

ABSTRACT

Title of Dissertation: FOR WHOSE INTEREST IT SERVES:
FOSTERING ALGORITHMIC AWARENESS
THROUGH A MULTILITERACIES
FIRST-YEAR COMPOSITION PEDAGOGY

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Algorithmic agents like generative AI and user personalization filters increasingly mediate information retrieval and discursive practices online. In response, the teaching of research and rhetoric must account for students' own "algorithmic awareness," or their demonstrated use and critical sentiments of algorithms. Drawing inspiration from algorithmic and digital literacy scholarship, this study utilizes the college-level first-year writing course as a space to foster, capture, and analyze students' algorithmic awareness.

A multiliteracies curriculum was used to examine students' demonstrated awareness toward social media and search algorithms. Data collection was multimodal, including typed reflections alongside recordings. Digital multiliteracies and discursive psychology informed the analysis of how students demonstrated awareness through talk and text as well as actions taken to pursue various research and rhetorical goals.

Findings indicated that students' reported use of algorithms often aligned with their critical sentiments. Students who favored accessible, easy-to-use algorithms selected their

sources among what I called the “littoral zone,” or the top of search results, whereas students who expressed skepticism toward this top-level arrangement reported moving beyond it. Some students moved beyond the search page altogether, navigating through webpages and embedded hyperlinks to locate additional sources.

While deeper reported click or scroll engagement generally coincided with deeper critical awareness toward algorithms, students did not demonstrate awareness consistently. In fact, the awareness students showcased when using search engines sometimes directly contrasted with their demonstrated use of social media and generative AI. This discrepancy suggests that algorithmic awareness isn’t a stable, generalizable state of mind; rather, it can be considered an embodied practice influenced by interface design alongside intended search motivations. These findings suggest that recent changes in web-based search interfaces, particularly those with AI-generated content summaries that disincentivize clickthroughs, may encourage littoral engagement and influence demonstrations of algorithmic awareness.

Implications of this study underscore the benefits of tracking the ways students construct and describe their engagement with algorithms multimodally, using both reflective renderings and recorded class activities. It additionally presents a call to action to software developers and education policy-makers, challenging the techno-utopian claims that position algorithms as inherently agential or emancipatory forces in the networked public sphere.

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THROUGH A MULTILITERACIES FIRST-YEAR COMPOSITION PEDAGOGY

by

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Preface & Acknowledgements

I entered this program at a crossroads in my life. After realizing we were moving in opposite directions, my ex-wife and I amicably separated in 2018. We had a good run, but we both felt we were compromising too much on one another's wants and desires. And so, with each of us granted a new lease on life, she returned home, halfway across the world, and I pursued this PhD. I guess it just felt like the right thing to do in a quarter- or third-life crisis. It certainly felt better than continuing to spin wheels in the pottery studio as we slowly drifted apart.

I still remember the moment I was accepted in early 2019, only a couple months after she had returned home. My new apartment was still composed of more boxes than discrete pieces of furniture. My cats didn't mind that, of course.

I was in the grocery store when I first found out. I needed to take a walk, and I found myself checking my e-mail amidst the yogurt section—you know, as one does. I felt so proud when I saw I was accepted. But I also felt scared. Was this all a mistake? Should I have fought harder for my marriage? Could I truly meet the moment? Was I doing right by my students to stop teaching, to leave them behind?

I removed these thoughts from my mind as best I could, and I looked to this as an opportunity to reinvent myself. To reinvent my relationship with teaching, with technology. And so, in August of 2019, I eagerly began my journey.

How naive I was. How little I knew what was to come.

COVID really did a number on me, as it did on all of us. Aside from the presence of my cats, Cole and Sophie, and aside from trading freshly baked bread for doing my laundry at my mother's place every couple weeks, I spent most of the quarantine alone. I had Zoom classes and conferences, sure, and even a Zoom funeral and divorce.

What wasn't mediated by technology was otherwise mediated by distance. I did have the occasional outdoor happy hour or the awkward coffee date in Malcolm X Park, but I was generally out of arm's reach of others due to social distancing. At times, I went weeks without touching another person, but I couldn't go minutes without touching my phone. At times, I feared the contagion would crawl up through the floorboards and take me in my sleep.

In those times, we learned to become more patient and communicative with one another. Life slowed down. We valued the time we made for one another. Once-cursory gestures like a handshake became a deep bond of trust. Sharing air conditioning was a moment of vulnerability. We realized just how much we took for granted.

Our relationship with technology also changed, though not necessarily in ways that have brought us together. I remember, in my youth, when our online worlds once came with built-in reminders to leave them. Growing up playing online massively multiplayer games, I still distinctly remember the first time I booted up *Final Fantasy XI* in 2004. I remember spending hours installing the game across multiple discs, bypassing the trials of PlayOnline, only to be greeted by a message urging me not to neglect my life outside the game before I had even started. Similar reminders appeared in *World of Warcraft* and *Guild Wars Prophecies*, encouraging players to take breaks on the hour, to remain tethered to the wider world that existed beyond the digital interface.

Today, these warnings seem so alien, so out of place. In the years since, there's been a sort of uncritical embracement of digital tools as they increasingly mediate every aspect of our lives. The algorithmic interface has woven itself into our world view more so, at times, than the real world itself. Checking the time has been replaced with checking notifications. To be in the now has been replaced by the desire to be pulled elsewhere, anywhere but the present moment.

One-to-one technology policies have dictated that every student now has a laptop in school. As a result, their default orientation when they enter my classroom is not to turn and talk to a nearby neighbor as they did when I first taught but, instead, to pull out their laptop. In our desire to foster digital connections at a young age, we've sacrificed physical ones between our students. The number of high school students who solicit advice from Claude and ChatGPT in place of their friends, their family, or trusted adults is terrifying.

In a way, technology has grown to mediate even the most basic discursive practices. I can't even click-and-drag highlight content in a Google Doc or let a blinking cursor sit on a blank page without a suggestion *to refine* or *to write with Gemini*. Precision in place of authenticity. Productivity in place of originality.

I've grown older and gained perspective, but I've also grown disoriented, scattered. Reclusive. At times, as I wrapped up my comprehensive exams and prepared for this dissertation, I wondered whether *too much* had changed. Whether too much about *me* had changed. Whether I could truly meet the moment, facing down this yawning maw of online disinformation, of algorithmic content moderation, of both social and public fragmentation. Where do you even begin? What does research and writing instruction look like in response to these phenomena? How do you put in your oar when you cannot see the river or its current? I felt rudderless in the dark.

Frankly, I often didn't know what to do. At times, this came at the expense of my physical presence and emotional availability. I became less present, less participatory. I am nevertheless eternally grateful to all of those who stood by and helped me navigate up to this point, and I understand and respect those who couldn't. I will still remember your generosity and the support you provided me to the end of my days. I could not have done this without you, too.

And so, here we are. The moment has arrived, and now I find myself hesitating to name anyone out of fear of leaving someone out. All I can say is that while this dissertation bears my name in isolation, it is not the work of a single author. This manuscript simulates the many conversations, relationships, and trauma-bonding moments that have sculpted me into shape the past thirteen years—ever since I began teaching in 2013.

It's impossible to disentangle that assemblage and describe all these relations in earnest. To acknowledge how I got here, to give proper thanks, to give deference and space to all who participated in helping me get to this point—I would need another 250 pages to properly articulate it. In truth, just know that you are here. In this section and beyond it. Within the margins of every page.

These days, it is increasingly difficult to distinguish between what is real from what is fabricated. And so, above all else, I acknowledge one thing: The work here is imperfect. It is messy. But it is real. It is honest, authentic work.

I spent seven years in this program to produce this work, in service of both current and future students. To assist in their ability to better navigate the digital environs of the networked public sphere. And what follows is simply my best attempt at meeting the moment.

*Cole, who was my star.
(2009-2023)*

*Sophie, who was my shadow.
(2011-2026)*

You both were everything you occupied and the space between.

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Chapter 1: Introduction

In the section that follows, I introduce the broader motivations and goals for this dissertation study. First, I establish the social and academic exigency for a study that captures how students perceived and showcased algorithmic awareness. Second, I explain what motivated me to choose the first year composition space as my intended site of study. Lastly, I review key concepts and ideas relevant to situating my research questions.

1.1 Orientation

Our ancient ancestors once learned how to seize control of their surrounding natural resources. They learned how to exploit fire, water, and stone for human-oriented ends, manipulating the environment to foment a civilization from which we draw our legacy. Today, however, we find ourselves grasping to control the very digital resources we've created for ourselves, of the communicative technologies that no doubt weave new, unforeseen complexities into our social fabric—those that, if not handled with care, may very well burn, drown, or bury us no different from the trials of our predecessors.

Of course, it is not an awfully controversial statement to make in exclaiming that communicative technologies impact our social fabric. The rise of radio and television, for example, has been seen to contribute to the development of a national and even global consciousness (Mattelart, 1996/2000), and within this consciousness, the development of a public memory. Yet unlike legacy media organizations that promoted deeply institutionalized perspectives, those that often aligned themselves toward dominant narratives and discourses, the public memory that was expected to be formed at the turn of the century through the growth of

the internet was to be something different—seen as emancipatory to some (Benkler, 2006), disruptive to others (Stiegler, 2019).

In making these statements, I’m reminded of Eli Pariser (2011). From the TED2011 stage, he once said: “This is how the founding mythology goes, right? In a broadcast society, there were these gatekeepers—the editors—and they controlled the flows of information. And along came the internet and it swept them out of the way and allowed all of us to connect together.” During his talk, Pariser explained the driving conventional wisdom that guided the formation of what has since come to be defined as the networked public sphere (Benkler, 2006). Theories relevant to the networked public sphere position the internet as a tool to scaffold a new information society, one where an increasingly networked and interconnected public would have more accessible means of rhetorical engagement. The networked public sphere was believed to enhance the means of deliberative democracy where one’s ability to participate was limited only by their access to a networked electronic device. Many of these proclamations were drawn in large part from foundational media theories of the global village (McLuhan, 1964) and the public sphere (Arendt, 1958; Habermas, 1989). More recent advocates contend the internet could serve as an agential or emancipatory force, simplifying the means of communication and broadening the scope of public opinion much like the printing press had done centuries prior (Mattelart, 1996/2000).

Yet Pariser (2011) was not convinced. In his words, “that’s not actually what’s happening right now. What we’re seeing is more a passing of the torch, from human gatekeepers to algorithmic ones.” Algorithmic spaces like social media news feeds and Google engine search results pages, in his view, are oriented toward a different ethos: one that privileges personalization over the plurality of perspective. Using collaborative filtering techniques, many

of these algorithms function instead, to foment echo chambers—what Pariser (2011) described as “filter bubbles” at the time—where users are shown and recommended web content as their actions align with broader trends among individuals with perceptibly similar interests (Herlocker et al., 2000). Rather than bring about the newly imagined public sphere that was heralded at the turn of the century, the algorithmic web might only further substantiate many of the existing dominant and subordinate hierarchies the networked public sphere was ostensibly intended to dismantle, and in ways more invasive and predatory than previous forms of mass media were capable of (Zuboff, 2019). Through filter bubbles and other personalization processes, others have contended that the public memory that was formed with the rise of mass media has begun to fragment and impact our very means to engage across difference within the networked public sphere (Stiegler, 2019). Though others have questioned the breadth of these filter bubbles and the fragmentation as a result of their implementation (e.g., Haim et al., 2018), algorithms are only going to have an increasing presence across the networked public sphere, and we must gain a deeper understanding of how these algorithms impact the flow of information online and in general—and not just in concept but through social action as well.

1.2 Exigency

In the fifteen years since Pariser took the TED stage, algorithms have only taken an increasing role in the arrangement and dissemination of online content. Turning to contemporary cultural narratives surrounding ChatGPT, Google Gemini, and Claude at this stage is an easy example to make, but such “generative AI” technologies are just one aspect of the continuing creep and scope of algorithmic agents actively working within the networked public sphere. For decades now, algorithms have served a mediating function in “assisting” online information retrieval

tasks when using libraries and search engines, yet these algorithms are now equipped with new collaborative filtering and personalization techniques that subsequently complicate these processes. The systemic integration of such algorithms across the web has no doubt re-oriented considerations toward how information flows across the internet and the mediating role algorithms have in shaping the circulation of texts online, especially on matters of daily communicative practice (Ridolfo and DeVoss, 2009).

By way of example, dating apps are one such space where the influence of collaborative filtering and personalization algorithms on social practices are prevalent. Tinder was released in September 2012, heralding the emergence of online dating “swipe culture.” Unlike many of its online dating predecessors that were more like websites in appearance, Tinder orients its users toward a card-game like experience where profiles inclusive of a few short word prompts and images are presented one at a time. Users are then inclined to either swipe left, rejecting their profile, or swipe right, leaving a “like” on their profile. Should the user swipe right on them in return, the users subsequently “match” and are given the opportunity to communicate privately with one another. All of these actions are marked by the algorithm, and subsequent profiles you are provided are also solely determined by the algorithm.

In the years since Tinder’s initial release, online dating “swipe culture” has led people to increasingly treat finding matches online as if dipping one’s toes into the dating pool were a game itself. As one user explains: “I think [online dating] is about how you catch someone’s attention, and that’s a game in and out of itself. And I think the swiping action is also something people like because it’s fun and makes it feel more like a phone game you play” (Huang et al., 2022). As a divorcee who re-entered the dating scene among the rise of these various apps, I

must confess that my own experiences carry a distinctly different vibe than it did before these apps existed, in large part due to these game-like algorithmic processes.

I even had identical sentiments to the aforementioned user as it pertains to using dating apps in general: it all does feel very much like a game. And as I communicate with other single friends—men, women, and non-binary alike—I hear all sorts of folk theories relevant to how people orient to and engage with these platforms, with these algorithms, and treat the experience as if it were a game—or perhaps a puzzle. In these conversations, they substantiate various theories about what kinds of profiles the algorithm prioritizes and promotes, and such folk theories have led users to present themselves in specific ways through the use of particular photographs or by using specific prompts with key words in the hopes of being prioritized or ranked highly by the algorithm.

Existing research has shown that such theories about algorithms impacting online dating simply lead users to engage in deception (Markowitz & Hancock, 2018), but these deceptive orientations to the algorithm are oftentimes relatively benign. Dating folk of the DC region jokingly talk of photos inclusive of people posing with friends' dogs, a strange overabundance of rock climbing, and, perhaps most indicative to DC's emphasis on globetrotting as a signal of wealth, the "Machu Picchu tourist pose." Users in these instances are not always displaying their authentic selves, ostensibly to meet their perfect match; instead, they are at times aligning their online persona with dominant dating conventions. And thus one finds oneself swiping through the simulacra of dating profiles that are rhetorically sustained via filtering algorithms that rank users on the basis of both who swipes whom and how often.

In truth, these folk theories hold some credence. Even though there is limited empirical data to support the argument that algorithms are effective tools at sussing out romantic

compatibility between users, dating apps typically utilize collaborative filtering algorithms that attempt to make more accurate matches not only on the basis of which profiles you individually swipe left and right on but the types of profiles people with interests akin to yours additionally swiped (Joel et al., 2017). And while such personalization algorithms are designed to help you find potential partners, ostensibly sharpening its recommendations the more you use it, existing research work has drawn attention to the impacts these collaborative filtering algorithms have in encouraging users to prioritize certain features in partners (Sharabi, 2022) including those relevant to race (Nader, 2021). Collaborative filtering algorithms have, unfortunately, been shown to only further reinforce many of the social divides that have plagued the online dating scene for more than a decade (Rudder, 2009), a phenomenon most concerning when historically marginalized groups, most notably LGBTQ+ folk, are increasingly likely to use such dating apps to safely meet potential partners (Rosenfeld et al., 2019). As tools of convenience, these algorithms unfortunately function as well as unintended tools of oppression that reinforce existing discriminatory hierarchies when “personalizing” search results in ways deeply aberrant to the founding mythologies of the networked public sphere (Hern, 2020).

As an extended example, dating apps serve as just one instance where algorithms now play an increasingly participating role in shaping discursive practices. And as algorithms and algorithm developers continue on this trajectory, there remains a genuine benefit for users to better understand how these algorithms work in shaping their web-browsing experience and to better understand what role user personalization and content filtering algorithms serve in achieving social actions. To do so, we must cultivate what has come to be described as *algorithmic awareness*: the understanding of how to use algorithms and the understanding of

how they curate content and mediate user experiences online, whether for good or ill (Hamilton et al., 2014).

1.3 Motivation

Rhetoric is most commonly defined as the awareness of and the effective use of one's available means of persuasion, generally involving the analysis of the expression and dissemination of deliberation for both public and private audiences. While the field of rhetoric is most closely aligned to the classical traditions of Aristotelian ethics and, later, Kenneth Burke's (1969) theories of identification, the field of rhetoric has expanded to include both the consideration of how public and private discourses evolve through the uptake and subsequent circulation of ideas (Warner, 2002) as well as the recognition of genres not as rigid structures but as constitutive of social actions that are innovated over time (Miller, 1984). Seeing rhetorical engagement as a materially-bounded process, meaning-making processes are mediated through a tense, push-pull engagement between producers and consumers, which only further necessitates deeper considerations of the digital infrastructures that support these innovations. In recent years, rhetoric has become increasingly motivated toward sustainability within these power relations in particular, motivated by what Jenny Rice (2012) describes as the development of the "exceptional public subject" capable of not just "questioning" but also "changing" the very modes of production: one that involves the creation of "a new rhetorical vista," Rice argues, "from which we may stand and view ourselves in relation to the current landscape."

Sight and the agency to see ourselves in relation to things is no doubt a central effort of algorithmic awareness work in general, especially with regard to the increasing digitization of all aspects of daily life that make the influence of technology increasingly invisible and more

difficult to parse. Similar to existing technology-based, more-than-human ontological work oriented from the subjective (e.g., Barad, 2007), the efforts of algorithmic awareness are to help users see technologies not merely as tools but as malleable forces that exert pressure on these consumer-producer relations, especially on users who wield them and subsequently shape one's material lived experience (e.g., Bennett, 2010; Ihde, 2012).

Focused on experimentation and co-production, the multiliteracies framework (Cazden et al., 1996) has similarly served as a viable model to not only help students better understand the impact multimodal texts and technologies have on their daily life but additionally provide empirical evidence that such interventions work to evolve student perceptions of these technologies (e.g., Silva, 2011). Stuart Selber (2004), especially, has shown keen interest in helping students develop critical digital literacy skills by identifying how algorithms shape institutional, cultural, and social power dynamics. Unfortunately, up to the point of this writing, empirical research that draws connections between algorithmic awareness and multiliteracies is exceedingly limited, especially in the space of first year composition (e.g., Koenig, 2020).

When it comes to the teaching of online research practice, a pedagogical space where algorithmic awareness might easily be couched within, the first year composition course (FYC) has no equal. As a general education requirement at most public and private institutions in the United States, the content that is covered in FYCs can reach nearly every American college and university student, making it quite a suitable space to create our new rhetorical vista.

Given its primacy in the general education curriculum, especially as it pertains to the teaching of research practice, the FYC is a particularly valuable space that warrants a deeper investigation for how such a digital multiliteracies curriculum might cultivate instances of algorithmic awareness in students as they produce original research and engage in rhetorical

practice. How might, for example, a semester-long research project take a different shape when the development of algorithmic awareness is its end-goal?

This project is born out of the desire to more effectively connect these two initiatives—algorithmic awareness and multiliteracies—continuing the work of Bakke (2020) and Koenig (2020) to produce a robust, empirical study that extends their initiatives into the community college FYC space. The study I present here owes incredible deference to their existing work while looking to evolve new models of learning that showcase the efficacy of this work. In doing so, this study answers two central research questions:

- How do students showcase algorithmic awareness when conducting and presenting research?
- How do students showcase algorithmic awareness when transforming their research findings into rhetorical engagement?

Chapter 2: Literature Review

This literature review serves to draw connection to existing motivations of algorithmic awareness outlined in the preceding chapter to on-going efforts of multiliteracies. To do so, I will provide a brief overview of the pedagogical aims of multiliteracies as they relate to the frameworks promoted by both the New London Group (Cazden et al., 1996; Cope & Kalantzis, 2000) and Stuart Selber (2004) as well as provide an explanation as to how such work is implemented and subsequently assessed.

2.1 The aims of multiliteracies

Over a century ago, John Dewey (1915) exclaimed that schools must “recognize the needs of all classes of pupils, and give pupils a training that will insure their becoming successful and valuable citizens.” Dewey established literacy education as a force for public good and social equity, equipping Americans with the skills necessary to meaningfully engage in public deliberation. And as digital interactive technologies became increasingly commonplace, the New London Group (Cazden et al., 1996) sought to further expand upon this initiative. Dubbed their “multiliteracies” project, they intended to motivate another monumental shift in literacy education that would insure our students’ abilities to engage publicly within the networked public sphere: one that necessitated a shift away from purely print-based modes of literacy instruction to one that was increasingly *multimodal*, reflecting the evolutions in communication systems with the rise of the internet at the turn of the century.

According to the New London Group, the multiliteracies approach was introduced as a way to scaffold a further modernized literacy curriculum: one that would develop the skills students truly needed to better navigate and participate within an increasingly diverse and

multimodal public sphere. They advised that “new communications media are reshaping the way we use language,” building on existing theoretical work by Marshall McLuhan (1964) to rethink the motivations of literacy instruction beyond print reading and writing and to extend new literacy instruction to include the inquiry, experimentation, and research of visual and interactive media—a motion that, as McLuhan once advocated, must be done lest “our school curricula will insure a citizenry unable to understand the cybernated world in which they live” (p. 383). If the pursuit of literacy is to best prepare students for public deliberation and civic engagement, then we must certainly reorient literacy education to be multimodal in nature to reflect the increasingly digital, multimodal, networked public sphere they must deliberate within.

2.1.1 Defining multimodality

New London Group member Gunther Kress (2000) argued that real-world rhetorical engagement is always multimodal, as language itself, the underpinning to all rhetorical engagement and public deliberation, is subsequently multimodal by default: inclusive not only of writing and reading but also of verbal, non-verbal, and even gestured modes of communication as well. What makes language multimodal, according to Kress, is not the inclusion of all elements exclusively but that these elements operate in tandem, oftentimes in cooperation with one another. This is especially pertinent to digital and mass media spaces of mixed-use media that is often inclusive of print text, images, and sound, nevermind the distraction of pop-ups and banners interlaced between words on the page that promote third-party advertising.

The important point to establish here is that, within this new literacy framework, one’s literacy level is determinant not only of one’s *comprehension* but also one’s meta-cognitive awareness of a text’s affective power and its ability to exert attention and orientation; literacy

instruction moves beyond close reading strategies like ascertaining the main idea of a text to helping students better understand our relationship to texts we encounter in daily life and their very impact on the way we think, write, and communicate.

Through this shift to toward literacy as a *multimodal* endeavor, multiliteracy work seeks to reimagine the way we teach students to associate and engage with *all texts* in general—a process that involves a cognitive, reflective process that is far more domain-general than what is typical to “print” or even expanded “media” or “digital” literacy instruction. Multiliteracies instruction is not platform or genre specific, and the methods of instruction are generalized across all modes of communication, which makes the approach, in some respects, more sustainable and resolute to future evolutions in communicative practice.

Kress (2000) makes this claim because he sees all texts as multimodal. The primary motivation of multiliteracies as a reading literacy approach, in his view, is to instantiate a reading process that encourages seeing all texts “constituted by a number of modes of representation” (p. 184). While language is often contextualized in the adjectival sense—as *written* language or *spoken* language—language and phenomena relevant to language-specific meaning-making processes are rarely, truly “monomodal.” A novel or poem is not merely “read,” scanned line by line down the page. Such a work of fiction is similarly observed for style—its paragraph breaks, its use of quotation marks, its line breaks and stanzas—as well as for sound, as many plays and poems are not merely read but also *performed*. Thus, proper “reading” of a work of fiction, even a print work, necessitates not only understanding its written content but to consider how its visual elements present themselves to the reader—that is, the very nature of how the content itself is *arranged* and subsequently experienced.

Kress (2000) explains that language is by default a *multi*-sensory process rooted in our available means of perception. “Reading,” according to Kress (2000), is not a process merely done with our eyes but is, instead, a *full body* experience, even in the most mundane of tasks like shopping for bottled water in the supermarket:

As we walk among the shelves of water in a supermarket, we read the bottles. We respond to them as multimodal texts, which are meaningful in every aspect of their multimodality: we see the labels, and treat them, however fleetingly, as texts of language and image; we notice whether the bottles are glass or plastic – with some bottles emphasizing their materiality and others disguising it; we notice their color: green, or blue, or clear; and we notice their shape: squarish with moulded patterns (denoting foreignness or ‘Frenchness’), elongated and without mouldings denoting ‘localness’ such as ‘Britishness’); and so on. Our readings are of course cursory, in one sense: we do not often pause to read the details of the labels – though these meanings influence our choice. In another sense the readings are already coloured by a former or imagined use: how will this bottle look on the dinner table? how will it feel when I pour? how will it fit into my fridge?

The reading of the bottle as text points to one domain of use, the semiotics of taste in the sense both of what we taste and of lifestyle. Here the messages about and the discourses of health, heritage, environment are important. Here too the shape of the bottle is important: the clear-glass bottle of ‘delightfully still’ English water, with its square shoulders; its blue square label with gold printing and fake royal crests hints, intersemiotically, at gin bottles and at the social (semiotic) domains of ‘social drinking’,

whether of the gin-and-tonic hour, or otherwise ... This is ‘reading’ as a semiotic cultural practice in which it is ‘meanings’ as much as water which are ‘consumed.’ (p. 188)

This vignette is important because it represents how the “reading” of a text depends on sight in association with other sensory maneuvers: the touch of the bottle, such as how it feels in one’s hand, as well as taste of the water, whether real or imagined. It represents the literal orientation *to the object* that is involved in any engagement with even the most basic of texts. And while directly attending to a text, each of the elements that comprise it vie for and compete with one another for our attention.

2.1.2 Helping students attend to affect and engagement

By re-focusing attention to seeing all texts as multimodal, Kress (2000) believes that we can more seriously privilege the influence of body orientation, attention, and perception in our literacy-based meaning-making processes. Doing so helps re-situate textual consumption as deeply subjective (and affective) cognitive processes. He makes these points out of response to what he sees as an existing status quo of literacy education that is facilitating otherwise deeply passive, standardized, and mostly print-based models of literacy that have to this point left us, he argues, “singularly ill-equipped in the new landscape of communication” that more than certainly, at times, overloads the mind (p. 183, 188).

Toward this end, multiliteracies as a reading approach has found renewed applications within the digital and algorithmic turn we find ourselves in the midst of. While not explicitly a *digital* literacy framework, the New London Group additionally encouraged the examination of “the potentially complex ways in which meanings are constituted through relationships to other texts, text types, narratives, and other modes of meaning,” which is something that is naturally

present on many digital media platforms, including algorithmic spaces like social media, generative AI, and Google search engine results pages (Cazden et al., 1996, p. 82). Such intertextual reading strategies include examining all elements of a webpage in unison, reflecting on whatever social narratives it contributes to, and engaging in research processes to see how its messaging has been taken up and represented in relation to other media—a holistic examination of a text that includes both close and distant reading strategies (Moretti, 2013). Such approaches are designed to help students understand how the construction of a text—beyond its print elements—orient attention, shape engagement, and potentially even code cultural behaviors (Kress, 2000). Thus, beyond the processing of meaning-making across multiple modalities, digital reading activities additionally encompass navigating hyperlinked spaces like library databases, search engines, and social media platforms with a focus toward perception, body orientation, and attention.

This work is especially critical, as while digital humanists originally saw hyperlinked texts as “liberatory” at the turn of the century (Hayles, 2007), affording readers new agency in interpretation with multiple routes of participation out of response, new bodies of research related to information problem solving (Frerejean et al., 2016; Walraven et al., 2008) and civic online reasoning (McGrew, 2020) have showcased the real challenges the average online user faces when consuming multimodal, hyperlinked texts and how easy it is to succumb to mis and disinformation online, especially within networked webs of texts like search engines and social media platforms that vie for one’s attention.

2.1.3 Situating student lifeworlds

New London Group peers Bill Cope and Mary Kalantzis (2000) similarly argue for increased attention to the complexity when navigating multimodal media and the need to attune reading as well as writing processes toward more subjective, *situated* models of instruction that help expose the finer details of meaning-making processes as deeply *cultural* processes. They contend that the “common view of language” that perceives meaning making “as inherently stable systems of elements and rules” oversimplifies a deeply subjective meaning-making process that is affected not only by one’s individual perception but also one’s cultural training (p. 203). In line with contemporary rhetorical thought derived from the work of Carolyn Miller (1984), who defined rhetorical engagement as a reflection of socially constituted conventions, Cope and Kalantzis (2000) argue a similar heterogeneous orientation toward literacy, one that affords students the agency to experiment with and innovate new means of communication, necessitating a re-thinking of “writing” outcomes in addition to its “reading” approaches.

To do so, Cope and Kalantzis (2000) establish that reading and writing instruction must shift away from standardization. Standardized forms of literacy instruction, they argue, do not sufficiently represent “the breadth, complexity and richness of the available meaning-making resources” our students bring into the classroom (p. 204). What they believe to be the necessary conditions for effective reading and writing instruction is a celebration of these subjectivities and the cultural range of perception: one that is anchored by lived experience and offers instances of exposure of students’ lifeworlds within the classroom, what they describe as “the raw material of culture” (p. 207). Toward this end, Cope and Kalantzis (2000) contend that situated practice is a process of representation, not reproduction. Instruction must focus on the range of experiences relevant to student lifeworlds, to include texts that may be deeply familiar to some yet unfamiliar

to others, with the ultimate motivation to help students contend with the breadth and range of media they're likely to encounter in the real world.

2.1.4 Fostering a critical consciousness

But the goal of these exercises is not merely comprehension. With a critical framing, instruction would also generate essential conversations around the function and structure of texts, to get students asking, as Cope and Kalantzis (2000) put it: “for whose interest it serves” (p. 247). Literacy instruction, thus, moves beyond comprehension-based close reading strategies and encourages students to additionally consider how a text exists within a broader structure, context, or ideology. Through this critical framing, students may more deeply analyze the social media content they regularly come across, such as whatever they find on Twitter, Reddit, or Tiktok, even reflecting on how the personalization of their news feed benefits producers, consumers, and—most importantly—the social media platforms themselves.

By way of another example, critical framing might steer students to reflect on audience and uptake: who the producer of a text is intending to reach, for instance, and why this type of text is best to reach that specific audience. Critical framing moves literacy instruction beyond the vacuum of close-reading texts and to consider how a specific text exists within a broader assemblage of ideas, platforms, or infrastructures, to consider not only how specific modalities adapt meaning-making processes but also how producers of texts deliberately target those adaptations for an intended rhetorical effect.

Multiliteracies contemporary Stuart Selber has perhaps been the most involved in conceptualizing this critical framing within new digital contexts. In *Multiliteracies for a Digital Age*, Stuart Selber (2004) argued that “if students are to become agents of positive change,”

harkening back to the original motivations of literacy as defined by Dewey (1915), “they will need an education that is comprehensive and truly relevant to a digital age,” (p. 234). In his book, Selber proposed an increased attention to the development of critical literacy skills where students can identify the social norms and cultural codes behind the use of digital technologies and recognize their influence on ideological and institutional forces within networked design cultures and to be able to identify how dominant, subordinate, and even subaltern (Spivak, 2004) perspectives are dispersed across the networked public sphere.

Selber belabors this point in particular as, at the turn of the century, there were many idealistic arguments around new media technologies and the networked public sphere. For example, as established in Chapter 1, Benkler (2006) advocated that these digital platforms had the power to disrupt hegemonic institutional forces present in the twentieth century and that the internet would usher in a freer, more democratic, more accessible public sphere. The existing gatekeepers of information would be swept aside in this flood of citizen journalism and digital democracy in action.

Selber was motivated to get students thinking more critically on these matters, and his outcomes targeting critical literacies sharpened a curricular focus toward the consideration of how various digital modalities influence the way producers and consumers interact with one another. Critical framing, thus, serves to equip instructors with the tools to help students unpack the broader ramifications of many on-going digital evolutions in action: what is actually happening as a result of these modal influences? How much are various modalities truly effecting change? And if not enough, then what must be done to subsequently evolve the context-use of these modalities and make the idealized networked public sphere a reality?

2.1.5 Transforming institutional and infrastructural power

If multiliteracies is designed to foster the development of a certain episteme or phronesis, such as to wield technology prudently, then critical literacy is the development of a *techne*: to not just gain knowledge in the abstract but to *apply it* toward social action. Such a framework, according to Selber (2004), “prepares students to be social critics rather than indoctrinated customers of material culture, with critique generally defined as the cultural study of power in situated uses of computers” (p. 95). Toward these ends, the multiliteracies framework helps students understand the digital technologies we wield inside and outside the classroom and how they exert an active influence on our perception in ways beneficial to dominant, institutionalized viewpoints.

Drawing upon New London Group member James Paul Gee’s work relevant to semiotic domains (2003), Selber contends that many technologies disseminate institutionalized discourses, or those that are “highly formalized, that regulate language use and behavior in ways that tend to maintain the social and political order” (p. 97). For a critical literacy to best meet students’ needs to make meaningful engagement within the networked public sphere, literacy instruction must take a more “emancipatory” approach that “encourages students to put multiple discourses in conversation with each other, that is to critique one discourse in conversation with each other in order to develop critical analysis capacities” while additionally understanding how varied digital technological infrastructures privilege certain discourses or modes of expression (p. 98).

According to Selber, critically literate individuals do not just recognize the “power moves” that computers as cultural artifacts make. It is not merely enough to see the influence that technologies “project into everyday social worlds” (p. 101); instead, critically literate students would be able to similarly institute their own power moves against technologies, what

Selber dubs actions of “technological adjustment” (p. 105). Some examples of technological adjustment include supplanting the cultural narratives promoted by a particular technology, re-shaping user access to the technology, or even directly modifying the technology itself. In helping students develop a more critical perspective toward technologies and the cultures they promote or demote, students are encouraged to exert meaningful change on technologies and their social impact.

To achieve these aims, students are encouraged to leverage certain rhetorical literacy skills to analyze effective use of these technologies and similarly wield them persuasively—both in relation to their intended use contexts as well as any instances of social change. Rhetorical literacy work within this critical orientation is equal parts analytical and reflective. Students are tasked to journal ardently—to narrate their encounters with technologies. “The point,” Selber explains, “is to develop a rich, concrete account that can serve as a gateway to analysis” (p. 160).

In speaking to institutional and infrastructural power—and in the interests of dismantling or evolving such relations between users and their service providers—multiliteracies work is additionally inclusive of what is described as transformed practice (Cope and Kalantzis, 2000). As students shift from consumers to producers, they are additionally encouraged to create a text within a specific modality and then attempt to transfer it to other modalities and contexts, thereby reflecting on that experience of transfer—such as, for example, writing an MLA research paper with one specified intended audience (i.e., the instructor or a small group of classroom peers) and then re-producing it into a more public-facing podcast, YouTube video, or some other multimodal text with a significantly larger intended audience.

The motivation behind such transformed practice is to help students explore how meaning may transfer or even evolve across multiple contexts or modalities—such as having

students initially read the lyrics to a song, then listen to the song itself, and then watch a music video based on the song—and then to have students produce texts themselves that are subsequently adapted across various modalities. Such motivations additionally offer opportunities to consider how the transference of meaning across varied modalities creates a certain topography. By attending to textual production across varied modalities and contexts, students are able to more effectively see the more frictional elements of rhetorical engagement as they expand their audience and encounter those that may be questioning or oppositional to their viewpoints.

2.2 Teaching multiliteracies in first year composition

Over the next section, I will showcase the broad scope of literature on the teaching of multiliteracies in first-year composition that informed my study design. I begin by identifying what kinds of multimodal texts students are tasked to compose. I then explain the kinds of texts students are tasked to read and analyze, especially as it pertains to online research practice, all with the intent to better situate and contextualize the construction of my own intervention.

2.2.1 Multimodal writing assignments

Existing FYC interventions have utilized many different multimodal texts to publish student work. Students have primarily used web-based media like blogs (Costello, 2011 & 2015; Gallagher, 2010; Kirchoff & Cook, 2016; Kreniske et al., 2019; Smith, 2008) and personal websites (Blackburn, 2012; Bourelle & Bourelle, 2015; Clark, 2010; Klages & Clark, 2009; Peele & Antinori, 2013; Shin & Cimasko, 2008). Students have additionally used social media platforms inclusive of Facebook (Balhizer et al., 2011; Barrot, 2016), Instagram (Wallis, 2014;

Yeh & Mitric, 2019), Twitter (Hong et al., 2011), Vimeo (Beckelheimer, 2017), Yelp (Ewing, 2013), and YouTube (Beckelheimer, 2017; Blackburn, 2012; Ewing, 2013) to produce assigned course content. Students have additionally been encouraged to critique and consider the impact of using various digital tools in the production of multimodal texts (Beckelheimer, 2017; Costello, 2015; Wallis, 2014; Ewing, 2013; Blackburn, 2012; Balhizer et al., 2011; Gallagher, 2010; Gregory & Steelman, 2008; Halio, 1996; Shin & Cimasko, 2008).

By composing multimodal texts, students have shown a deeper understanding of the nuances pertinent to public engagement. Through the production of these multimodal texts, students developed a better understanding of media-specific audiences (Blackburn, 2012; Clark, 2010; Costello, 2015), even recognizing the nuances between who populates specific social media platforms (Ewing, 2013). These interventions additionally revealed that, by producing texts for an audience far beyond what they normally write to in an academic essay format—an essay that is usually read and responded to by only their instructor or, at best, several of their peers—students developed a keen “understanding of the implications of public writing,” a critical skill that Clark (2010) has argued “help[s] them emerge from the course as engaged citizens” (31). Whether it was related to the growth in their critical consciousness (Merritt, 2006) or simply promoting the use of online composition as a means of more localized, community-based civic engagement purposes (Klages & Clark, 2009), or even simply to bridge informal and formal writing practice (Hong et al, 2011; Kirchoff & Cook, 2016), the inclusion of multimodal textual production has historically facilitated the kind of work that promoted initiatives of social equity and a “leveling of the playing field” (Peele & Antinori, 2013). As a result, multiliteracies-informed interventions to this point, especially specific to the first-year composition space, have developed students’ abilities to connect with others outside of their own

classrooms on issues important to them while additionally feeling like a part of something much larger than themselves.

Contrary to the constraints of the traditional MLA essay writing process—the four-line heading, the twelve-point Times New Roman font, the one-inch margins—students in online composition contexts were often afforded generous control over the design and layout of their multimodal texts. In Costello’s (2015) integration of blog-based writing assignments in their course, for example, one student articulated that “the layout of my blog including color, font, images, videos, and design were constantly changing. Eventually, I settled on a format where I felt my blog represented me” (p. 183). Additionally, when it came to the integration of technologies, many instructors offered students the choice of what medium they wished to work with. Blackburn (2012), for example, allowed students to choose to publish their works either on a blog or through YouTube. In allowing students to utilize whatever medium they wished to express their ideas, Blackburn additionally granted their learners the right to express their creativity in ways they felt most comfortable (Yeh & Mitric, 2019; Shin & Cimasko, 2008). As such, multimodal writing instruction, through the integration of digital technology, has historically reduced constraints in means of student expression and has made a more equitable, expressive classroom aligned to its foundational principles (Cazden et al., 1996).

2.2.2 Multimodal reading activities

The reading of multimodal texts, as well, has become a point of study within the first-year composition space, especially in relationship to Cope and Kalantzis’s (2000) approach to situated practice. The inclusion of texts in literacy instruction that are more closely related to the content students consume outside of the classroom. To this end, Wikipedia (Morain, 2008; Purdy, 2010;

Silva, 2011; Locklear, 2016), search engines (Blackburn, 2010; Silva, 2011), and social media platforms (Morain, 2008; Blackburn, 2010; Mazzoleni, 2012; Morris, 2016; Rodrigue, 2017; Overstreet, 2020; Al Bulushi, 2021; Cole, 2021; Maksimova, 2021) were commonly taken up as sites of inquiry for these reading activities.

While all of the above were deliberately chosen because they were familiar to students, used on a regular basis by students outside of the classroom, situated practice similarly intends to challenge students' conceptions of multimodality to stoke a critical orientation. Rodrigue (2017), for example, assigned the reading of electronic literature in her coursework with the clear intent to "defamiliarize the act of online reading" and steered her students into a more interrogative, exploratory process with a literary genre wholly unfamiliar to them rooted in the hypertext titled Shelley Jackson's *My Body*. As she explained: "If I had asked students to engage with a familiar genre, such as an online newspaper article, they would have already had a sense of how to approach reading and understanding it"; as such, her students were led to make connections with the unfamiliar, "[drawing] on their knowledge of print fiction to read web texts" (p. 246, 248).

Shifting away from the mere close reading of texts—such as to identify an argument's main idea or to locate instances of symbolism in a poem—critical framing as a learning objective steers students to consider how a specific text functions within a broader network of ideas, platforms, and ideologies. Cole (2021), for example, conceptualized a series of classroom exercises where students would be tasked to find a social media text that had "gone viral or received a high level of engagement" (p. 32). Students would then be encouraged to see whether it cited sources for its information—reviewing whatever was provided—or simply fact-checking the post, relying on credible news sources to verify the information presented. In another conceptualized activity, Cole would have students compare social media posts from verified

news sources like the Associated Press to other social media profiles that were “less reliable but verified” (p. 32). Such tasks would help students understand how being “verified” on social media does not relate to a source’s trustworthiness, especially in instances where a profile is run anonymously or run by an individual who does not disclose their professional background or personal identity.

Rather than simply engaging in close reading practices—such as to examine a rhetor’s use of persuasive appeals in the construction of a text—Cole designed a series of lessons that expected students to move beyond the source, to interrogate who’s behind the information, and to reflect on what being “verified” on a social media platform truly means. She noted that activities like these would help students detect the influence of bias in social media content and recognize how the text was designed—its use of specific word choice, hash tags, or visuals—could potentially influence how the content was consumed and subsequently circulated by its readers (p. 34).

Many of these interventions also included a critical framing segment of their digital reading activities pertinent to the effect various modalities—such as the inclusion of video or audio—had on the reading experience over another. Al Bulushi (2021), for example, encouraged her students to consider how the design of videos, with the inclusion of color, sound, and clever camera work, orient one’s gaze and shape one’s attention. By way of considering “the producers’ potential intentions towards certain choices and their possible impact on the viewer,” she hoped to help students “think beyond the immediate content of the videos” and critically reflect on how the very arrangement of a video’s features can shape what is and how it is consumed—especially those of all flash and no substance (p. 114).

2.2.3 Multimodal research activities

Spaces like Wikipedia, historically, have been a central object of study as it pertains to multimodal reading activities (Morain, 2008; Purdy, 2010; DeCuir, 2014; Locklear, 2016). Beyond just the aforementioned literacy instruction to help students better utilize Wikipedia for both formal and informal research practice, many of these interventions included a critical component that encouraged students to more deeply interrogate what “research” means to them. Purdy (2010), for example, believed that the integration of Wikipedia instruction in first-year composition classrooms was “an asset to their understanding of research and writing as recursive and intertwined,” (p. 51). While Purdy makes it evident to his students that Wikipedia doesn’t necessarily belong in the works cited section of one’s research paper, he does contend that the exploration of Wikipedia can up-end long standing perceptions of research practice, especially the notions students develop in the construction of paper-based projects with a sense of completion or final draft. By recognizing Wikipedia as a living text that evolves over time, students can recognize that research is an on-going process of reinvention—and one that can be more easily tracked and updated through the use of digital technologies.

Silva (2011) observed similar outcomes in her digital reading activity intervention, where students began to see research as a more incremental, recursive process. One of her students, Ana, initially “felt frustrated when she could not find the ‘perfect source.’” Over time, she began to look more holistically at all sorts of texts, even those that initially appeared irrelevant “as potential evidence of something.” Eventually, Ana began to see how even “a commercial website could provide evidence for keywords or function as one conversation within a larger rhetorical landscape” (p. 174). Across much of the literature, beyond helping students become better readers and researchers, these digital reading and research activities expanded students’ notions

of what could be defined as “research” while additionally widening the rhetorical vista of “research texts.”

Designed as a series of video lessons, each under ten minutes in length, Silva’s intervention covered a variety of topics including keyword searching, evaluating sources, and using Google Scholar and Wikipedia as students were expected to produce a semester-long research paper. Students additionally received three handouts that contained a series of online reading strategies, including common source evaluation methods like the CRAAP test (The CRAAP Test, 2018). Conducting an initial pre-test, students were observed as they located six sources to help compose their 5-page research paper. These observations included a think-aloud protocol in addition to tracking their movements across the web with screen-recording software. They received no formal instruction ahead of time and were tracked according to their navigational and reading comprehension skills as they scanned for sources online (p. 100). The results of the pre-test indicated that study participants primarily navigated the web using a “hub and spokes” method, collecting six sources to meet the assignment expectations through trial and error. By simply clicking through various search results in their SERP, chose sources based on their relevance to their intended topic. Most frequently sources would bear no relation to one another, and students did not draw any intertextual connections between them (p. 116-17). Students were additionally reluctant to rely upon Wikipedia as a starting point in their research, identifying that past instruction has taught them to believe that it is unreliable.

Following the lessons, participants completed a post-test in week six of the semester, where they had showcased a “massive improvement” in their navigational abilities as they searched for four additional sources for their research paper (p. 117). Rather than overtly relying on the “hub and spokes” method, students shifted toward an intertextual research process

involving the mining of references in the source's works cited, examining other articles published by the same journal, or conducting forward-citation searches of their chosen articles (p. 159). Students' perspectives toward Wikipedia additionally shifted, where Wikipedia became a site to acquire "overview information" of key terms and concepts they stumbled upon in their research process (p. 168).

In relation to online search practice, discussions of algorithms were additionally commonplace. As influencers in web search—a process already deeply impacted by one's self-selection bias (Parker & Smith, 2022)—Bakke (2020) and Koenig (2020) have both encouraged their students to be increasingly critical of how web pages are arranged and subsequently encountered in search engine results pages. Bakke (2020), for example, tasked her students to engage in a search reflection where they recorded themselves for a set duration of time, speaking to the decisions they were making while navigating a search engine through a think-aloud protocol. As a nod toward greater algorithmic literacy (Glottfelter, 2019) initiatives, Bakke (2020) desired that her students not only document their search procedure but understand how to improve the efficacy of their search retrieval practices while additionally avoiding more aberrant, destructive behaviors like falling into echo chambers online (e.g., Pariser, 2011).

2.3 Teaching algorithmic awareness in first-year composition classrooms

Having established the ways in which multiliteracies instruction has taken shape in the first-year composition space, the following section outlines research on algorithmic awareness pertinent to my study design. I will begin by presenting a general overview of how algorithmic awareness is broadly defined. Then, I will focus on how algorithmic awareness has been applied in English first-year composition classrooms specifically. Finally, I will explain what gaps in algorithmic awareness research my study design addressed.

2.3.1 Defining algorithmic awareness

Algorithmic awareness can be broadly defined as the understanding of how to use algorithms as well as how algorithms curate content and mediate user experiences online (Hamilton et al., 2014). For example, an individual showcasing algorithmic awareness may report understanding how algorithms rank and prioritize certain content through automatic filtering and user personalization; another may identify how these algorithms may steer certain purchasing habits and even shape a user's worldview over a period of time. Toward this end, algorithmic awareness is generally captured through an observation protocol inclusive of written reflections, recorded interviews, or thinkaloud protocols.

As a concept, there remains some discussion regarding the boundaries or limitations of what constitutes algorithmic awareness. Zarouali et al. (2021), for example, conceptualized algorithmic awareness across five broad dimensions:

1. Content filtering: that algorithms personalize content to the specific user
2. Automated decision-making: that algorithms can make content filtering decisions without direct supervision
3. Human-algorithm interplay: that user engagement shapes algorithmic decision-making
4. Algorithmic persuasion: that algorithms can be used persuasively to achieve a certain rhetorical outcome
5. Ethical considerations: that algorithmic content filtering has implications for the networked public sphere

Toward this end, the definition that Zarouali et al. (2021) wield is strongly interlinked with Selber's (2004) conceptualization of critical literacy. Others, however, utilize a more expanded definition of algorithmic awareness that encompasses more than a user's criticality of algorithms.

Koenig (2020), for example, scaffolded algorithmic awareness into tiers of basic, rhetorical, and critical awareness akin to what Selber (2004) originally conceptualized in his digital multiliteracies framework. Recruiting students from the courses she taught, Koenig was able to categorize representations of basic (or functional) awareness from more advanced forms of awareness like critical or rhetorical awareness. Though some students, for example, merely showcased a clear understanding of how to use the algorithm as a tool, others demonstrated a deeper, more advanced understanding of how their agency was directly impacted by the use of these algorithms or were able to conceptualize who stands to gain most in their usage.

2.3.2 Algorithmic awareness in the first-year composition classroom

Koenig's (2020) study was deeply illustrative of how the composition classroom can be used as a space to integrate and observe instruction tied to algorithmic awareness. In her study, she utilized written journal entries from 20 participants, in which they search procedures and awareness of how the algorithm arranged content (as well as its broader impacts of which), ranking her students' responses in categories relevant to the basic, rhetorical, and critical notions of algorithmic awareness. For instance, Koenig (2020) separated students based on those with a *basic* understanding of how an algorithm functions to those that showcase a more *critical* understanding of why algorithms function the way that they do—whether to the benefit or detriment of the user. The prompts for these journal entries varied, according to Koenig (2020), though she expressed that each prompt expected students to “perform tasks in which they engaged with algorithms in naturalistic settings and were asked to write about those experiences” (p. 5). Alongside their typed reflections, students were additionally expected to present screenshots of their search practice.

The use of writing as a data collection method to capture algorithmic awareness is persistent across the existing literature. For example, Bakke (2020) had students generate a written reflection as a means of vetting students' algorithmic awareness in the construction of what she called the search reflection. The goal of this standalone assignment, Bakke (2020) explained, was to "evaluate their search process. They identified strengths and weaknesses and made specific recommendations to themselves for how they would approach the search differently the next time." Her emphasis, she explained, was less on "[imposing] rules" to the research process but to instead "support students in making more informed and intentional decisions throughout their search process" (p. 13).

Colby (2024) similarly conceptualized a first-year composition course that helped students ascertain the productive and harmful elements of social media and search engine algorithms in the production of their research essays. One student, for example, reported in their research paper that "the Google algorithm generates ad content based on previous searches," raising questions of Google's neutrality as a search algorithm. The student then reported understanding how "it prioritizes certain search results over others based on a complex formula derived from a history of a user's previous searches and how many websites are hyperlinked to the search result using the PageRank formula."

2.3.3 Existing gaps in algorithmic awareness research

While the existing studies cited above present a diverse portfolio of approaches to capture and analyze algorithmic awareness in the first-year composition classroom, there remain two visible gaps in the literature I directly addressed in this dissertation study.

First, the existing literature on algorithmic awareness is quite limited and generally analyzes only one assignment or a partial set of assignments over the course of the semester. The number of studies that include students' sentiments of both social media and search algorithms (e.g., Colby, 2024) are relatively rare. The work in this space, instead, generally reflects students' perceptions of either social media platforms or search engines, such as the vetting of one source or the reflection of their social media feeds (Bakke, 2020; Koenig, 2020). This finding is relevant given the acknowledgement by algorithmic awareness researchers that algorithmic awareness itself is contextual to both platform and purpose. In the pursuit of her own study, Swart (2021) observed—through the use of interviews—how some users were able to more easily recognize the influence of algorithms in one space versus another. As a result, a user who showcased high algorithmic awareness in one context did not showcase it in another, suggesting that the potential for any “spillover effects” (p.5) of algorithmic awareness in one context was not always observed to transfer in others. She did, however, acknowledge that “the more platforms participants used, the more elaborate they could reflect on what algorithms are and do,” raising pertinent questions about whether the length or depth of the study design, to include both social media and search engines, would broaden students' showcasing of algorithmic awareness (p. 8). These findings point to the need for a more robust, semester-long or even multi-semester study of algorithmic awareness across various social media platforms and search algorithms.

Second, these studies do not illustrate what students did or in what conditions algorithmic awareness emerged. How students navigated these algorithmic spaces is not given as much attention as students' reported perceptions of the algorithm and how that influences their search practice. Koenig (2020), for instance, drew patterns from “how the platforms' results were understood by the user,” but her data did not prioritize the “actions taken within the platform”

that sustained each instance of algorithmic awareness (p. 5). One student she profiled, for example, noted the presence of clickbait and promotional advertising in their search results. “If companies can pay to be at the top of the search results,” the student wrote, “then I believe that music groups can take advantage of the same thing” (p. 9). The student in this instance was aptly reflecting a deeper critical and rhetorical awareness of the algorithm, but *how* they arrived at that moment is unclear.

Bakke (2020) also used written reflections as a means of vetting students’ algorithmic awareness. However, rather than reflect within the moment, she tasked students to record themselves using search algorithms. Students were then expected to watch back the recording and generate a reflection from that recording. According to Bakke (2020), students then “identified strengths and weaknesses and made specific recommendations to themselves for how they would approach the search differently the next time” (p. 13). It was not reported in the manuscript whether she collected these recordings or not, but they were not included in her analysis. While not relevant to the purposes of her research question, this limitation bears a significant relation to the recommendation she makes at the end of her article: “I advocate a practical approach to teaching research that acknowledges and builds on students’ existing practices” (Bakke, 2020, p. 12). For us to be able to effectively build on students’ existing practices, however, it is necessary to place greater emphasis on what students *do* with algorithms and not exclusively how students refer to or talk about them in the abstract.

2.4 Discursive psychology

In the section that follows, I will explain how discursive psychology offers a methodology to systematically analyze how students showcase algorithmic awareness in a multiliteracies

classroom. To do so, I will begin by presenting the onto-epistemological framework that orients discursive psychology as a methodology. Then, I will draw attention to how discursive psychology has been previously utilized as a methodology to study psychological states relevant to users' sentiments toward and usage of technology. Lastly, I will explain how discursive psychology assists in the capture and analysis of algorithmic awareness despite limited uptake between both areas of research.

2.4.1 Discursive psychology as a methodology

Discourse analysis, broadly speaking, is the study of language. As a discipline of discourse analysis, discursive psychology maintains particular attention to how psychological constructs or states are represented and enacted through language (Wiggins, 2016). Discursive psychology, for example, is used to understand how people present and negotiate attitudes (Potter, 1998), emotions (Potter & Edwards, 1999), and identity (Eriksson & Aronsson, 2005) in social situations.

Discursive psychology as a discipline focuses on collecting *in situ* data for analysis. Any data that is collected is meant to be naturally occurring to the context of study's research questions and is to be from the point of view of the participants themselves (Wiggins & Potter, 2008). This is done because discursive psychologists see discourse as both *constructed*—made up of “linguistic building blocks” that present a partial, subjective rendering of reality—as well as *constructive*: that such renderings are bounded by specific contexts (Wiggins & Potter, 2008, p. 77). As both a constructionist and constructivist framework, discursive psychology views discourse as action-oriented, where discourse is situated within and utilized to facilitate social

action. Subsequently, discourse is treated as a series of sequential turn-taking, contextual to a specific rhetorical or social situation.

Traditionally, discursive psychology has given primary attention to discursive devices defined as *interpretive repertoires*. Interpretive repertoires are the *building blocks* that communicators wield in speech or writing that functionally represent psychological states like one's thoughts or feelings (Wiggins, 2016). More recently, discursive psychology has taken a turn to incorporate more multimodal studies of discourse: the study of gestures, body positioning, and interactivity as well. This turn toward multimodal discourse analysis is best exemplified in the study of *embodiment*. Embodied gestures and actions, Wiggins and Cromdal (2021) explain, are conceptualized as gestures or maneuvers wielded by communicators that invoke a psychological state alongside speech or writing. The study of embodiment in discursive psychology has included, for instance, the study of how players moving board game pieces can showcase thinking during active gameplay (Hofstetter, 2021).

Within this larger turn toward embodiment, discursive psychologists have embraced the interrogations of subject-object relationships in socially constituted discourse. "Our work is closely aligned with the emergence of multimodality and embodied research within conversation analysis," according to Wiggins & Cromdal (2021, p. 6), who explain that discursive psychology seeks to capture how embodiment becomes socially mediated through discursive practice: "Since we are not isolated entities but rather socially situated beings," they explain, "embodiment is not simply a matter of individual physiology. The management of subject-object relations is thus at the heart of DP's focus on psychological matters as socially constructed" (p. 14).

Using discursive psychology, this study sought to understand how students described their perceptions and use of algorithmic technologies as a tool to achieve certain research and

rhetorical outcomes. Such an understanding acknowledges that the observed perceptions and usage of algorithmic tools is not representative of all use-contexts or potential social situations. Students' perceptions and their usage of algorithmic tools, for instance, might take an expanded shape or composition in contexts beyond what is observed in this particular course or site of study.

Nevertheless, discursive psychology affords researchers a methodology to identify the discursive devices and interactive strategies that situate the emergence of algorithmic awareness in discourse across these varied observable contexts, informing how users deviate in behavior from one algorithmic space to another. The emphasis was not to develop a systematic, explanatory model that sufficiently described all situations relevant to algorithms. Instead, the intent was to glimpse at the rich tapestry of encounters students have with algorithms and showcase how students demonstrate their varied ways of navigating the web for various research and rhetorical purposes.

2.4.2 Discursive psychology and technology

Technology has sustained the attention of discursive psychologists since its relative emergence as a discipline, though how technology has been analyzed has changed over time. Initially, discursive psychology studies were motivated to address a larger sense of “neglect” in considering how users interacted with technologies in commonplace contexts, examining how users wielded technologies “to accomplish social goals” (Veen et al., 2011, p. 813). Social goals, in these instances, corresponded with *the use of* technology to facilitate social practice between communicators. More recent work in this space has included studies tied to the use of telephone helplines (Hodges, 2007), online learning environments (Raistrick, 2016), or social media

platforms (Coles & West, 2016) to facilitate complex social practices. In sum, discursive psychology work has an established history of treating technology as a contextual frame of analysis of discursive practices between individuals, examining how discourse is mediated by or through technology.

Alongside the study of using technology for discursive purposes, discursive psychology includes the study of sentiments or opinions about technology as well (e.g., Friesen & Lowe, 2012). As Aagaard and Birk (2025) put it, the study of technology in discursive psychology additionally includes the study of “how we talk about these artifacts ... which myths, metaphors ... and how [they are] put together in ways that allow them to perform particular actions” (p. 4). More recent studies with this framing have, for instance, focused on how technological innovations are taken up as sources of optimism in response to climate change (Nielsen, 2023) or how techno-neoliberal narratives around AI enhancing worker productivity introduce potentially deleterious effects on the public sphere (Rousaki, 2026).

To do so, these studies position users’ perspectives toward technology as psychological states as they wield or talk about technologies, which consequently frames what implications the use of technology has on existing social practice. These studies do not treat technologies as neutral tools to be wielded for discursive aims but instead seek to understand how technology is talked about and how technology is involved in the shaping of discursive practices from users’ perspectives. Such a shift, Rousaki explains, distances discursive psychology from “passively documenting how technology is used” to instead directly facilitate considerations of how technologies operate as “active agents” in on-going social actions (Rousaki, 2026, p. 9).

This motivation espoused by Rousaki (2026) is made within the discipline’s larger turn toward embodiment. As established previously, discursive psychology has similarly positioned

itself as a means to analyze more than just talk or text in sequence, inspired in large part by similar shifts observed in conversation analysis and multimodal discourse analysis (e.g., Mondada, 2019). Its original emphasis on interpretive repertoires, analyzing how language is constructed to scaffold and facilitate social action, has been expanded to include an attention toward embodiment: drawing attention to not only how talk and text is constructed but also how interactivity, body movement, and subject-object positioning are a part of the sequence.

The study of embodiment has been extended to the study of technology as well, though this work remains relatively limited in practice. Rather than situating the study of technology exclusively through the lens of interpretive repertoires—how users write or talk about technology—these studies include attention to the usage of technology as well: the active engagement and actions taken when using them to achieve social goals. Studies that analyze these interactions have additionally been previously conducted in the classroom space, such as exploring how gesture and gaze can impact “deep learning” in a robotics science classroom (Gomoll et al., 2017).

2.4.3 Discursive psychology and algorithmic awareness

To recap, discursive psychology positions various forms of discourse, whether represented through talk, text, or action, as constitutive of social practice. The attention of discursive psychologists in particular is how a psychological state—such as one’s perception of how one uses an algorithm or one’s overall sentiment toward an algorithm—is represented and demonstrated in social practice. The study of these psychological states is explicitly multimodal, inclusive of analyzing gestural, spoken, and written forms of discourse within a specific social situation. These psychological states have traditionally focused on human-centered analyses of

discourse, but the recent turn toward embodiment has facilitated a broadened exploration of subject-object relations inclusive of digital technologies. To do so, discursive psychology draws upon *interpretive repertoires* as a unit of analysis, “a collection of words or ways of talking about objects or events in the world which provide a relatively coherent and culturally recognisable characterisation of that object or event” (Wiggins, 2016, p. 244). Discursive psychology, as such, corresponds strongly with the motivation to capture algorithmic awareness, or the reported perception of how to use algorithms or how they impact the range and delivery of online content (Hamilton et al., 2014).

Existing research has already begun to lay the groundwork for how discursive psychology can orient algorithmic awareness research. Hong et al. (2026), for instance, sought to understand how users demonstrated dissatisfaction with how video streaming platforms generated user recommendations. To do so, their analysis included framing typical to discursive psychology, paying attention to how users talked about personalization algorithms as well as how they reported navigating the platform. What subsequently framed their analysis included both what users typed into search boxes when using Netflix or YouTube, for instance, while also paying attention to reported sentiments of users’ trust or satisfaction with the platform.

What Hong et al. (2026) and other existing studies indicate is that there is precedent to incorporate studies of technology with discursive psychology. However, rather than treating algorithms as neutral tools to be taken up and wielded for various discursive practices, discursive psychology affords the opportunity to capture students’ sentiments or beliefs about the role algorithms serve in online search practices, whether connected to social media or search engine use. It affords a means to measure how students describe the ways in which they operationalize

and wield algorithms while also presenting a methodology to consider how various actions within the interface are taken up and wielded in embodied practice.

Chapter 3: Methodology

This chapter reviews the methodology I used to collect and analyze the data pertinent to my research questions:

- How do students showcase algorithmic awareness when conducting and presenting research?
- How do students showcase algorithmic awareness when transforming their research findings into rhetorical engagement?

In pursuit of best promoting study replicability and to best articulate the context behind the data that was drawn, I first begin by profiling the site of the study as well as the design of my course with respect to a multiliteracies curriculum. I then review how students were recruited, what data were collected, and the analytical procedure I used informed by discursive psychology to code and analyze the collected data.

3.1 Site of study

The following section outlines the characteristics of the institution as well as the nature of the course from which my data was collected during the Fall 2023 and Spring 2024 semesters.

3.1.1 Institutional profile

Northern Virginia Community College, colloquially referred to as “NOVA,” was chosen as a site of study for two reasons. First, I had taught at NOVA for six years prior to my start as a PhD student, and I was able to return to the institution as an adjunct faculty member to conduct this study. Alongside the agency and latitude the institution granted me to redesign my course sections to best fit the parameters of my study, the ability to conduct the study as the instructor of

record minimized the risk of lesson misdelivery or other unforeseen influences in the data collection process.

Second, it is a relatively diverse institution that affords clear opportunities to leverage a multiliteracies curriculum to its fullest. Between its six campuses scattered throughout Fairfax, Arlington, Prince William, and Loudoun counties, NOVA serves over 55,000 enrolled students. According to its most recent fact book published by its Office of Strategic Insights (2025), NOVA has a minority-majority student population (30.4% reported as White). Additionally, 74.5% of the population are considered part-time students, with 43.3% of the student population attending at least one night class. The median age of the student population is 19.2, with a mean age of 21.7.

As one of twenty-three institutions within the Virginia Community College System (VCCS), students who complete classes at NOVA are afforded the opportunity to transfer earned credits toward an undergraduate degree at a four-year public university in the state of Virginia, such as the nearby George Mason (GMU) or Virginia Commonwealth (VCU) universities. GMU and NOVA have a particularly unique relationship given the proximity of both institutions—a short 29K Metrobus ride is all that separates GMU from the Annandale campus where this study was conducted—where students who earn thirty credits at NOVA are afforded the opportunity to transfer to GMU without an application fee, are eligible to take courses at GMU while enrolled at NOVA, and are offered increased access to internship opportunities ahead of their transfer to GMU.

The Annandale campus, located just beyond the I-495 Beltway in the suburbs of Fairfax County, takes its name from the census-designated place of Annandale, Virginia. While not all students who attend the Annandale campus of NOVA are residents of the locality, Annandale

itself is home to 43,363 according to the 2020 census (U.S. Census Bureau, 2026). Annandale is a minority-majority locality in the Commonwealth, with the largest populations being Hispanic or Latino (31.8%) or Asian (23.9%); additionally, 42.5% of the residing population of Annandale additionally reported as foreign-born (U.S. Census Bureau, 2026).

3.1.2 Course description

“ENG 111: College Composition I” was the name of the course I taught, which was used as the site for data collection. All ENG 111 sections involved in this study were held in-person, and each met twice a week for two 75-minute sessions.

ENG 111 is the first of a two-semester course sequence that encompasses the first-year composition curriculum at NOVA. Officially, ENG 111 is described as a course that:

...prepares students to write in academic and professional contexts. Students will apply the writing process to generate ideas, organize their thoughts, draft texts in various genres and modes (e.g. digital and print), and revise, proofread, and edit to improve writing. Students will produce texts that reflect critical thinking and knowledge of active reading and rhetorical situations. Students will develop information literacy, learning to use traditional and digital technologies to conduct introductory research. Students will produce multiple texts, totaling at least 4500 words (15 pages typed).

As can be predicted from the course description, ENG 111 is fairly typical to first-year composition courses, signaled through its five overarching course objectives that relate to developing students’ writing, reading, and thinking, inclusive of both information literacy as well as academic literacy skills:

- **Writing Processes:** Writers multiple composing processes to conceptualize, develop, and finalize projects. Composing processes are seldom linear and are also flexible. Successful writers can adapt their composing processes to different genres, contexts, and occasions.
- **Rhetorical Knowledge:** Rhetorical knowledge is the ability to analyze writing, reading, and speaking occasions and then make strategic choices to negotiate the rhetorical situation. Rhetorical knowledge includes the ability to demonstrate command of purpose, audience, and context.
- **Active Reading and Critical Thinking:** Active reading is the process of engaging articles, essays, and other forms of writing to identify main ideas and supporting evidence, to pick out surface-level meaning, and to make logical inferences. Critical thinking refers to the ability to investigate ideas and solve problems through analyzing, interpreting and evaluating information, situations, and texts.
- **Inquiry and Information Literacy in a Digital Age:** Inquiry and information literacy refers to asking questions, developing an understanding of documentation, composing texts grounded in evidence, using a variety of print and digital resources, and producing print and/or digital texts.
- **Knowledge of Discourse Conventions:** Conventions are the formal rules and informal guidelines that define genres; they provide rules for such things as mechanics, usage, spelling, and citation practices. College-level writing often demands adherence to conventions of academic discourse communities. These communities shape readers' and writers' perceptions of correctness or appropriateness.

3.2 Course design

The following section explains how I redesigned my course to afford students increased opportunities to develop and express their algorithmic awareness. I begin first by reviewing the redesign of the daily class discussions before moving into how typed assignments were structured with respect to multiliteracies learning outcomes.

3.2.1 Implementing situated practice in class discussions

Every meeting was framed around spirited discussions between students in both small group and whole class contexts. During these discussions, I played a role closer to a moderator or facilitator than that of a “teacher.” Classroom meetings rarely involved me standing behind a lectern, and I was reluctant to outright lecture. It was a far more customary practice for students to engage in talk-turns between one another with my supervision but without my direct involvement.

Every class session was anchored around an essential question or key concept or idea. One meeting, for example, established the concept of *kairos* for students, while a follow-up meeting considered how *kairos* was reflected in daily practice. To facilitate the strongest discussions around each of these key concepts or ideas, students were tasked to either review assigned readings ahead of a meeting or to conduct informal research and identify instances of that concept or idea existing in the real world. When discussing a concept, students were not directed to analyze or apply them in a proscribed, specific manner; instead, students were expected to draw from their own lived experience for examples of these concepts existing in the real world.

3.2.2 Conceptualizing affective reading practices with the distant reading analysis

When analyzing these texts, students were encouraged to expose their own schema as they worked through disciplinary knowledge concepts tied to the course curriculum. The teaching of *what constitutes* a logical or emotional appeal was still a pedagogical aim, for example, but the goal was not merely developing disciplinary knowledge for its own sake. Certainly, such reading practices helped students understand how persuasive appeals took shape, especially in relevance to what strategies the author employed to *appear* persuasive to one's intended audience. The goal, however, was to facilitate an approach to analysis designed in respect to Kress's (2000) more affective elements of the multiliteracies curriculum, thereby shifting students' analysis toward how they individually encountered the text or that rhetorical device.

By asking students to devote attention to these encounters, they prepared themselves for the expected forms of reading and analysis that were oriented toward the subjective—those that fostered the truly enriching opportunities for algorithmic awareness to reveal itself. Rather than teaching students to read in a directed manner, such as to identify instances of logical or emotional appeals as they appeared, I encouraged them to voice their own perceptions of how each rhetorical device shaped how the text was ultimately experienced. Doing so subsequently encouraged students to consider the more subjective elements of the reading process, such as how one's encounter with a text may be affected by background knowledge or prior lived experience.

Through such lessons and reading strategies, students were not solely taught the building blocks of rhetorical analysis through a teacher-oriented, overly directive method. They *were* tasked to engage in certain close reading routines, such as to identify the thesis or purpose of a text, certainly, and much of what we discussed during the first half of the course was built on the

foundations of established Aristotelian, Rogerian, and Toulmin models of analysis typical to every first-year composition course. But throughout the semester, whether analyzing a text in the grain size of a particular *situation* or as a matter of its *circulation*, students were afforded substantive opportunities to draw upon their life worlds beyond the classroom and identify how past lived experience shaped the way they specifically encountered and made meaning of texts they came across in their daily life. Each student's individual perspective remained commensurate to the disciplinary knowledge they developed in the analysis and evaluation of the texts they encountered.

This attention to affect and lived experience extended to their writing in the course as well. Similar to how one may wake up to the smell of coffee in the morning or unthinkingly respond to the passing ambulance siren with the turning of one's head, students were asked to root their analytical process to how they oriented themselves to a specific text they chose to analyze. To do so, students were encouraged to privilege the first person perspective and were expected to write in a format where they articulated how they processed the text from start to finish.

This style of writing began with the distant reading analysis. Students were tasked to consider not only how they experienced a text of their choice but how that text existed, as how they understood it, within a broader assemblage, context, or infrastructure. They were tasked to articulate how they discovered the text, how the text was received by its intended audience, and how the text was subsequently taken up and circulated via web-based algorithmic interfaces. The goal in such an instance was to afford students the opportunity to conceptualize how the text existed on one level as a cultural artifact produced with a particular purpose in mind for a specific intended audience—functionally framing what is commonly dubbed as a *rhetorical*

situation—with the added consideration of how that text was subsequently consumed, taken up, and circulated beyond its intended audience with the assistance of the algorithm. Doing so enabled them to consider how the text existed on added layers based on specific individual contexts of certain regress—the very *velocity* of its movement, at times, being an object of analysis (Ridolfo & DeVoss, 2009). And by recognizing that texts gain new meaning through *rhetorical circulation*, it helped students better understand the role that algorithms play as mediators in the networked public sphere as both arbiters and disseminators of information. And through the course of these writing assignments, students were afforded numerous instances to showcase their algorithmic awareness as they considered the algorithmic influence of digital circulation and the impact it had on the subsequent uptake of a particular idea.

3.2.3 *Critical framing and the research project*

This was perhaps best exemplified in the redesign of the research paper from a reflection of an “end-product” rendering of their research process to one that articulated the process of research from the proposal to the presentation. The intentions behind the project, with multiliteracies in mind, was to engage students to produce original research on a topic of their choice. This original research was intended to inform a rhetorical intervention of their own design, where they outlined a course of action where they chose a particular digital medium or platform to target a specific intended audience, leveraging everything discussed previously in the semester.

With respect to the conventions of the first-year composition course and the accreditation standards expected from my institution, I continued to teach thesis statements, citation styles, and source-use integration as all my colleagues did and continue to do at NOVA as a part of their research projects. To do so with respect to my multiliteracies goals, I restructured the thesis

statement away from an *argumentative* claim to one that reflected an answer of *inquiry*-based research. To achieve this goal, I tasked students to treat this research project less as a stereotypically “objective” research approach where they cobble together a bunch of sources that agree with their perspective to, instead, develop an understanding of others’ perspectives on the topic and legitimately, rhetorically speaking, consider the means of reaching across difference.

In the construction of the project proposal, their research was informed by a question of their own design that sought to explore a multitude of perspectives on their topic of choice: one of a more ontological, descriptive orientation. Students were particularly discouraged from developing research questions that sought to *explain* or give *justification* for certain perspectives (e.g., “Why do...?” styled questions). Research questions such as “What do English instructors think of ChatGPT as an essay writing tool?” or “How do recovering gambling addicts feel about the propensity of sports betting apps shown in commercial breaks in hockey?” were sufficiently styled questions for this form of inquiry. The focus of this proposal was to establish and substantiate, from the beginning, an inquiry-based research method that involved understanding varied perspectives before, ostensibly, “dipping one’s oar” in the Burkean (1969) sense.

From the proposal, students completed a cadence of assignments that tracked their ability to identify and represent outside sources that informed the answer to their research question. These sources could be drawn from archival research methods inclusive of scouring the web and the library, or they might have been discovered through original reporting drawn from interviews and ethnographic observations they conducted themselves. Whichever sources they ultimately drew upon, the first major assignment of the research unit, the sourcing report, shifted student thinking from the ontological to the epistemological, encouraging them to consider what they

knew about each of the sources they've found in relationship to their research topic and, subsequently, *how* they knew they're worth including in their project.

For some students, they drew upon sources that were highly cited and researched, credible individuals that are easy to fact-check for reliability. For others, they drew upon friends and family members who had more shaky if not outright questionable credibility. Because students were tasked to identify a plurality of different perspectives, especially from those that might have come from social media spaces in some instances highly relevant to their research questions, students were ultimately tasked to conceptualize what "credibility" means in relation to their specific research topic. To make these judgment calls, students were given opportunities in class to explore how credibility was both constructed and contextual with respect to established information literacy pedagogical aims such as the ACRL ("Framework," 2015) while also invoking many of the co-constructive conceptualization objectives within the multiliteracies framework (Cope and Kalantzis, 2015).

The sourcing activity was conducted around the mid-point of the semester, between the research proposal and sourcing report. The sourcing activity was intended to help prepare students for the sourcing report, where they were expected to outline the procedure they used to vet sources. In preparation for this task, students were shown in class how to vet sources using a variety of lateral reading processes. Though I provided a starting place composed of various independent watchdog groups that are useful to vet certain publications, I encouraged students to be creative. I did not indicate that these resources were an exhaustive list of all reliable sources, methods, or avenues for lateral reading. In truth, given the myriad research topics my students chose to explore, it was not possible for me to provide for them every relevant supporting tool for every one of their research projects. Instead, students were expected to develop their own,

emergent methods of vetting sources as the needs of their particular research topics might require. The vetting of a social media influencer, for example, may not necessarily follow the same procedure as how one vets a newspaper publication, and students were frequently encouraged to approach lateral reading not as a proscribed process but one that merely involved working within the sandbox of one's search results to corroborate the claims made by their author. Whatever decision-making students undertook, through both close and distant reading strategies taught in the rhetorical unit, they were expected to vocalize how they found these sources and showcase how and why this particular source was worth including in their later research findings.

But before reporting their overall findings, students constructed the annotated bibliography, which included all the sources they intended to represent in their final research findings. The annotated bibliography was inclusive of four main elements: the citation itself, how the source helped answer their research question, how they found the source, and what made the source worth including in their findings. And in the research findings, students ultimately presented an answer to their research question, in the form of a thesis statement, substantiating their answer with evidence from the sources they encountered either online or offline.

3.2.4 Transformative practice through the rhetorical intervention

With respect to multiliteracies and its aims of transformative practice, however, students were not merely tasked to produce a thesis-based research paper. Students, instead, were expected to shift this academic document into a public facing text using a medium of their choice. Equipped

with the understanding of other perspectives relevant to their topic, students were tasked to conceptualize a rhetorical action in response to the answer to their research question.

For some students, this answer was merely informative, serving to raise awareness on something they believe others need to know about. For others, this answer was more argumentative, looking to convince others of a stance they believed to be the right one. Whichever was the case, students were tasked to produce a digital, multimodal artifact where they addressed their intended audience and provided support for their claims. They were expected to establish their own credibility as researchers, identifying the sources of information they drew upon in making their conclusions, while all the while flexing rhetorical knowledge to craft a persuasive argument.

Alongside this final assignment, students produced a short, pre-recorded research presentation where they explained their reasoning for the intended audience they chose, why they used those particular rhetorical devices, and how they intended to broadcast their message sensitive to algorithmic influences. As a form of rhetorical engagement, the research presentation was intended to reveal a student's algorithmic awareness, such as identifying how they would leverage search engine optimization techniques and social media algorithms to best reach their particular intended audience. And by drawing connections between academic and real-world research, it provided additional opportunities to discuss how research in the first-year composition course and other academic contexts served to promote a particular *genre* of research-based writing that did or did not overlap with the conventional, day-to-day research-based rhetorical engagement they observe on social media. I used our final exam period to break down these talking points with the accompaniment of various dietary-respecting baked goods and a large thermos of coffee.

3.3 Participant recruitment

The following section outlines the process I followed to recruit participants, obtain consent, and determine who to include in the study.

3.3.1 IRB approval process

Given my research positionality as both a PhD student at the University of Maryland and a faculty member of Northern Virginia Community College, IRB approval from both institutions was obtained before any participants were recruited. Given NOVA's significance as the site of study, I consulted their offices first for approval before consulting UMD's IRB office. The study was expediently approved by the NOVA IRB office, and it was subsequently deemed exempt from IRB approval from UMD due to it meeting the established exemption categories.

3.3.2 Obtaining informed consent

The IRB approval process was completed after the start of the Fall 2023 semester. As a result, students were introduced to the study in the early weeks of September. I allotted fifteen minutes of class time to review the nature of the study, what data was to be collected, and how the data would contribute to answering my research questions. I additionally informed students that their participation in the study did not affect their grade or my disposition toward them in the class.

All of this information was provided via a consent form, which included additional information and points of contact for any questions students had about the IRB approval process of the study. Students were given one week to sign and return the consent form, and students

were informed that their participation was not binding. They were notified of the option to remove themselves from the study at any time without penalty.

This process was repeated again during the Spring 2024 semester. Because of the already-approved exemption status of the study, students were invited to participate in the study during the second week of the semester.

3.3.3 Inclusion criteria and total participant population

Given the circumstances of the study required participants to be enrolled in one of my respective student sections, all participants in this study were enrolled and completed the course during the Fall 2023 and Spring 2024 semesters. Out of respect for vulnerable student populations and the study's subsequent exemption status, only students who were at or over the age of 18 were able to participate in the study. In addition, because of the study's exemption status, I was not able to collect additional demographic information from students. In total, thirty-eight students participated in the study between five course sections delivered in the Fall 2023 and Spring 2024 semesters.

3.4 Data collected

In the sections that follow I explain the data I collected from the thirty-eight participants of my study. I begin by first outlining the submitted assignments I collected, and then I review the observed class activity I included.

3.4.1 Submitted assignments

To answer my research questions, I collected and analyzed the distant reading analysis, the sourcing report, the annotated bibliography, the research findings, the rhetorical intervention, and their recorded project presentations each participant submitted. Each of these assignments were chosen because they offered opportunities for students to demonstrate their algorithmic awareness pertinent to my research questions. Though a more thorough explanation of each assignment is included in the appendix, Table 1 below provides a cursory overview of the objectives of each assignment.

Table 1. Overview of collected assignments and their alignment with multiliteracies outcomes

Assignment	Situated Practice	Conceptualization	Critical Framing
Definition Essay	Students reflect and develop a personal definition to a phenomenon relevant to their life world.	Students showcase their understanding of “definitional” and “objective-based” writing processes.	Students challenge “objective” based definitional processes and, in subsequent class discussions, consider why “objectivity” is sometimes privileged in academic writing.
Descriptive Account	Students reflect and describe a moment of past lived experience.	Students showcase an understanding of how subjective writing processes enhance opportunities to represent their lifeworlds in the classroom.	Students consider how first-person, subjective-based writing approaches differ from more formal writing processes historically taught in academic writing.
Close Reading Analysis	Students analyze a text of their choice, ideally relevant to content they typically encounter online.	Students showcase an understanding of how they individually encounter and experience a text of their choice.	Students identify how orienting toward the subjective enables them to see the rich diversity in how people encounter and engage with texts,

			oftentimes mediated by one's lifeworld.
Distant Reading Analysis	Students analyze a rhetorical situation of their choice, ideally relevant to content they typically encounter online.	Students showcase the complexity of any rhetorical situation (and any subsequent circulation).	Students consider how algorithmic and interactive technologies shape circulation and subsequent uptake, especially in relationship to dominant, subordinate, or even subaltern perspectives.
Research Proposal	Students develop a research question (or questions) to a topic of their choosing.	Students showcase what effective inquiry-based research means to them.	Students identify the impact of framing research around a question (or set of questions) as not an argument- but inquiry-based approach.
Sourcing Report	Students identify a source relevant to their research question(s), discovered through their own research processes.	Students showcase their own perception of credible sources—and credibility sourcing processes—relevant to their specific research topic.	Students identify how credibility is contextual and constructed with respect to their research topic. Students additionally identify how algorithms mediate credibility sourcing processes.
Annotated Bibliography	Students represent a broad range of sources across varied modalities that help answer their research question(s).	Students set their own criteria of who “belongs” in their findings while additionally showcasing effective source-use inclusive of concise summaries and proper citation formatting.	Students identify the rhetorical landscape of their research project, considering the dominant, subordinate, and even subaltern voices relevant to the research topic.
Research Findings	Students present their own informed answer to the research question they developed, drawing upon a plurality of	Students showcase how dominant, subordinate, and subaltern perspectives relevant to their topic are	Students share how they experienced navigating algorithmic spaces to inform their research question(s). Students

	multimodal, real-world sources specific to their individual research question(s).	represented.	additionally identify how algorithms may, at times, mediate power dynamics between dominant, subordinate, and subaltern perspectives.
Rhetorical Intervention	Students conceptualize a rhetorical intervention designed for a social media platform of their choice.	Students showcase how to craft context-specific persuasive arguments tied to their research project topic.	Students consider the impact algorithmic and interactive technologies have on the circulation of their rhetorical intervention.

All of the assignments were submitted directly to Canvas and were designed to be retrievable upon completion of the course for any subsequent data collection. All typed assignments were submitted as either PDFs or uploaded Google documents, and the recorded presentations were submitted as an uploaded video using Zoom’s built-in recording software. Zoom was chosen because all students were provided free access to Zoom as enrolled students in the course.

As an English composition course, students’ submitted assignments were typed almost exclusively in English. In certain instances, students included quoted and cited sources that communicated in languages other than English, but students nevertheless translated what these sources said into English alongside the inclusion of any secondary languages.

3.4.2 Recorded class activity

An in-class workshop I dubbed the “sourcing activity” was additionally recorded as an additional data source. As previously explained, the sourcing activity was conducted in preparation for a subsequent paper assignment called the sourcing report. Students were expected to bring to class

a source they had not yet vetted and were expected to use the tablet provided to them to verify whether the source they found was credible.

Students were placed into specific groups with other students who also consented to participate. These groups were then clustered on one specific side of the classroom and were handed tablets that I provided. Each tablet was installed with Zoom, which was used for both screen capture and audio recording. The tablet did not record students' physical appearances or was intended to collect any additional personally identifiable information. By recording these in-class observations, I was able to capture instances of algorithmic awareness in situ across a critical stage of the research project: the assurance that the sources of information they were drawing upon to answer their research question were credible.

The choice to screen and audio record was integral to this goal. Doing so enabled me to analyze their verbal talk and their search procedure with the algorithm in unison. The capturing of their screen movements enabled me to recognize how students navigated each search result in association with their uttered speech, for example, and screen recordings additionally contextualized the types of texts they interacted with directly—ostensibly to best contextualize any utterances of algorithm awareness, such as the impact algorithms had on web-based search practice. And though I was prepared to recruit a translator if it was needed, all students spoke in English during the recorded activity. In total, nine student groups were recorded across both the Fall and Spring semesters.

3.4.3 Data collection protocol

I waited until both the Fall 2023 and Spring 2024 semesters were completed before I began any collection and subsequent analysis. Data collection and analysis began May 2024. I first

downloaded all submitted assignments from Canvas from those who agreed to participate in the dissertation study. All personally identifiable information was first removed, such as student names from MLA four-line headings. Only then were the submissions uploaded to a password-protected, two-factor authenticated cloud-based storage platform accessible only to myself. Any local files stored on my computer at that time were subsequently destroyed, as duplicates could be re-retrieved from the course's Canvas page were any unexpected data losses to occur.

As content was uploaded to cloud storage, I categorized the submitted content by individual students. Each student's work was held to a corresponding folder to ensure I was able to better understand which students showcased what instances of algorithmic awareness as I conducted my analysis. Students were anonymized by number, from S1 to S38, and a key was maintained to ensure I knew which student corresponded with which number alongside their student e-mail address for the purposes of member checking once my data analysis was complete. At no point in time did I collect any information pertaining to the grades of student work, their phone numbers, home addresses, etc.

As is customary to a first-year composition course, the submission of assignments carried a certain topography among the participant population. Because my research question was merely focused on the *showcase* of algorithmic awareness and not the *improvement* or *development* of algorithmic awareness, I did not require students to submit every assignment to be included in the study. So long as students submitted at least one assignment, they were included for analysis. In total, 32 distant reading analyses, 35 sourcing reports, 34 annotated bibliographies, 35 research findings papers, and 35 rhetorical interventions were collected for analysis.

Recorded presentations were collected next. Because students used Zoom to record their own presentations, they were already transcribed by Zoom to decent accuracy. Just like the submitted assignments, I went through the process of removing any personally identifiable information from each of these transcripts, such as a student introducing themselves with their name at the beginning of their presentation. I listened to each presentation, editing the transcript for accuracy as I did, and then uploaded them to the cloud storage platform. Each was included in a student's corresponding folder. Because the video recordings themselves were not pertinent to my research question, and because many of them included personally identifiable information like students' physical appearances, any local files saved to my computer were deleted once the transcript uploading process was completed. All of these recordings remained accessible on the course's Canvas page alongside their submitted assignments should any data loss have occurred during the analysis of my data. In total, 32 recorded presentations were collected for analysis.

The recorded sourcing activities were collected last. Because Zoom was used to screen and audio record students' interactions, the recordings were also time-stamped and transcribed with relative accuracy. The original Zoom recordings were downloaded to edit out any personally identifiable information, such as a few students who logged into their Google Docs account to retrieve relevant information about their source like hyperlinks or instances where students called one another by name. When such instances occurred, I used iMovie to clip the concerning segments and either muted the audio for that segment or removed it entirely. I then re-reviewed the audio transcripts for accuracy, removed any personally identifiable information like students' names, and then uploaded the anonymized transcripts and videos to the cloud storage platform alongside the rest of the data. I did not use the Jefferson transcription system during my audio transcription. While the Jefferson transcription system is oftentimes utilized in

discursive psychology work, the capture of verbal intonation, pauses, overlaps, or emphasis were not relevant to the answering of my research question. I was focused instead on the lexical elements surrounding each of their actions.

Though nine student groups were recorded using the tablets I provided, only six were actually collected and analyzed. Two recordings were excluded for analysis because they were ineffective at showcasing their use of the algorithm due to students accidentally stopping the recording early in the activity by prematurely putting the iPad to sleep. Another video showcased a group's engagement for the duration of the activity, but they mistakenly disabled the iPad's microphone when they began using the tablet. Because the purpose of my study was to analyze action and talk in correspondence with one another, this video was also excluded from analysis.

3.5 Data analysis

In the section that follows, I explain how I analyzed the data I collected. I begin by first reviewing the coding scheme I developed to answer my initial research question while reviewing submitted assignments before turning my attention to the recorded activity. I then review how I answered my second research question, drawing attention to the coding scheme I developed to examine how students transformed their research papers into rhetorical interventions. Lastly, I explain how I conducted reliability and member checking during the analytical process.

3.5.1 Preliminary coding scheme

Because my initial research question tied to the conduct and presentation of their research, my analysis began with attention to the assignments that reflect their research process. This analysis included the distant reading analysis, the sourcing report, the annotated bibliography, the

research findings, and the presentations. I moved from one student folder to the next in sequential order to do so.

As stated previously, discursive psychology is a methodology to explore how users wield technologies to facilitate discursive practices. Interpretive repertoires are, by extension, the ways in which users characterize or describe their encounters with ideas or objects (Wiggins, 2016). These characterizations or descriptions include both *what users do* with these objects as well as *how users feel* about them. To develop my initial coding scheme to inform this sequential interpretive work, I utilized Selber's multiliteracies framework, drawing particularly from the *functional* and *critical* ends of his framework.

I considered all instances of students reporting *what they did* with algorithms as indicators of *functional awareness*. Functional awareness included instances of students consulting search engines, specifying the key words or phrases they used—essentially anything that demonstrated how they used the algorithm. The intention behind each interaction with the algorithm certainly differed from assignment to assignment, and these distinctions in search telos would later frame the corresponding *social action* tied to their use of the algorithm.

Critical awareness, comparatively, was reserved for any and all instances of students reporting how algorithms impacted their search results, their social media news feeds, or the general delivery of content they encountered online. While functional awareness revolved around the reported usage of algorithms, such as the reporting of their search parameters or their activity within their search results, I categorized instances of students talking about their search results or about the algorithm specifically as instances of critical awareness. Any instances where students revealed their sentiments, opinions, or beliefs about algorithms were treated similarly to functional awareness as a constructed rendering of students' ways of thinking toward and about

algorithms—each of which revealed a certain discursive framing about algorithms with both positive and negative sentiments.

Each instance was cataloged as it was discovered. The content of the instance itself, which was generally chunked into a paragraph or set of sentences, was first copied and pasted into a spreadsheet. The instance was then numbered and subsequently categorized by assignment and student. This preliminary approach to categorizing each instance allowed me to sort the spreadsheet by both assignment and student as was necessary to develop deeper coding schemes later on. When copying and pasting the content of the instance, I marked whether the instance corresponded with functional or critical awareness. I then jotted down additional thoughts I had toward the instance that might have proved useful for added analysis as I developed my coding scheme. Table 2 below represents an illustration of the initial coding scheme I used.

Table 2. Logbook format for preliminary coding scheme, Selber-inspired method

#	Assignment	S	Instance	Selber	Notes
1	Sourcing Report	1	My research started by browsing the front page of my browsers, though that led to nowhere.	Functional	Recommended content

3.5.2 Functional awareness in the presentation of research

Having mapped all instances of students' use of algorithms in the conduct and presentation of their research projects, I began to apply a grounded theory methodology to parse trends in the data. To do so, I began to organize instances of functional awareness on the basis of the purpose or telos of their search procedure. Vetting an author in the sourcing report, for instance, utilizes the algorithm for a different motivation from simply scrolling through the search results to discover or select a source. I subsequently sorted the sheet by assignment and began looking for

trends, starting with the distant reading analysis. I felt this was a good starting point as they were essentially the “oldest” instances in my data set with respect to the semester cadence.

When reviewing the distant reading analysis, students reported how they scrolled and clicked within the social media interface. I began sub-categorizing these instances as markers of *functional awareness* alongside what students typed into search algorithms, ostensibly in pursuit of “talking with” the algorithm as a social action. As I began to pay increased attention to these reported actions, I noticed that some students were more evocative of their process than others.

One of these more active reporters described her distant reading procedure as if she was “digging deeper” into her social media feed. I latched onto this illustration, and it became a strong influence on my coding scheme to follow. I imagined these more active processes of distant reading to be similar to that of a spelunker or a deep sea diver, resulting in my eventual coding of these instances as *distant diving*. I undertook this refined coding scheme, focusing only on what was reported. I did not interpret a students’ approach to distant reading as distant diving unless they deliberately indicated conducting such a process in their distant reading analysis.

As I became more intentional in my analysis, I became additionally observant of how some students simply *drifted* within the algorithm’s recommended content. My focus was on instances where students reported scrolling through a social media app’s personalized news feed or its home page with suggested content based on a user’s previous browsing history. Informed in part by the aquatic imagery I was already working with, I coded these students as a second, distinct category as *tidal drifters*.

I then moved ahead to the research project. As I paid attention to how students clicked and scrolled through their search results to both find their sources, I found myself again drawing comparisons to the tide. The littoral and the limnetic zone, essentially the tidal zone versus open

water, became another curious metaphor that corresponded well to what I observed in how students navigated their search results. Some students preferred to merely dip their toes in their search results, so to speak, by clicking on sources among the top of their search results without any reported scrolling. I coded these instances as *littoral engagement*, offset from instances of *limnetic engagement* where students reported scrolling past the top of their search results, ostensibly going head-underwater before making their selection.

I additionally paid attention to what students clicked on and what motivated these selections. Some students were particularly forthcoming in reporting what type of source they were looking for when navigating their search results, showcasing an *inclusion criteria*. Others were more interested in navigating through various webpages and clicking through hyperlinked elements, such as recommended or related articles on a website, which I coded as *clickthroughs*.

I paid attention to how students vetted their sources too. I observed that some students would sufficiently *laterally read* about their sources via usage of the algorithm, essentially finding information about the source from a secondary, unaffiliated source of information. Others would stick instead to *close reading* the source—drawing out a credibility claim about the source from their own byline or about page without any corresponding use of the algorithm. Even more curiously, I observed quite a few instances where students used an algorithm with the intent to laterally read, only to end up conducting *primary cross referencing*. Unlike lateral reading, which involved gaining information from a secondary or independent source of information, primary cross referencing involved extracting information from a site that was affiliated with or directly connected to the sponsoring organization or author they were vetting.

In addition to paying attention to what students clicked on, I considered what kinds of search parameters they used as a reflection of their “functional talk” with the algorithm. Some

students preferred to merely input particular key words, which I coded as *keyword search talk*, whereas others were more inclined to copy and paste their entire research question into the search box, which I coded as *question-based search talk*. Additionally, I marked instances where students conducted *search refinement*, such as when they inputted an initial entry of search talk and then amended after their initial result.

With my functional awareness coding scheme developed, I went through the sheet and categorized each instance accordingly. I additionally returned to every submitted assignment to double-check that I had not missed anything upon my initial pass. Based on all accumulated instances, students were then labeled and marked according to the master table which forms of functional awareness they showcased in their writing. Table 3 below illustrates the finalized coding scheme I used to categorize all instances of functional awareness I included for analysis in this process.

Table 3. Categories of functional awareness

Sub-code	Definition	Example
Tidal drift	Engaging with recommended content on a social media platform via clicking or scrolling	<i>This source was found on my YouTube home page as a recommended video by the algorithm.</i>
Deep diving	Moving beyond “splash page” or “FYP” recommended content on a social media platforms (e.g., conducting search queries, navigating across social media platforms)	<i>I decided to make my way down the rabbit hole for a more comprehensive understanding by exploring the topic further on YouTube.</i>
Keyword search talk	Inputting search terms with specific words or phrases to find a source on a search engine	<i>I searched up “wrestling tribalism” and “wrestling tribalism article.”</i>

Question-based search talk	Inputting full-sentence questions to find a source on a search engine (e.g., typing out their research question)	<i>I decided to go on google and searched up "Is the US economy failing?"</i>
Search refinement	Amending one's search parameters after first observing an initial set of search results	<i>I recognized the complexity of the topic and the cultural ties between Japan and its neighboring countries, so I decided to broaden my search. I expanded the search by using Korean and Japanese keywords to uncover additional perspectives.</i>
Littoral engagement	Demonstrated clicking among the top entries of a search engine's results page without any indication of scrolling beyond it	<i>I found this article through Google; it appeared as one of the first links among my research results.</i>
Limnetic engagement	Demonstrated scrolling past the top entries of a search engine's results page	<i>I scrolled past the top results to a Forbes article.</i>
Clickthroughs	Demonstrated discovering one source not from a search results page but by clicking through webpage elements	<i>I found this through another article in the "more like this" tab.</i>
Inclusion criteria	Demonstrated a click procedure driven by a criterion or a set of criteria (e.g., seeking a familiar or trusted source) when selecting a source in a search engine's results page	<i>I picked this one because NIH is a very known and trusted website if you look anything up about your health.</i>
Close reading	Relying on self-reported statements of credibility about the sponsoring organization or the author without added use of the algorithm to confirm	<i>The author has a doctorate in cognitive psychology, and I believe her to be a credible source in my research.</i>
Lateral reading	Using the algorithm to find secondary reporting that confirms the source's credibility statements tied to the sponsoring organization or author	<i>Psychology Today is credible because its contents are written by experts on the topic according to Wikipedia.</i>
Primary	Using the algorithm to find	<i>I happened to come across his</i>

crossreferencing	secondary reporting only to click on a link affiliated with the sponsoring organization or author (e.g., the author's social media presence)	<i>LinkedIn profile, which stated he had acquired a bachelor's in history from Georgetown University.</i>
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With my dataset organized into discrete sub-codes of functional awareness, I then sought to synthesize my findings. In the pursuit of answering RQ1—in understanding the types of algorithmic awareness that revealed themselves in the submitted assignments—I was especially interested in understanding how the showcasing of one type of functional awareness might reveal or correspond with other types of functional awareness. And though my approach to analysis was not motivated to identify cause-and-effect relationships between certain types of algorithmic awareness, I shifted from the definition and identification of discrete types of functional awareness to tabulating codes and identifying relationships between various types of functional awareness.

This process unfolded in multiple stages. I first started with functional search talk, seeking to understand whether different types of reported search talk would correspond with increased reporting of search refinement. I then analyzed the various click and scroll actions students reported when finding new sources for their research project. During this process, I observed that students who indicated certain ways of clicking or scrolling were more or less inclined to demonstrate other actions within the interface. With this preliminary work completed, I pivoted to coding instances of critical awareness coding and to consider deeper, threaded relationships between not only various forms of functional awareness but how certain forms of functional awareness might correspond with instances of critical awareness.

3.5.3 Critical awareness in the presentation of research

As previously defined, instances of critical awareness met one of two conditions: either students reported what they thought *about* the algorithm specifically as they used it during the research project, or they reported what they thought about social media or search engines at large. Critical awareness in such instances included moments where students commented on the arrangement of search engine result pages based on Google-generated content (*search bias*), the efficacy of algorithms in their ability to broaden the means of participation in the public sphere (*circulation*), or the identification of certain dominant or subordinate perspectives reinforced via the arrangement of content on a social media news feed (*content arrangement*).

While critical awareness is typically reserved for sentiments tied to one's agency or emancipation, critical awareness for the purposes of this project focused on both the negative as well as the positive impacts of algorithms. One particularly curious manifestation of algorithmic awareness that revealed itself was that of students remarking the *accessibility* of one algorithm for another. Rather than focus their attention on how search engines or social media platforms impacted the arrangement or composition of content online, they instead focused on how convenient, easy to use, or expedient certain algorithms were to wield, such as when a student would prefer to turn to Google over a library database given that Google was simply easier to use. While these students were not exhibiting the traditional sentiments of critical awareness in these instances, the students were still nevertheless reporting their perceptions of the algorithm as they used it or of algorithms at large in their submitted work.

With my critical coding scheme developed, I went through the sheet and categorized each instance accordingly. I then went back and revisited every submitted assignment to ensure that I had not missed any additional instances with my refined coding scheme. Students were then

labeled and marked according to the master table which forms of critical awareness they showcased in their writing similarly to what I had done with the functional coding process.

Similar to my approach to functional awareness instances, I again attempted to synthesize my findings. I began to consider how certain types of critical awareness might correspond with certain demonstrations of functional awareness. These relationships were not analyzed causationally, though I was particularly curious to see which reported actions (or the lack thereof) might have related to how students demonstrated critical awareness.

Table 4. Categories of critical awareness

Sub-code	Definition	Example
Accessibility	Comments on a social media or search algorithm's sense of convenience, ease of use, or expediency	<i>Google is one of the main search engines where you can find information rather quickly, so that is exactly what I did.</i>
Search bias	Promotes the belief that search algorithms reinforce or privilege certain perspectives	<i>Google is extremely biased on what you want to see and how it wants you to see things.</i>
Content arrangement	Articulates that algorithms shape engagement on social media platforms	<i>The dynamics of upvotes and downvotes created a hierarchy of opinions.</i>
Circulation	Claims that algorithms broaden the scope and reach of online participation (versus analog, print, or TV media)	<i>Social media platforms ... have played a pivotal role in amplifying discussions using hashtags.</i>

3.5.4 Embodiment in the conduct of research

At this point in my analysis, I developed a strong understanding of how students revealed both functional and critical awareness across various submitted assignments. I developed a coding scheme that distinguished instances of algorithmic awareness through a mapping of various

repertoires. These repertoires characterized the ways or nature in which students accounted for their procedures when using algorithms across various submitted assignments. These repertoires additionally presented a short-hand understanding of students' sentiments toward using algorithms across a number of contexts. Yet while these repertoires reflected students' use of the algorithm to some extent, I hadn't yet fully answered my first research question.

The method I had applied up to this point answered how students showcased algorithmic awareness when *presenting* their research in writing; however, I had not yet established how students showcase algorithmic awareness when *conducting* research in practice. To put it another way: the submitted assignments thoroughly illustrated the *presentation* of research, but its retrospective quality—a product of writing submitted *after* the completion of the task—revealed a particularly incomplete illustration tied to the literal *conduct* of their research. By analyzing the recorded in-class activity, however, I was able to garner a closer attention to students' conduct of research: the actions they took in sequence as they arose from within the activity.

To facilitate this analysis, I shifted focus. My analysis moved from the classification of various talk, text, and action—what I deemed as the building blocks of algorithmic awareness I intentionally captured from my data set—to the study of their direct engagement using an algorithm in practice. My focus shifted from understanding how students showcased or presented algorithmic awareness to instead considering how the various procedures of search talk as well as how they clicked and scrolled through the interface became “invoked in interaction to achieve specific goals” (Wiggins, 2016, p. 228). As embodied practices, limnetic or littoral engagement were not analyzed solely as actions or discursive resources that represented students' reported *doing with* or *interacting with* the algorithm. Instead, students' actions within the interface were examined as potential co-constructed products of discourse with the algorithm: constructed in

part by both the stated intent or motivation to achieve a certain search telos or purpose as well as what the algorithmic interface presented to them.

In examining students' *conduct* of research, I wanted to understand how the interface potentially influenced the actions students took, such as whether they conducted limnetic or littoral engagement less so as an *intended practice* and more so *in response* to what the search results presented them. Rather than treating these observed actions as prepared, preordained practices students custodially perform, I analyzed the emergence of certain click or scroll actions in relation to what the algorithm presented them, tracking these as movements or maneuvers across an extended search task. By treating these actions as embodied practices within a larger sequence, I was able to better understand and account for how each of these were enacted in situ based on a combination of reported intentions alongside the composition of the interface.

To clarify, this shift in focus did not adjust my unit of analysis. I paid attention to the same discursive practices I observed in student writing. But while my initial attention on the presentation of research represented students' ways of talking or reflecting on their use and sentiments toward technologies in the abstract, my analysis was limited to examine each discursive practice in isolation and in service to a specific social goal. When classifying littoral and limnetic engagement, for instance, I framed my analysis solely in relation to the finding and selecting of sources and the emergence of corresponding critical awareness in sequence. Shifting toward embodiment, instead, afforded a way to represent how the various maneuvers students reported when using the algorithm emerged in conjunction with other observed actions and, perhaps, with respect to certain interface design features.

One of the core matters of discursive psychology—and often the reason for its application as a methodology to study discourse—is the conceptualization of discursive practices

as *rhetorical* maneuvers. The various repertoires or discursive practices that emerge through written, retrospective accounts include the potential for rationalizations, subject positioning, or even obfuscation affecting how they *presented* their research process. Students may be reluctant to admit clicking on the first thing they see when they are told not to in a classroom, just as students may prefer to report lateral reading over close reading when one process is encouraged over another—rhetorical maneuvers in the hope of saving face, essentially. And while the consideration of what motivated students’ reporting or ways of showcasing algorithmic awareness was not a focus of this study, the inclusion of these recorded interface actions nevertheless gets us closer in understanding the ways in which students click or scroll in practice. What students reported doing in their papers may, in some instances, differ from what students do in practice.

In drawing these comparisons, I was not interested in verifying the accuracy of how students presented research to how they conducted research in practice. Any differences between what students reported doing versus what they did under observation only reinforced the importance of seeing algorithmic awareness as a malleable, evolving psychological state that emerges contextually. The reported actions that informed the presentation of their research in submitted work were packaged into a discursive product quite distinct from the literal observation of their use-practices with the algorithm in a classroom. Neither were treated as a more *true* or *real* presentation of a students’ algorithmic awareness; instead, how students present and conduct research each function as a vertical slice or partial representation of what emerges in both reflective *and* situated practice with the algorithm. And by capturing the conduct of students’ research, I was simply afforded a glimpse of what percolated to the top of their mind within that specific encounter.

To support this work, my analysis turned multimodal. I focused on both search talk as well as any corresponding click or scroll actions when reviewing these recorded activities. Following proscribed discursive psychology methods, I analyzed all of these as sequential actions within the algorithmic interface in service of achieving a goal. Talk that was captured was inclusive of self-talk, talk-turns between students, and even teacher-talk from myself as I roamed the room during the activity. Actions using the algorithm that were tracked included the words typed into search boxes as well as how students navigated their search engine results. As I conducted this analysis, I did not seek to explain or interpret any actions using the algorithm or any talk among students as anything more than what was directly stated or shown. My approach remained exclusively descriptive of what was revealed during the activity, seeking to understand *what* actions were taken using the algorithm and *when* they occurred.

Because of the complexity of interwoven talk and text across multiple lines of a transcript, instances were not individually numbered. Instead, the transcript was chunked into instances based on stated search goals. A search goal, motivation, or telos, for instance, might involve looking up information about a source's credentials—such as whether they really worked where they claimed to. Each instance that was partitioned from the broader transcript was color coded separately within the transcript for readability. I still made an effort to number individual talk turns or interface actions that were observed within each instance of the transcript, but this numbering scheme was designed solely to track the progression or chronological order of the steps student-groups took with the tablet; I was not counting *how many* of what happened. Table 5 below illustrates an example of how I engaged in a preliminary analysis of all self-talk, talk-turns between students, search talk with the algorithm, and any corresponding actions

students tied to completing the sourcing activity.

Table 5. Embodied practice logbook using discursive psychology methods

	Content	Coding	Notes
1	S1: So I'll just try to find my source...	Self Talk	Search telos
2	He enters into the Google search box: "women in gaming harassment frontiers."	Search Talk	Keyword, title, publication
3	He scans the top of the page, which presents a Google-generated summary of an article from Frontier.com titled "Women Rank the Best Gaming Communities."	Littoral Engagement	
4	He continues scrolling down the search results beyond the "People also ask" section. Other Frontiersin.org articles are present in the search, and he scrolls back to the top of the page.	Limnetic Engagement	
5	S1: Someone else do it. I don't know where mine is.	Self Talk	Failed search
6	S2: I'm gonna, I'm gonna find the one I used for the proposal. That's what I'm...	Talk Turn	Preceding this, he had difficulty remembering which source he chose to analyze, which is why this is Talk Turn coded; I had recommended he use a source he cited in his research proposal.
7	He begins to type into the Google search box a full URL : https://www.psychologytoday.com/us/... and then pauses.	Search Talk	Direct entry of website URL
8	S2: This sucks.	Self Talk	Could also be a Talk Turn, as in talking to me. I am remaining with the group during his search task. Revisit.
9	Student continues typing and enters ".../blog..."	Search Talk	Direct entry
10	S2: Immediate problem found. It says blog. I'm a failure. I failed.	Talk Turn	
11	AG: What's the source you're looking at?	Teacher Talk	
12	S2: Apparently a blog. Oh, I failed. Oh no.	Talk Turn	
13	AG: Apparently a blog?	Teacher Talk	
14	Student continues typing the rest of the URL: /anger-in-... and the emoji list opens up on the keyboard.	Search Talk	Direct entry
15	S2: What? I did not click emojis. What? I did not mean to type that.	Self Talk	

16	S1: Did you type the full link? [laughing]	Talk Turn	
17	S2: I- I'm not used to typing on a tablet. I swear I'm good at typing.	Talk Turn	
18	S1: No, it's all good.	Talk Turn	
19	AG: You could just Google it probably.	Teacher Talk	Shifted search telos

3.5.5 Emergent cases as embodied practices

As established previously, the presentation of research up to this stage reflected how students described their use (functional awareness) of and sentiments (critical awareness) toward social media and search engine algorithms. As I conducted my analysis, I limited my approach to examining each discursive practice in relation to a corresponding goal. When classifying littoral from limnetic engagement, for instance, or when capturing students' use of clickthroughs, I coded these in relation to a particular search telos: the discovery and selection of sources, for example.

As I began reviewing these recordings and analyzing these maneuvers as embodied practices, I gravitated toward instances where students' actions diverged from what was reported across the submitted work. These instances, which I classified as *emergent cases*, represented emergent practices like using clickthroughs and littoral engagement as vetting processes. These were the same discursive practices I observed in student writing, though they were enacted differently to achieve a different goal with the algorithm than what I observed previously.

As I analyzed these, I additionally observed how they function as an embodied practice within a greater sequence. The use of clickthroughs, for instance, became positioned in relation to lateral reading; the use of an inclusion criteria, additionally, was taken up and then subsequently abandoned because of a failed lateral search. I became greatly interested in

understanding the greater context that influenced these maneuvers, treating each of these as an embodied practice.

Ultimately, I refined my analysis to focus on three of the six student groups, each exemplifying an emergent case of an embodied practice. To present each case, I sequenced segments of talk with screen captures in the form of vignettes to illustrate when and how these maneuvers were taken up in practice.

3.5.6 Rhetorical awareness when transforming findings for rhetorical engagement

I then pivoted to answering my second research question, to understand how students showcased algorithmic awareness when transforming their research findings into rhetorical engagement. To do so, I examined how *rhetorical awareness* emerged in their submitted work. In defining rhetorical awareness from that of critical and functional awareness, I focused on one particular detail: the intended audience.

Previously, I defined functional awareness as the effective tool-use of an algorithm. Conducting a search query on a library database or consulting a search engine for an opposing perspective on a research topic, for example, were coded as instances of functional awareness using this approach. With that definition in mind, I considered all reported actions tied to using the algorithm (e.g., search refinement) as if they were *communicating to* the algorithm directly. In a manner of speaking, as a discursive process, the algorithm was the audience in these instances.

For rhetorical awareness, I observed how users wielded the algorithm as a means to reach other users on various social media platforms during their rhetorical interventions. Rather than focusing on how users *communicated to* the algorithm as I did with functional awareness, I paid

attention to how users *communicated with* or *communicated through* the algorithm to reach other users. So while the algorithm was the intended audience for all instances of functional awareness, other users became the intended audience for all instances of rhetorical awareness.

As stated previously, the rhetorical intervention was the assignment where students constructed a webtext meant to facilitate a call to action tied to their research project. Students were not instructed to publish the intervention on social media or any corresponding digital public space, but the rhetorical intervention they designed was expected to reflect the kind of content they typically encountered online and what they thought would be effective with respect to their particular intended audience. During the project presentation, students were additionally invited to explain their reasoning behind the construction of their rhetorical intervention, such as how they might best ensure that it reaches their intended audience. While students were merely tasked to generate mock-up posts with respect to students' privacy, many students chose to nevertheless publish their interventions in public. Out of respect for their privacy and the IRB protocol that guided my data collection and analysis, only mock-up social media posts were imaged directly as figures in the analysis.

Toward this end, my preliminary coding scheme to answer RQ2 began similarly to RQ1: I drew upon Selber's multiliteracies framework for inspiration, particularly drawing attention to *interface design features* as a point of analysis. With attention to *interface*, I focused on both the platforms students chose for their intended intervention as well as the modes of communication students relied on in the construction of their rhetorical intervention. To do so, I took note of any instances where students remarked on the design features of their rhetorical intervention in their project presentations alongside the submitted rhetorical interventions themselves.

As I combed through the presentation transcripts and their corresponding interventions, I took note of the *platform* they chose to use as well as the use of images, words, and even sound or video in the construction of their rhetorical intervention, coding all of these as various modal design features. While many students settled with composing interventions that consisted of *searchable text*, such as the construction of a tweet or Instagram post, I coded other interventions as *multimodal* when a student referred to using more than one mode of communication, such as the use of both an image with written words in the form of a meme. When students reported or showcased the use of interactable features like hashtags or hyperlinks, I additionally coded their interventions as inclusive of *hypertext* features. Table 6 below showcases the preliminary coding scheme I used to analyze their project presentations and rhetorical interventions.

Table 6. Preliminary coding scheme for design features

Sub-code	Definition	Example
Platform	Platform of choice for rhetorical intervention	<i>I specifically chose Reddit because people tend to flock towards it.</i>
Searchable text	Use of written communication minable by a search algorithm.	<i>For my rhetorical intervention, I wrote a tweet.</i>
Multimodal text	Use of more than one mode of communication (i.e., verbal, non-verbal, visual, written, or audial)	<i>There are captions to help those who are hard of hearing, and also, I wanted to talk in a video with kind of, like, empathetic tone of voice.</i>
Hypertext	Included direct engagement to content creators (as in, @ing someone directly) or hashtags as hypertext elements	<i>I have decided to make a Twitter post with a hashtag and a brief explanation of the problem.</i>

What I first noticed was that only some students exhibited a clear understanding of how certain design features impacted their text's means of circulation. Some students, for example,

noted that the use of hypertext elements like a hashtag connected their intervention to a broader conversation. Other students, however, showcased the use of a hashtag in their intervention without making similar statements as to how it assisted in its circulation. While I did not want to discount that just because latter students didn't self-report it that they weren't similarly aware of the relationship as the former students, I chose to distinguish these students from those who exhibited *reflective practice*. I coded instances of reflective practice when students stated their understanding of (or their attention to) how communication unfolded differently on the web with attention to the design features of algorithmic interfaces as Selber originally envisioned as a learning outcome of his digital multiliteracies framework. Given the emphasis of my study design focusing on algorithmic awareness at large, my analysis of reflective practice was limited to students referring to and talking about searchable text and hypertext features.

To track these deeper forms of rhetorical awareness, I drew my attention to *what* students claimed they were aware of and *what they did* with that awareness. To do so, I focused on what people said during their research presentations in association with the actions they took in the construction of their rhetorical interventions. I categorized anything as *reflective* whenever students satisfied one of two conditions: either they commented on how social media influencers they watch engage in certain behaviors based on the existence of the algorithm, which thus informed the decision-making of their own intervention; or they simply articulated how the design features of their rhetorical intervention influenced their ability to reach other users. What was given primacy in this approach to analysis were the actions that framed what was ultimately achieved with *intended use of* the algorithm as a rhetorical process rather than the parsing of observed characteristics that might inform unspoken cognitive processes, which enabled me to

focus my attention more on what students believed was achieved upon employment of the algorithm.

I observed that through these instances of reflective practice, students referred to the algorithmic design features of their intervention impacting their process in two ways. The first, which I coded as *wave-catching*, was when students saw algorithmic elements like hashtags as a means to broaden the circulation of their text. The second, which I coded as *dipping the oar* (i.e., Burke, 1973), was when students used hypertext design features as a way to facilitate social action: to move readers of their intervention to act or operate differently with assistance from the hypertext elements. Table 7 below indicates the coding scheme I used for coding instances of reflective rhetorical awareness.

Table 7. Coding scheme for reflective rhetorical awareness

Sub-code	Definition	Example
<i>Catching the wave</i>	Using hypertext design features to amplify exposure of their intervention	<i>Hashtags were included to increase visibility and interaction.</i>
<i>Dipping the oar</i>	Using hypertext design features to shape user engagement following the exposure of their intervention	<i>I want to lead people in the right direction [using hashtags].</i>

3.5.7 Composition of algorithmic awareness across student population

After coding all preceding instances of algorithmic awareness, I then mapped all students' reported instances of algorithmic awareness into a larger table to present how instances connected to the coding scheme were distributed across the student population. Figure 1 below reflects this distribution.

Figure 1. Distribution of recorded instances across student population

Participant	Functional Awareness										Critical Awareness				Rhetorical Awareness					
	Keyword search talk	Question-based search talk	Search refinement	Litlral engagement	Clickthroughs	Limeric engagement	Inclusion criteria	Tidal drift	Distant diving	Close reading	Lateral reading	Primary cross-referencing	Accessibilty	Search bias	Content arrangement	Circulatory power	Searchable text	Multimodal	Hypertext	Reflective Practice
1					✓	✓				✓				✓			✓	✓		
2		✓		✓						✓							✓			
3								✓	✓						✓					
4							✓									✓	✓	✓		
5	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓
6		✓		✓						✓	✓		✓		✓	✓	✓	✓		
7	✓	✓	✓	✓	✓					✓	✓						✓	✓		
8	✓	✓	✓	✓	✓							✓	✓				✓	✓	✓	✓
9				✓			✓		✓	✓		✓	✓		✓		✓	✓	✓	
10	✓		✓									✓						✓		
11		✓	✓			✓				✓				✓				✓		
12						✓	✓			✓				✓		✓	✓		✓	✓
13		✓		✓						✓	✓		✓		✓		✓		✓	
14		✓					✓	✓	✓	✓					✓		✓	✓	✓	✓
15							✓	✓		✓								✓		
16	✓	✓	✓	✓	✓		✓	✓	✓		✓			✓		✓	✓	✓		
17								✓		✓						✓	✓	✓	✓	✓
18		✓									✓									
19				✓			✓											✓		
20	✓		✓		✓		✓			✓	✓				✓		✓			
21	✓		✓		✓		✓			✓						✓		✓		
22		✓		✓			✓			✓	✓									
23	✓			✓					✓	✓								✓		
24		✓	✓			✓			✓	✓						✓	✓	✓		
25	✓		✓				✓			✓						✓	✓			
26		✓				✓	✓	✓			✓				✓	✓	✓			
27	✓		✓			✓	✓			✓					✓		✓		✓	
28		✓				✓				✓	✓				✓		✓	✓	✓	
29	✓		✓	✓	✓		✓				✓	✓	✓				✓	✓	✓	✓
30	✓	✓	✓			✓	✓		✓		✓			✓	✓		✓	✓	✓	✓
31	✓		✓			✓	✓			✓		✓			✓		✓	✓		
32		✓					✓				✓	✓					✓	✓	✓	
33	✓		✓					✓		✓	✓				✓		✓	✓	✓	
34		✓	✓		✓						✓			✓				✓		
35	✓		✓			✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
36	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				✓			✓		
37	✓		✓	✓	✓	✓			✓	✓	✓	✓					✓		✓	✓
38	✓		✓					✓		✓				✓	✓	✓	✓	✓		

3.5.8 Reliability and member checking

Portions of the anonymized data set were shared with fellow graduate students in my University of Maryland program to ensure that I was not over-analyzing or overstating the significance of my findings relevant to my research questions. On occasion, these readers were also provided snippets of the manuscript itself as I wrote it, which were then discussed at a predetermined date and time in a seminar formatted discussion.

In addition to these reliability checks as I completed the manuscript, I provided my participants the opportunity to review how their collected data was analyzed and presented in the manuscript. To achieve the highest participation rate, all participants were individually contacted via e-mail. Students who agreed to participate in this member checking met with me individually over Zoom. I shared with them segments of the manuscript relevant to their contributions to ensure their views were being represented fairly and ethically. All participants received three e-mail notifications across a twelve-month period to participate in this member checking protocol. Students in this member checking protocol were additionally advised of the option to have their work not being profiled or even withdraw their consent from the study, though none of them opted out of the study or requested any changes to the manuscript.

Chapter 4: Findings

The following chapter illustrates what I discovered in pursuit of answering my two research questions:

- “How do students showcase algorithmic awareness when conducting and presenting research?”
- “How do students showcase algorithmic awareness when transforming their research findings into rhetorical engagement?”

The presentation of how students showcased algorithmic awareness is catalogued under four main umbrellas: (1) discovering sources, (2) selecting and vetting sources, (3) browsing social media algorithms, (4) and transforming their research findings into a rhetorical intervention.

More specifically, I will begin by answering my first research question by presenting the findings relevant to the capture of students’ search talk as they discovered sources. From there, I will move into showcasing the search maneuvers students employed in the conduct of their research project—those that corresponded with how students clicked and scrolled through their search results upon the result of a search talk exchange with an algorithm in both the selection and vetting of their sources. The analysis of these ways of interacting with their search results will correspond with instances of critical awareness as they were revealed. After broadly accounting for the various functional strategies students employed in the conduct of their research project, I will home in on three specific student groups, each representing a vignette that showcases an emergent case that further contextualizes and complicates the findings drawn from earlier segments of the chapter. Each vignette will include a sequence of excerpts, figures, and my analysis.

I will then pivot my focus to social media algorithms. I will present the various functional strategies students employed in the nature of their distant reading analysis alongside the critical awareness the assignment generated. I will then move into my second research question tied to the transformation of research findings into rhetorical engagement, where I will showcase the various design features students employed in the construction of their rhetorical intervention. From there, I will present a brief overview of the deeper indications of reflective practice where students exhibited clear indications of rhetorical awareness.

4.1 Discovering sources using search engines

In the following section, I will present how students demonstrated searching with algorithms to collect sources for their research project. I will begin by first defining what constitutes *search talk* before breaking down the two main categories of search talk that I observed: *keyword search talk* and *question-based search talk*. After defining these terms, I will explain some of the broader trends tied to each type of search talk before explaining the use of *search refinement*, or the variation of one's search talk on the basis of multiple search entries.

4.1.1 Keyword and question-based search talk

All students included phrases documenting their reasoning behind their search procedure, such as one student who stated that "Google can be used to look for anything and everything, so I began my search there." However, thirty students (or 78.9% of all participants) went further to identify the exact search terms they used to collect and catalog sources for their research project, which I coded as types of *search talk*. Search talk was sub-categorized into either *keyword search talk* or *question-based search talk*. *Keyword search talk* included the use of Boolean search operators,

search phrases, or individual words, whereas *question-based search talk* included instances where students would word-for-word input their research question into the search box.

Keyword search talk was reported by eighteen students (60% of search talk reporters; 47.4% of all participants). Keyword search was inclusive of individual keywords, such as one student who reflected that they began their research process inputting keywords like *social media* and *marketing* in relation to their research topic on the efficacy of social media campaigns as a marketing tool. Keyword search talk included phrasal search terms as well, such as one student who reported using the search terms *video game effects on mental health*.

Question-based search talk was additionally observed in eighteen (or 60%) of all the participants who reported their search talk. Students who conducted question-based search talk were coded as such when they explicitly stated plugging their research question verbatim into a search engine. One student, for example, claimed that they started researching answers to their research question by simply “inputting my research question.” Another, instead of typing out their question, “just copied and pasted the initial question into Google to see what the first sites would be and how close they were to my topic.” Other students reported question-based search talk by simply reiterating their research question as their search parameters. “I found the source after I searched ‘what challenges do the immigrants face when they move to a new country?’”

Examining all reported search talk, certain students reported only conducting one type of search talk. Among the students who engaged in question-based search talk, nine (or 50% of question-based search talkers; 30% of all reported search talkers) only reported conducting question-based search talk. Among the students who engaged in keyword search talk, twelve (or 66.7%; 40% of all reported search talkers) only reported conducting keyword search talk. Out of

all thirty students who reported their search talk procedure, six (or 20% of all reported search talkers) composed *both* question- and keyword-based search talk.

4.1.2 Search talk refinement

In addition to reporting the composition of their search talk, twenty students (66.7% of all search talk reporters; 52.6% of all participants) indicated conducting *search refinement*, or the variation of one's search talk across multiple reported search queries. Search talk refinement corresponded more frequently with students who reported using keyword search. Specifically, seventeen (or 94.4%) of the eighteen students who reported keyword search talk showcased at least one instance of search refinement. Comparatively, nine (or 50%) of the eighteen students who reported question-based search talk did the same.

One student, for example, began her research project by typing in her full research question: *How can introverts overcome their shyness and gain confidence?* In her essay, she explained that she began her research project by lifting her research question directly from her research proposal and copying and pasting it into a search engine. Upon inputting her research question, she observed that “there weren’t a lot of reliable sources” and that “it was mostly a lot of social media posts like Reddit.” In response, she reported cutting down her search query to two words, *overcoming shyness*, which enabled her to find what she described as more credible sources.

Indications of search refinement at times corresponded with statements that showcased student understanding of the influence that search terms they chose had on corresponding search results. One student, for example, wanted to understand how misogynistic experiences online impacted women’s attitudes towards video games. To do so, he perused library databases, social

media platforms, as well as Google. When using Google, he explained that he first inputted search terms and search phrases like *women in gaming* and *harassment of women online*. He reflected on this process primarily in his research findings, stating that keyword search procedures enabled him to “find a huge amount of sources, particularly news articles and blogs.” Additionally, he observed that these “huge” search results produced a number of off-topic or irrelevant sources of information to his research question. As he explained in his research findings submission: “I had to narrow my search results down so that I could find articles more centered around my question.” In response, he reshaped his search parameters with increasing specificity, replacing more generalizable terms—such as *gaming* or *online*—with more precise terminology more closely connected to his research project like *voice chat* and *verbal abuse*. “This gave me less to work with,” he explained, “but they were seemingly more valuable articles.”

While his approach to search refinement was motivated with the intent to pare down his search results, other students utilized search refinement to expand their search results. One student, for example, was trying to understand public perceptions around the safety of Japanese food following the Fukushima nuclear power plant accident in 2011. As she began, however, she felt that many of the initial search results weren’t useful for her project: “I first went to Google,” she explained, “searching with my research question at first to see the results of what I would get.” As she phrased it, she found herself first “clicking through the top few hits that surfaced.” However, this process wasn’t entirely productive, and she used her proficiency as a native speaker of Korean to edit her search terms: “Initially, finding credible sources or even finding a relative article was challenging, as many were either sparse or gave ambiguous explanations,” she explained. “I recognized the complexity of the topic and the cultural ties between Japan and

its neighboring countries, so I decided to broaden my search. I expanded the search by [using] Korean and Japanese keywords to uncover additional perspectives.”

In addition to refining their search through adjusting word choice or phrasing with search algorithms, students conducted search refinement by tinkering with search filters. One student, for example, came across another of his sources after shifting from his initial Google search to clicking on the “News” tab without changing the actual wording of his search. Other students checked off only seeing peer-reviewed articles when that option was available to them. One, too, used date filters “to remove older articles and skip over a few less compelling articles.”

Students additionally reported using search refinement as they navigated scholarly databases. Collectively, four of the eight students who used library databases and Google Scholar during their research project reported using search refinement. One of these students wanted to better understand the circumstances surrounding the Lavender Scare in the 1950s after watching a related 2017 documentary. They began their search by going to the NOVA library website and browsing the available online scholarly databases. However, as they explained it: “I began to become overwhelmed until I realized that I could filter the options to find and search for eBooks,” which ultimately led them to the discovery of one of the critical sources for their research project.

4.2 Selecting sources using search engines

This section will give a more thorough representation of how students clicked and scrolled through their search results to find and select sources for their research project. In collating this section in sequence, everything described in this section corresponds with what students reportedly did *after* conducting search talk with the algorithm.

This section will present demonstrations of both functional and critical awareness. While a students' reported actions were treated as a demonstration of functional awareness—in other words, what students did when navigating the algorithmic interface—a presentation of their functional awareness also corresponded, at times, with demonstrations of their critical awareness. To illustrate this threaded relationship, I will review each category of functional awareness and their relation to instances of critical awareness.

I will begin by first showcasing more surface-level engagement with their search results, incorporating all instances of *littoral zone engagement*. As I review this way of interacting with one's search results, I will showcase how certain demonstrations of critical awareness tied to convenience and accessibility exclusively corresponded with users who reported exhibiting littoral engagement in the presentation of their research. From there, I will represent more thorough actions taken within the interface that I coded as *clickthroughs*. Clickthroughs, despite subverting one's use of the algorithm, nevertheless corresponded with more nuanced indications of critical awareness toward the algorithm. From there, I will conclude showcasing the two actions that corresponded with actions related to click restraint: *limnetic engagement* and *inclusion criteria*.

4.2.1 The littoral zone

Typically, the littoral zone is defined as the geographical region where water meets land. Extending out from the shoreline through and beyond the intertidal zone, the littoral zone's defining boundary with open water is the point in which light can no longer penetrate to the sea floor. To extend this definition as a metaphor of one's functional use of the algorithm, one might consider littoral engagement inclusive of clicking among the initial results present at the top of

the page without any subsequent scrolling—essentially wading into only the shallowest ends of one’s search results. In total, twelve students, making up 31.6% of the total student population, reported navigating search engines this way.

One student, for example, settled on his topic of researching the impact of microtransactions in video games after watching a few YouTube videos from content creators he followed. He admitted that these initial sources he drew inspiration from “weren’t exactly ‘credible,’” so he turned to Google to find additional sources. He wrote that he began by first inputting *microtransactions in video games* into Google. From this initial search, he clicked on a related Wikipedia entry presented to him that he described being at the top of the page. Despite clicking on it, he reported that he knew Wikipedia wouldn’t count as a source for his research project.

From there, he reported conducting search refinement. He admitted that his search terms were too broad and decided “to narrow it down” by adding the word *controversy* to his search parameters. After making this adjustment, a new list of search results populated the page. He reported remaining once again at the top of the search page, clicking on a Forbes news article. As a demonstration of littoral engagement, in neither instance did he report scrolling to see what else was on offer beyond these top-level search results; he only reported that he clicked among the top of his search results both times. Seemingly convinced that the top result was what he was looking for, he felt satisfied and selected it as a potential source for his research project.

4.2.2 Littoral engagement and accessibility

What students reported doing with algorithms, at times, correlated with how students talked about them. Five (or 41.7%) of the students who demonstrated littoral engagement, for instance,

made direct commentary on the ease or accessibility of the search algorithms they used as they conducted their research: a finding that did not extend to the remaining student population. Specifically, no other students made any such statements favoring algorithms that were straightforward or simple to use.

According to these users, the choice to use more “accessible” search algorithms was a time-saving measure. As one of them explained: “Sorting through different articles, looking into the background of sources, and citing them properly” was quite a time-consuming task, especially when it involved the use of scholarly databases. Familiar, “more accessible” search engines like Google and Bing—those with AI assistance tools baked into them—were simply preferred to what these students referred to as “slower” databases like EBSCO, Gale, and JSTOR. Littoral users described scholarly databases as difficult to use and said that the requirement to use Boolean search terms to parse search results and find the right sources for their projects was, as one student put it, a “tangible barrier, limiting the depth to which certain avenues could be explored.”

During the initial stages of her research, one of these littoral users found a number of sources using what she referred to as “normal” Google. However, she admitted that “normal” Google alone would likely not be sufficient for her research project, and so she chose to consult Google Scholar as well. Her move to Google Scholar, however, did not go as well for her as her previous searches using “normal” Google had. She commented that “there were a lot of articles, but most of them were from 2021 or before.” When she made this observation in her essay, she did not indicate using search refinement to sharpen the search results to present her the more recent sources she was looking for; instead, she returned to the comforts of “normal” Google and reported selecting the first article that appeared.

By way of another example, one student sought to understand the benefits music listening had on study habits. She began her research project using Google Scholar, though she realized it would be difficult to “find something” on the platform that could directly answer her research question. “I then tried using databases that are available on the school’s website,” she explained. “This again wasn’t good enough for me. I fell behind in this process because I could not find a source that I liked to answer my question. It was very difficult to keep going when I felt like I was falling into a rabbit hole trying to find at least one source.” In response, she pivoted to using “plain old Google.” As she explained it, “my search continued until I came upon the sources I have now. I chose my sources because in each of them, they had a clear answer and information on what music can do. These sources answered my question in the way I wanted them to.”

While readability was the factor that led her to select her sources, the desire for a more accessible search engine is what drove her to turn to Google in the first place. These statements tied to the ease of use or convenience of “plain old” or “normal” Google, as both students put it, was a repeated descriptor among littoral users. As another student phrased it: “Google is one of the main search engines where you can find information rather quickly.” For his research project, he felt compelled to use the search engine exclusively. As he put it: “Google can be used to look for anything and everything, so that is exactly what I did.”

4.2.3 *Clickthroughs*

Aside from clicking within the littoral zone, six students (or 15.8% of all participants) reported clicking through webpages, articles, and documents that led to the discovery of a second source from within an original source of information, which I coded as *clickthroughs*. Despite clickthroughs functioning as a click maneuver that moves students away from their search results

page and the algorithm as well, clickthrough users showcased an increased interest to report sentiments toward algorithms, thereby showcasing or demonstrating their critical awareness.

Clickthrough users and littoral users could be distinguished as two different groups of students. No students who reported conducting littoral engagement reported conducting a clickthrough at any instance of their research project; similarly, no students who reported conducting clickthroughs reported conducting littoral engagement. In fact, clickthrough users in certain instances drew attention to the littoral zone and criticized its composition directly. One student, for example, reflected on the types of sources that populated the top of his search results as he conducted his research project. Describing them as “common news articles,” he deemed these “insufficient” for his project. In response, he reported that he “dug deeper and discovered some pretty well-informed educational websites which discussed a lot of topics regarding psychology.”

While his vague indication of “digging deeper” did not accurately reflect how he scrolled among his search results, he reported that he found one website—the Greater Good Magazine—that provided him with a complement of articles and studies he deemed helpful for his research project. “I chose to focus on this website in particular for this part of the project,” he explained, “because there was so much to analyze. Not only was the information in this article fantastic, it also linked many credible and niche sources directly, such as scientific studies which will greatly benefit my project.” From the front page of the website, he clicked through elements of the webpage and found two additional articles for his research project.

Similar to the aforementioned clickthrough users, students who demonstrated clickthroughs positioned these actions as a means to *dig deeper* into individual sources among their search results—a finding, though unsurprising, that draws a more distinct contrast between

clickthrough users and users who drew their sources from the littoral zone. For instance, recall the littoral user who reported “falling behind” in their research process, who struggled to find sources that answered her research question in a way that she “liked.” She reported these experiences as demotivating, saying that “it was very difficult to keep going when I felt like I was falling into a rabbit hole trying to find at least one source.”

While she disliked the sensation of *falling into the rabbit hole*, clickthrough users seemingly embraced the opportunity. One clickthrough user, for example, referred to her research process as an “investigation,” explaining that she found herself “thrown down a rabbit hole of learning” as she pursued an answer to her research question. Rather than confront these rabbit holes as a source of difficulty, she described the opportunity in a more positive sense: being thrown down the rabbit hole, as she put it, resulted in her feeling “shocked with the lack of knowledge” she had about her research topic. And just as the first clickthrough user was enticed by the amount of data presented to him through these actions within the interface (e.g., “there was so much to analyze”), her motivation to *dig deeper* resulted in her finding what she described as one of the most valuable sources for her research project: a Google Doc composed of multiple links to various articles that became a “hub of links and resources.”

Clickthrough users reported their sentiments of search algorithms in ways quite distinct from littoral users. While five (or 41.7%) of the twelve littoral users demonstrated critical awareness tied to an algorithm’s accessibility or ease of use, only one (or 8.3%) of them went further to comment on the bias or arrangement of their search results. Conversely, four (or 66.7%) of the six users who reported conducting clickthroughs showcased at least one instance of critical awareness toward search algorithms. This commentary was related specifically to

sentiments tied to *search bias*, or the indication that search algorithms structure or arrange content that profile certain perspectives or types of sources.

While these instances at times corresponded with their clickthrough protocol—recall, for instance, when one clickthrough user cited the top of his search results being filled with “common news articles” that subsequently led him to “dig deeper” into his search results—this was not always the case. It remains unclear whether clickthroughs by themselves activated these sentiments toward algorithms or whether more critically aware users of algorithms are simply predisposed to click through the interface or willfully *fall down the rabbit hole*. Nevertheless, these students saw clickthroughs as a productive exercise. As one student put it: “Here is where we take responsibility. There is no longer an excuse: ‘I didn’t know where to look.’ ... We must dig deeper, and truly take it upon ourselves to learn, research and share. With all these resources at our fingertips, there is no longer a wall of unknowing to hide.”

4.2.4 *Limnetic engagement and search bias*

The limnetic zone is defined as the region of water that lies beyond the littoral as one enters into the open sea. As such, the perusal beyond the initial entries of one’s search results with a reported corresponding scroll—beyond the littoral zone—is considered a reflection of limnetic engagement when navigating one’s search results page. In total, thirteen students (or 34.2%) of all participants reported conducting *limnetic engagement*, or scrolling beyond the littoral zone and scanning a series of results before making their click.

The students who reported scrolling into the limnetic evaluated a source’s placement at the top of one’s search results in a way that was directly opposed to the framing used by littoral users. While littoral engagement showcased a clear propensity to click on the top of one’s search

results without scrolling further, limnetic users exhibited a deep skepticism of the reliability of the sources among the littoral zone. Thus, limnetic engagement often corresponded with instances of critical awareness, particularly the awareness of an algorithm's *search bias* similar to clickthrough users. Compared to the one in twelve (or 8.3%) of littoral users who exhibited an awareness of search bias, six in thirteen (or 46.2%) of limnetic users of the algorithm reported commentary on the arrangement or composition of their search results.

To these limnetic users, a source's placement at the top of one's search results gave the indication that the content was merely sponsored by Google and, as a result, was not the most credible or useful source within their search results. One student, for example, intentionally avoided clicking among the top of their search results because they were only seeking out sources that had "reliable information." Some students allowed this perspective to influence their clicks, even within the limnetic zone, such as one student who selected a source solely because it was the last link on the page.

According to these students, because Google search results were primed to push a link you were likely to click on without much consideration, the tops of its search results were often littered with sources that tended to promote a certain perspective. For example, one student commented that even when exploring more worldly, less western-centric research topics, her search results kept promoting news articles that promoted more American and British perspectives. She indicated that the search algorithm in these instances didn't promote these sources on the basis of their relevance or connection to the topic she was exploring but simply promoted sources that were seemingly familiar to her or, as another student phrased it, a part of "the mainstream."

These perceptions of search bias are perhaps best reflected in one student who was researching the War in Palestine for her research project. She explained that she knew that “Google is extremely biased on what you want to see and how it wants you to see things,” a remark she made when she saw that western news outlets like the Washington Post and the BBC were promoted at the top of her search results. While she saw both sources as perfectly reliable—she eventually chose the BBC as one of the sources for her research project—she acknowledged that the inclusion of western perspectives at the top of her Google search presented a certain world view that more centrally located publications in the Middle East and Arabian peninsula may otherwise show.

Other students were far more critical of these news organizations that typically populated the littoral zone. As one student put it, these mainstream news organizations were prone “to sensationalize and distort the truth, creating a narrative that is often far removed from reality,” which subsequently led them to scroll past the top of their search results to find those more favorable to them. Whether this thought process is a productive line of inquiry, limnetic users showcased a strong relationship between reports of scrolling within one’s search results and the showcasing of one’s critical awareness—and an awareness that appeared openly skeptical of the same *accessibility* features of the search engine that littoral users embraced. In fact, the one littoral user who showcased an awareness of search bias presented it at the very end of her research findings essay. She explained, in her conclusion, an understanding that she now “feels compelled to delve deeper into this topic, exploring alternative sources of information” than what she had relied on that were circulated within the littoral zone.

4.2.5 Inclusion criteria

Eighteen students (or 47.4%) of the total population showcased clicking amidst their search results based on a reported *inclusion criteria*. Seeking a source promoting a different perspective than they already found, for example, or perhaps selecting a source they recognize would count as an inclusion criteria. Whatever the reasoning was, the use of an inclusion criteria was marked when a student reported that a certain criterion or set of criteria had to be met before deeming it was worth being clicked on.

A student's use of inclusion criteria varied significantly based on each of their research topics and their scope. One student, for example, was researching the impact of video games on society. He deliberately avoided clicking on sources from newspaper outlets, as he was "aware of the bad reputation" that video games maintained among popular media outlets, opting instead to focus on more scientific sources that, in his words, "conducted experiments." Another student applying an inclusion criteria took the contrary approach: he chose to prioritize selecting news articles for his research topic in the belief that news articles would be more relevant, more recent sources of information for his project on competing soccer athletes than scholarly articles present. His decision to do this was mediated by a sense of skepticism toward popular media outlets, however: "In addition to other factors," he wrote, "I also paid attention to the author's credibility before proceeding to read the article and verifying the accuracy of the information."

In both of these examples, each student's inclusion criteria was mediated by a roughly-drawn heuristic informed from a cursory understanding of their respective research topic. For the first student, his belief of the "reputation" video games had among mainstream media outlets motivated him to move beyond the littoral zone where such sources were typically

present. For the second student, his perusal in more popular news articles, at times skirting within the littoral zone, motivated vetting his sources before clicking on them.

While the use of an inclusion criteria often involved students electing to click on only certain types of sources, as with the students profiled above, it also involved the selective use of trusted or familiar sources. One student, for example, was researching the impact AI would have in the workplace. She wrote that “having a combination of opinions and theories as well as academic research would both be good to include” in her project, indicating a search criteria scaffolding her corresponding clicks. As she outlined her research methodology, she iterated a fairly open inclusion criteria of who belongs in her annotated bibliography: “opinion-based pieces from people who may or may not be in the industry ... people who may not be into technology, [those who] closely follow it, [the] crazy guy ranting in his garage, and academic research done by professionals. I want to take information from all of these sources and create one overall conclusion.” Her initial research process showcased a similar dynamism where she googled *How will the widespread adoption of artificial intelligence impact future employment?* And, in her words, “gazed at the millions of results” that were returned to her.

Despite that open-ended question and the sheer diversity of voices she wished to include in her project, she began with a directed, click-restrained approach: “I first wanted to start with something that was fact-based, perhaps an academic journal or research conducted by a reputable company—bonus points if it was one who specializes in technology,” she wrote. Alongside this inclusion criteria, she exhibited a refusal to wade within the littoral zone: “Scanning article titles, dates and website of origin, I ignored the first 10 to 15 results.” She avoided these top search results because they were, according to her, “sponsored ” content and included social media platforms like Reddit and Quora—sites that she stated “had more questionable or unknown

reputations.” As indicated previously, her prior knowledge mediated her click restraint, and it determined what she chose to click on. “I kept scrolling,” she wrote, “until I saw a name that every American knows.” In her case, it was the White House, which had just recently published an economic study on the impact artificial intelligence would have on EU and American trade.

Given the more amorphous nature of what qualifies as an inclusion criterion—including staying within and moving beyond the littoral zone—users of an inclusion criteria did not indicate as strong an aversion to littoral engagement as limnetic users did. Five (or 27.8%) of the students who reported using an inclusion criterion as a part of their research project nevertheless drew at least one source from the littoral zone. This movement within and beyond the littoral zone, as a result, potentially impacted how critical awareness emerged in practice: four (or 22.2%) of the eighteen students who exhibited an inclusion criteria reported at least one instance of an awareness of search bias, with two (or 11.1%) of these users additionally exhibiting at least one instance of accessibility.

4.3 Vetting sources using search engines

After compiling sources for their research project, students were expected to verify that those sources were by some definition credible. To ascertain a source’s credibility, students were discouraged from *close reading*, such as scanning the contents of the article itself in order to ascertain the source’s credibility. Instead, students were encouraged to vet their sources using a process known as *lateral reading*, or consulting an unaffiliated secondary source of information to learn more about the original source.

The sections that follow will illustrate the pathways students took to vet their sources as they reported in their sourcing report, annotated bibliography, and research findings submissions. What the following findings will showcase, however, is that in addition to conducting both close

and lateral reading strategies to vet sources, students engaged in what I dubbed as *primary cross referencing*: using the algorithm to vet sources by seeking out an unaffiliated source of information only to end up clicking on a site that was also affiliated with or managed by the source, such as an author's personal website, an organization's social media presence, or other articles written by the same organization or author. To do so, I'll begin by providing a brief overview of how students were taught to vet their sources. I will then profile instances of close, lateral, and primary cross referencing in order to present points of comparison in how students used the algorithm to vet each of their sources.

4.3.1 Defining the vetting of sources

In preparation for this task, students were shown in class how to vet sources using lateral reading techniques. Though I provided a starting place composed of various independent watchdog groups that are useful to vet certain publications, I encouraged students to be creative. I indicated to students that these resources were not an exhaustive list of all reliable sources, methods, or avenues for lateral reading. In truth, given the myriad research topics my students chose to explore, it was not possible for me to provide for them every relevant supporting tool for every one of their research projects. Instead, students were expected to develop their own, emergent methods of vetting sources as the needs of their particular research topics might require. The vetting of a social media influencer, for example, may not necessarily follow the same procedure as how one vets a newspaper publication.

Students were encouraged to approach lateral reading not as a proscribed process but one that merely involved working within the sandbox of one's search results to corroborate credibility claims the source makes about themselves. As an example of an emergent method,

one student in another study participant group mentioned clicking on the follower list of a person's social media feed to see who they were following, as the types of people they gravitated toward, they believed, might indicate something about them as well. Students were expected to report how they vetted every source they included in their annotated bibliography and research findings, and students were expected to vet sources even if they were previously known or trusted sources.

A source was considered vetted when a student presented a *credibility claim*. Credibility claims involved a student making an inference about the source's credentials that resulted in the conclusion of their investigation. These credibility claims were tracked and catalogued from multiple assignments across the research unit: the sourcing report, the annotated bibliography, the research findings, and research presentation transcripts. Only the initial instance of a credibility claim was collected for analysis.

When reporting these credibility claims, students typically reported examining only the author or the publication in isolation. Establishing trust in the organization itself rarely corresponded with further examination of the author; alternatively, identifying trustworthy information about the author rarely led sequentially into the vetting of the publication based on students' reporting. Across all reported instances of vetting their sources, only one student showcased vetting both the author and publication of one source in the writing of their research project submissions.

4.3.2 Close reading strategies

While lateral reading was the expected approach to vetting one's sources, twenty-five students (or 65.8% of all participants) utilized close reading as a vetting process at least once, and twelve

participants (or 31.6% of all participants) only showcased close reading. Each instance of close reading was coded when students made a credibility claim of the source without a reported search, scroll, or click that indicated the credibility claim came from a secondary, unaffiliated source of information.

Credibility claims were reinforced by associations made to the author, the organization, or the text itself. Fifteen students (60% of close readers) made credibility claims related to the author. Fourteen students (56% of close readers) made credibility claims related to the publication or sponsoring organization. Ten students (40% of close readers) referred solely to content of the text itself as a means to vet the source via close reading.

When using close reading as a vetting process, students commented on a publication's self-reported expertise, essentially relying on credibility claims drawn from the source itself. As an example, one student wanted to understand the impact AI would have on the American healthcare system as his research topic. While seeking sources, he came across a previously unknown source named npj Digital Medicine. To vet the source for its credibility, he reported navigating to the organization's about page. From there, he learned that it was a journal that claimed to publish "high-quality, peer-reviewed research." Upon making this credibility claim, he concluded his vetting process and believed it was credible on the basis of the source's own claims.

This procedure similarly extended to the vetting of authors. One student, for example, remarked that the source he found was credible solely "because of who wrote it," explaining that he "[clicked] on her profile within the page and [reviewed] where she went for education among other things." While education was seen as important in that instance to situate his sense of trust in the source, credibility claims about authors differed on research topic and scope. Students, at

times, indicated that the “seriousness” of their research topic reduced the need to vet their sources more thoroughly. In the research of tribalism in wrestling, for example, one student drew attention to one of his sources being “active online” in wrestling debate spaces, stating that it was all that he needed to identify as a credential to indicate that “he knows what it is and what it is like.”

Alongside self-reported credentials, students remarked on the quantity of work an author or publication produced as a reason to trust them, often drawing conclusions from the content lifted directly from an author’s self-written profile or an organization’s about page. One student, for example, noted that the author of their source claimed to have written “over 600 articles” on the site, seeing them as an expert solely on the quantity of material they’ve published to that particular website. Others put stock in how certain authors were profiled or featured on their corresponding websites, such as one student who exclaimed that their author was “featured” in a publication and has “numerous educational articles that have been published and documented over thousands of times.” Others reported a sense of motive as another factor, such as one student who wrote: “Each author had no logical reason to make history up for their lives revolved around recording the truth.”

Comments tied to a source’s appearance of information focused both on how the information was presented as well as how much information was presented. In researching the topic of inflation and its impact on the US economy, for example, one student found a source that taught him “about the vulnerabilities, challenges, and risks of the US economy” that, in his words, provided “a combination of data and analysis.” In his analysis of the source’s abundance of information, he also claimed that the source was “unbiased” because of the richness of its

information as well as the fact that it “does not make any claims.” The source’s “descriptive charts,” in his words, merely “showed numbers and other types of data.”

In making comments toward the appearance of information as a means to trust a source via close reading, students also remarked on how the appearance of *only* information served as a reason to trust a source. One student made a claim in their project, when reviewing a Wall Street Journal article, that they believed the article “was a neutral source because it showed facts. There weren’t any opinions that were involved in what the author was analyzing.” In another instance, one student exclaimed that their source simply appeared unbiased on the basis that they were writing in a way that read as “purely factual.”

4.3.3 Lateral reading strategies

Nineteen students (or 50% of all participants) conducted lateral reading using a search algorithm at least once. Each instance was marked when a student indicated using a secondary source of information to vet a potential source, such as visiting an author’s Wikipedia page or reviewing claims of bias on a news outlet published by an independent media watchdog organization. In addition to these resources, students reported using news articles referring to the work of the author or publications they were vetting. Some students additionally turned to generative AI models like Google Gemini and ChatGPT to vet their sources.

Of these nineteen students who showcased instances of lateral reading, there was an observed split whether students vetted authors or publishers when laterally reading. While eighteen students (or 94.7% of all lateral readers) vetted websites and their sponsoring organizations, only seven students (or 36.8% of all lateral readers) similarly reported attempting

vetting the author of a source directly. Only one (or 5.3% of all lateral readers) reported laterally reading about both the author and publication for one source successfully.

This discrepancy between vetting authors and publishers had much to do with which was reportedly easier. Between the seven students who reported laterally reading authors, they reported being successful only six out of nine total times in finding information from a secondary, unaffiliated source of information; the three instances where students communicated being unable to laterally read the author were coded as a *failed search*. When confronted with a failed search, students reported either laterally reading the organization instead or close reading the source directly. One student, for example, admitted that they “couldn’t find much on the authors” for one of their sources; in response, rather than reporting any vetting of the organization or the publication, they concluded that “the person the article references at the end seems pretty reputable,” entrusting that the source itself was credible because they cited perceptibly reputable sources of information.

The likelihood of a failed search was much lower when vetting organizations directly. There were only two reported instances of a failed search from the twenty-six credibility claims students drew from lateral reading, making up only 7.7% of all lateral reading attempts (versus the 33.3% of failed searches to laterally read about authors). In both instances where students reported a failed search about an organization, students pivoted to close reading the text directly.

Lateral reading was done using both search engines as well as generative AI, and students often mixed in the use of both based on the results of a failed search. As a part of her vetting process, one student wrote that “if the sources had an author, I used Google, ChatGPT, and Gemini to look up their credentials.” While she stated that she was moderately successful in this process, she admitted she “couldn’t find anything” whether she looked on ChatGPT or Gemini

when vetting one of the authors of a source she was considering. She did, however, shift her approach to laterally read the organization instead, which she concluded was reliable after reviewing a relevant Wikipedia page.

While she was unsuccessful in using large language models to vet one of her sources, she was successful in other instances. In all observed instances of students reporting the use of large language models, they reported using Gemini or ChatGPT first. When these lateral reading strategies proved successful, students did not report moving beyond Gemini or ChatGPT to corroborate the claims they made. For example, one student wrote in their annotated bibliography that they first “looked through the website,” indicative of close reading the site before lateral reading. From there, he stated that “I used ChatGPT and Gemini to look for its credibility. It said that the website is credible because it is transparent with its information. Before the information is published, it is reviewed by experts.” After reciting the credibility claim drawn from his search talk with the ChatGPT, he did not showcase or report any further vetting procedures. This was despite the fact that ChatGPT appeared to recommend students to seek other sources to corroborate its claims. As one student reported, after vetting one of his sources using ChatGPT, it told him that his source “from Harvard University seems trustworthy because of where it’s published. Look into the author's background, if it was reviewed by peers, and if it’s relevant to your research.” The student did not, however, report looking into the author’s background or if it was peer-reviewed.

Even more curiously, when it came to explaining the process of vetting the next source in his annotated bibliography, he again cited content ChatGPT had told him, specifying that the “source is credible because it is a LinkedIn source.” Despite drawing on ChatGPT as a secondary, unaffiliated source of information—functionally a process of lateral reading—his

search talk with ChatGPT resulted in the platform reinforcing the notion that a social media post, an affiliated source of information tied to an author or organization, is deemed credible. While it did once again tell him to vet the source further by “checking the author’s expertise, verifying the accuracy of the information, considering engagement levels, and evaluating the reputation of the platform,” he once again does not report doing so. He merely copied and pasted the prompt from the algorithm into his annotated bibliography. Thus, while ChatGPT’s insinuation that a social media post was in and of itself a credible source of information raises critical questions as to how notions of credibility are operationalized by large-language models, the student’s choice to simply go along with the reasoning without further exploration raises even greater concerns.

4.3.4 Primary cross referencing

Nine students (or 23.7% of all participants) exhibited at least one instance of *primary cross referencing*. As defined previously, primary cross referencing involves using the algorithm to laterally read the source via an unaffiliated source of information only to click on a source that was directly affiliated with the author or sponsoring organization the student was vetting. Looking up information about an author and clicking on their personal website or social media profile would, for example, be considered an act of primary cross referencing.

Primary cross referencing was most commonly associated with the vetting of authors. Specifically, eight (or 88.9%) of them used primary cross referencing to vet their authors exclusively. One student, for example, vetted the first source they found by googling the author’s name. As an indication of primary cross referencing, they reported clicking on the source author’s social media profiles published among the search results, and they concluded that the

information presented in the author's website bio at least "matched" what the social media content showcased.

Aside from social media presence, the amount of articles or alternate publications the author wrote for was also considered. One student, for example, reported that their vetting procedure involved "looking up names on search engines and seeing their history to determine their credibility," essentially navigating to other websites the author had also written for. In these instances, the credibility claims tied to these sources would be drawn to what authors said about themselves in their personal biographies. If an author claimed to also write for the New York Times, for instance, students would search up articles the individual wrote and verify that they wrote for the New York Times. Credibility claims would not extend to notions of reliability or expertise in these instances—merely writing for the New York Times would be seen as a marker of one's credibility. Students reported primary cross referencing authors even when they did not seem to make these claims. One student, for example, said they searched up the author of the source she was considering "just to see if they wrote any other articles."

Only one student (or 11.1%) primary cross referenced a publication. He did so, reportedly, as a result of a failed lateral search. He first attempted to vet the source, MakeUseOf, by using independent watchdog websites like SourceWatch and InfluenceWatch. When he searched for them, however, he found "there were no matches" on SourceWatch and that "there was nothing also on InfluenceWatch," which in his estimation was "maybe not the greatest sign" in the source's perceived credibility. From there, he said that he simply "googled MakeUseOf." From his search results, he reported that "they were a publishing website specializing in everything technology. The website was founded in 2007 but it was bought by another company called Valnet in 2020." Though he did not recite the specific actions he made to make these

assessments, such as whether this information came from a primary or secondary source of information, he did explicitly make a credibility claim tied to their social media presence. “They post quite often,” he wrote. “All in all, I’d say that this source is pretty reliable considering my topic. I mean, you probably won’t find scholarly articles talking too much about video games.”

4.4 Using search engines during the sourcing activity

In addition to the submitted work, I analyzed the actions students took during a recorded small group activity. As previously explained, the sourcing activity was designed to be an opportunity for each student to bring an unverified source to class—one they did not yet know to be credible or worth including in their project. They were then expected to work as a group to vet each of their sources using the tablet I provided them with screen and audio recording software installed. Students were encouraged to use the algorithm to vet their sources, verifying the author’s or publisher’s credentials via lateral reading.

Unlike the submitted assignments, which presented *retrospective* accounts of algorithmic use, these recordings captured students’ actions using the algorithm *in situ*. Doing so, I was able to examine how the discursive maneuvers students reported in their papers were enacted in the conduct of research. This, in turn, afforded me the ability to treat the very search procedures students employed as *embodied practices* when using the algorithm.

Initially, I observed many of the same intertwined relationships between various functional strategies students reported in their submitted work. Pivoting to close reading upon the failure of a lateral search, for example, was observed across multiple groups. However, I also came across what I defined as *emergent cases*: instances where students’ maneuvers with the algorithm deviated from what they reported in their submitted work. Rather than treating these differences as indicators of students’ potential unreliability or inconsistency in awareness,

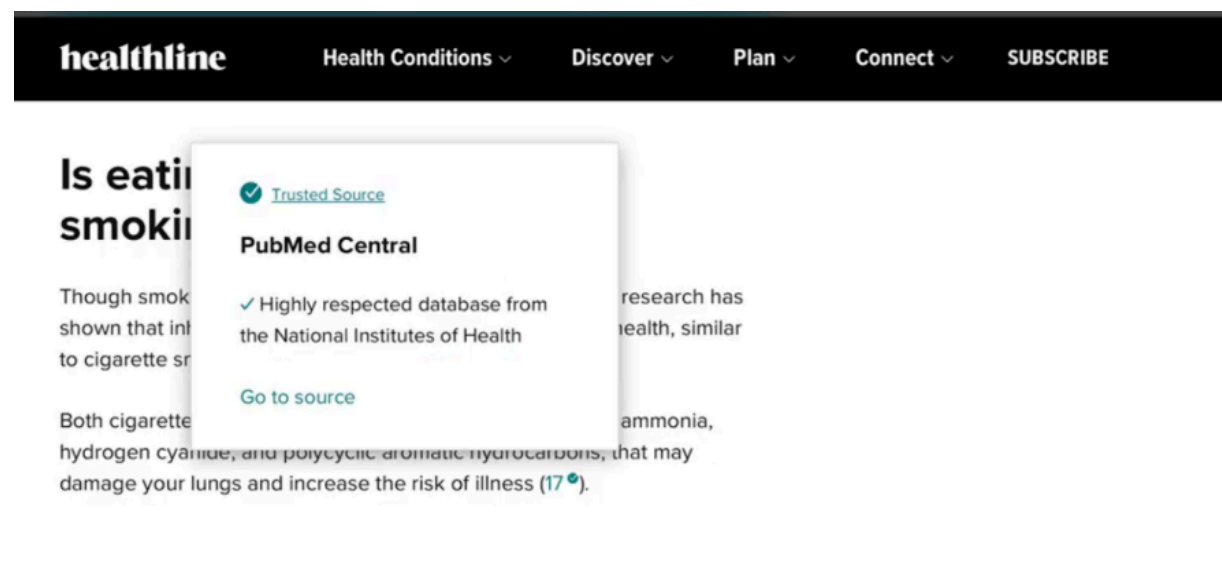
however, I approached each case as an opportunity to examine algorithmic awareness as an embodied practice. Whether through attention to the design features of the interface or the sequences of actions students took with the algorithm, each of these cases suggests that algorithmic awareness is not a stable, generalizable, or predictive psychological state but one that shifts and evolves across contexts.

To illustrate this relationship, each series of vignettes will exemplify one of these emergent cases and the context from which it arose. The first group to be profiled includes a student who employed clickthroughs as a vetting strategy, an emergent close reading strategy distinct from what he reported in his submitted work. The second group includes a student who established an inclusion criteria to avoid primary sources of information only to forgo this criteria upon the encounter of a failed search. The third and final group showcases a particularly complex association between lateral reading, primary cross referencing, and the littoral zone. While students reported using littoral content to vet sources via primary cross referencing, for instance, this group will indicate how the littoral zone might more readily come into conflict with lateral reading processes and give the illusion of lateral reading.

Collectively, three vignettes extend the study of algorithmic awareness to showcase how it is enacted as an embodied practice. In doing so, each vignette positions algorithmic awareness as a co-constructed process. Rather than positioning algorithmic awareness as a psychological state that is simply possessed—that is, demonstrated as something students bring to algorithmic encounters—these vignettes will showcase how demonstrations of awareness can emerge and evolve through actions within the interface as well.

10 **Jack:** So, I’m assuming that footnote #19 is a trusted source. PubMed Central.
 11 Oh, I see. So they have links directly to their sources for that.

Figure 2. PubMed Central pop-up citation



Up to this point in the activity, Jack stayed exclusively on the website. Beginning from the byline, he spoke aloud his close reading approach to Daniel. In his remarks on lines 8-9, by saying he was “not looking at the content,” Jack drew attention to the presentation of supporting information, of citations, and of hyperlinks across the page. However, rather than follow the link or to step outside of the article and laterally read the original publication or its sources, he simply “assumed” the footnote provided was trustworthy when the website claimed it was a “trusted source” on line 10. Despite the intended purpose of the activity was to laterally read the source, Jack appeared to take the source’s claim of PubMed Central as a trusted source at face value.

At no point did Jack indicate moving laterally to vet the source as he held the tablet. As the group sat looking at the source together, Samantha made a request to “see the article” and was handed the tablet by Jack. The article remained on the screen as indicated in Figure 2.

Excerpt 2. “You could check each individual site for their credibility.”

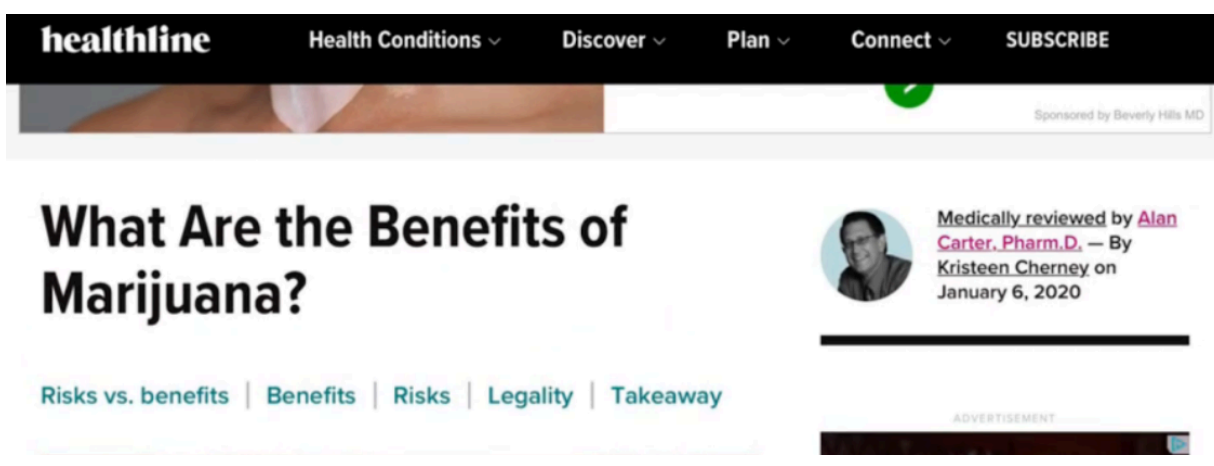
12 **Samantha:** It should be at the top, right?

She closes the pop-up and scrolls to the top with the byline in the upper right corner, indicated in Figure 3 below. It includes details on both the article’s author as well its medical reviewer.

13 **Samantha:** Oh. There we go.

14 **Jack:** Like, it would be a lot of effort, but you could check each individual site
15 for their credibility.

Figure 3. Location of link to medical reviewer’s about page



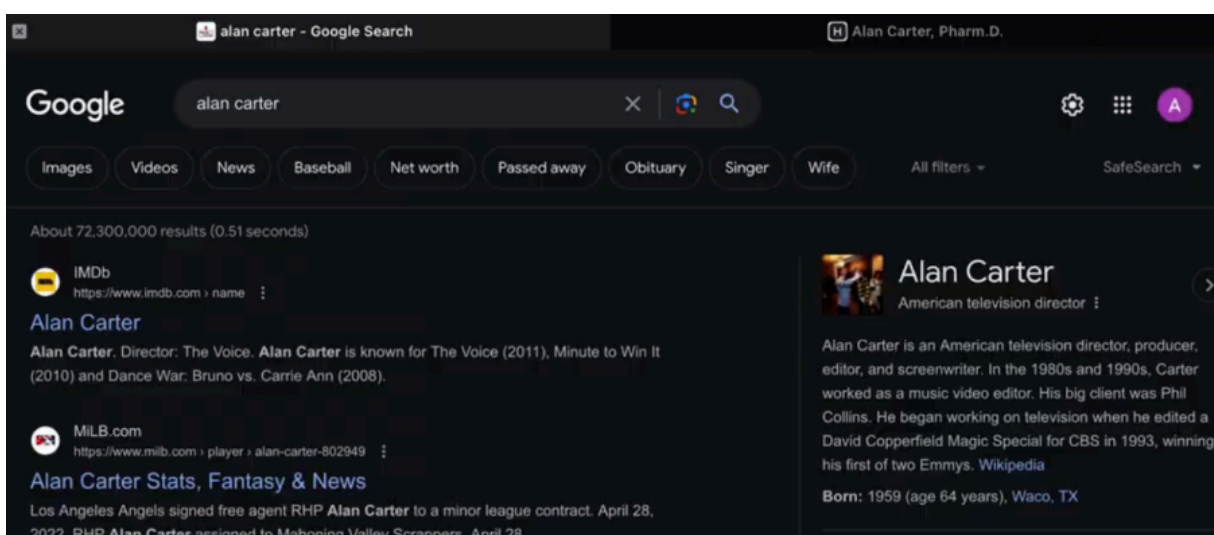
Despite his earlier strategy to close-read the source and view the citation as credible on the basis of what Healthline said about it, Jack’s talk-turns with Samantha afforded the emergence of a deeper vetting protocol: conducting clickthroughs to vet the source. This protocol still involved the process of close reading in favor of lateral reading, but he framed this approach as a motivation guided by “checking each individual site for their credibility,” even though it would be, by his own admission, “a lot of effort” (lines 14-15).

Instead, Samantha followed her own search procedure by clicking the link that took her to Alan Carter’s biography page indicated above, in Figure 3, who was listed as the article’s medical reviewer. After clicking on the link, Samantha was presented with a brief biography

page that listed his name alongside his credentials: “Alan Carter, PharmD.” Samantha then scrolled down the page.

From there, Samantha began lateral reading. She opened a new tab and typed *alan carter* into the Safari search box. After she submitted her search query, a Google generated snippet with an Alan Carter having the job description of an “American television director,” presented in Figure 4 below. Excerpt 3 follows, which illustrates the talk-turns that corresponded with this search result. Finally, Figure 5 represents what Samantha was looking at as she made a credibility claim about the source on line 23.

Figure 4. Keyword search of “alan carter”



Excerpt 3. “I’m going to look up ‘pharma d.’”

Samantha is holding the tablet as Jack looks at the search results presented in Figure 4. He first draws attention to the Google generated snippet on the right-hand side of the screen.

16 **Jack:** The American television writer?

17 **Samantha:** I don’t think that’s the same guy. I’m gonna say that these are different
18 people. I’m going to look up “pharma d.”

She refines her search talk to “alan carter pharm d” and hits enter.

19 **Samantha:** Oh. Here we go. We’ve got a LinkedIn, Medical News Today,
20 HealthGrades, ResearchGate... He’s on a lot of these websites. I have no
21 idea where to look, but, oh– the University of Missouri.

She selects a link to a website affiliated with the University of Missouri-Kansas City. It presents a news article referencing Alan Carter talking with Healthline, indicated in Figure 5 below. She is looking at Figure 5 as she talks.

22 **Samantha:** This is where he graduated, apparently. Okay, yeah. I mean, he’s on their
23 official website, and it seems like this guy’s pretty credible.

24 **Daniel:** Oh good.

Figure 5. The University of Missouri-Kansas City article



Though Jack made the recommendation to “check each individual site for their credibility” back on lines 14-15, demonstrating his consideration of clickthroughs as a vetting strategy, Samantha vetted the source instead by laterally reading via the algorithm. She clicked on the link to the medical reviewer’s profile who ostensibly peer-reviewed the article, accessed the necessary information about his credentials, and then consulted a quick search.

Confronted by a failed search on first pass, she reported a refinement in her search telos on line 18—to look him up on the basis of his reported education credentials—and changed her search parameters accordingly. From the search results that were generated on the second pass, she scanned and selected a link from a reputable, secondary source instead of selecting primary sources of information like the source’s LinkedIn profile. She then demonstrated making a credibility claim about the source from lines 22-23, confirming Alan Carter’s education background.

In her conduct of lateral reading, Samantha arrived at a secondary, unaffiliated source of information to confirm Alan Carter’s credentials in much less time than Jack had taken to close-read the article—and with much more to say about the author’s overall credibility. What soon transpired as they moved onto the next source, however, was a continued reluctance to laterally read in favor of close reading. What will emerge from the following excerpts, in fact, will be a deepened emphasis toward close reading through the use of clickthroughs as a vetting strategy.

Admitting that she didn’t think her own source was “very credible,” Janet volunteered her source next. To find it, she typed the phrase *COVID 19 has driven* and hit enter, completing a title-based search of her article. She clicked on the first result to appear in her search results, which was a Health Affairs article that shared the title she searched for. She held the screen at the title and byline and asked Daniel if he’d like to try vetting her source. She explained to him that she only knew the first author had a PhD based on the source’s byline before passing it off.

As Daniel began vetting Janet’s source, he followed a process closer to Jack’s than Samantha’s. Holding the webpage at the byline, he once again read the title of the article aloud to the group before scrolling through the article. As he scrolled, he commented on many of the

same details that Jack had done previously: the article's inclusion of hyperlinks, citations, and additional sources of information, for example ("Okay, it cites another thing. So that's good"). However, when Janet watched him sit at the bottom of the page without any further motion, she asked whether the source was credible. To this, he responded: "I don't know."

Based on the existing analysis I had drawn from students' submitted work, students reported going one of two directions when close reading failed to provide the information they sought: either they, like Samantha had done previously, navigated away from the site and vetted it using the algorithm, verifying its credibility on the basis of what other sources had to say about it; or they simply limited themselves to the results of their close reading process, whether discarding the source as unreliable or accepting it at face value. Jack presented Daniel with another choice, however, which did not come up in any of the other student groups or in any of the submitted work prior to what occurred in Excerpt 2: using clickthroughs as a vetting process to, as he suggested to Samantha, "check each individual site for their credibility" (line 15).

Requesting the tablet from Daniel, Jack scrolled back to the top of the article and began his clickthrough process. Similar to the preceding article, the Health Affairs article was layered with hyperlinked content, indicative of a vetting process that, if followed to completion, "would be a lot of effort" as he put it on line 14. Figure 6 below showcases his starting point in this process, with Excerpt 4 narrating his actions in sequence from this screen capture, ending with Figure 7.

Figure 6. Jack's clickthrough protocol

to document the extent of violence and racism experienced by Asian Americans nationally during the pandemic and suggests a path forward.

The Federal Bureau of Investigation (FBI) has documented [77 percent increase from 2019 to 2020 in hate crimes against Asian people](#) living in the US. And during the period from March 2020 to June 2021 [more than 9,000 anti-Asian hate incidents](#) were self-reported to the advocacy group Stop AAPI Hate. Yet, such crime statistics are likely [vastly underreported](#). Meanwhile,

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Excerpt 4. "This is the actual FBI, so where's the 77 percent?"

25 **Jack:** Okay, so this is Healthaffairs dot org ... April 12, 2022 ... recently
26 motivated– the FBI– a 77 percent increase. Okay, I'm gonna see...

He selects the hyperlink showcased in Figure 6 above. It sends him to another website.

27 **Jack:** This is the actual FBI, so where's the 77 percent?

The source he clicks is not the actual FBI, which is represented in Figure 7 below. It is the Department of Justice website, which is citing an FBI crime statistics study. He continues searching down and up the page as he talks.

28 **Jack:** I'm just looking for the number 77... Okay, it does not show the number
29 77. It does not show this. But I'm just, maybe– Oh! Wait. Oh, here it is.

He holds his finger over a word and drag-highlights the rest of the sentence with his finger and reads off the page to his group, which is shown at the bottom of Figure 7.

30 **Jack:** Additionally, there were 279 anti-Asian incidents reported in 2020, a 77%
31 increase...

Figure 7. Community Relations Service webpage



Unlike Samantha, Jack conducted clickthroughs to vet the source instead of lateral reading. On line 26, he announced to his group his intentions to follow this first hyperlink, and he even established what he was looking for to his group—an indication that the 77% figure drawn from the original source was accurate on lines 28-29. Once again, Jack found himself in a situation where he was “not looking at the content” as he said back on lines 8-9, instead narrowing his attention to simply finding the corroborating number 77.

Only after discovering and reading aloud the 77% figure to his group did Jack *look at the content* and realize the website he was on wasn't affiliated with the FBI at all but the Community

Relations Service. At this point in the activity, Jack put down the tablet and shifted to his own laptop. He reported to his group that he was going to search up the Community Relations Service, unsure of whether it was a branch of the FBI or of something else. His actions at this stage were completely untracked, as I did not have access to a recording of his screen; however, Jack did thoroughly narrate his search protocol to his group, which was caught by the tablet's audio recording.

To vet the source using his laptop, he went to their official website. This resulted in him ending up on the home page of the justice.gov website the crime statistics were hosted on in the first place. He then reported scanning the hyperlinks of the landing page, inclusive of their table of contents, and browsing news articles before declaring his findings to the group: “This is not the FBI.” (Specifically, the Community Relations Service is a part of the Department of Justice, which was citing the 2022 FBI crime statistics.) Upon making this statement, Jack first voiced a reduced sense of trust in Health Affairs, but when he picked up the tablet again and reviewed the Community Relations Service page again—still held at the top of the page as it appeared in Figure 7—he realized his mistake admitting he had “missed the first line in the article” specifying it was referencing FBI crime statistics and was not the FBI website itself.

After admitting his mistake, Jack returned to the Health Affairs article. He moved on to examine the very next source cited by the original article, corresponding with his original goal to *check each individual site for their credibility*. Upon selecting the next link, however, he ran into a 404 error with a dead link, which is showcased in Figure 8 below. Excerpt 5 will establish the talk that followed his arrival to the 404 webpage, with Figure 9 representing where Jack concluded his search procedure.

Figure 9. Wikipedia page on Stop AAPI Hate

Stop AAPI Hate 🌐 10 languages

Article Talk Read Edit View history Tools

From Wikipedia, the free encyclopedia

This article is about the non-profit organization. For the larger protest movement, see [Stop Asian Hate](#).

Stop AAPI Hate is an American nonprofit organization that runs the Stop AAPI Hate Reporting Center, which tracks self-reported incidents of hate and discrimination against [Asian Americans and Pacific Islanders](#) (AAPI) living in the United States. The organization was formed in 2020 in response to the [racist attacks on the Asian American community as a result of the COVID-19 pandemic](#). The organization's approach centered on four strategies:^[1]

1. Data & Research,
2. Policy & Advocacy,
3. Community Capacity Building
4. Narrative Change

History [[edit](#)]

Stop AAPI Hate was founded by a consortium of three groups: AAPI Equity Alliance (formerly A3PCON, the Asian Pacific Policy and Planning Council),^[2] [Chinese for Affirmative Action](#) (CAA), and the Asian American Studies Department (AAS) at the [San Francisco State University](#),^[3] under the leadership of Manjusha P. Kulkarni, Cynthia Choi, and [Russell Jeung](#).^[4] The consortium began its action in January 2020 as a response to the impact of the COVID-19 pandemic on Asian Americans, specifically news accounts of incidents of racially motivated violence. The group takes a [grassroots](#) approach to gathering data and providing

Stop AAPI Hate



Formation	2020; 6 years ago
Founder	Manjusha P. Kulkarni Cynthia Choi Russell Jeung
Location	San Francisco, California, US
Website	stopaaphate.org 

It is unclear whether the “something” he mentioned on lines 32-33 they should no longer like is the Stop AAPI website, the Health Affairs article, or clickthroughs as a vetting strategy. Regardless of what the “something” is, the 404 link disrupted his clickthrough process. From there, he pivoted to laterally reading the organization instead, moving to a Wikipedia page he found after searching up the organization directly. From there, he confessed he was no longer interested in conducting further clickthroughs to vet the source on line 38.

As the group wrapped up their vetting of Janet’s article, I began pulling the class together to discuss how things had gone for them. During this conversation, Jack shared his thoughts and said, if he’d had more time, he would have looked for other “holes” in the evidence linked by the

Health Affairs article. He shared with the class the 404 error he ran into when clicking on the link to the Stop AAPI Hate organization in the first place—a statement made after already confirming through more reliable lateral reading processes that the source itself was who they claimed to be and was, for the purposes of the activity, judged as credible by the rest of the group.

What emerged from this group were two main observations. First, the decision to close read at times preceded or even replaced lateral reading. Even though nineteen (or 50%) of all student participants reported laterally reading at least one source over the completion of their research project, including both Daniel and Jack, this vignette indicates that when students report conducting lateral reading, it may not always be the initial maneuver within the sequence of vetting sources. This finding raises questions about the sequence in which students conduct close and lateral reading when vetting sources.

Second, the turn-taking between Samantha and Jack did not reinforce the use of lateral reading as a vetting technique. Despite Samantha presenting lateral reading to her group as an expedient method to vet an unverified source, the uptake of lateral reading as the initiating move was not observed in the rest of the group. Daniel did not conduct any lateral reading at all when it was his turn to use the tablet, and once Jack got a hold of the tablet again, he initially conducted clickthroughs instead; he didn't maneuver to laterally read until after this clickthrough protocol proved ineffective.

These findings suggest that the boundaries between close and lateral reading are more nebulous than students indicated in their submitted work. In their written renderings, students generally positioned close and lateral reading as distinct vetting processes, reporting one or the other in exclusion. Instances where close and lateral reading were reported in the vetting of an

individual source were more so as a result of a failed lateral search, where students pivoted to close reading the article when they couldn't find an independent, unaffiliated source of information. What Jack presents here, however, is the opposite: an embodied practice that positions the use of close reading *first* as a vetting process, quite distinct from the retrospective accounts he generated across the project. In fact, though Jack was a fervent user of clickthroughs as a vetting strategy during this activity, he did not report a single instance of doing so in his submitted work.

Framed as an embodied practice, Jack's decision to close read first may, in part, be due to the abundance of information presented in both articles. Unlike Samantha, who initiated lateral reading at the outset, the density of information and hyperlinks present in both sources appeared to invite Jack to conduct a protracted and evidently exhausting clickthrough process—one that, as a result, left him not really wanting “to dig much more.” Lateral reading did emerge later in his vetting procedure—but only after he was confronted with a 404 broken link that prompted a reorientation from clickthroughs to lateral reading.

Ultimately, this vignette presents how clickthroughs emerge as an embodied practice when vetting sources. While this certainly reinforces the importance of lateral reading at the onset, it raises added questions about the relationship between interface design features and close reading practices. Websites that present multiple hyperlinks, aside from reinforcing the possibility of students making at-a-glance conclusions about a source's reliability as reported previously in submitted work, may additionally draw users like Jack to conduct a protracted close reading process that delays or replaces the inclination to laterally read.

4.4.2 Excluding and then including primary sources: “I think this is a terrible source.”

The following series of vignettes will exemplify an emergent case of a student who wavered in his inclusion criteria as he vetted three separate authors tied to one source. This group, composed of Dylan, Irving, and Mark, will showcase an added dimension to the vetting of sources and how students may rely on primary cross referencing in the face of failed searches more than their submitted work indicated.

Irving held the tablet, opting to vet his own source. He opened the Safari search box, typed *what do people like and dislike about their friends*, and hit enter. Irving first scrolled past the initial search results and selected a National Institutes of Health link toward the middle of the first page of search results. Irving then scanned the NIH link, a PubMed overview, clicking then on the link marked as “full text” in the upper right corner. He scrolled down to page 24 of the document that showed a large graph with labels of “best and worst traits” and began speaking with Dylan. Excerpt 6 to follow indicates the talk turns between them both.

Excerpt 6. “I’m gonna look people up on the iPad.”

- | | |
|---|---|
| 1 | Irving: Okay, so this is something I found interesting. “Best and worst traits.” You |
| 2 | know, they have, uh, they have graphs, but– |
| 3 | Dylan: [scoffing, quoting the chart:] Lazy is one of the worst traits? |
| 4 | Irving: People look down upon laziness. It’s about perception, and this article is |
| 5 | specifically about self image and– |
| 6 | Dylan: Ahhh... |
| 7 | Irving: –Image of friends. So, it’s about how you look at yourself and how you |
| 8 | look at the people close around you, not really how you look at people |
| 9 | from a distance. |

Irving begins scrolling back up through the article as he talks.

- | | |
|----|---|
| 10 | Irving: I’m still trying to find more of a source about that. I’m trying to find out |
| 11 | how they, uh, how they got this, because... |

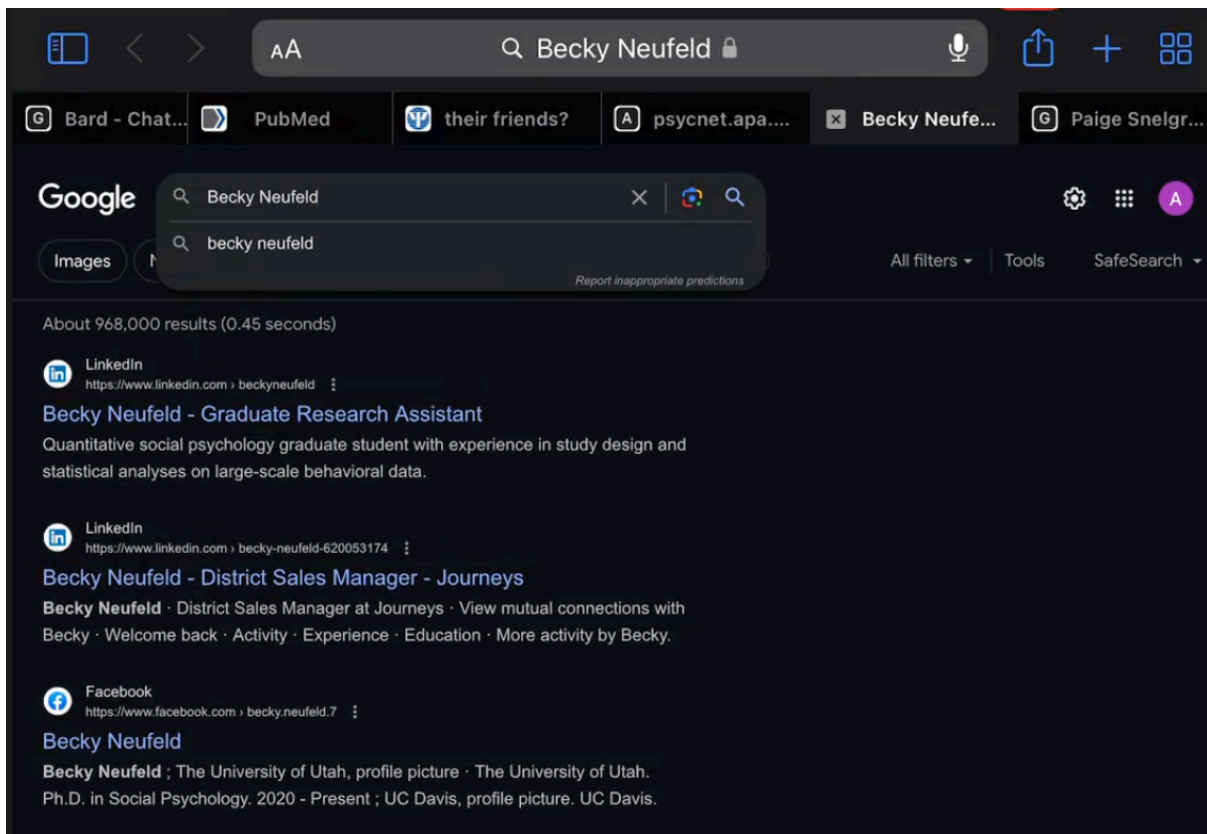
Irving stops scrolling in the article's methods section.

12	Irving:	Data collection... I mean, that's a good way to see if something's credible,
13		right? If they collect their data in a good way or bad way? I don't know.
14		What else we can do... Let me open up, um... I'm gonna look up the
15		people on the iPad.

In Excerpt 6, Irving introduced his source to both Dylan and Mark. To vet the source for credibility, Irving first appeared tempted to engage in close reading by examining the authors' data collection methods on lines 12-13 ("that's a good way to see if something's credible, right?"). Instead, he pivoted to laterally read each of the authors instead on lines 14-15 ("I'm gonna look up the people on the iPad").

With his search telos reported to the group, Irving opened a new tab on Safari and typed one of the author's first names, *Becky*, into the search box. As David Beckham, Becky G, and Becky Newton appeared as search suggestions, he completed the search with the addition of *Neufeld* and hit enter, showcased in Figure 10 below.

Figure 10. Keyword search of “Becky Neufeld”

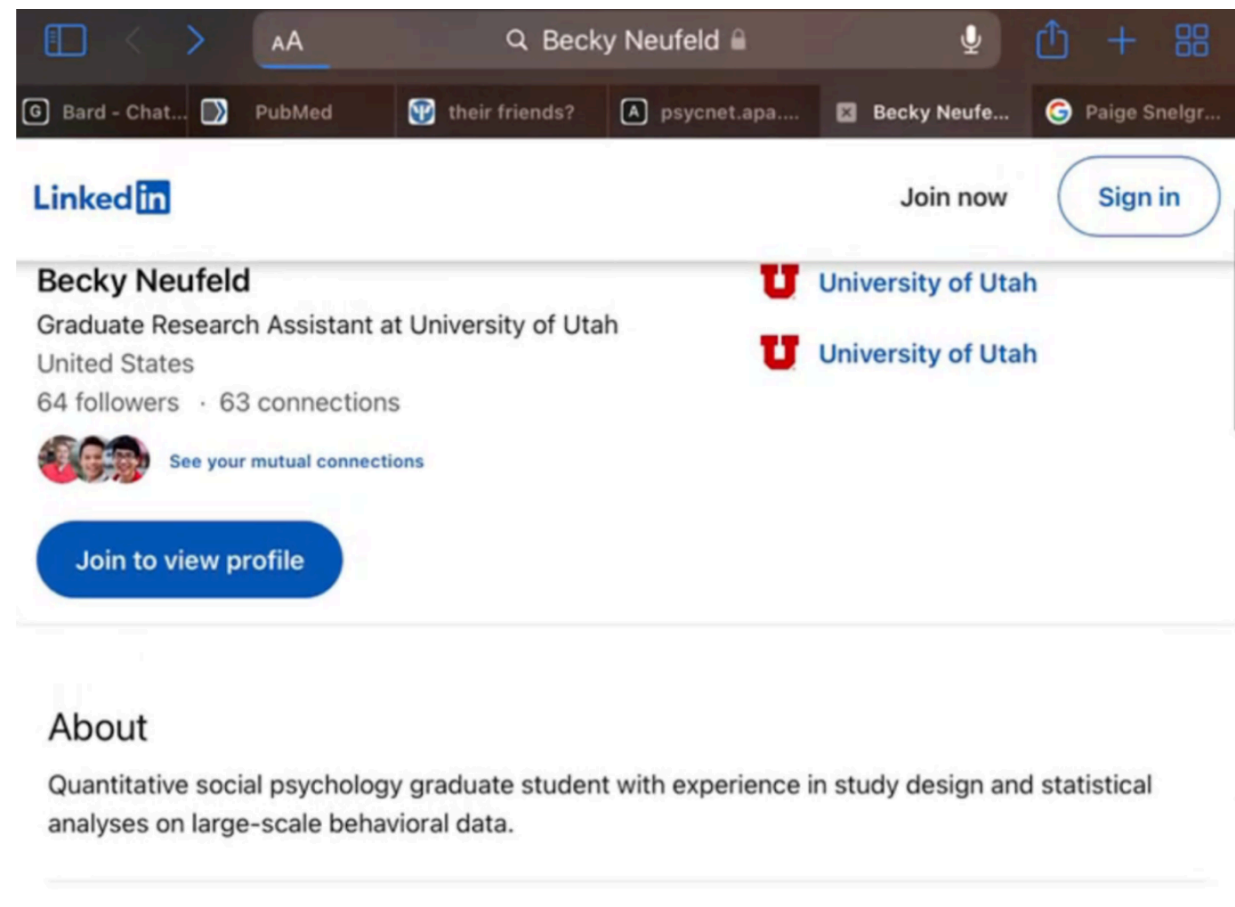


Before scanning the results of his search, however, he quickly opened another tab and began typing the name of the article’s second author. As he typed *Paige* into its search box, Google recommended a link to an individual named Paige Spiranac. He paused, verifying the author’s name by moving back to the first tab, and then completed his search by adding *Snelgrove Psychologist* into the search box. As the results for *Paige Snelgrove Psychologist* began to populate, he pivoted back to the previous tab with the *Becky Neufeld* search results in Figure 10.

As the above figure indicates, he was presented with a series of social media content at the top of his search results, including two different LinkedIn profiles for individuals both named

Becky Neufeld with discrete job titles. He scanned the results for a few seconds before selecting the LinkedIn page listed at the top. At no point in this process did Mark or Dylan offer any commentary or suggestions about his process. A few moments later, with the LinkedIn page remaining open, he began to speak to his peers. Figure 11 showcases a screen capture of the LinkedIn source he initially navigated to, with Excerpt 7 reflecting his talk while examining it.

Figure 11. LinkedIn page for Becky Neufeld



Excerpt 7. “You know, that’s not very good.”

16 **Irving:** I think this is a terrible source, looking at someone’s LinkedIn page,
 17 where they can put whatever they want. You know, that’s not very good.

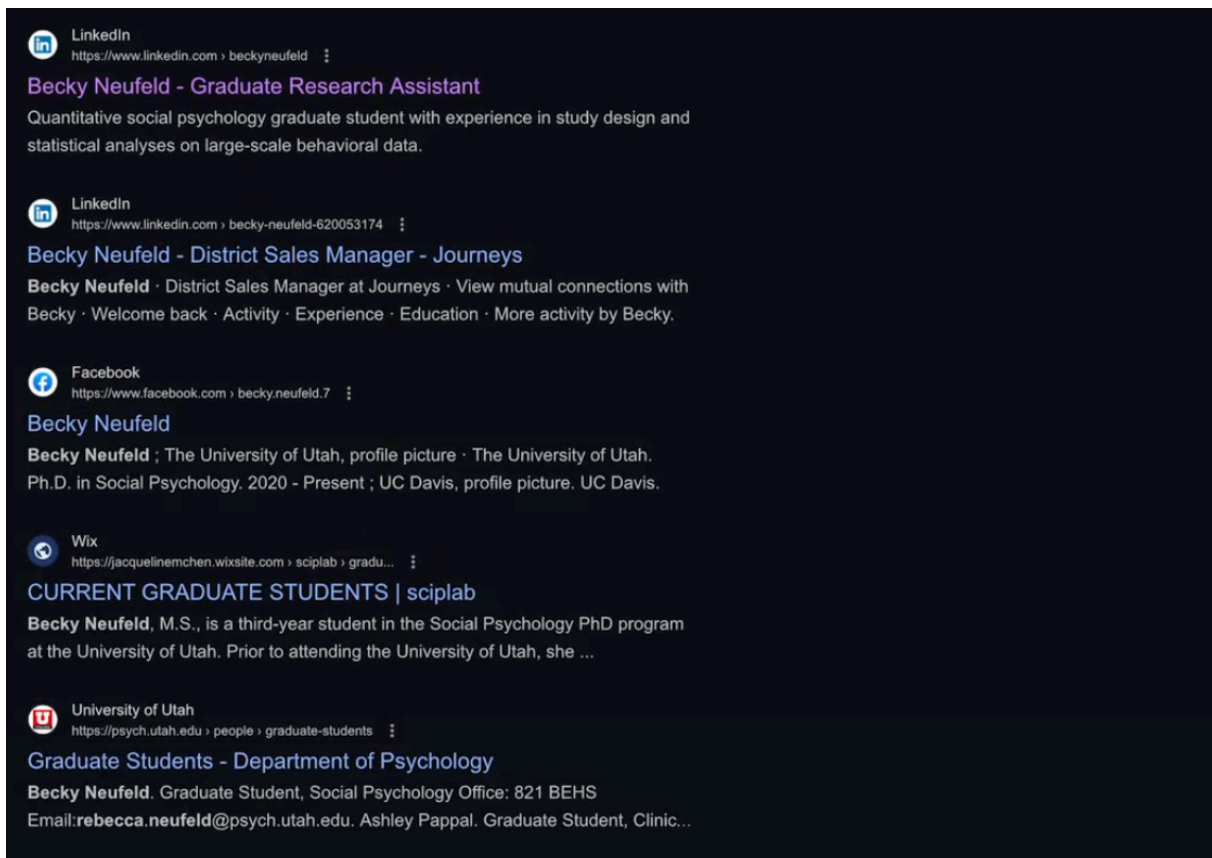
Irving backs out to the search results page and scrolls further down the page, presented in Figure 12 below.

18 **Irving:** But there's also a, um... there's the official Utah Department of
 19 Psychology.

He clicks on the Graduate Students page of the University of Utah's Department of Psychology shown at the bottom of Figure 12.

20 **Irving:** That says that they are a graduate student, so there you go.

Figure 12. Return to keyword search of "Becky Neufeld"



Irving demonstrated achieving his search telos on line 20 ("That says that they are a graduate student, so there you go"), and the entire sequence of events up to this point consisted entirely of self-talk. At no point did Mark or Dylan comment on Irving's process, such as his decision to simply click on the very top search result despite the University of Utah link being

presented on the first page of search results on the first pass. Neither Mark nor Dylan commented, either, on Irving's rejection of LinkedIn as a source to vet the author.

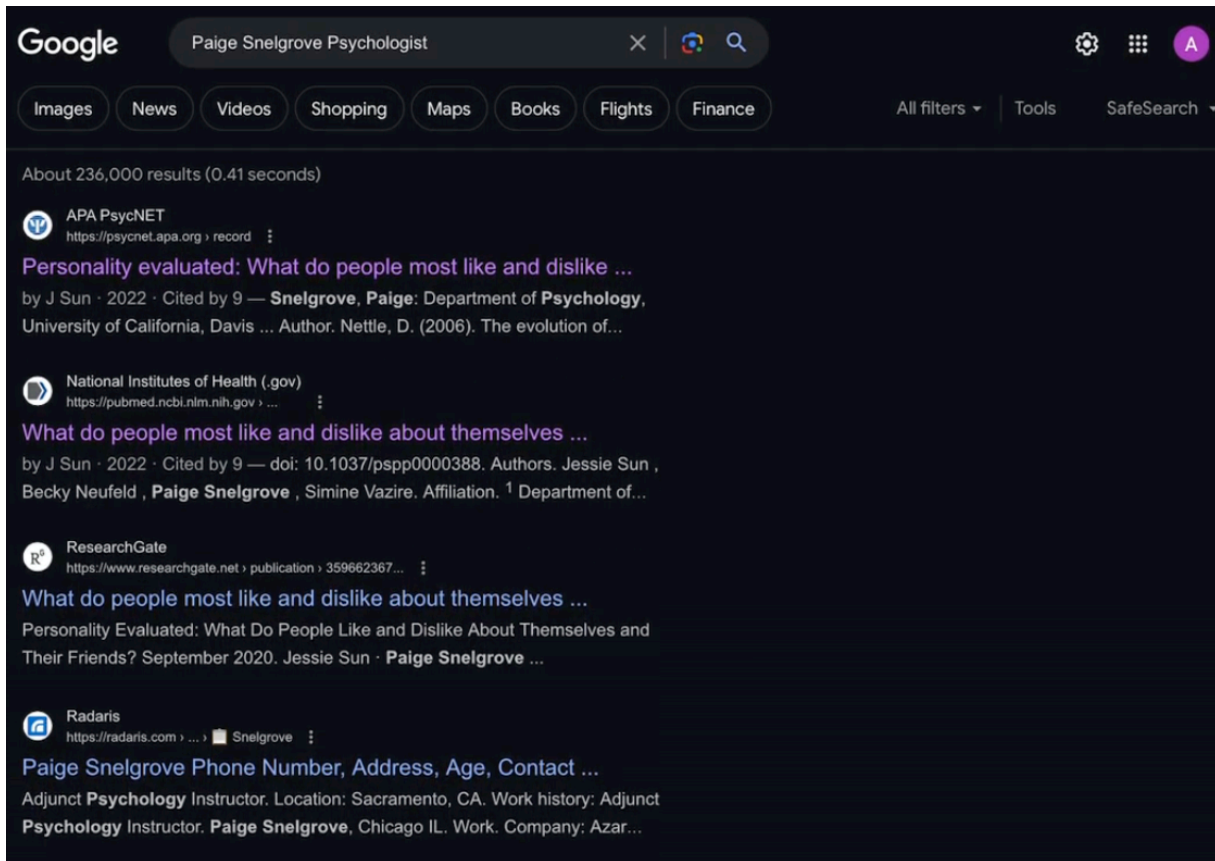
Irving presented a non-linear illustration of lateral reading, especially in comparison to Samantha. He first turned to a social media post from the author's LinkedIn profile at the top of his search results, but he quickly backed out of it, admitting it would not be a sufficient source of information to vet the author's credentials given "they can put whatever they want" about themselves (line 17). In response, he pivoted to the webpage of her graduate school, a secondary source of information that Neufeld would not have authorial control over.

In this instance, Irving established what I observed in many instances across students' research projects: a use of click restraint I coded as having an *inclusion criteria*. The use of an inclusion criteria corresponded with a student reporting a certain criterion or set of criteria that must be met before it was worth being clicked on. By stating on line 16 that he saw social media profiles like LinkedIn to be "a terrible source" of information when vetting authors, Irving was imposing an inclusion criteria to ensure that he only drew information from sources that, by his own definition, did not offer an author the capacity *to say whatever they want* about their credentials.

What is additionally worth establishing, however, is that his usage of an inclusion criteria by avoiding social media content to vet the author was drawn conducting littoral engagement first: clicking on the top search result without any corresponding scrolling. Had Irving avoided this littoral-type engagement in the first place, he would have found the University of Utah link and succeeded vetting the source on the initial click. Such a finding raises pertinent questions about whether the sources that populate the very top of one's search results are the most valuable resources for vetting authors, websites, or their sponsoring organizations, though this critical

assessment of the littoral zone remained unstated by Dylan, Mark, or Irving. Nevertheless, having verified the credentials of the first author, Irving then moved to the other tab with the *Paige Snelgrove Psychologist* search results shown in Figure 13 below.

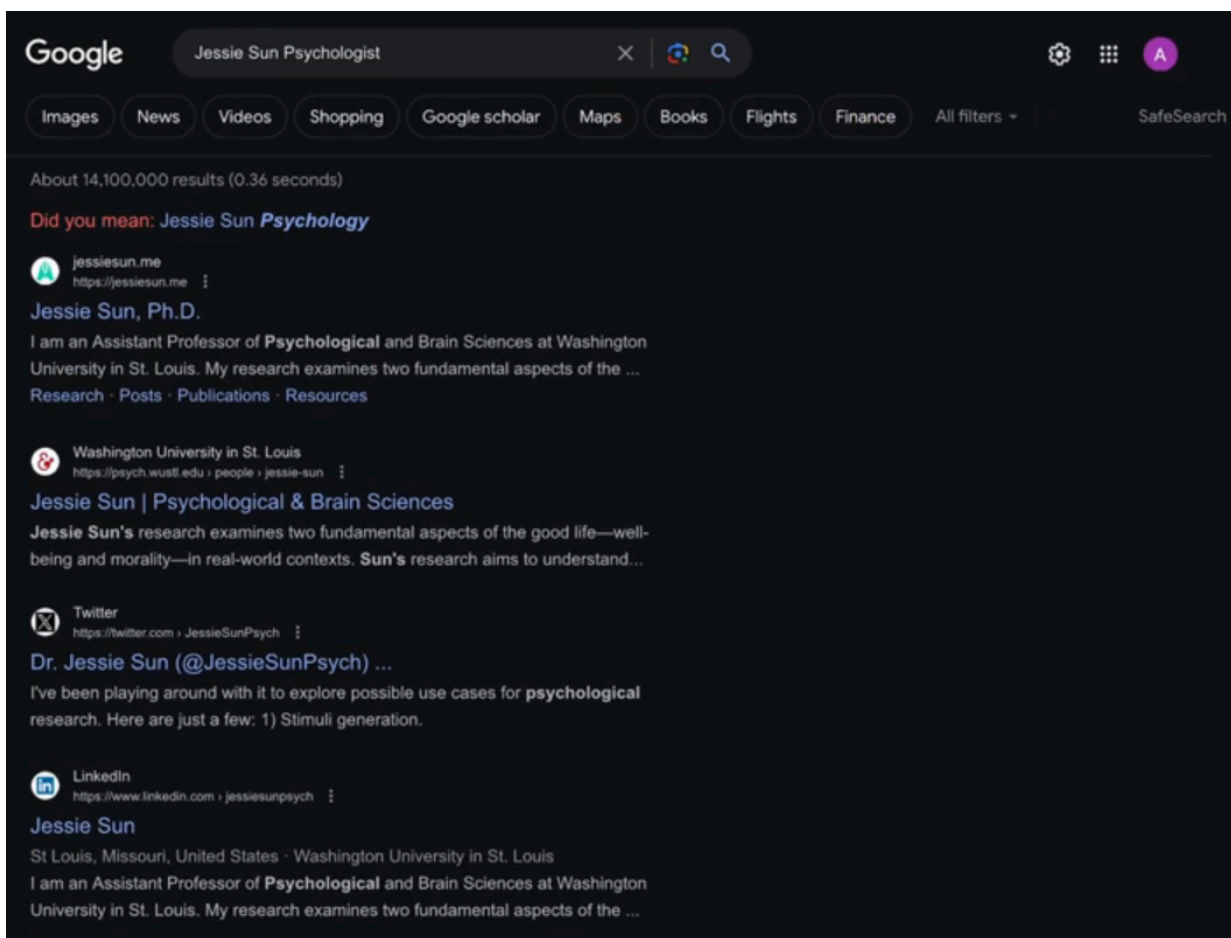
Figure 13. Keyword search of “Paige Snelgrove Psychologist”



Unlike his initial search, he did not click on the first search result, which presented a hyperlink to the source article. Instead, he scrolled midway down the page and paused, concluding that he couldn't "find anything" about the second author. He did not conduct any search refinement, such as adjusting his search parameters or even pivoting to vetting the organization or publication instead. As a result, Irving's lateral reading of the second author resulted in what I previously coded as a *failed search*, or the inability to find a secondary, unaffiliated, or independent source of information.

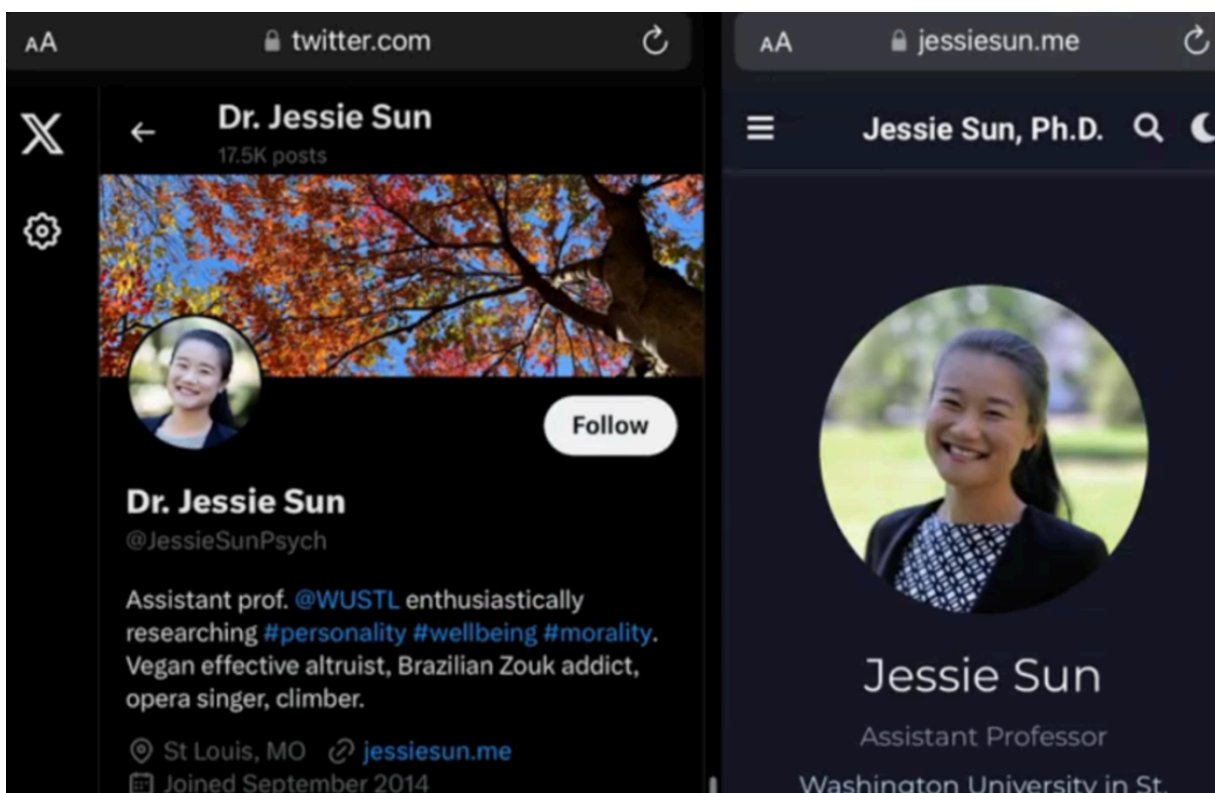
Now, Irving's confrontation with a failed search is not within itself emergent. In fact, students reported failed searches quite regularly when vetting authors directly—at a 40% clip when totaling up all reported attempts to laterally read a source's author in students' submitted work. When confronted with a failed search, students reported pivoting in one of two directions: either they pivoted to close reading the source to vet its credibility instead, or they simply began vetting the sponsoring organization, website, or publication. Irving, however, simply moved to vetting the third author. To do so, he typed out *Jessie Sun Psychologist* and hit enter, presenting him with search results showcased in Figure 14 below.

Figure 14. Keyword search of “Jessie Sun Psychologist”



As shown in Figure 14, Irving was presented with a list of links. The first link was to her personal website. The second was a link to the Washington University in St. Louis webpage. The third was to a Twitter profile. Irving did not select any of them at first. Instead, he held-and-dragged the link and created a second browser window on the same tab, creating a split view with the Twitter profile on the left and the original search result presented on the right of his screen. He ignored the Twitter feed at first, hovering over Jessica Sun's profile picture and bio when Irving moved back through the search results on the right-hand side of the tab. Rather than selecting the Washington University of St. Louis webpage this time, however, he selected the very first link indicated in Figure 14, which sent him to her personal website. This resulted in a side by side view of the Twitter feed on the left and the personal website on the right as shown in Figure 15. Excerpt 8 to follow showcases their turn-taking as he reviewed this split view.

Figure 15. Split view of Twitter profile and personal website



Excerpt 8. “They’re the same person.”

Irving is looking at Figure 15 as he speaks aloud to his group.

21 **Irving:** You know what? I’ll put this down as, uh, authentic because they’re the
22 same person.

23 **Dylan:** Oh?

24 **Mark:** Wow.

25 **Irving:** Yeah, you can tell that they’re real because they have two separate
26 pictures of themselves on two separate accounts of theirs.

Irving begins scrolling down the Twitter feed on the left side of the screen.

27 **Dylan:** Oh, yeah?

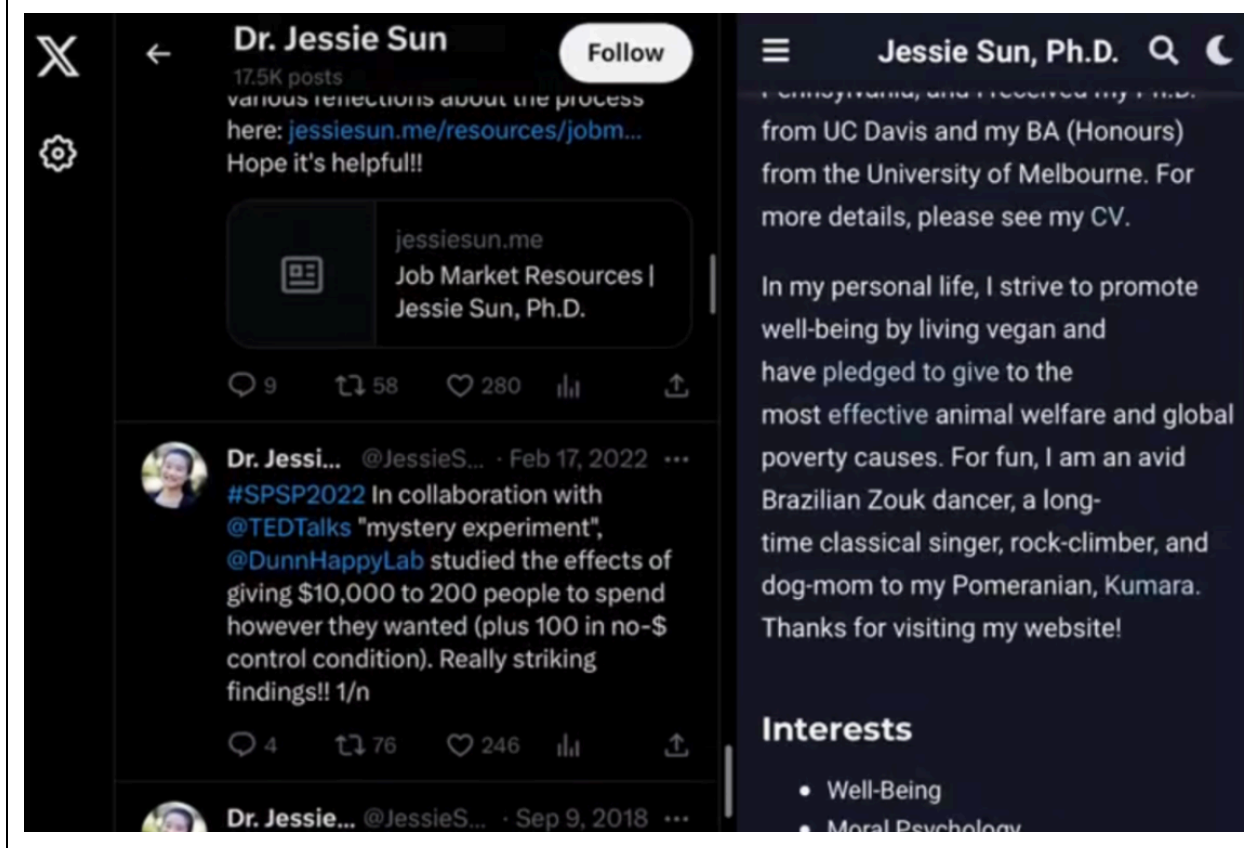
28 **Irving:** All right, this person is credible. They don’t post very much on Twitter.
29 I’m also going to say that’s a good thing.

30 **Dylan:** Not getting into any controversies?

Irving stops scrolling down the Twitter feed and moves over to the right side of the interface profiling her website. He starts scrolling down the page and pauses. Figure 16 below indicates what he’s looking at as he responds to Dylan’s question.

31 **Irving:** I don’t know, but they have an interest in their personal well being, which
32 might mean that, uh, they focus more on emotion... Might not... Might be
33 bad, I don’t know.

Figure 16. Irving scrolling through the personal website



As Irving moved through both the personal website and social media profile, he seemingly abandoned not only his inclusion criteria but also his original motivation: from verifying the author’s credibility to determining their “authenticity” instead. Given this shift in search telos reported on line 21, he concluded the author was “real” based on the observation that “they have two separate pictures of themselves on two separate accounts” (lines 25-26).

From there, he then scrolled through the personal website. He took note of their self-reported education background and research history, perceptively reorienting his intentions back to vetting the author’s credibility. He then concluded that the third author was credible despite relying on a previously established “terrible source” to make that judgment call on line 16 of Excerpt 7—one where they can *say whatever they want* about themselves.

Though Mark and Dylan indicated surprise on lines 23 and 24 of Excerpt 8, at no point did Dylan or Mark push back on Irving's assertions or recommend a readjustment in his vetting procedure. However, after Dylan substantiated Irving's assessment that not being on Twitter is "a good thing" by "not getting into any controversies" on line 30, Irving appeared to doubt his assessment. His "I don't know" response on line 31 was followed by Irving backing out from the personal webpage on the right-hand column.

From there, the search results composed themselves into a different arrangement as indicated in Figure 17 below. The personal webpage and Twitter profile he previously visited were reoriented as the top two search results, with the Washington University of St. Louis link listed third. He selected this link, with Excerpt 9 showcasing the turn-taking that corresponded with this click and Figure 18 reflecting the end process of his vetting procedure.

Figure 17. Split view of Twitter and Google search results

Dr. Jessie Sun
17.5K posts
they re being jerks. 1/11
psyarxiv.com/sg5aw/

Follow

11 86 199

Dr. Jessi... @Jessie... · Sep 17, 2020 ...
"Eavesdropping on Missing Data: What Are University Students Doing When They Miss Experience Sampling Reports?" (w/ @mijkenijk & @siminevazire) was accepted at PSPB this week! psyarxiv.com/5tcwd THREAD (1/n)

osf.io
Eavesdropping on Missing Data: What Ar...

8 71 209

Dr. Jessi... @JessieS... · Feb 12, 2021 ...
Closing advice: Do research that you're really proud of and believe in; don't postpone it until you get a job or get tenure. @betsylevyp #SPSP2021

3 30 209

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<https://psych.wustl.edu/people/je...>

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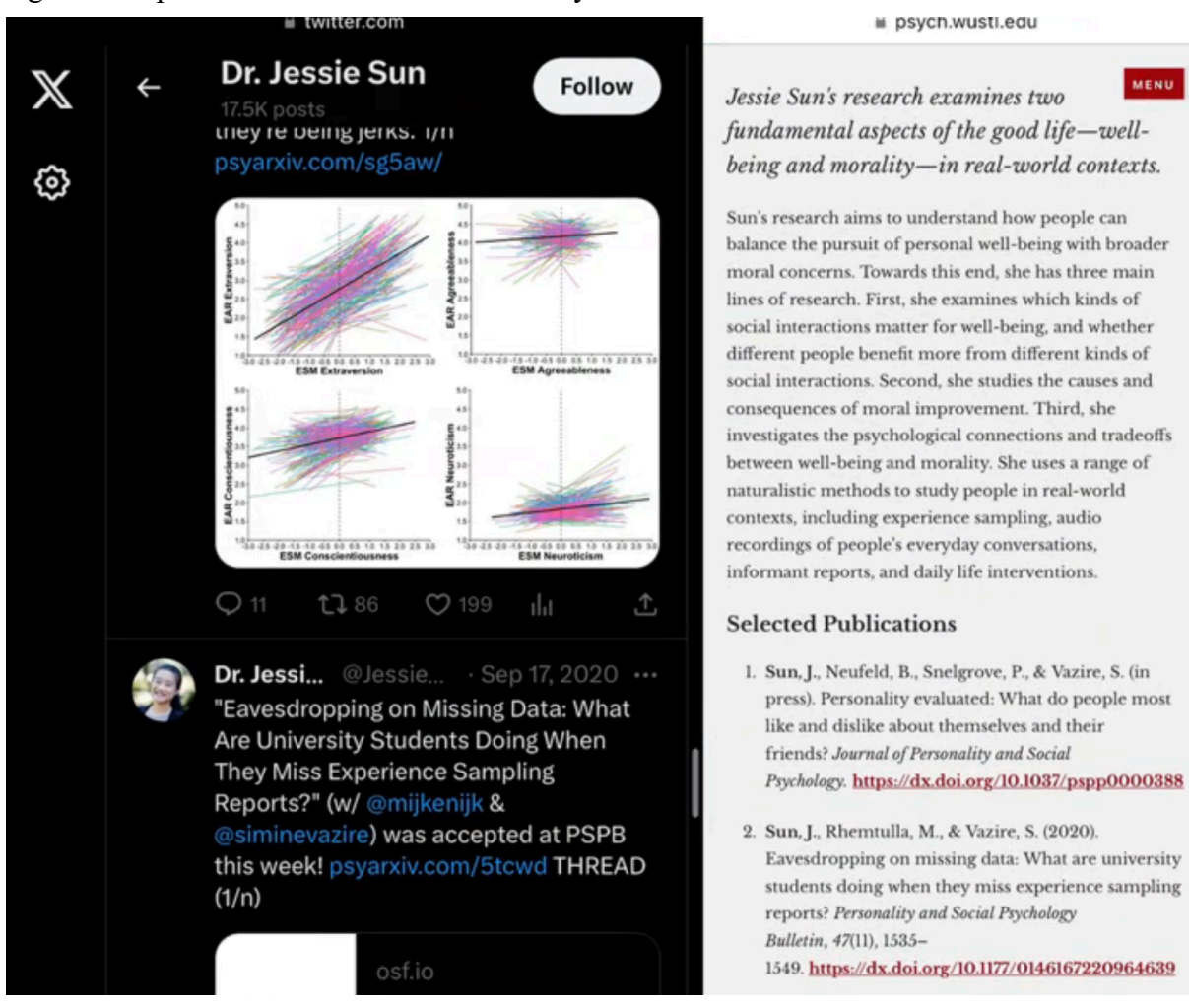
Excerpt 9. “I think this is enough to verify...”

34 **Irving:** Okay, here’s something from the Washington University of St Louis that
35 talks about their research.

He scrolls down the page to see a list of selected publications with links, which is reflected on the right-hand side of Figure 18.

36 **Irving:** All right. I think this is enough to verify that my source was at least
37 written by people who are somewhat competent.

Figure 18. Split view of Twitter and secondary source



In the end, Irving did manage to secure a secondary source for the third author to qualify as lateral reading in this final instance, but he did so only *after* having engaged with social media

and personal website content first, even after acknowledging such a process as “not very good” from the onset. Similar to the first group that indicated a threaded, more complex relationship between close and lateral reading than the existing data had suggested, Irving’s encounter with these three authors raises questions of how judiciously students maintain an inclusion criteria and how often students break or abandon this inclusion criteria in place of search refinement. Rather than demonstrating a linear or progressive track of vetting sources using a search algorithm, even with a preordained orientation to avoid primary sources of information, Irving’s movements through the interface indicate a more threaded relationship between primary cross referencing and lateral reading than the submitted work previously indicated.

He originally conducted littoral engagement, directing him to a source that qualified as primary cross referencing: the author’s LinkedIn profile. From there, he realized that a source’s social media content was not an effective method to vet a source, pivoting to lateral read the author instead by viewing a webpage connected to the university the author attended. Though he established this method to laterally read as an inclusion criteria, this procedure led to a failed search when vetting the second author. However, rather than adjust his search parameters or pivot to vetting the organization instead, as students reported doing so in their submitted work, he simply abandoned his inclusion criteria when moving to the third author by once again clicking on an author’s social media content and personal website. Perhaps in part because of his earlier reference to personal websites and social media profiles being a “terrible source” for the purposes of lateral reading, he hedged his credibility claims in marking that the third author was at least a “real” or “authentic” person on the basis of these resources. He made these maneuvers by selecting the first and third links of the search results and not the legitimate secondary source that was sandwiched between them: a webpage connected to the university where the author

worked. Specifically, rather than moving to the university webpage as he had done with the first author, he directed his attention to the author's social media presence and personal website.

What these maneuvers illustrate is not a wholesale prioritization of primary cross referencing or lateral reading as a vetting strategy but a decision to maneuver between both on the basis of a failed search in absentia of search refinement. When confronted by a failed lateral search, students typically reported amending search terms or simply looking up information about the journal or its publisher. Other students reported shifting strategies entirely: pivoting to close reading, for instance. What Irving illustrates here, instead, is the omission of search refinement corresponding with a pivot to relinquish an inclusion criteria.

This is an important consideration, as students reported that they were just as likely to conduct primary cross referencing as they were to laterally read when vetting authors in their submitted work. Specifically, among the nine students who exhibited primary cross referencing in their submitted work, eight of them reported using primary cross referencing to vet their authors in comparison to only seven students who reported attempting to laterally read their authors at all. Irving did not submit a research findings essay to help establish a stronger link to this phenomenon, but what he indicated in the preceding excerpts nevertheless raises an important consideration of how primary cross referencing can emerge as an embodied practice when confronted by a failed search encounter or an apparent aversion to refine one's search parameters.

Similar to the first group, this series of vignettes additionally raises questions about how talk-turns between students influence the emergence of actions previously associated with demonstrations of algorithmic awareness. Despite Irving following a relatively isolated self-talk protocol that led to his concluding remarks on the third author on lines 28-29 ("All right, this

person is credible. They don't post very much on Twitter.”), Dylan's follow-up response on line 30 (“Not getting into any controversies?”) coincided with Irving's movement away from the personal website instead to the university's webpage. The extent to which these talk-turns contribute to the emergence of certain actions when vetting sources warrants further investigation.

4.4.3 Vetting sources within the littoral zone: “Google literally tells me he has a PhD.”

As defined previously, the littoral zone represents the top-level content of a search engine results page. Anything that can be accessed within the littoral zone can be reached without scrolling. Littoral zone content is inclusive of the top few search results, for example, as well as Google-generated content like widgets and paraphrased excerpts from Wikipedia pages. The third group to be profiled here showcases four students: Draper, Holden, Miller, and Nagata, who inferred a source's credibility using these Google-generated snippets within the littoral zone. As they did so, they drew conclusions about their source under the presumption they were laterally reading when, in fact, they were drawing credibility claims via content repurposed from the very same source they were vetting.

Miller volunteered to go after Holden struggled to find his source. After beginning to type the hyperlink directly, Miller conducted a title-based search for his article: *how to feel competemt in work and adequate in love*. He did not fix his mistype of “competent” when he hit enter, but he did comment that Google would figure out what he meant, admitting that “Google can figure out the ‘competent’ issue.” His search results presented a Psychology Today article as its first link, and Miller selected it, handing the tablet to Holden. At the start of the excerpt,

Psychology Today

[Find a Therapist](#) [Get Help](#) [Magazine](#) [Today](#) [US](#) [Search](#)

[Find a Therapist \(City or Zip\)](#)

Verified by Psychology Today

 Steven Stosny, Ph.D.
Anger in the Age of Entitlement

RELATIONSHIPS

How to Feel Competent in Work and Adequate in Love

Behaving the same way in these distinct domains weakens both.

Posted August 18, 2023 | Reviewed by Tyler Woods

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Pay Only For What You Borrow

Apply For A Business Line Of Credit

1 **Miller:** All right. Rip and tear. What's wrong with this source? Find something
2 wrong with it.

Holden is looking at the Psychology Today article presented in Figure 19, which shows the title and the byline. He makes no movement at this point on the page.

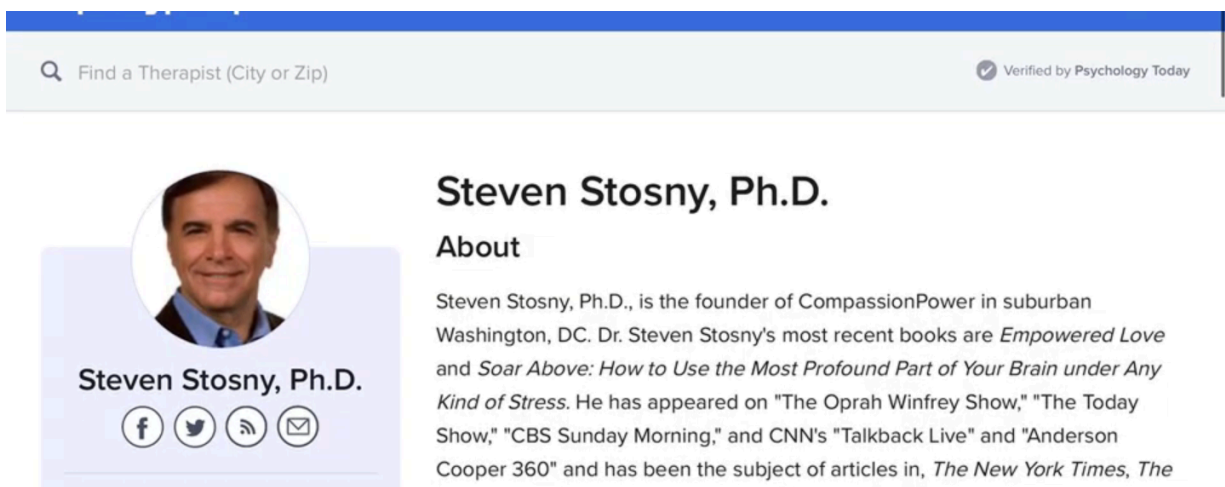
5 **Miller:** Does he?

Following his statement, Holden selects the hyperlinked byline at the top of the page, moving him to a separate page. Miller begins talking as it loads.

Miller abruptly stops talking. The page finishes loading: a biography about Steven Stosny on another page of Psychology Today, which is showcased in Figure 20 below.

- 9 **Miller:** It's on Psychology Today. You have to go to another source. I think I
 10 actually went to another source, uh, when I was researching it. I found,
 11 like a university he taught at... I think it was Trinity. I think I, like,
 12 googled 'Psychology Today.' I checked, like, for bias on it, and I checked
 13 for credibility on it. Although, I can't really think of any way that it could
 14 be biased at all because it's, like, an education topic with no marketability.
- 15 **Holden:** Trinity, okay.

Figure 20. Author's "about" page on Psychology Today

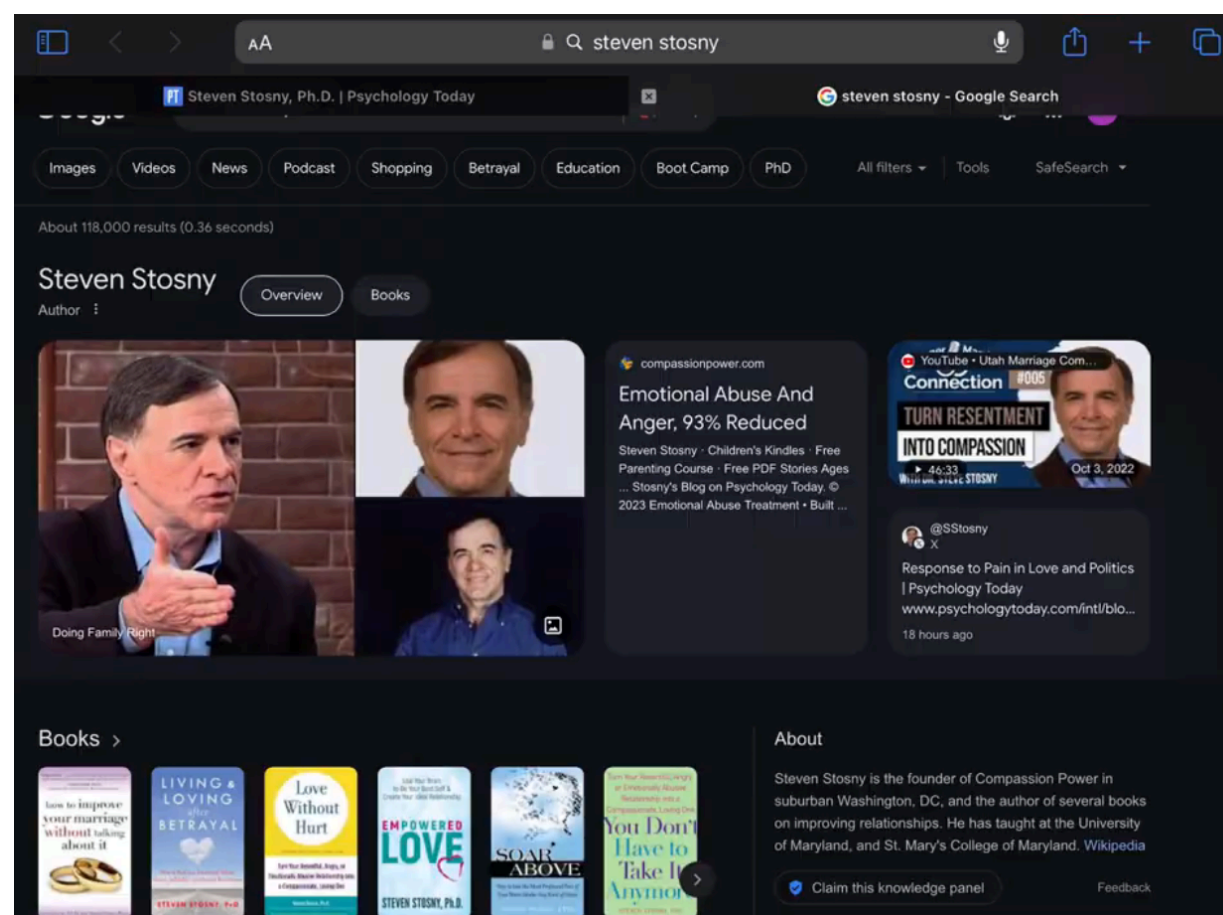


Though Miller directed Holden to “find something wrong” with his source on lines 1-2 of Excerpt 10, Holden first focused his attention on the author’s credentials: his PhD, which was listed in the byline. Contrary to past groups, Miller was quick to challenge Holden’s assessment of the source’s credentials on line 5 (“Does he?”). Regardless of whether Holden was clicking the link to vet the source by close reading as past groups indicated, or if he was merely seeking additional information to search up the author more accurately, Miller instructed Holden to go beyond Psychology Today on line 9, as the hyperlink merely sent them to another page on the website. Miller added information that he had already looked up the publisher and shared what

he learned, which potentially led Holden to vet the author instead of the publication—a task which had been shown to be difficult given what the previous vignettes showcased.

After Miller made his recommendation to laterally read the source, Holden opened a new tab and typed *Steven Stosny* into the search box. The results became populated with Google-generated content. The Google-generated content included a widget showing books Stosny has written alongside a Wikipedia summary. Holden hovered at the top of the search results for a few moments before he spoke aloud to Miller. Excerpt 11 showcases the talk-turns they engaged in as they reviewed the search results, showcased in Figure 21 below. The screen capture in Figure 22 reflects what they were looking at as they concluded their talk turns.

Figure 21. Keyword search of “Steven Stosny”



Excerpt 11. “Okay, this guy seems pretty credible.”

16 **Holden:** Hey, he’s on the front page of Google.

Holden remains at the top of the search results presenting the widget that lists the books Stosny has written, indicated in Figure 21 above. He scrolls left to right through the widget as he speaks.

17 **Holden:** Author of books, lots of books...

Holden then clicks on the Wikipedia link embedded in the Google-generated summary related to Steven Stosny in the bottom right of Figure 21. He scrolls to the very bottom of the page and back to the top as presented in Figure 22.

18 **Holden:** Okay, okay... Steven Stosny is the founder of Compassion Power...

19 Okay, this guy seems pretty credible.

20 **Miller:** Seems?

21 **Holden:** Seems, at least [laughing]. At least based on Wikipedia and the front page
22 of Google.

Figure 22. Wikipedia entry on Steven Stosny

Steven Stosny

🌐 1 language ▾

Article Talk

Read Edit View history Tools ▾

From Wikipedia, the free encyclopedia

This article has multiple issues. Please help [improve it](#) or [\[hide\]](#) discuss these issues on the [talk page](#). *(Learn how and when to remove these template messages)*



- This article **contains content that is written like an advertisement**. *(August 2014)*
- This [biography of a living person](#) **needs additional citations for verification**. *(August 2014)*

Steven Stosny is the founder of Compassion Power in suburban Washington, DC, and the author of several books on improving relationships. He has taught at the [University of Maryland](#), and [St. Mary's College of Maryland](#).^[1] Stosny argues that [marriage counseling](#), [psychotherapy](#), [anger management](#), and abuser

When presented with the *Steven Stosny* search results, Holden remained solely within the littoral zone, or what Holden described as “the front page” of Google. He first focused his attention on the Books widget before moving to Wikipedia. From there, he recited information from the Wikipedia article that corroborated the claims made about Steven Stosny on his Psychology Today biography page, concluding that Stosny “seems pretty credible” on line 19. At no point in the vetting of Steven Stosny did he scroll beyond the Google-generated content or click on any sources outside of the Wikipedia entry presented in the widget, exemplifying solely littoral engagement. Additionally, neither Holden nor Miller drew attention to the warning from Wikipedia that the article on Steven Stosny was of suspect quality: that it “[contained content that is written like an advertisement” while also “[needing] additional citations for verification.”

In making his statements, Holden did at least minimize his findings. In his reference to Stosny “seeming” credible on line 19, Holden qualified his statement with the acknowledgement that his vetting of Stosny at this point was merely “based on” the Google-generated content he clicked through on lines 21-22. Miller remained unconvinced, however, and pressed Holden to vet the author further. He asked him to “check the university,” referring either to his past search related to Trinity College or the contents of the Wikipedia snippet that reported that Stosny had taught at the University of Maryland. In response, Holden opened the Google search box at the top of Safari and entered *Steven Stosny University of Maryland* to verify. He scrolled to the bottom of the first page of search results before speaking again to Miller. Excerpt 12 illustrates the conclusion of their talk related to the source.

Excerpt 12. “I can’t find anything at all.”

23 **Holden:** Hmm. I can’t find anything.

24 **Miller:** Nothing wrong?

25 **Holden:** No. I can't find anything at all.

Holden does not click on any links. Instead, he scrolls back to the top of the page.

26 **Holden:** When I search 'University of Maryland,' there's no page, even though it
27 says he teaches there.

Holden continues to scroll up and down the search results. He then moves back to the first tab that shows the about-the-author page on Psychology Today and returns back to the original article.

28 **Holden:** We'll just say he's credible for now. He seems pretty credible based on
29 what I've seen here.

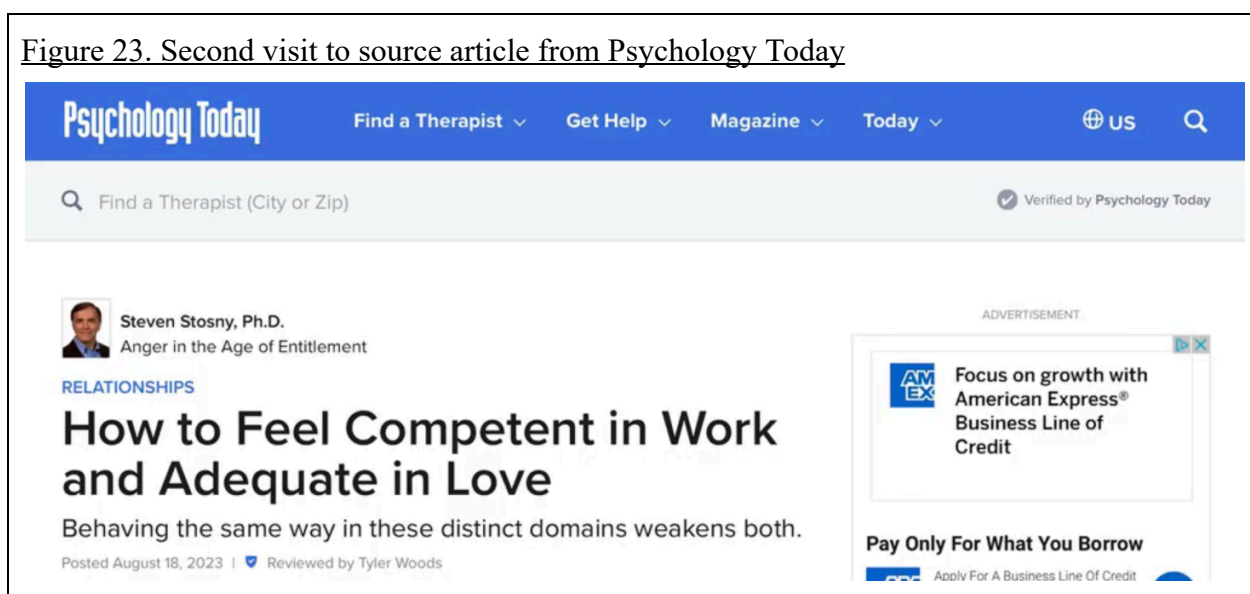
By all appearances, Holden conducted lateral reading up to this point in the process. He deferred trusting the author on the basis of their own biographical information and instead maneuvered to laterally read the source using a secondary source of information. From the primary source of information, Holden moved to Google and began drawing conclusions about the author based on what the "front page of Google" presented to him during Excerpt 11, such as the number of books that he authored on line 17. He then went to Wikipedia, a perceptibly unaffiliated source of information from Psychology Today, and subsequently drew a low-stakes conclusion about the author's credibility on line 19. However, despite maintaining all appearances of lateral reading, Holden's process maintained a closer resemblance to primary cross referencing, and neither he nor Miller reported their awareness of it at the time.

While Holden was keen to minimize the scope of his conclusions of the source's credibility in that he *seemed pretty credible* on the basis of what he had seen up to that point, Holden failed to pick up on multiple context clues to indicate that the Wikipedia article itself was not a sufficient source to vet the author's credibility. Aside from Wikipedia's own self-reported concerns about the article's tone and its lack of citations, the very content that Holden read aloud to Miller was citing the same article they had originally navigated from in the first place: the

Steven Stosny biography page on Psychology Today. Thus, even though Wikipedia counts in this instance as an unaffiliated, secondary source of information, Holden and Miller were, in a manner of speaking, drawing information from the very source they were vetting despite working under the assumption that Stosny’s credibility was “based on Wikipedia and the front page of Google.” While not an exact representation of primary cross referencing, this finding raises serious concerns about the quality of information one can draw from the littoral zone when it comes to vetting unknown sources of information—and when drawing information from Wikipedia without double-checking its own cited sources of information.

As these events transpired, Nagata and Draper were working together to vet Draper’s source on their personal devices. Though Holden seemed content with the source’s credibility, Miller recruited Nagata and Draper for assistance, seemingly unconvinced of Stosny’s credibility. Draper volunteered to take a look at the source, and Holden handed her the tablet. The tablet was still presenting the article where Holden had left it, sitting at the top of the page as showcased in Figure 23. Excerpt 13 reflects what Draper said as she began scanning the article’s content, with Figure 24 reflecting the keyword search they conducted at the end of the excerpt.

Figure 23. Second visit to source article from Psychology Today



Excerpt 13. “Google literally tells me he has a PhD.”

30 **Draper:** [Reading from the byline:] Well, it says he has a PhD.

Draper scrolls down and then up the page as she and Nagata talk.

31 **Nagata:** Yeah, I think he seems credible.

32 **Draper:** From what, the PhD? [laughing]

33 **Holden:** I mean, that’s what I said.

34 **Draper:** I don’t get why a PhD wouldn’t be credible.

Draper continues scrolling down and back up the page as they talk. She has not yet moved beyond the source article page.

35 **Draper:** I mean, you spend so many years...

36 **Miller:** Yeah, but we don’t know if he actually has a PhD or if he could be making
37 that up.

38 **Draper:** Wouldn’t that be a crime?

39 **Miller:** Yes, and? Welcome to the internet. Have a look around.

Draper moves to the second tab with the Steven Stosny University of Maryland Google search results. She deletes the University of Maryland key words from the search, adds PhD, and hits enter. Figure 24 reflects what they’re looking at as they talk.

40 **Draper:** Okay [scoffs]. Well, that clears that up.

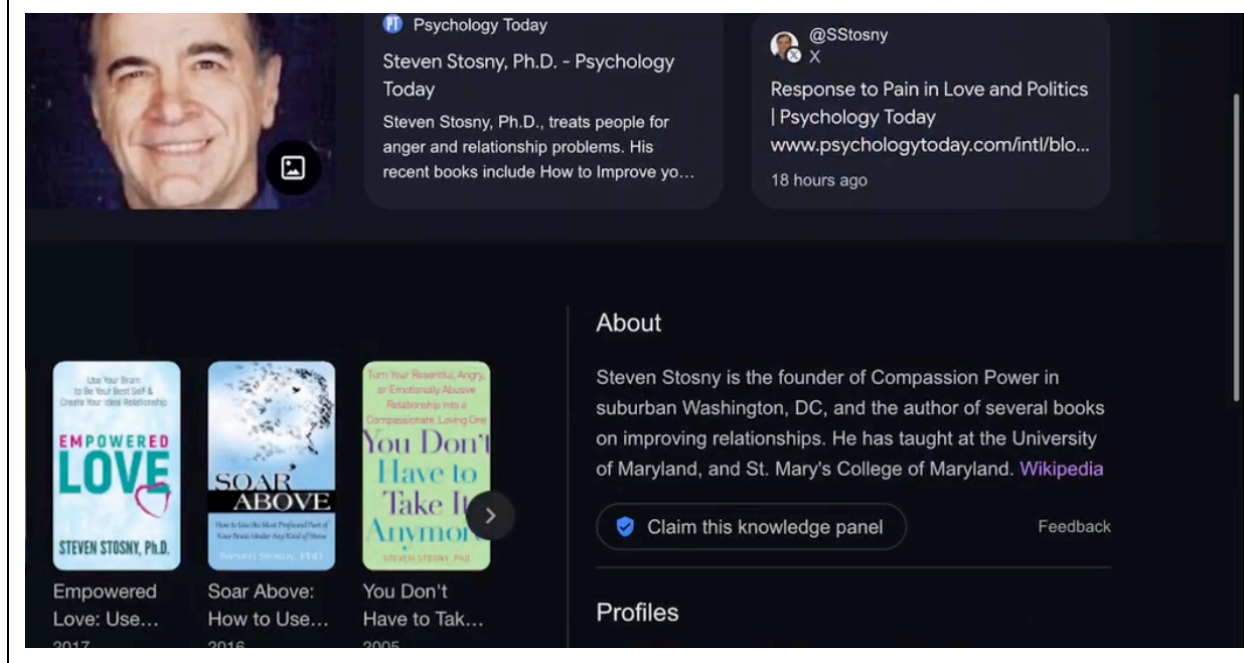
41 **Nagata:** Huh?

42 **Draper:** Google literally tells me he has a PhD [laughing].

Draper does not scroll beyond the Google generated content or clicks on anything, with the page hovering as indicated in Figure 24.

43 **Nagata:** Yeah, yeah. I think it’s a credible source, whoever’s article this is...

Figure 24. Keyword search of “Steven Stosny PhD”



Unlike Miller and Holden, who focused on reviewing his teaching experience, Draper and Nagata turned to his education, insisting that the indication from the byline that he had a PhD made him credible on line 30. Draper made this claim without first drawing any information about Stosny outside of the article itself to verify whether the claim was true—an explicit indication of close reading as a vetting process. Draper moved beyond the source material and attempted lateral reading, but only after Miller pushed back on her reasoning—similar to what he had done with Holden. Additionally similar to Holden, Draper drew exclusively from the littoral zone to draw out another credibility claim on line 42.

The change in her search parameters to *Steven Stosny PhD* corresponded with a change in the littoral zone’s appearance. When Draper consulted the littoral zone, it presented to her a snippet pulled from Psychology Today directly—from the same exact biography that Holden and Miller navigated away from. However, she did not ascribe ownership of the claims about Stosny from the Psychology Today snippet as coming from the site itself. Instead, she positioned Google

as a secondary source of information itself in specifying that *Google told her* Stosny had a PhD. As such, while Holden's vetting of Steven Stosny fell within a liminal space between lateral reading and primary cross referencing, Draper's assertions of Google "[telling] her" (line 42) that Stosny has a PhD is a clear indication of the primary cross referencing feedback loop that can occur when vetting within the littoral zone. Using keyword search talk comprising the author's name and his reported credentials, the littoral zone merely repackaged the very same Psychology Today article she was vetting.

From here, the group grabbed my attention, explaining that they were at an impasse. While the rest of the group was seemingly convinced of Stosny's credentials, Miller continued to challenge his own source's credibility. As Nagata explained it to me in the moment: "I thought it was fine. Then we looked up if he— because he says that he went to the University of, or he— he works at the University of Maryland. But it says he doesn't work there when we looked him up on the website, so now we're conflicted."

Tablet in hand, Miller then walked me through the stages of their vetting procedure up to this point by "googling about him specifically." This led him back to the Wikipedia page again from the *Steven Stosny PhD* search results. Excerpt 14 reflects the talk turns we took together, with Figure 25 presenting the Wikipedia page once again.

Figure 25. Second visit of Wikipedia entry on Steven Stosny



Excerpt 14. “Okay, so it’s a loop...”

Miller is reading the second sentence of the Wikipedia article presented in Figure 25.

44 **Miller:** His Wikipedia says he hasn’t taught, or– he has taught. Okay. He has
45 taught.

46 **Instructor:** Maybe he worked as, like, a lecturer? Or something like that.

47 **Miller:** Probably that, so, um... Wait. There’s a footnote.

Using the tablet, he taps on the numbered footnote at the end of the sentence. It sends him to the bottom of the page, indicated in Figure 26.

48 **Miller:** Psychology Today. Okay, so it’s a loop where Wikipedia is referencing
49 Psychology Today, which is what we’re trying to see... So, so... In reality,
50 we don’t have enough information.

Figure 26. Footnote in Wikipedia entry on Steven Stosny

References

[edit]

1. ^{a b} "Steven Stosny, Ph.D. | Psychology Today" [↗](#).
2. [^] Stosny, Steven (2006). "Why Marriage Counseling, Psychotherapy, Anger-Management, and Abuser Treatment Made It Worse". *You don't have to take it anymore: Turn your resentful, angry, or emotionally abusive relationship into a compassionate, loving one* [↗](#). Free Press. ISBN 978-0-7432-8469-1.
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Though he voiced his concerns about this feedback loop to his group on line 48, everyone else remained convinced of the source's credibility. Admittedly, regardless of Stosny's individual credentials or the indication of this feedback loop, the group was not unreasonable to conclude that Miller's source was somewhat credible given that Miller gave the game away in the first place. Holden began the lateral reading process being given the information from Miller that he had already verified the credibility of Psychology Today, searching keywords related to both its bias and credibility.

This vignette nevertheless illustrates a wicked problem that can emerge when students refer to these Google-generated content summaries when vetting sources: the blending of secondary and primary sources of information. Referring back to Figure 24, the Google-generated summary consisted of multiple content panels including the Psychology Today article, a link to his Twitter profile, a books widget, and the Wikipedia entry. While the content panel tied to the Psychology Today article explicitly articulated the source of information—despite Draper's positioning of *Google telling her* that he had a PhD—the Wikipedia entry presented the claim about Stosny's teaching experience without indicating the source.

Only through selecting the link and reading Wikipedia directly did Miller discover from Figure 26 that the credibility claim, composed within the knowledge panel, originated from the very same article he was vetting on lines 48-49 (“Okay, so it’s a loop where Wikipedia is referencing Psychology Today”). Without that corresponding footnote or the maneuver to hover or even potentially click through the interface, however, that observation may not have been made. In fact, if one compares the interface design features of Figure 25 and 26 from the Google-generated snippet presented in Figure 24, one can see that the hyperlinked citation that revealed the citation loop to Miller was not there. The design features of these Google-generated content summaries essentially buried the lead by not attributing where the information was coming from.

4.5 Using and talking about social media during the distant reading analysis

Sixteen (or 42.1% of all participants) reported how they clicked and scrolled through the interface to find the sources they analyzed for their distant reading analysis. The section that follows illustrates the two ways students reported interacting with social media platforms in their distant reading analyses: tidal drift and distant diving.

4.5.1 Tidal drift

Ten students (or 26.3% of all students) reported what I coded as *tidal drift*. I coded instances of student writing as tidal drift when I observed direct engagement with recommended content while navigating social media platforms. These students described their process as a matter of “browsing” through their news feeds, remarking that the content they saw was *recommended* or *suggested* to them.

While this perusal of recommended content sounds akin to littoral engagement, tidal drift involved two major differences. First, while tidal drifters indicated moving within the littoral zone, they also indicated moving beyond it. By scrolling through their “FYP” or “For You” pages on Instagram and TikTok, students reported engaging with more than just the first video or social media post they encountered. This propensity to scroll deeper into their news feeds correlated with the reduced reporting of littoral engagement during the research project. Specifically, only one student (or 10% of) all students who conducted tidal drift similarly showcased any instances of littoral engagement during their research project.

Second, some tidal drifters announced that, in their attempts to “browse” their recommended feeds, they did so over multiple instances before finally selecting a source to analyze. The intent, in many of these instances, was to find something to analyze that they believed had *gone viral*. One student, for example, chose to analyze a story that had been reappearing for multiple days in her feed; another student chose to analyze Tessica Brown, otherwise known as “the Gorilla Glue girl,” because she saw imitations crop-up in her feed for days after watching the original.

“It all began with a TikTok video,” she explained. “Due to the absence of her regular hair spray, a woman found herself with her hair firmly adhered to her scalp after using Gorilla Glue spray as a replacement.” Tessica Brown’s original video, in her words, “fueled widespread curiosity” across TikTok and ultimately resulted in a fad of “risky experimentation” among those who attempted to recreate Tessica’s error. One notable imitation, for example, included a man who she explained had “applied the Gorilla Glue to the rim of a red solo cup and affixed it to his lips.” Another video she found had shown someone running a comb through “adhesive-coated” strands of hair to garner strong reactions.

As she watched these videos, she explained that she became critical of TikTok and its effect on the general public. “Viral acts often lead to a cascade of imitations,” she said, “even when those imitations involve perilous stunts.” And in the case of Tessica Brown, this *perilous stunt* that was originally an isolated incident became a part of a larger trend of others “putting themselves in danger that might cause permanent discomfort to their bodies.”

Though the preceding remarks were targeted more so toward TikTok users and the use of the platform at large, she critiqued the role of the algorithm in this process as well. She explained that TikTok’s algorithm intentionally promoted more dramatic videos across the social media platform for the purposes of engagement on the basis of what she saw that tended to go viral. She felt that, in large part because of what the algorithm promoted, TikTok users are “encouraged to pursue extreme actions solely for the sake of garnering views on the Internet.”

Tidal drifters, in general, were critically aware users of the algorithm. While tidal drifters only made up 39.1% of all students who demonstrated critical awareness toward social media algorithms, nine of the ten (or 90% of) students who I categorized as tidal drifters made critical comments toward social media algorithms in their distant reading analysis.

4.5.2 *Distant diving*

Eleven students (or 28.9% of all participants) exhibited what I coded as *distant diving*. Instances of distant diving involved any instance where a student reported clicking through the social media platform’s interface, such as either to review additional videos by an individual content creator, or to navigate to other multiple platforms tied to a singular social media influencer, such as to ascertain the rhetorical uptake between one space versus another or between different social media posts. I also considered distant diving to include any instance where a student reported

moving beyond the “splash page” or “FYP” presented as the “front” of any social media app or website, essentially moving beyond recommended content, like conducting search queries on YouTube.

Distant diving bore a similar likeness to clickthroughs, and some distant divers even referred to their process similar to how students described clickthroughs as *going down a rabbit hole*. As a point of example, one student wrote in their distant reading analysis that they “decided to make [their] way down the rabbit hole for a more comprehensive understanding by exploring the topic further on YouTube.” Despite this association, only two (or 18.2%) of all distant divers exhibited clickthroughs when perusing search engines.

Distant diving at times corresponded with tidal drifting. Specifically, five of the students who exhibited distant diving initially conducted these tidal drifts. One student, for example, began her own distant dive by first “scrolling through TikTok late at night.” She reported that she came across a video “showing cute puppies for sale at a pet store” that was published to her FYP. After watching the video, however, she followed the hashtag to another video that revealed certain abusive pet store practices. She explained that she was presented with a video compilation of what led animals to be in these kinds of pet stores and what to look out for as a consumer. She learned that the entire account’s purpose was to draw attention to puppy mills—places she described as “where dogs are bred in poor conditions and are most likely not regulated correctly.”

From this point, she dug deeper into the content creator’s body of work. She reported scanning the statistics of other videos on their profile, explaining that “it seemed to reach a decent amount of people as it had hundreds of likes in most of their videos.” And after clicking through a few more of these TikTok videos, she moved to the content creator’s other social

media pages on Instagram and Facebook. She noticed that the Facebook comment sections offered a richer point of analysis than the Instagram or TikTok videos given there was increased engagement between both the viewers and the content creator with more likes and comments.

With her pivot to other social media platforms, her analysis became more critical. As she navigated to Facebook, she scrolled from top to bottom of each video's comment section she watched. She observed that "most people were also shocked" by the content of the video she was watching. "They were sending their support, and their gratitude for saving puppies from those horrible puppy mills," she explained. "But, I did see some comments saying that puppy mills aren't as bad as it was made out to be. One particular comment caught my eye and it said 'It could be worse!!' Another one was 'I mean they do have food and water.'" As she scrolled from top to bottom of each comment section, she observed that the comments themselves had a certain hierarchy. In her own words, she explained that she believed that "the more supportive the comments were, the more likes it got, which brought it more to the top." The more problematic comments in her estimation "didn't have more than ten likes" and were customarily pushed to the "very bottom" of the comment section.

Distant diving, in many of these instances, corresponded with similar demonstrations of critical awareness tied to content arrangement. In fact, nine (or 81.8%) of the eleven students who conducted distant dives like these made at least one critical remark toward the algorithm in their distant reading analyses as they did so. Another distant diver made a similar inference when returning to a video's comment section days after initially seeing it. The video, she explained, was a speech by then-President Biden in response to the emerging War in Palestine. "When I actually watched this video a couple of days before," she wrote, "I believe when it came out and it was freshly there, there were a lot of comments saying, 'Oh, you know, really try to understand

both sides.’’ However, upon revisiting the comment section again at a later time, the diversity and composition of the comment section had changed. ‘‘I’m not seeing that now,’’ she wrote:

It’s just very one-sided comments. I believe they had either been removed, or they had been just very dropped down. Usually it’s like the newest comments get raised up and the ones with the most likes get raised up. But now I’m not seeing them. I’m just seeing that, you know, we’re just really proud ... Basically, most of the common section are agreeing with Biden and how it’s very painful, how it’s very heartbreaking, how it’s just sad to see, and how he really feels like a leader. Biden now in his speech is one of the best they’ve ever heard him in a while. There are some comments saying that we have money to fight for wars to fund the wars, but we don’t have money for the poor, or we don’t have money for our own people, but mostly everyone’s just agreeing with him.

Toward this end, she referred to a more chambering influence the algorithm has on the composition of the comment section over time. While it originally presented itself in a manner that promoted both sides, she argued that over time it became ‘‘very one-sided.’’

4.5.3 *Content arrangement*

Instances similar to the aforementioned distant divers—those that corresponded with students’ perceptions or sentiments of how algorithms curate and shape social media content—were coded as *content arrangement*. However, demonstrating critical awareness did not always correspond with distant diving. Specifically, fifteen students (or 39.5% of all participants) showcased at least one instance of reported sentiments on social media content arrangement.

While some students reported sentiments of content arrangement like the aforementioned distant diver, who saw a more *chambering* or *narrowing* of perspectives due to the upvoting and

downvoting hierarchy of the comment section, other students saw content arrangement differently. These students, by contrast, thought that algorithms deliberately ranked comments as a means to *diversify* perspectives. “The purpose” of these diversified comment sections, one student explained, was to “highlight several points of view and initiate discussions.”

Students however shared a relatively mixed opinion on the quality of the discussions being initiated by this content arrangement. “The comment section is always filled with silly little things that I find funny or controversial,” explained one student. For her distant reading analysis, she took the time to browse through her TikTok feed. “More than the video itself, the app always has the most interesting comment section. There’s so much conflict and different opinions.”

Other students shared this sentiment. “I think that social media opens up lots of chances to meet new people,” wrote another student. However, as a result of how algorithms are programmed, he explained that they serve to facilitate “more conflict than constructive conversation.” He extended this sentiment to not only the nature of comment sections but also what videos tend to circulate the platform. In his estimation, the algorithm is programmed to “promote more dramatic encounters” that subsequently increases user engagement on the platform. As another student put it, these interactions close a feedback loop where continued engagement between these conflagratory videos and their corresponding comments sections is “what keeps videos trending and popping up.”

4.5.4 Circulatory power of social media algorithms

Twelve students (or 31.6%) of the total participant population reported at least one instance of what I coded as *circulatory power*, or sentiments of how algorithms impact the uptake and

subsequent circulation of content online. The circulatory power of algorithms centered around two primary themes: one, the effect of algorithms broadening the availability of perspectives; and two, the effect of hashtags in connecting various content creators and commenters together.

By promoting a variety of viewpoints, these students argued that algorithms carried with them a certain circulatory power that enabled a widening of who can participate in the public sphere. This widened participation was seen as emancipatory, especially in contrast to more traditional means of communication. For example, according to one student, social media algorithms broadened the available viewpoints involved in conversations, especially “those who do not have the capabilities of TV networks to share their messages.”

Such statements regarding the broadening of perspectives and dialogues between various users corresponded frequently with conceptualizations of content going viral with the help of algorithms. Virality allowed content to circulate between various algorithmic spaces in a way students believed more traditional media spaces would not typically afford—presenting a far more nuanced, diversified view of the public sphere. As one student explained:

In a world full of perspectives and topics to be discussed, we often choose to share those ideas with others and express them in different social settings. With so many people from various backgrounds and different opinions, topics and discussion can become quite controversial. With so many people sharing new ideas in one area in particular like the internet, things can become widespread in a rather quick timeframe.

As a means of promotion, students also commented on the means to which content circulated across the web via algorithmic interfaces through another algorithmic affordance: the ability to share content through the inclusion of hashtags. As another student explained: “Social media platforms, particularly Twitter, Instagram, and TikTok, have played a pivotal role in amplifying

discussions surrounding *The Hate U Give*, with readers sharing their reactions, insights, and personal connections to the narrative using hashtags such as #TheHateUGive and #THUGLife. The novel's themes and characters have spawned countless fan art, memes, and tributes, further solidifying its status as a cultural touchstone within online communities," commenting not only on content circulation but also the recomposition of content via engagement with the algorithmic interface. All of this was possible, they argued, because of the algorithmic interface interconnecting various social media platforms together, enabling subdued or subjugated voices the ability to challenge authority—such as the viral trends surrounding Reesa Teesa's marriage.

According to one student, Teesa's story traveled "from TikTok, to Instagram, to Youtube, to online news sites and now—national news companies like Good Morning America are tapping on her shoulder to talk to her. None of that would have happened if the video didn't make its way from TikTok." Toward this end, students frequently saw such virality and circulation increasing the share of perspectives otherwise not possible, essentially broadening the number of voices in the mainstream. "CNN and other Western media outlets have been controlling the narrative for decades," claimed another student, "making the average American unaware of atrocities happening" in other parts of the world. "However," he continued, "this began to change by the time social media was in the hands of everyone, as Twitter, Facebook, and other apps had no real restrictions back in the early 2010s ... to look up videos that talk from the eyes of the oppressed, who do not have the means of corporate media in the West like CNN or Fox News."

The multitude of perspectives thus allows for a pushing back against more authoritative, established voices—a relationship that extended even to different content creators. According to one student, Logan Paul's choice to publish a video related to a man who committed suicide "became the most trending on all social media for some time." However, because of the public's

ability to circulate his video beyond his intended audience, “millions despised Logan” to the point where “he received hate and even some threats. He quickly took the video down once he realized what he had done.” However, the story continued:

Hours later Logan posted an apology video regarding his actions. In a perfect world that sounds great, although it wasn’t great. The apology video Logan had posted was absolutely pathetic. In the video he sounds like he was being forced to say sorry. He sounds like he didn’t care, and us, as the audience was in the wrong. Quickly other large influencers caught on and started creating parodies of Logan’s apology video ... This situation ended up shining awareness on the topic of influencers dealing with sensitive topics such as mental health issues and suicide. The results of Logan’s video showed the power of the audience.

This power was not granted exclusively to the audience, however. Another student shared in the belief that social media algorithms function as “agents of change,” both broadening various perspectives and helping the average user make a direct impact on the world at large; however, he also believed that these algorithms have influenced the breadth, scope, and persistence of corporate advertising, especially when it came to paid promotional content from content creators, resulting in what he described as a “business standard to get more viewership and attention” through less conventional methods. This in turn influenced not only what content got promoted by videomakers, according to him, but the conduct and procedure of content creators themselves.

4.6 Showcasing rhetorical awareness through rhetorical interventions

Upon completion of their research projects, students were assigned to develop a rhetorical intervention where they generated a mock-up social media post intended to reach an outside audience of their choosing: one they felt would be best served to be more informed on their

research topic. In total, thirty-five students (or 92.1% of all participants) uploaded a rhetorical intervention as a part of their submitted work across the semester.

To better distinguish rhetorical awareness from functional awareness, it is important to specify the intended audience. Functional awareness corresponded with when students showcased what they did when using algorithms *when communicating to* an algorithm. Looking up the time for the first pitch of the upcoming Washington Nationals baseball game, by communicating with a search engine directly, would constitute functional awareness of how to use an algorithm when communicating to an algorithm; rhetorical awareness, conversely, would be involved in the Washington Nationals front office creating a social media post to bring awareness to the correct time of the game's first pitch. Social media posts are not created for the entertainment or benefit of the algorithm itself but for its users. Thus, while both functional and rhetorical awareness constitute an observed tool use of the algorithm, functional awareness is couched in turn-taking with the algorithm, while rhetorical awareness is framed around the use of an algorithm to reach other users or to facilitate talk turns with other users on a specific platform, medium, or space. To put the matter most clearly: functional awareness is *communicating to* an algorithm, while rhetorical awareness is *communicating* to other users *through* or *with* the algorithm.

In the section that follows, I explain the findings drawn from the method I previously outlined in Chapter 2. I explain how I first analyzed students' rhetorical interventions according to their design features as outlined in Selber's framework as a preliminary approach to my analysis. I then will explain how students demonstrated rhetorical awareness through the exhibition of what I coded as *reflective practice*.

4.6.1 Defining design features

The thirty-five rhetorical interventions varied in arrangement and composition and utilized three primary *design features*. Design features included the use of searchable text, multimodality, and hypertext elements. Of the thirty-five submitted rhetorical interventions, twenty-seven of them (or 77.1%) had searchable text, or the inclusion of minable words or phrases by search algorithms; twenty-eight (or 80%) contained multimodal elements, such as pairing images with text or designing a video; and seventeen (or 48.6%) used hypertext elements.

4.6.2 Searchable text and choice of platform

The design feature of *searchable text* included any interventions that included typed content that could be catalogued by a search algorithm. Social media platforms rely on users' personalized feeds as a means of engagement, but many of them also include search algorithm tools for users. To take Reddit as an example, users are able to conduct a text-based search to discover various subreddits, users, posts, and even individual words within posts. Typing the word "cat" into a Reddit search box, for example, will present users with a list of cat-related communities, posts, and user names. While there are extensions and third-party tools available to conduct image-based search queries, these are not directly supported by Reddit.

In total, twenty-seven (or 77.1%) of the submitted interventions included typed content that was minable by the algorithm for this purpose. One student, for example, explained that the inclusion of key words and phrases enabled him to "push" his tweet to his intended audience, making their content more accessible via search algorithms beyond just the hypertext elements of his intervention. Other students looked at typed content more rhetorically, such as the use of certain persuasive appeals or rhetorical devices that were covered in the course. By making a

Twitter post, one student explained that he would have ample space to include “a brief explanation of the problem” and better situate the comic he included in his intervention. He explained that the inclusion of the typed content helped him reinforce the “emotional appeal” of the post, one that he explained was “geared more toward sarcasm.” Another student explained how the typed content of her post ensured it maintained an “ominous” tone between the title and its content—to make it more attention-grabbing as users navigated social media. The inclusion of these text-based design features thus corresponded with reports of how tone and word choice impacted the intended uptake of their rhetorical intervention.

The inclusion of these textual features also corresponded with the platforms students chose to use. Overall, Twitter and Instagram were the most frequently cited platforms for designed rhetorical interventions, referenced in twelve (34.3%) and eight (22.9%) projects respectively. The others were spread between Facebook (2; 5.7%), Reddit (2; 5.7%), and TikTok (1; 2.6%). No students chose YouTube as a platform for their rhetorical intervention despite it making up a significant presence in the development of their research findings.

What seemingly drove this phenomenon was a combination of three factors: audience, uptake, and effort. By way of example of intended audience impacting what platforms they chose to use, Facebook made up a slim percentage as a platform of choice based on its perceived user base. While one student dedicated their intervention to Facebook “so I can reach out to the older generation,” others steered away from the platform for similar reasons. Another student, for example, admitted that it made much more sense for them to craft their intervention on Twitter based on their intended audience. In their recorded presentation, they explained that “the majority of people who are affected by [my topic] are in the younger demographic ... It wouldn’t make sense for me to go on Facebook to post this.”

Others chose one platform over another due to the nature of uptake—what texts tend to be read and circulated. One student, for example, chose Twitter for their rhetorical intervention because “Twitter has this writing style of where people would use threads to actually explain [their ideas] one by one.” She felt this style worked well for her intervention, especially in comparison to other platforms like Reddit: “Writing a whole essay,” she explained, “would be kind of, like, not that appealing to readers.” The popularity of shortform content, while not a demonstration of algorithmic awareness, informed much of the rhetorical decision-making behind which platforms students chose. Students felt that these small, piecemeal texts in the composition of a brief tweet or Instagram post were easier to distribute across the web—those that, another student explained, were “ripe for wide dissemination.”

The limited uptake of TikTok and YouTube, by extension, corresponded with effort-based sentiments. Students acknowledged in their presentations and submitted work that TikTok and YouTube were spaces they frequented on their own time. However, their familiarity with these platforms resulted in a raised sense of skepticism—to design a persuasive intervention with the limited time they had, they felt, was unlikely. “I was thinking of a Youtube video,” explained one student in his presentation, “but so many people have made videos on this topic.” He explained that the level of fidelity necessary to make a compelling video would make it “hard to stand out above the rest.” He, as well as other students, reported pivoting to making a more simple, text-based post on Twitter or Instagram for his rhetorical intervention. Only one student considered disseminating their rhetorical intervention across more than one platform (citing Instagram, Facebook, and Twitter), and twelve students (34.3%) did not specify which platform they would use.

4.6.3 Multimodality

There was, thus, limited uptake of YouTube and TikTok with the creation of videos: only one student *considered* making a video for TikTok, presenting a script and general overview as a part of their submission. Additionally, no students brought up YouTube as an intended platform for their intervention. Despite this lack of video-based rhetorical interventions, however, multimodal elements were nevertheless commonplace in the design features of the rhetorical interventions they submitted. In total, twenty-eight students (or 80% of participants who submitted an intervention) designed a post that included multimodal elements. Figure 27 below illustrates two example multimodal interventions: one as a *searchable multimodal text*, the other using a meme-styled *image macro*.

Figure 27. Examples of searchable multimodal texts versus image macros

Parents, it is time to be less strict with your children for them to be less shy. They will be missing out on opportunities due to their shyness. This will help them be more confident and comfortable with others. #ShynessFreeZone #Confident



Aside from the one student who designed (but did not record) a TikTok video, multimodal interventions typically took the appearance of one of the two interventions profiled in Figure 27. Of the twenty-eight multimodal interventions, thirteen (or 46.4%) took the

appearance of the intervention on the left-hand side of Figure 27, or the inclusion of an image corresponding with searchable text. Students who composed these *searchable multimodal texts* commonly reported their choice of intended platform for their interventions—generally choosing Instagram or Twitter. What made their intervention *searchable* was the inclusion of interactable written text, like the body of a tweet or Instagram post that could subsequently be searched for and discovered using a search algorithm.

The intervention on the right-side of Figure 27 was coded as an *image macro*, or the superposition of text over an image. Image macros, as a multimodal text, were not composed of searchable type as a design feature. Instead, any written elements were layered into the image directly, making them easy to consume and distribute through a simple copy-paste sequence. In total, fourteen students (or 50% of all multimodal interventions) generated these image macros.

While these image macros were designed to be visually appealing, they lacked the inclusion of certain design features that would assist in their circulation the same way *searchable multimodal texts* benefitted. Image macros *did* include written elements of communication to transmit their message, such as the one profiled in Figure 27 that poked fun at the heated arguments that occur in online wrestling discourse. Superimposing “wrestling fans” on the right-side of the image macro certainly communicates its point. However, the words themselves were not arranged in a format to be minable by a search algorithm in the same way the earlier student described using searchable text as a means to “push” his tweet to its proper audience when users search for similar content on Twitter. The intervention he designed, as a point of comparison, would be much more difficult to find if a user were to conduct a text-based search inquiry using relevant keywords or phrases on Twitter.

4.6.4 Hypertext elements

What additionally impacted the circulation of rhetorical interventions was the use of hypertext elements, or hashtags as well as direct engagement to notify and reach other users. Seventeen rhetorical interventions (or 48.6% of all submitted interventions) used hypertext features to assist in their spread.

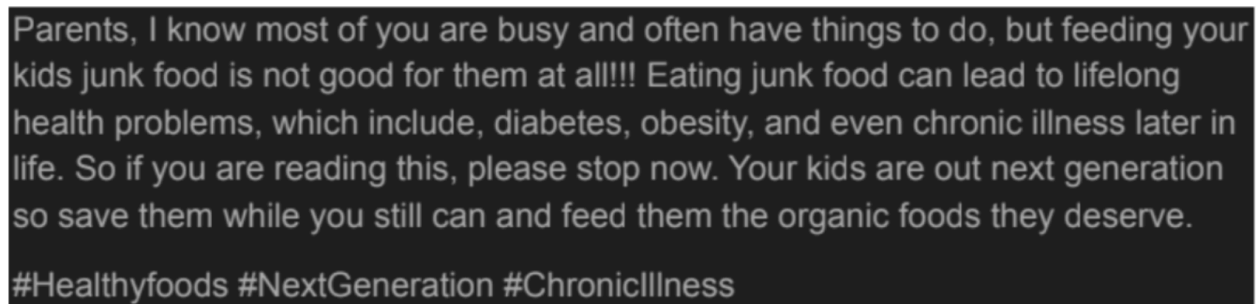
Direct engagement involved students using the hypertext capacity to reach out to specific users by @ing them in the written content of their post. One student, for example, researched the issues of sexism in online video game communities for his project. For his rhetorical intervention, he published a tweet with an image recounting an unpleasant experience a woman had when playing *Valorant*, an online competitive first-person shooter. The design features of the intervention were multimodal, inclusive of searchable text and an image. The image presented a screen capture of a female user being berated by a teammate with sexist comments after simply asking the team to push a map objective—a typical request made in a team-based video game like the one she was ostensibly playing. In the composition of the tweet, he explained that women deal with sexist rhetoric like this “literally every day” when playing online ranked games. He ended his intervention using direct engagement to call out the video game’s developer by writing @riotgames in the post, asking them to do something about the frequency of sexist language that appears in both voice and text chats.

Hashtags were similarly seen as a means to reach other users. One student’s research project on the circulation of learning styles in education, for example, led her to consider developing an intervention that was intended to speak directly to the local school board. She believed that using existing hashtags that already generate traffic would be helpful, citing that “[the school board] is a broader and bigger institution that could possibly get the word more

spread.” By inputting school board related hashtags into the body of her post, she felt she was able to “hit a broader audience” and direct attention to those actively involved in that space. “I know that there are some different teachers and different people in the profession and in WAC.” She explained that through the use of these hashtags, she could “possibly reach them in that, on that platform.”

Hashtags themselves varied in composition and scope on the basis of each students’ research topic. These hashtags, students explained, encompassed keywords and phrases tied to their research topic, like #decolonizemymind, #FUMicrotransactions, or #academicpressure. Others used individual words with a more general application like #shorts, #life, or #confident. Figure 28 presents one rhetorical intervention that exhibited these kinds of hypertext elements.

Figure 28. Example of hypertext rhetorical intervention



Parents, I know most of you are busy and often have things to do, but feeding your kids junk food is not good for them at all!!! Eating junk food can lead to lifelong health problems, which include, diabetes, obesity, and even chronic illness later in life. So if you are reading this, please stop now. Your kids are out next generation so save them while you still can and feed them the organic foods they deserve.
#Healthyfoods #NextGeneration #ChronicIllness

Showcased in Figure 28 above, this student wanted to use both the body of their post as well as the hashtags to draw attention to the topic of their research project: childhood obesity and food diet. He imagined his rhetorical intervention as an opportunity to shift attitudes in parental shopping purchases for their children. Toward this end, he described his intervention as “designed to attack parents,” using the hashtags to connect his points to a broader conversation on food diet and obesity. “‘Attack’ may be a strong word,” he admitted. He reported understanding that many parents struggle making healthier foods for their children due to cost

and work-life balance, but he followed up saying that “although they are busy, certain choices can save their lives in the future. I chose this angle because so many kids are eating the worst possible foods that will affect them later in life.”

In the design of his “attack,” he also saw hashtags as an opportunity to make amends and suggest a productive line of inquiry. Using hashtags like #HealthyFoods, he imagined a scenario where a parent may be compelled to see what alternatives exist upon seeing his post. The role of these hashtags, he explained, was not “to put them down” for feeding their children what he described as “the wrong kinds of food.” Instead, by clicking on the hashtag, he imagined he was helping “to lead them in the right direction.”

4.6.5 *Reflective practice*

Only a percentage of the students who submitted a rhetorical intervention exhibited *reflective practice*: the reported understanding of (or their attention to) how their intervention was designed with respect to the algorithm. For example, while twenty-seven students showcased the use of minable or searchable text features in the construction of their rhetorical intervention, only one of them drew direct attention to social media posts *as being* minable content where the inclusion of key words and phrases enabled him to “push” his tweet to his intended audience when they searched for it. Reflective practice, in such instances, includes phrases that indicate how *the inclusion of* certain design features were made in part *because of* or *based on* the function of the design feature.

In addition to the one student who drew attention to the searchable design features of his intervention, another eight students (or 22.9% of all students who submitted a rhetorical

intervention) exhibited reflective practice in relation to the hypertext elements of their intervention.

These instances of reflective practice were coded when students communicated how the existence of these hypertext design features shaped the intended engagement of their rhetorical intervention, giving the appearance that students composed their rhetorical intervention *based on* the conditions or means of engagement afforded *by* or *through* the algorithm. Reflective practice in connection to the hypertext elements of their interventions were broadly sub-categorized into two groups. The first group is composed of those who utilized hypertext design features to *catch the wave*: using hashtags to broaden or amplify exposure of their text to ensure its discovery and subsequent uptake. Of the eight users who exhibited reflective practice in this way, seven (or 87.5%) of them exhibited at least one instance of wave-catching. The second group was composed of those that utilized hypertext design features to *dip the oar*, or use hashtags to shape user engagement after encountering their rhetorical intervention. Out of the eight total users who exhibited reflective practice toward hyperlink design elements, five (or 62.5%) of them showcased at least one instance of dipping the oar.

Akin to a surfer paddling their way to match the speed of an oncoming wave, I coded students matching their rhetorical intervention to existing trends to propel the movement of their text to reach a broader or unanticipated audience as *catching the wave*. Instances of wave-catching, thus, were those that positioned *the text* under the direct influence of the algorithm, wielding hypertext elements to ensure it would be discovered by its intended audience. One student, for example, explained that they chose to use hashtags as a part of their rhetorical intervention because they “didn’t want to reach just one category of people.” Based on her research project to understand public perceptions of the War in Palestine, she created a

Twitter post to advocate a change in perspective. “A big problem in the world right now is that two sides don’t trust each other,” she explained. “It’s a reminder that we urgently need to talk, understand each other, and work together to make the world a safer place for everyone.”

Supplementing these ideas, she said she chose to use more general interest hashtags that were unrelated to the war: #TrustIssues and #WorldPeace. She explained that the use of these hashtags in particular would connect her intervention to a larger audience—an approach, she hoped, that might “reach every single person on the platform.”

While certainly an ambitious claim, wave-catchers correlated hashtags with language tied to engagement, attention, and uptake within an intended audience. These audiences, however, were not always seen as openly receptive of these interventions, and some students saw hashtags as not just a means to build coalitions with an existing user base but instead to wield them as a tool of disruption. One student, for example, was exploring the impacts of regular social media use on teenagers. In his presentation, he explained: “I started off [my project] by asking a straight forward question: ‘What happens to teens when they spend a lot of time on social media?’ Seems like a no brainer, right?” As he continued his presentation, however, he reflected on his initial retort toward his research question and explained that his process led him down a far more nuanced path. He realized that there were some of the positive effects of social media use, such as its ability to keep teenagers “connected with friends.” However, the longer he spent on his project, the more he felt compelled to profile the more negative impacts of habitual social media use. “You can get addicted to social media like you can get hooked on a candy,” he explained. “But it’s not just an addiction. It can mess with your memory, and it can make you feel really unhappy sometimes. That’s not cool.”

Though he did not specify the platform of choice for his follow-up intervention, he conceptualized a social media post that would intercept high engagement users as they navigated a social media platform. In the body of his post, he included hashtags directly tied to his messaging of the intervention like #teens and #NoSocialMedia. However, he also used more general interest hashtags like #cats because he believed that these hashtags would better connect to the individuals “who spend significant amounts of time” on the platform and capture their attention. Despite the composition of his post being focused on mental health and social media use, his use of the #cats hashtag reflected a direct wielding of a hypertext element to disrupt on-going discursive practice across the algorithmic web.

Students catching the wave showcased not only an understanding of how to use hypertext elements to reach a potentially broader audience but also how these hypertext elements can be used rhetorically. Drawing upon existing lanes of engagement through the use of established hashtags like #WorldPeace to advocate an anti-war message, for instance, exhibits a literal application of a hashtag in connection with its discursive practice. Folks who care about world peace, sensibly, might take issue with war as a social concept. The application of the #cats hashtag despite the function of his post being a disruption of the on-going discursive practice examining cat pictures, by comparison, is quite ironic. Instances of catching the wave, thus, indicate how students conceptualize hypertext elements as the pathways of discursive practice across the algorithmic web, but they also illustrate the rhetorical power that hashtags have as a means to scaffold interventions that attempt to exert social change.

In other attempts to exert social change, five students illustrated reflective practice akin to *dipping the oar*. The distinction between catching the wave and dipping the oar is a matter of sequence. Wave-catching involves instances where students emphasized how hashtags were

wielded as a means *to circulate their text* with the intent to reach a larger, established audience. Dipping the oar, by comparison, involves instances where students established the use of hashtags as a means of continued uptake and sequential social action *following the encounter* with their intervention. As a point of clarity: neither dipping the oar nor wave-catching were mutually exclusive. In fact, four of the students who exhibited instances of dipping the oar also described hashtags as a means to catch the wave. These four students, thus, made parallels to hashtags influencing both the movement of their text as well as its subsequent uptake.

One example of this combined use of reflective practice was a student who described her intervention as “a call to action, really, trying to motivate people” to learn more about her topic on decolonizing language. Her intervention, inclusive of the hashtags #EndOccupation and #DecolonizeYourMind, were described as a means to “boost” the outreach of her message to her intended audience, exemplifying a wave-catching sentiment. However, she saw the hashtags as doing more than just extending her ideas toward a larger audience and on-going conversation. “Using hashtags,” she explained in her presentation, served as not only a means of “reaching intended audiences” but also facilitated a means for those “that want to learn more. I just want to lead people in the right direction.” By *leading people*, she phrased the distinction between wave-catching and dipping the oar, where dipping the oar involves facilitating the movement of users *upon taking up* the intervention. The hashtag, in her mind, was meant to connect interested users to additional resources and materials to learn more about the topic. In her mind, she envisioned the process similar to her own source discovery process where she found “a large document linked with resources ... a hub to use and share with others.” By incorporating relevant hashtags in her intervention, she imagined a similar route of discovery could be realized for interested readers.

By way of another example, one student explored the effect social media use had on mental health. He explained in his presentation that the use of social media creates “a complex, two-sided effect on young adults.” He explained that while social media helps us remain connected with friends, it also reinforces a sense of loneliness when users begin comparing themselves to the life others appear to be living based on the content they publish. For his rhetorical intervention, he chose to use Instagram as a platform, seeing Instagram as “one of the bigger culprits” of this relationship between loneliness and connectivity on social media: “Instagram is known for all this ‘big’ content, seeing people happy,” he explained, “but then you being on your phone makes you feel depressed. You start comparing yourself to other people.”

As a rhetorical intervention, he created a dummy account named MentalHealthMatters. He used an Instagram post generator to create a mock-up post indicative of something that would “spread out there, put out there the idea to limit social media interactions and change your media use.” As a part of this incentive, he included a few hashtags at the bottom of his post: #MentalHealth, #Loneliness, #SocialAwareness, and #UAreNotAlone. He believed using these hashtags in particular would help users who felt this way find a means to connect to resources available to them and understand “they aren’t alone in feeling the way they do. On Instagram, it’s very easy to fall into, like, feelings of loneliness, of depression, of just, like, feeling disconnected.” By dipping the oar, he did not position the hashtag as a tool to connect his post to a broader audience. Instead, he framed the hashtag as a tool to steer user engagement to additional resources and foment a sense of belonging that would be discovered through the use of these hashtags: “Just to put out the idea, you know?”

Chapter 5: Discussion & Conclusion

The following section serves to interpret and contextualize the findings that were presented in the preceding chapter. To do so, I will first present a brief summary of the central findings. I will then explain the significance of these findings in relation to existing literature on algorithmic awareness. From there, I will acknowledge the limitations of my findings before drawing attention to what my findings imply for future research and practice in this space.

5.1 Summary of study findings

In the section that follows, I provide a brief overview of how I answered each of my two research questions:

- How do students showcase algorithmic awareness when conducting and presenting research?
- How do students showcase algorithmic awareness when transforming their research findings into rhetorical engagement?

5.1.1 Algorithmic awareness when conducting and presenting research

In answering my first research question, I drew evidence from both typed submitted work as well as a set of recordings from one in-class activity. From reviewing their submitted work, I observed students' demonstrations of *functional awareness*, or how they represented typing, clicking, and scrolling within social media and search engine interfaces in both the conduct and presentation of their research. I was additionally able to determine that how students reportedly navigated these algorithmic interfaces bore an affinity to certain sentiments or beliefs about algorithms, which I coded as demonstrations of *critical awareness*.

Demonstrated instances of functional and critical awareness frequently corresponded with one another in students' typed submitted work. For instance, some students articulated a sentiment favoring algorithms that were deemed efficient or easy to use; additionally, many of these same students showcased an inclination to click on the first thing they saw at the top of their search results, or they refined their search results until the top result took the appearance of what they were looking for. Conversely, the students who reported deliberately scrolling past the top of their search results did so, at times, while reporting more negative sentiments about the way the algorithm arranges their search results. In particular, some of these students would express skepticism toward the very top search result in direct contrast to littoral users. These sentiments did not always refer back to specific actions students took when navigating the interface, and actions like clicking the very top first result or scrolling past it did not always correspond with a demonstration of critical awareness. Nevertheless, the students who were more descriptive of their procedure, showcasing their functional awareness, more frequently demonstrated their critical sentiments as well.

Recorded in-class activities afforded added insight into how ways of interacting with algorithms—such as clicking on the first result or scrolling past it—were potentially influenced by the composition of the interface. The inclusion of Google-generated content summaries, for instance, enabled students in one group to infer a source's credibility without scrolling or clicking further; however, without conducting subsequent clickthroughs, students misattributed primary sources of information as secondary or unaffiliated ones. Students who were presented with a hyperlinked list of search results, by contrast, were able to navigate search results more deliberately—and more easily distinguish between primary and secondary sources of information. These findings underscore the importance of capturing algorithmic awareness

multimodally and analyzing it as a co-constructed practice between both user intentions and the algorithmic interface.

5.1.2 Algorithmic awareness when transforming findings into rhetorical engagement

In pursuit of answering my second research question, I catalogued students' reporting of *rhetorical awareness*, or their reported understanding regarding how (and their subsequent application of) algorithmic design features influence the uptake and circulation of content. Rhetorical awareness was relatively limited across the student population, but students demonstrated rhetorical awareness in two general ways.

The first way was when students identified how hypertext design elements assisted in the movement of their rhetorical intervention across the algorithmic web, which I coded as *catching the wave*. These students saw hashtags, for example, as a means to step into a broader, on-going conversation to raise awareness on their research topic and, subsequently, their rhetorical intervention. The second way was when students identified how hypertext design elements were capable of influencing the movement of users, which I coded as *dipping the oar*. Dipping the oar involved students using hypertext design features to call attention to existing resources and communities sustained via the algorithm, such as through hashtags. Though coded as discrete demonstrations of rhetorical awareness, there was noticeable overlap in students demonstrating both catching the wave as well as dipping the oar.

Similar to some of the findings drawn from my first research question, catching the wave and dipping the oar each related to clicking through the interface as a means of demonstrating algorithmic awareness: clicking on hashtags either to discover their original text or to access additional resources related to their text's overall purpose. Given that the demonstration of

rhetorical awareness involved the awareness of such clickthrough procedures, these findings substantiate continued associations between how users interact with the interface and the emergence of not only critical but also rhetorical awareness. The connection between rhetorical awareness and the leveraging of hypertext design features should be a continued point of investigation.

5.2 Interpretation of study findings

Having established the broad strokes of my research findings, the following section will first outline what my study contributed to the literature. I will then present the limitations of my findings.

5.2.1 Contribution to literature

This study was one of the first to analyze students' reporting of algorithmic awareness across a range of assignments. These assignments captured students' showcasing of algorithmic awareness through both talk and text as well as their actions taken when using both social media and search engine algorithms. This study contributes additional evidence to Swart's (2021) observation of there being limited "spillover" of algorithmic awareness from one space to another. In her research, she concluded that users who exhibited algorithmic awareness in one instance were not necessarily "more conscious about potential algorithmic curation in other situations" (p. 5).

The findings of my study reinforce this observation when capturing how students showcased algorithmic awareness using both social media and search engines. Many students, for instance, reported critical sentiments exclusively toward social media *or* search engines, but not both. Additionally, how students reportedly navigated one algorithmic interface was not

necessarily predictive or representative of how they navigated others; there was, in particular, an uneven distribution between search engines and social media algorithms. In reference to social media algorithms, for instance, some students appeared critically aware of how a platform's news feed was composed of content "recommended" by the algorithm, usually to enhance user engagement or participation. When these same students moved to search engines for their research projects, however, they reported clicking on the first search result without any commentary or sentiments about how the search results themselves were arranged.

To clarify, the omission of any statements indicative of algorithmic awareness *does not* support the conclusion that the student was subsequently algorithmically *unaware*. However, the omission of critical talk alongside the corresponding reporting to click on the top search result nevertheless indicates that critical sentiments or functional usage reported in one instance is not reflective or predictive of how students would engage with algorithms in other instances or contexts. To borrow a term from Swart (2021), any *spillover* of algorithmic awareness from one platform or context to another was not shown to be guaranteed. This reinforces the importance of gathering critical sentiments and functional usage of *both* search engines and social media algorithms rather than a focused attention on one particular frame or context (e.g., Bakke, 2020).

This study was additionally one of the first to conceptualize a process to capture the circumstances from which demonstrations of critical awareness emerged in practice. When accounting for the current body of literature connecting digital multiliteracies with algorithmic awareness, students' reported sentiments or perceptions of the algorithm were the primary focus of analysis (e.g., Koenig, 2020), but how students reported navigating search algorithms informing these sentiments was comparatively understudied. This study contributes to a greater understanding of how students navigate these platforms as they report these sentiments, which

thereby informs potentially deeper relationships between how users interact with algorithmic systems and how they demonstrate their critical awareness in ways than existing research could illustrate.

Though self-reported renderings are the typical method of capturing students' demonstrations of algorithmic awareness when using digital multiliteracies methodologies (e.g., Colby, 2024), the findings revealed the benefits of capturing recorded screen maneuvers as well. For instance, students used Google-generated snippets to vet their sources. When they reflected on these maneuvers, they used vague descriptors of whether they were drawing credibility claims from primary sources or from secondary sources when doing so. To present one instance as an example, one student claimed to have vetted a source by searching the organization's name, reporting that "they have a pretty large social media presence, especially on Twitter and Facebook." Yet alongside remarking on the source's social media presence, the student recited information from the Google-generated summary at the top of the page, claiming that the source they were using was also reliable because the snippet told them that "they are a gaming focused news website that is available all around the world."

When students made credibility claims like these in their essays, it was difficult for me to parse the source. Was the snippet presenting information from an unaffiliated source like Wikipedia? Or was it merely repackaging content drawn from the organization's own about page? The distinction matters, as a student who drew credibility claims from an organization's own about page would merely be reproducing an algorithmically mediated form of close reading known as primary cross referencing: the consulting of a credibility claim about one source from another, directly affiliated source of information. Unfortunately, when drawing evidence from

these reflections, it was oftentimes unclear whether students were aware of this distinction or whether they believed they were truly consulting an unaffiliated source of information.

With the addition of these screen recordings in my data collection methods, however, I was able to understand how the interface impacted students' search practices in similar situations. The Google-generated content summaries that typically percolated within the littoral zone often conflated primary and secondary information and presented nebulous markers to indicate where the information was coming from. As a result of these ambiguities, students were observed drawing credibility claims from affiliated sources of information despite communicating sentiments within their group that appeared to position the source of information as unaffiliated. This observation reinforces the importance of incorporating multimodal data collection as a method to capture algorithmic awareness using submitted work as well as recorded talk-turns and screen-level engagement using algorithms in contrast from the sole collection of written renderings typical to this area of research (e.g., Koenig, 2020).

Taking all of the above in accumulation, the findings of this study make two major contributions. First, this study contributes to a greater understanding of how the use of and sentiments toward algorithms can be captured as they are constructed and sustained through discourse. Second, it reinforces how much is learned by interlinking the study of algorithmic awareness with embodiment, attending to how the multimodal design of the algorithmic interface can short-circuit or co-opt user intentions. Such findings contribute to a stated, reinforced need to study algorithmic awareness as an embodied practice, to consider how the discursive devices and maneuvers that showcase algorithmic awareness are “invoked in interaction to achieve specific goals” (Wiggins, 2016, p. 228) while additionally drawing back to the foundational ethos of a multiliteracies pedagogy to help students attend to affective reading processes (Kress, 2000) and

how technologies exert an active influence on user perceptions (Selber, 2004). In fact, despite there being relatively limited uptake between both disciplines (e.g., Bergstrom, 2024), the results of this study reinforce how the onto-epistemological framing of discursive psychology and its study of embodied practices are suitable to further track instances of algorithmic awareness in the multiliteracies classroom.

5.2.2 *Limitations in findings*

The primary limitation of my findings is tied to the nature of self-reporting as a data source when marking instances of algorithmic awareness. When identifying functional awareness, for example, students must account for *what they did* when navigating the algorithmic interface, including the presentation of any corresponding search talk or how they moved amidst the interface. Students who merely reported finding a source on a search engine without accounting for how they clicked and scrolled through the interface, by definition, did not demonstrate an *awareness* of their procedure. However, shifting from self-reporting to direct observation, such as watching a student navigate a search engine, tracking their search procedure, may not be representative of functional awareness without an appropriate think-aloud or dialogic protocol either. Some form of verbal reporting is necessary to ensure they are aware of what they are *doing with* the algorithm as they navigate.

Reviewing screen recordings of the sourcing activity, however, revealed the possibility of a potential discrepancy between what students *reported doing* versus what they *actually did* when navigating these spaces. By way of example, students positioned the processes of close reading and lateral reading differently in their essays from what was observed during recorded small group activities. Students were inclined to position the lateral reading of sources as the

primary means to investigate the credibility of unknown sources in their submitted work, turning only to close reading when a secondary source failed to materialize in their search results. A few of these same students, however, appeared to prioritize close reading their sources first, treating lateral reading as a supplemental process—an opposite positioning from what was presented in their typed submissions. In some instances, students were not observed to laterally read their sources at all during the sourcing activity despite reporting exclusively doing so later on in their annotated bibliography or research findings submissions.

This discrepancy necessitates a broader understanding of what algorithmic awareness represents and what it does not. In line with my methodology, instances of self-reporting were treated as a constructed, discursive rendering of students' perceptions of what they did with the algorithm within a particular sequence of actions. As an evident limitation of my findings, these self-reported instances of algorithmic awareness were not representative of *real* cognition or *actual* behavior. As a result of this discrepancy, I did not and cannot evaluate the *correctness* or *accuracy* of these accounts; I only focused on how students understood and presented their own search procedure and how these reflections related to broader sentiments or beliefs about algorithms.

This discrepancy is perhaps most noticeably felt in the rhetorical awareness section of my findings. While students exhibited a strong understanding of the various design features of the algorithmic interface that comprise social media platforms, very few students reported an explicit *rhetorical awareness* of how various design features would influence the mobility or uptake of their rhetorical intervention. Students *were* particularly communicative regarding the choice of platform and intended audience, such as when one student humorously drew distinctions about whether to use Facebook “to reach older people.” This limitation nevertheless refers to a greater

tension in how to capture rhetorical instances of algorithmic awareness, though future work could explore how students' sentiments on whether the varied topography of older folks to younger folks on various social media platforms is, perhaps, an algorithmically-mediated phenomenon.

Another limitation in my analysis related to how I coded and tracked specific movements within the interface. These were coded based on their corresponding intended action, such as discovering or vetting a source. As a result, actions were coded and analyzed exclusively in relation to a corresponding goal, such as the use of *clickthroughs* in relation to the discovery and selection of a source using a search algorithm. As such, while *clickthroughs* and *distant diving* appear similar, they were coded and analyzed separately due to their placement in the sequence of assignments and the intended action as a part of the assignment or activity. Students were explicitly encouraged to engage in *distant diving* during their distant reading analysis, for instance, which resulted in the composition of these analyses differing significantly from the research project. To broaden the analysis of *clickthroughs* across all assignments and intended actions would have risked muddying the waters on how students orient to the algorithm on the basis of a specific defined purpose. I did not want to generalize beyond the intended sequence of actions. I wanted to maintain a certain rhetorical framing by distinguishing maneuvers tied to distant reading, research project, and rhetorical intervention from one another.

Another limitation tied to my data collection process and the lack of video recordings of participants themselves. As a part of my approved IRB protocol, I avoided video recording classroom activities directly, instead drawing evidence from screen and audio recordings from the tablet directly. This, as a result, impacted the greater conclusions I could draw tied to embodiment and gestures, as the only observations I drew were from the screen recordings: how

they clicked, scrolled, and typed within the interface. I was unable to determine how gaze or body orientation, for instance, played a role in how students interacted with the tablet or with the algorithm. Another consequence of my IRB approval protocol additionally was the limitation of being able to collect more specific demographic information about my student participants.

This study, additionally, does not distinguish between the framing of algorithmic awareness that was taught to students versus what was independently activated from students' own perceptions or lived experience. While this is a stated and known quality in relation to my methodology—discursive psychology positions cognition and awareness as constructed, negotiated state and not any kind of constant—there nevertheless remains a tension in how this study was designed in relation to multiliteracies instruction. This study was conducted within my own classroom—a space where I have spent more than ten years scaffolding conversations about algorithms and the internet. The classroom context of this study may have significantly impacted how students both navigated and reported their ways of engagement with social media and search algorithms, which introduces one particular limitation in relation to multiliteracies work: the likelihood of how many instances of demonstrated awareness came from a truly bottom-up approach to student thinking. I found it particularly difficult to disentangle my own instruction from students' actions taken with algorithms when vetting sources, using explicitly instructed methods of vetting sources like lateral reading. This study, as a result, does not accurately reflect whether students' means of interacting with social media and search algorithms arose from their own thinking.

In addition to the above limitations, the recruitment protocol inclusive of a signed waiver may have contributed to a chilling effect on the overall participation population, resulting in only about a quarter of all enrolled students consenting to participate in the ENG 111 sections I taught

between the Fall 2023 and Spring 2024 semesters. I additionally did not gather data relevant to students' race, ethnicity, gender, socioeconomic status, or major of study. In addition to the limited data on my participant population, member checking participation was low (10.5%). This was likely due to many students moving on from the institution by the time I finished my data analysis and either losing access to or simply making less frequent checks of their institution e-mails.

5.3 Implications of study findings

The following section outlines the broader implications of my findings. I will begin by outlining what my findings indicate with regard to recommendations for future research in the realm of discursive psychology and algorithmic awareness. I will then showcase how continued work in this space might influence teaching practice and policy.

5.3.1 Embodiment and discursive psychology

My findings illustrate the importance of capturing algorithmic awareness multimodally. Future research in this space should continue applying such an approach to data collection and analysis, and multimodal approaches that wield discursive psychology could meaningfully assist in the methodology's more recent turns to study both embodied practices and subject-object relations with technology. The continued application of discursive psychology as a multimodal methodology is, thus, both critical and transformative to enhancing our understanding of how students showcase algorithmic awareness in future research work.

Discursive psychology offers more than just a means to capture how psychological states like algorithmic awareness are showcased in talk and text. Additionally, it provides a framework to understand how psychological states are constructed and sustained through continued

interactions between individuals, objects, and the environment. More recent discursive psychology work (e.g., Wiggins & Cromdal, 2021) treats this expanded orientation as a turn toward *embodiment*, emphasizing that these psychological states are not fixed products of discourse: they are sustained, challenged, or reshaped across sequential actions or discourse.

To extend this orientation toward embodiment to the findings of this study, I must reiterate the study's original intentions. This study presented how students showcase algorithmic awareness through both talk and text as well as their actions taken within the interface. The findings of this study inform a framing of the certain repertoires or practices that correspond to functional, critical, or rhetorical awareness—an essential stepping stone to more thorough, methodical discursive psychology work in this space. And work must continue to examine how students reported clicking and scrolling through the interface as embodied practices. Representations of algorithmic awareness should not be treated as static or fixed psychological states drawn exclusively from the perspective of the user when the interface of these technologies continue to evolve over time; the study of these maneuvers as each are embodied within the interface is a necessary condition of continued research in this area. To explain how, I will expand on one finding I drew from my study.

Littoral engagement was a type of action I observed when students selected sources for their research project. Students who reported clicking on the top-level search result or clicking among the top of their search results without any reported scrolling were coded as conducting littoral engagement. While littoral engagement was, for the purposes of this study, coded as an action taken in relation to the selection of sources, littoral engagement was present in the vetting of sources as well.

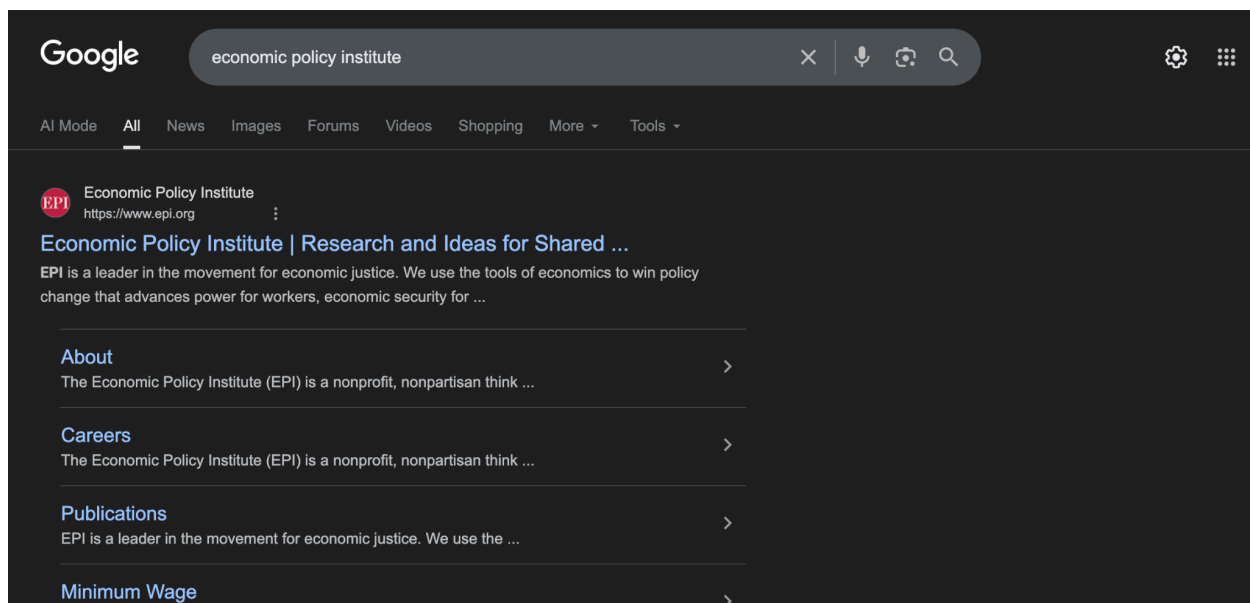
As both the second and third vignettes presented in my findings chapter illustrated, the composition of the littoral zone can change depending on context. During the second vignette, Irving clicked through a hyperlinked list of sources that clearly distinguished primary sources of information from secondary ones. In these instances, primary sources of information included sources directly affiliated with the source who was being vetted: an author's social media profile or personal website, for instance. Secondary sources of information, by contrast, were independent or unaffiliated sources of information like Wikipedia, or they were a source of information the author did not have direct control over—a university directory, for example. The explicit indication of primary from secondary sources helped Irving establish an inclusion criteria that determined which sources he clicked on to generate his credibility claims—to deliberately avoid these primary sources—even though his adherence to this criterion varied as he laterally read the three different authors for his source.

The third vignette, by contrast, showcased a littoral zone composed of Google-generated content summaries. Unlike Irving, Draper and Nagata treated these summaries as independent sources of information, using them to generate credibility claims about the source without conducting additional clickthroughs. In fact, Draper treated these knowledge panels as a secondary source of information, and she even positioned *Google itself* as a source for independent verification. This created a feedback loop more closely aligned with primary cross-referencing than lateral reading, a distinction that only became visible when Miller clicked through the interface and reviewed Wikipedia directly.

What both vignettes illustrate is how the algorithmic interface frames each action as an embodied practice. Attention to littoral engagement in this way affords researchers the ability to consider how the construction of a search results page sustains or challenges students' intended

practices when navigating the web. It reframes littoral engagement as a co-constructed process influenced by user sentiments *as well as* the composition of one’s search results. This is important, as Gemini/AI-generated content has only taken up an increasing proportion of the littoral zone since I finished collecting my data in Spring 2024. Take, for instance, keyword search for an economic policy think tank in Figure 29 below:

Figure 29. Keyword search of “economic policy institute”

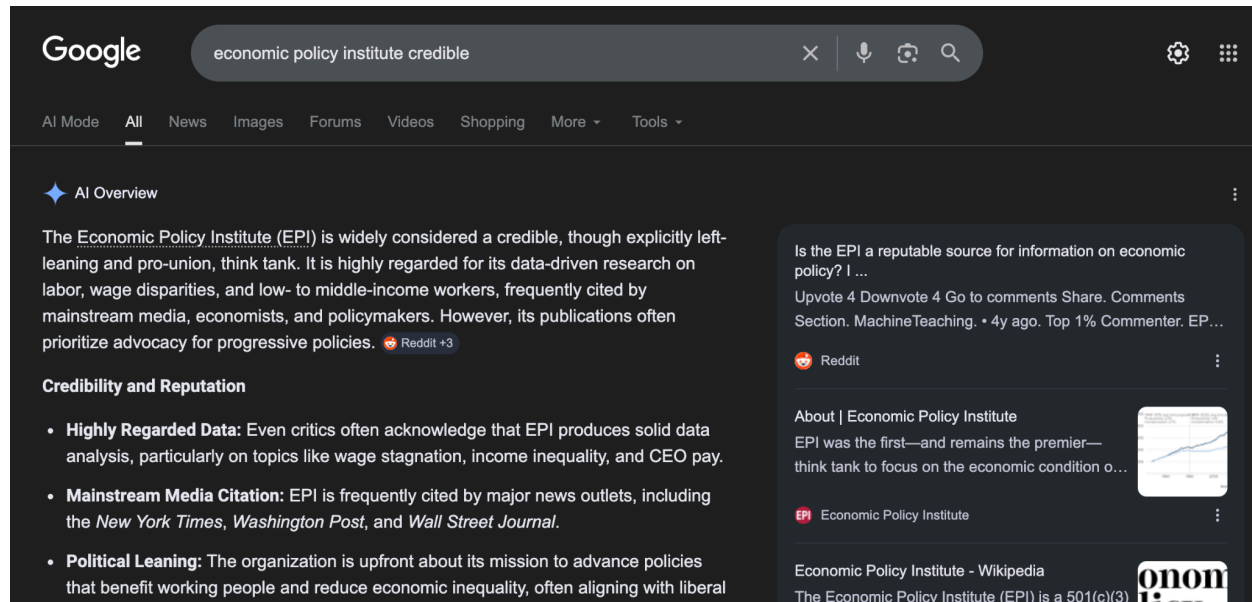


As shown in Figure 29, I conducted a quick search inclusive of the keywords *economic policy institute*, a think tank located in Washington, DC. By conducting a keyword search with these parameters, I was presented with the Economic Policy Institute (EPI) website—an expected result in consideration of search engine optimization techniques and Google’s own prediction patterns of user engagement. Users searching the name of an organization are likely looking for that organization’s specific website.

When I refine my search parameters to include the word *credible*, however, the presentation of my search results change. As can be seen in Figure 30 below, the hyperlinked

littoral zone is replaced with a Gemini-generated content summary that draws from an assemblage of sources—one that includes the EPI website, a four-year old Reddit post, and a Wikipedia page on the Economic Policy Institute.

Figure 30. Keyword search of “economic policy institute credible”

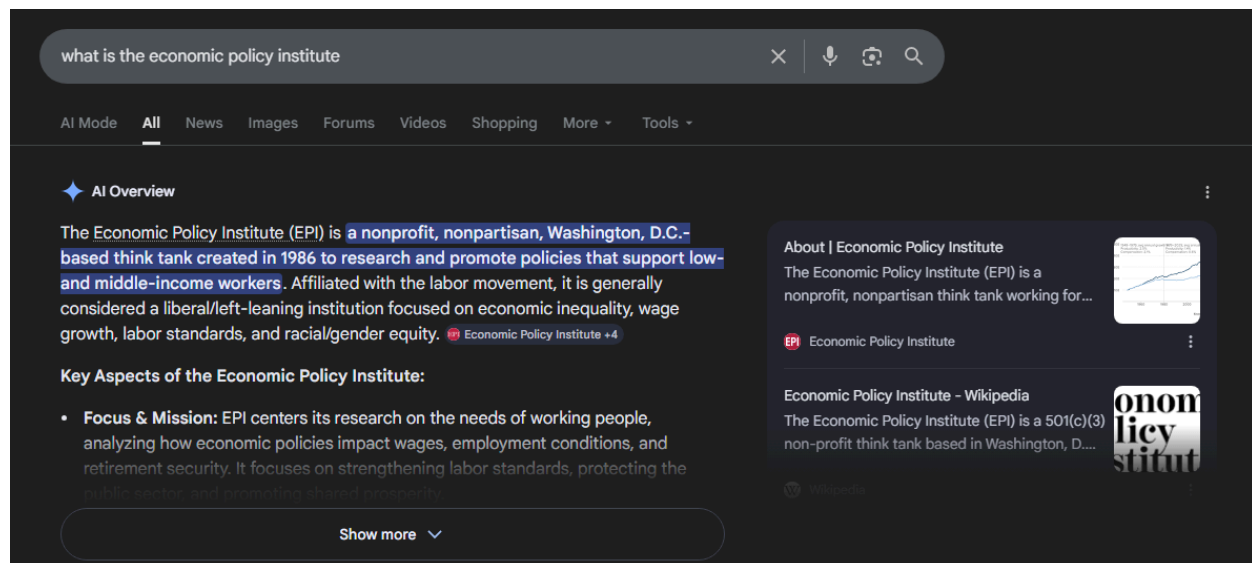


Even though the generated content summary presented in Figure 30 includes secondary sources of information like Wikipedia, it still draws upon the about page of the organization when deliberately sourcing an organization’s credibility without clearly delineating which credibility claims are drawn from which source of information. This is especially important given that the question of EPI’s credibility revealed indicators tied to the organization’s perspective as being “considered credible” though nevertheless “explicitly left-leaning.”

While a source’s perspective does not necessarily challenge their credibility, these AI-generated summaries drawn from an assemblage of both primary and secondary sources can present conflicting narratives about their perspective. Conflicting reports about perspective can, by extension, raise questions about the source’s authenticity or transparency, which are indicative

markers of a source’s overall reliability or trustworthiness. The EPI being *explicitly* left-leaning is an important asterisk to consider when compiling sources for a research project, certainly, but the EPI’s perspective being a known quality does not necessarily invalidate their inclusion as a trustworthy source; if anything, it could reinforce trust in their willingness for transparency. If the EPI were to shroud that perspective and present themselves as nonpartisan or centrist, however, their motivation behind that framing and its impact on their trustworthiness may be similarly called into question. Take, for instance, Figure 31 presented below, which includes a question-based search tied to the same organization.

Figure 31. Question-based search of “what is the economic policy institute”



As can be seen in Figure 31 above, the Gemini AI content summary is drafted in response to a question: *who is the economic policy institute*. The summary includes two distinct claims about the source’s perspective: one, that the Economic Policy Institute is *nonpartisan*; and two, that the EPI is considered *liberal* or *left-leaning*. While a think tank does not need to be explicitly partisan to be considered left- or right-leaning in perspective, individual marking statements of a source as being *solely* nonpartisan or left-leaning would impart radically different impressions of

that source's overall perspective, which subsequently raises questions about the source's trustworthiness. This only becomes a deeper source of concern when subsequent clickthroughs reveal that the claim that the EPI is *nonpartisan* was drawn directly from the about page on their website, whereas the marking statement referring to the EPI as a nonprofit think tank being *left-wing* was drawn from Wikipedia.

While the above figures do not illustrate a clear representation of whether keyword or question-based search talk affect the emergence of the AI-generated content summaries—these Gemini-generated content summaries appeared when using both keyword and question-based search talk—they do present a valid reason to pay closer attention to the reciprocal relationship between the arrangement of one's search results and how the user engages with the algorithm. Further research is needed to examine how students interpret and navigate the littoral zone as it increasingly dominates the front page of search results. In particular, attention should be given to what ambiguities about a source's credibility or trustworthiness are introduced by AI-generated summaries, how much scrolling beyond the littoral zone or conducting clickthroughs might resolve these ambiguities.

5.3.2 Algorithmic awareness and existing education policies

Since the publication of the New London Group's foundational texts (Cazden et al., 1996), frameworks such as Common Core have expanded literacy instruction beyond print to include multimodal and digital literacy instruction. Common Core (2010) literacy outcomes tied to multimodal and digital media, however, are framed in positive, celebratory, even emancipatory terms, where multimodal and digital tools are described to “aid comprehension,” “clarify information,” or support students in becoming “self-directed learners” (p. 45). While Common

Core's shift from print-focused instruction was notable, established learning outcomes emphasize multimodal and digital textual production or tool-use, positioning students as *benefactors* of these initiatives. What remains largely absent in Common Core, however, is drawing attention to *how* students navigate and assess the algorithmic interfaces that scaffold these digital and multimodal learning outcomes. The motivation to capture students' *awareness* of these tools is conspicuously absent.

Recently, *New York Times* writer Ezra Klein sat down with David Perell (2025) to discuss his perceptions of AI and its impact on journalism, writing, and research. At one point in their conversation, Klein referred back to an article he wrote two years prior called "Beyond the 'Matrix' Theory of the Mind" (Klein, 2023). Klein explained to Perell (2025) that he originally associated the internet as if it operated as a fountain of knowledge, drawing direct inspiration from *The Matrix* to make his point: "It's like I wanted the port in the back of my mind that the little needle would go into," he explained to Perell. "I thought that what you were doing was downloading information into your brain." His associations of the internet as a mere *brainplug* to connect into reflects much of the emancipatory rhetoric surrounding digital literacy instruction, but it also connects to a larger phenomenon that has revealed itself as I worked on this manuscript: the broader offloading of cognition when using search algorithms and generative AI in particular.

Rather than enhancing executive functioning skills as Common Core (2010) originally imagined it, to "become self-directed learners, effectively seeking out and using resources to assist them" (p. 7), I observed students, at times, more predisposed to become directed by the algorithm. These students' sentiments toward search algorithms most closely aligned with the positive-coded sentiments exhibited in Common Core: those who cared about using search

algorithms that most expediently assisted in their search process were among those least inclined *to dig deeper* into their search results, deferring their research procedure to the contours of the algorithm. I say that because these students were more than comfortable just *copying and pasting outputs* from ChatGPT directly into their essays verbatim, playing with search results like a slot machine until they pulled *the right kind* of search result as their first link, or appearing to rely exclusively on the contents of the littoral zone to discover, select, and vet sources for their research project.

To put it most bluntly, these students satisfied every condition of being a “digitally literate” student as far as Common Core is concerned. They *effectively sought out* sources of information and *used resources to assist them*. But whose interest is served when students defer all authority of what sources are worth including or who is seen as credible to a search algorithm? There is a critical need to extend *awareness* as a learning outcome to these initiatives: students who are capable of reflecting on their social media scrolling and search engine processes, students who are capable of reporting their sentiments or beliefs about algorithms in ways beyond their accessibility, and students who are capable of rhetorically wielding elements of the algorithmic interface to make change in spaces they deem relevant to their (and our) attention.

Unfortunately, Common Core is not alone in this omission. The state of Virginia, where I currently teach, uses its own Standards of Learning to scaffold K-12 instruction. Even though there is a set of standards tied to digital learning (Virginia Department of Education, 2020), there is no direct emphasis made on the critical end of instruction that encourages students to understand or interrogate their relationship with these technologies. All that is encouraged, explicitly, is the *functional use* of digital technologies:

Access to and the effective use of current and emerging technologies are essential elements for contributing to a deeper learning experience for students. The use of the term “technologies” within these Standards includes the different facets, tools, apps, and applications that support and enable students. Digital learning has the potential to empower students as learners by improving their functional literacy as digital citizens capable of constructing knowledge, designing innovative works, thinking computationally, creatively communicating, and collaborating with others locally, regionally, and globally. (Virginia Department of Education, 2020)

Alongside intended outcomes of *functional use*, these associations of *empowerment* and *support* emphasize a continued positive-coded relationship of technology where students are de facto benefactors of these digital tools without the appropriate sequential expectation of understanding how students situate *themselves* in relationship to these technologies. What remains conspicuously absent in these expectations, just like the broader motivations of Common Core, is any attention to students’ sentiments or beliefs about these digital tools or, by extension, social media and search algorithms. Instead, there’s this unequivocal embracement of digital technologies as a solely emancipatory force that students can simply tap into to enhance productivity, collaboration, and creativity. These frameworks simply reproduce the *Matrix*-informed model of knowledge defined by Klein (Purell, 2025): one that treats the access of information online as a faucet of information one may freely tap into with no adverse consequences.

In response, one might turn to the International Society for Technology in Education, or ISTE, which publishes its own learning standards. The ISTE Standards (2024) are designed to provide added guidance for teachers and administrators so they may *more critically* integrate

technology into the classroom. For example, ISTE Standards suggest building lessons where students are encouraged to “understand fundamental concepts of how technology works, demonstrate the ability to choose and use current technologies effectively, and are adept at thoughtfully exploring emerging technologies” (ISTE, 2024, p.3). Lesson outcomes, as a result, do not merely involve the *effective use* of technologies to achieve a certain goal akin to the language of Common Core or the Virginia Standards of Learning; the ISTE Standards instead focus attention on the active demonstration of *responsible* or *thoughtful use* of technologies, and of students’ capacity to self-reflect on their usage. To achieve these learning outcomes, the ISTE Standards make recommendations to educators to “[encourage] curiosity, reflection, and the critical evaluation of digital resources” as a part of these activities (ISTE, 2024, p.5).

As a series of learning objectives, it makes sense that the ISTE Standards (2024) emphasize language tied to developing a certain *competency* toward digital technologies. But by devoting language toward the usage and uptake of technology as a set of competencies or skills, the standards subsequently place less emphasis on the *particular* sentiments students express toward these tools, which has been illustrated in this study to connect, in part, with how students engage with these tools directly. Additionally, less attention is drawn to how user motivations or interface design features may impact students’ broader orientations toward technology and how instruction might account for their influence.

Taken together, the current policy frameworks appear insufficient in determining whether and how students are becoming reflective, agential consumers and producers of digital technologies. Including the capture of algorithmic awareness in literacy instruction *can* inform future teaching practices. They can shift learning outcomes away from an emphasis on *what*

digital tools can do for students to instead emphasize *what students do* with these tools. To achieve these aims, informed by the findings of this study, I make two key recommendations.

First, educators should continue to teach students how to read and write in digital environments as outlined in existing policies, but instruction should include a broader attention to how algorithms prioritize, filter, and present information in ways that impact users *both* positively and negatively—and how some of these negative impacts may be performed to the benefit of algorithm designers by extension. Generative AI, especially, should not be positioned as a neutral or purely assistive technology but an object of analysis to scrutinize just as they do a work of art or literature. The shift from *functional literacy* to *functional awareness*, for instance, does not require adding new tools or skills to the curriculum; it simply requires a reorientation of existing practices and a reconsideration of what data is captured, analyzed, and discussed.

Second, instructional practices should continue to sustain opportunities for students to reflect on their own research behaviors, particularly moments where cognitive processes may be deferred or offloaded to algorithms. While recorded small group activities afford an important gateway to students conducting research in the moment, the capturing of awareness depends as well on self-reported renderings of a student's experience with an algorithm. The continued reconstruction of the typical research paper assignment, shifting from an end-product presentation of one's research findings to one that documents the process of their research, is paramount.

This emphasis on process helps us position research differently to students: not a process to be expedited or simplified through digital tools but one that, in Klein's own words, must be *grappled with* instead. He explained to Purell that his own opinion toward the gathering of knowledge on the web has changed since he wrote his 2023 article, which has consequently

reduced his use of AI in his journalistic, research, and writing processes. “There’s something about your process of grappling with something,” Klein explained, “that integrates it into the way your mind actually works ... What knowledge is supposed to do is change you, and it changes you because you make connections to it” (qtd. in Purell, 2025). Knowledge involves grappling with the phenomenon you are exploring, thereby necessitating an awareness of how one has changed through the encounter.

What is somewhat ironic here is that the emergence of generative AI systems such as ChatGPT, Claude, and Gemini establish a clear opportunity for users to more effectively *grapple with* the knowledge of something than what a typical set of Google search results presently offers. These AI tools could, in theory, ensure a curation of more recent, reliable, and credible sources of information that could, in some ways, bypass the littoral zone and search engine optimization techniques that litter the “front page” of search engines. They could operate as an always constructive group member who pushes us to think more critically, more self-aware of our search procedures as we navigate the algorithmic web—including its own interface.

Unfortunately, in my experience, it’s frequently quite the opposite. Rather than pushing me to think more deeply about matters as I prompt them for information, my use of generative AI models like Claude and ChatGPT often result in outputs that begin with agreeing with what I have to say—encouraging me that I have “good ideas” or that I’m going “the right direction.” It’s very rare, in my experience, to get any kind of pushback from ChatGPT, for instance, without first receiving positive-coded rhetoric that encourages me to continue thinking the way about things I already am. It’s a very reductive, deeply closed exercise. It’s all in service of the brain plug.

5.4 Conclusion

What led to this study was a slow, gradual process that started as little more than an informal sharing of videos like Eli Pariser's (2011) TED Talk on filter bubbles or articles like Sherry Turkle's (2012) "The Flight from Conversation." When I began teaching in 2013, I was simply motivated to understand what my students thought about the potential influence of technology on both composition and rhetorical practice. At the time, I had no idea how much the scope and structure of composition and rhetoric instruction would shift in response to the rise in digital phenomena like hashtag activism and online disinformation in the years to follow. I did not yet realize how much the influence and reach of the first-year composition space, a course essentially every college student takes or tests out of, could even serve as a space to facilitate such changes in pedagogy either. And while I would like to think that this dissertation study reflects one potential approach in facilitating change, I now find myself eager to shift my attention to other spaces beyond higher education on the other side of its completion.

Over ten years of my life were in service of teaching and evolving first-year composition instruction at the community college level; but upon the completion of my study's data collection, I felt it was time for a change. Though I repeatedly disregard the notion of research papers as end-products of one's thinking consistently throughout this document, there is a certain irony that this study, in fact, represents the end-product of my time teaching in higher education. Shortly after the completion of my data collection in May 2024, I eagerly accepted an English Teacher position in Arlington Public Schools in Virginia, only a few miles from the NOVA Annandale campus where this study was conducted.

Though teaching high schoolers alongside writing this dissertation the last two years proved, at times, to feel much like spinning plates to meet varied expectations, this dual

positioning as both researcher and instructor has helped inform how the work of this dissertation may transfer into the K-12 environment. Later this year, I plan to downblend many of the assignments and activities of this dissertation into discrete teaching units designed for grades 9 to 12 with a certain sensitivity to their vertical alignment. With APS approval, any subsequent research work could also potentially inform future development in local- and state-level policy on how digital and algorithmic literacy instruction is implemented and assessed in high school classrooms.

Multiliteracies, as established previously, is driven by the pursuit of fostering a critical consciousness toward both literacy and the structures and tools that sustain literacy practices. A continued examination of “whose interest it serves,” for both students and teachers, remains the nexus that drives continued evolutions in writing and composition instruction (Cope & Kalantzis, 2000, p. 247). This critical consciousness must remain inherently skeptical of techno-utopian arguments that position technologies as neutral, inert tools; however, it must also question the dismissive, arguably techno-dystopian arguments that deliberately hedge their integration. The critical consciousness we continue to foster in the classroom must instead be scaffolded by an active, deliberate interrogation of technologies—an approach that, in Donna Haraway’s (2016) words, must assert “a slightly perverse shift of perspective ... seeing the machine [as] not an *it* to be animated, worshipped, and dominated. The machine is *us*, our processes, an aspect of our embodiment. We can be responsible for machines; they do not dominate or threaten us. We are responsible for boundaries; we are they” (p. 15, 65).

From this perspective, technologies are neither inert instruments simply awaiting our usage, nor are they autonomous forces that operate outside of our control. Rather, they actively participate in shaping how we encounter information and engage in rhetorical action. And so,

educational approaches like Common Core and the Virginia Standards of Learning, portraying technologies as merely assistive tools, overlook this mediating role just as much as the adverse perspectives that frame them as fundamentally destructive overlook how users interact with these technologies in dramatically different ways. The matter at hand is not whether technologies are inherently beneficial or harmful but how the larger effects of algorithmic arrangement and circulation are shaped in part by the interface as well as how they are used in practice. And this study, in part, has showcased how algorithmic awareness research can begin to mold our vital understanding of these phenomena.

Ultimately, this study identified how the various ways students demonstrated using algorithms can, in some instances, reveal one's critical or rhetorical awareness. So, while the founding mythologies relevant to the networked public sphere may have not panned out to be entirely accurate, the findings of this study nevertheless suggest that the algorithmic web retains genuine potential to facilitate a networked and interconnected public better than one that exists without it. Sunstein (2017) once conveyed a similar argument, contending that online communication infrastructures "make it so much easier for ordinary people to learn about countless topics, hold their governments accountable, and seek out endlessly diverse opinions" (p. 262), reflecting many of the ways my own students demonstrated critical and rhetorical awareness, characterizing their relationship with technology in ways particular constructive to rhetorical and public deliberation; digital technologies can maintain productive use in stabilizing and sustaining deliberative action so long as we continue to orient ourselves accordingly.

However, Sunstein (2017) similarly contended that these technologies are just as capable of facilitating a less responsible, perhaps improper orientation—one that can foment the creation of online echo chambers, thereby dividing or fracturing the networked public sphere. Rather than

facilitating points of connection, these same tools can ostensibly cause individuals to “wall themselves off from topics and opinions that they would prefer to avoid” and, consequently, introduce “serious dangers” to deliberative democracy (Sunstein, 2017, p. 262). And while this study was not designed to examine the phenomenon of echo chambers directly, the findings of this study relevant to clickthroughs and littoral engagement—and their correspondence with demonstrations of rhetorical and critical awareness—raise pertinent questions about how digital phenomena like algorithmic arrangement may shape the range of perspectives users encounter, particularly when user engagement remains localized to the littoral zone.

As I expand my work within the realm of algorithmic awareness research, the teaching of algorithmic awareness may begin to similarly make significant inroads in how we can help students, both school-aged and adult learners, make more *informed judgments* about how they navigate the algorithmic web, better manage their own lives, and engage rhetorically within the networked public sphere. This work depends upon continued, deliberate investigation of these tools and their influence on discursive practices inside and outside the classroom. After all, for a truly *literate* society to emerge and sustain itself alongside the development and release of artificial general intelligence in the years to follow, we must continue asking ourselves whose interest is served when we use and how we use these tools. We must teach students not solely *to be users* of algorithms but *to be aware* of how they use them and how their use influences various discursive practices.

The implications of such work are not merely instructional or educational. They involve and sustain public, democratic engagement. And as public discourse becomes increasingly mediated by algorithms, continued meaningful participation in public engagement depends on an

awareness of how algorithms prioritize and circulate information amidst the networked public sphere.

Appendices

The following appendices supply added information about the nature of the course for the purposes of replicability.

Appendix A: Course Calendar (Fall 2023)

<u>Date</u>	<u>Lesson Sequence</u>
Aug 21	Introductions
Aug 23	Definitions: “What is a campus?”
Diagnostic & Definition essay due Aug 28 @ 11:59pm	
Aug 28	Descriptive accounts
Aug 30	Writing workshop
Descriptive account due Sept 4 @ 11:59pm	
Sept 4	Labor Day–No Class
Sept 6	Telos (purpose)
Sept 11	Pathos (attention)
Sept 13	Logos (evidence)
Sept 18	Ethos (credibility)
Sept 20	Kairos (exigency)
Close reading analysis due Sept 24 @ 11:59pm	
Sept 25	Rhetorical uptake
Sept 27	Rhetorical circulation
Oct 2	Rhetorical velocity
Oct 4	Distant reading activity
Distant reading analysis due Oct 8 @ 11:59pm	
Oct 9	Fall break–No class

Oct 11	Formulating research questions
Research proposal due Oct 15 @ 11:59pm	
Oct 16	Defining credibility
Oct 18	Verifying credibility
Oct 23	Sourcing activity
Oct 25	APA and MLA citation styles
Sourcing report due Oct 29 @ 11:59pm	
Oct 30	Creating a dialectic
Nov 1	Annotating strategies
Nov 6	Conducting interviews and surveys
Nov 8	Thesis statements
Annotated bibliography due Nov 12 @ 11:59pm	
Nov 13	Embedded quotes
Nov 15	Peer review workshop
Research findings due Nov 19 @ 11:59pm	
Nov 20	Facilitating calls to action
Nov 22	Thanksgiving break—No class
Nov 27	Recording presentations
Nov 29	Peer review workshop
Rhetorical intervention & Project presentations due Dec 3 @ 11:59 pm	
Dec 4	Watch presentations—No class meeting, one-on-one conferences available
Final Exam: Presentations discussion	

Appendix B: Sequence of assignments

The following section includes the sequence of assignments students completed over the course of the semester. This includes both the assignments that were included in data collection as well as those that were not.

Definition essay

As discussed in class, **definitions** serve to either simplify or complicate our understanding of a general topic, concept, or idea—*something* of personal importance—oftentimes through association, classification, qualification, negation, or description. (Feel free to review our slides from our second session together on this, if necessary.) To that end, I want you to consider defining something personally relevant to your lived experience. This can be a sport you play or a favorite team or league you follow. This might be a hobby or passion you have outside of work or school. This could even just be a favorite genre or sub-genre of music, film, or art, defining for me what differentiates it from other genres or sub-genres of work.

Ultimately, define something for me. What is it? What are its essential qualities? How might it be classified in association with other things? What is it not? How you go about answering this prompt is ultimately up to you, but you're given a large breadth of choice here in how you do so: after all, it's really your perspective being the only limitation here.

Especially in theme of this being a research-oriented course where what we cover will become increasingly interrogative or exploratory, I really do want you to pick something that you feel quite confident to write about and where it will come easily to produce a written piece – and perhaps something that will reveal a bit more about you to me. If you do find yourself struggling to come up with a paper topic, do not hesitate to contact me, but please do not just turn to a

dictionary or *Wikipedia* to define or describe something. That's a very fast and easy way to get zero points on this assignment. Keep it personally relevant, and refrain from pursuing any outside research. This is about **you** here; I want to read something written **by you**.

This is an excellent opportunity for you to teach me a bit more about yourself in a more formal environment that additionally enables me the opportunity to see you produce something and provide early feedback/suggestions on mechanics and sentence-level writing. In all honesty, there's a reason the diagnostic is worth a similar amount of points; you might as well consider this its writing counterpart. There is no maximum word count attached to this assignment, but please write at least 500 words in double-spaced formatting. (For context, this entire prompt is around 500 words.) Additionally, because this is the first assignment of the semester, I do require that this is a typed submission. In the future, you will be allowed to record audio or video (with a written aid, like a transcript) in place of later submissions, but I want a good sense of where your writing is before we dig into the "real" assignments this semester.

Descriptive account

For your second assignment of the expository unit, you are tasked to delve into the realm of **description**, which differs in some ways from the work of **definition** that we have done up to this point in the semester. While definition straddles both sense- and meaning-making processes, a combined approach of both tacit (what we feel) and empirical (what we observe) knowledge, description is the full-blown endeavor of felt, lived experience through visual, illusory, or otherwise creative accounts. Description values referencing your "state of mind" when encountering an object, event, or other phenomena rather than explicitly "what" something is.

To that effect, I would like you to produce a **descriptive account**: a rendering of lived experience where you describe an experience as much as possible as you live(d) through it. Avoid causal explanations (why it happened), generalizations (the significance of the event), or otherwise abstract interpretations (theorizing). Instead, you describe the experience from the inside, as it were—the feelings, the mood, the emotions, and so on.

It's best that you focus on a particular example or incident regarding the descriptive account. Describe specific events, an adventure, a happening, or a particular experience. Try to focus on a key example of the experience that stands out for its vividness, or as it was the first or last time. Attend to how your body feels/feels, how things smell(ed), how they sound(ed), and so on – and of course, feel free to use accompanying images (or even video) to enrich your descriptive account.

Unlike the definition essay, you are welcome to submit an audio or video recording, and for this assignment, I actually encourage it. We'll talk more about how to “best” produce a multimedia file for this assignment and how to avoid common pitfalls, but note that you are still required to upload a transcript of your video/audio recording. Your transcript, or your written submission, must total 750 words.

Close reading analysis

Navigate the internet and select a text of your choice that is, in your view, sufficiently *argumentative*. This can be any text in any media: a newspaper op-ed article, a YouTube video, a TikTok video, etc. Whatever text you choose, this assignment will unfold in three general parts: summary, description, and analysis.

- **Summary:** Relay, in your own words, what the text is about. Identify its main idea or **thesis**, its intended **purpose** (in your view), and a general overview of the author's **persona** as you interpret it.
- **Analysis:** Identify some of the rhetorical strategies the author uses. Do they rely more on logical appeals to support their claim? Or do they rely more so on emotional appeals? Make sure you draw out an example here to situate your observations.
- **Description:** Similar in vein to the descriptive account, I want you to describe how you encountered the text. First, help contextualize the process you followed in retrieving it. Where did you find it? How did you find it? And why did you choose it? But additionally thread throughout your summary and analysis a bit of this descriptive flavor. What do you find interesting or compelling about the piece? Which moments or parts of the text leave a lasting impression on you that led you to write or talk about it? Did certain elements of the text perhaps remind you of something in your life? When considering the author's use of persuasive appeals, what did the text make you think of as you read it? What did it make you feel?

While description is listed as its own section above, understand that descriptive writing should book-end both your introduction and conclusion and should, additionally, be utilized throughout the submission. In total, your close reading analysis should reach roughly 1,000 words. Note that just like the descriptive account, you are welcome to submit an audio or video recording with an included transcript. You will additionally need to provide some kind of link to the source you're analyzing, though an actual works cited entry is not necessary.

Distant reading analysis

As the final assignment of the rhetorical unit, ahead of the start of our research project, I would like us to conceptualize how algorithms and interactive elements affect the broader impact and circulation of texts online. And so, for the Distant Reading Analysis, I would like you to expand your scope of analysis from *close reading* a specific text – attending to what you see, think, and feel as you encounter it – to *distantly* read it. What this means in the context of this course is to consider how texts do not exist in a vacuum but are artifacts constructed with respect to a specific time period, intended audience, and rhetorical motivation.

Distant reading is a loose plurality of approaches intended to better assess the broader uptake and impact of a specific text: to examine not just its purpose or main idea but how the text is ultimately consumed, shared, and circulated. To this end, distant reading involves digging into the comments, looking at secondary and tertiary reporting, and even reflecting on the arrangement and placement of the text within its larger systematic infrastructures. Distant reading may involve the use of assistive digital tools, which we'll work with next week, or it may be completed through utilizing the ethnographic and/or archival research methods we've discussed already.

Similar to the close reading analysis, you are welcome to choose whatever text you wish to analyze here. In fact, especially since we're doing substantially different work for this distant reading approach, you're even welcome to continue using the same source you used for the last assignment. That said, as we move into more infrastructural modes of analysis, it may be worth looking at texts that exist in spaces more akin to circulation between different social groups, especially social media spaces like Twitter, Reddit, YouTube, and TikTok that make it easier for

us to additionally track that circulation (e.g., retweets). Whatever text you choose, however, a distant reading analysis typically includes:

- A brief overview of your encounter with the text: Where/how you found it, what it's about, what you find interesting/compelling about it, etc. Remember to be descriptive.
- A clear indication of its intended rhetorical situation: Who was it *seemingly* trying to reach, or who was its *intended* audience? Was a particular medium or specific platform chosen for certain rhetorical effect, in your view? Be interpretive and conceptualize your own connections between audiences and platforms, if possible. There are no real wrong answers here.
- A description of how you see the text being taken up and circulated: How did this text appear to travel among its intended audience? What are some of the headline comments or perspectives that were promoted via the algorithm? What appears to be informing the decision-making of the algorithm? How do these comments/perspectives align or differ from your own point of view? (It may be additionally worthwhile to consider what dominant or subordinate perspectives are generally represented in these headline comments.) Are there any indications that it was shared beyond this original context? If so, how was it received in those alternate spaces? (It may, again, be worthwhile to consider dominant and subordinate perspectives as it travels through these different spaces and audiences.)

This assignment, similar to the close reading analysis, is expected to be around 1000 words.

Research proposal

For your first assignment of the research unit, you will craft a project proposal that is inclusive of a few elements:

- **Overview:** What it is you wish to explore for your research project alongside what motivates you to explore this topic. The topic you choose should be something personally relevant to your interests.
- **Research Question:** A research question that scaffolds the inquiry that will guide your research process. Remember that you may have more than one research question and that our questions are *not* accusatory or argumentative (e.g., “what” or “how” but not “why” questions). Good research questions are, additionally, sufficiently complex enough to warrant a deeper research process. “Good” research questions require more than one source of information and aren’t typically answered by just clicking on the first result of a Google search.
- **Positionality statement:** What is your background knowledge on this topic, and how do you think that might influence the way you navigate this project? Acknowledge whatever biases you might have that may influence your approach to this research topic. (This is what makes us human; don’t feel bad about it. Just own it!)

I recommend reviewing our meeting’s slides to best prepare for this assignment. It’s small – your proposal should be roughly 150-200 words – but there are some important details to be included here.

Sourcing report

For the first major assignment of the research unit, you will be tasked to produce a sourcing report that deeply analyzes one source you intend to include in your final research project. Your sourcing report should be inclusive of:

- **The initial encounter:** What was the research process that led you to this source? Was it merely the first thing you saw on Google? Or did you scour through the results page before settling on this one? Essentially, describe to me how you encountered the text inclusive of the platform being used and how you used the algorithm. What search terms or strategies did you use to find it, for example?
- **Your description of the text:** How does this source help you answer your research question? That is to say, what new information does it present? How does it align or differ from some of the other sources you've encountered so far? What makes it worth choosing over others, for example?
- **Your assessment of the source's credibility:** What makes them a credible source that informs the answer to your research question? What process did you follow to ascertain their credibility? Remember that credibility is constructed and contextual to each of our specific research topics and motivations, so highlight the credibility of this source as it is relevant to the subject area of the topic you are researching.
- **Your choice of citation style:** APA, MLA, Chicago, etc. Pick whichever format you wish, just make sure it's done correctly as we've covered in class!

Annotated bibliography

For the next assignment of the research unit, you will be tasked to construct an **annotated bibliography** inclusive of many (if not all) of the sources you are expecting to use to generate your **research findings**, which we will discuss next week.

Each annotation should be inclusive of four main elements:

1. Citation of the source
2. How you found the source
3. Brief summary of the source (2-3 sentences, ideally)
4. How the source relates to other sources in your bibliography
5. Review of the source's credibility

You are expected to have a minimum of **five sources** for your annotated bibliography.

Research findings

As you near the completion of your research project, the research findings will serve as the primary space to account what you discovered throughout your process of inquiry. As such, this assignment will be structured a bit differently from your traditional research paper, appearing something closer to an autobiographical or autoethnographic account of your research project. In *at least* 1000 words, your paper should be formatted with the following sections:

- **Introduction.** You will introduce your topic the same way you began: by identifying your research question and, hopefully, developing an answer to it in the form of a thesis statement.

- **Methods.** You will describe your research process rather than merely account an argument or define the topic. The body of research findings should indicate where you went, what you found, who you consulted, etc. The emphasis here is drawing out the process you followed as you conducted your research.
- **Findings.** This is the meat and potatoes of this paper. You will thematize your findings, drawing attention to specific sources or examples and threading them together into an interwoven narrative. Keep in mind you will likely not draw significant attention to every source you consulted throughout your research inquiry, though most of the sources that made your annotated bibliography should, ideally, be mentioned. Additionally, rather than merely summarize each source, you will be expected to draw connections and build a conversation between them. Essentially, your findings should substantiate your thesis statement, but we are not “laundry listing” sources here; our purpose, instead, is to thematically weave our sources together, especially in relevance to the dominant, subordinate, and subaltern perspectives we’ve drawn increased attention to during our in class activities.
- **Conclusion.** You will close your research findings with an honest reflection on the process. Is this something you wish to continue doing in subsequent semesters? What limitations were necessary that, with more time, you’d potentially explore? In this section, it may be helpful to additionally acknowledge any challenges or issues you encountered, especially when it came to cataloging sources to inform your research question.

Rhetorical intervention

With an answer in mind, it is now time to scaffold and facilitate a call to action. Though you aren't *actually* posting this intervention on social media (though you may if you want to), I am asking you to construct a webtext or social media post as if it were something you would publish to social media. To this end, your intervention may be something written – mimicking a Reddit or Twitter post, perhaps – or it may be visual – as if mimicking an Instagram reel or YouTube video. This intervention could even just be constructed in the form of a visual image like a meme you'd encounter on Tumblr.

Whatever medium you choose for this rhetorical intervention, I ask that you make a creative webtext that is informed by the answer you developed from your research question. That is to say, your intervention should hold some consistency with the findings of your research project. (If emotional appeals seem to be what gets the most clicks in your space, then I wouldn't expect a static graph to mark a meaningful intervention, for example.) To this end, you will be assessed less so on your creativity (I mean, who am I to judge?) but more so on how your intervention aligns with the findings of your overarching research project when it comes to what ideas and perspectives circulate within the space you're investigating—and to which intended audience you're targeting.

Project presentation

Coinciding with your rhetorical intervention submission, you will be tasked to record and upload a video presentation. Your presentation must be 4-6 minutes in length and include the following:

1. What your research question was and how you answered it

2. An example of one source that proved particularly useful in your research
3. An overview of your rhetorical intervention
4. Why you've chosen that space as a rhetorical intervention
5. How you designed the intervention with respect to its intended circulation

You are not required to use a visual aid for this presentation, but I definitely recommend it. I additionally recommend using Zoom to record this presentation given the file size for these recordings can get quite large. To use Zoom on your personal computer or mobile device:

1. Download the standalone Zoom application. Do not use the Zoom link within the Canvas shell, as that is tied to only class meetings I can create.
2. Log in using the "SSO" sign-in. Enter "VCCS" in the SSO field, and then input your VCCS log-in. It should look something like: abc1234
3. Once you're logged in, click "create meeting" and press the "record" button when you are ready to present.
4. Click "share screen" if using a visual aid.
5. When you are finished, stop the recording and save it to the cloud.
6. Download the file that is uploaded to the cloud (it should be an MP4 file) and then upload it to this discussion board.

After recording and uploading your presentation, you will be given time to watch and comment on your peers' presentations during our scheduled class time next week, though you will have until our final exam period to do so. When reviewing student presentations, it may also be helpful to review the rhetorical intervention they have posted online in the discussion board.

Appendix C: The sourcing activity

Procedure (75 minutes)

- Initial setup (5 minutes): Help students get acquainted, getting into small groups (2-4 students). Students who are study participants are placed into their own groups and moved to a section of the room to limit picking up voices of non-participants. Participant groups are each handed a tablet that is installed with screen and audio-recording software.
- Overview of the activity (10 minutes): Give students a brief walkthrough of how to conduct lateral reading using examples presented on a slideshow.
- Sourcing activity (30 minutes): Students analyze sources in small groups.
- Discussion/Breakdown (15-20 minutes): Students report out to the rest of the class their experience using search algorithms and generative AI to vet sources.
- Wrap-up (5 minutes): Participant-groups return tablets.

Appendix D: IRB documentation

NVCC Study Approval



July 31, 2023

Alexander Glass
LASS Adjunct Faculty
Northern Virginia Community College
Alexandria Campus
5000 Dawes Avenue
Alexandria, VA 22311

Dear Alex,

Your proposal to study how students conceptualize and showcase algorithmic awareness has been approved. Participation in any research project is purely voluntary. Ensure the participants are aware of their options. Please send any changes in your research methodology and final report once complete.

Feel free to contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Partridge", is written over a faint, light-colored signature line.

Steve Partridge
Vice President of Strategy, Research, and Workforce Innovation
Northern Virginia Community College
4001 Wakefield Chapel Road
Annandale, VA 22030

Cc. Dr. Annette Haggray
Interim Dean Jay Steere

Maryland IRB Exception Letter

1204 Marie Mount Hall
 College Park, MD 20742-5125
 TEL 301.405.4212
 FAX 301.314.1475
 irb@umd.edu
 www.umresearch.umd.edu/IRB

DATE: September 22, 2023

TO: Alexander Glass

FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [2087463-1] Student conceptualizations of algorithmic awareness

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: September 22, 2023

REVIEW CATEGORY: Exemption category # 45CFR46.104(d)(1)

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the IRB Office at 301-405-4212 or irb@umd.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Maryland College Park (UMCP) IRB's records.

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