding the sources, any difficulties they had, and any lessons they learned. This reflection piece is an important component of the critical pedagogy used in the class, and has yielded some very interesting and encouraging thoughts from students.

The resulting library display, which I create using the sources the students find for the assignment, is both physical and virtual. The books are displayed on a table in the library lobby with a sign and short explanation of the class and assignment, along with the public-facing text provided for each resource by the students. The virtual display is a Libguide that lists the remaining sources—academic articles, websites, and social media posts—the students found and also includes the public-facing text they provided. An example of this Libguide can be seen here: https://research.wou.edu/WhoseVoices. Students have expressed satisfaction and appreciation at seeing their work publicly displayed in this way. This is also an important component of the critical pedagogy for the library portion of the class, in that it brings students into the process of *creating* knowledge, not only consuming it. It positions them as an authority that challenges biases and presents diverse voices, thus illustrating in the real world the concepts that they learned about in the classroom.

Conclusion

This chapter has discussed some specific, practical strategies for teaching students that search algorithms are not neutral and what this fact means for their research—both academic and otherwise. These are not (by far!) the only strategies for doing so. These ideas are mainly discussion and activity-based because it has been my experience that students are better able to internalize these concepts by seeing and doing, rather than simply by hearing or reading about them. I believe this is due to the formative nature of some of the ideas that we are attempting to undo—specifically the idea that search engines are neutral, objective blanks that simply bring back the most popular results. The strategies, discussion prompts, and activity ideas I have included are the ones that I have found useful for getting at these thorny concepts in my own teaching practice. I have shared them with the intent of empowering working librarians to bring social justice and critical information literacy into the classroom. If one of the techniques does not work for you, I hope it will at least have given you some ideas and principles upon which to build practices that do work for you.

The central example used in this chapter is of one class in which I am able to use all of these activities (including pre- and post-work), discussion techniques, and strategies together, but I am well aware that librarians often do not have this much time with students, nor this much integration into the class. The ideas and activities can also be used piecemeal, however, in sessions that are shorter. For example, you could introduce the idea of bias in search algorithms and demonstrate using the examples provided in 5-10 minutes during any session in which you are discussing the evaluation of sources. The concepts can even be dropped into sessions and conversations without adding any additional activities simply by intentionally choosing example search topics that demonstrate search engine bias or illustrate how different the results can be from various perspectives. This often prompts a good discussion of these topics, even in classes that are not about social justice per se, in which you can use the questioning techniques discussed, as well as the advice about interrupting microaggressions. As critical librarians and educators, we approach each class, no matter the length or content, as an opportunity to teach critical information literacy and prompt our students to think about issues of power and social justice. With that in mind, the techniques and ideas in this chapters can be adapted for almost any setting or session length.

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