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### MAKING SOFTWARE VISIBLE IN RHETORICAL APPROACHES TO FAKE NEWS

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As rhetoric and composition scholars, it is easy to assume we are adept at identifying credible sources. After all, we teach it perhaps more than any academic discipline. But it is a mistake to assume only “non-experts” are susceptible to fake news. Doing so assumes literacy is merely skill acquisition and deemphasizes the role of the more invisible components of literacy, like ideology and—as we posit in this essay—information access technology. James Chase Sanchez, a co-author of this chapter, describes a moment in May 2017 when he browsed his Twitter feed and viewed a video. In the short clip, Donald Trump speaks to a young black girl who tells him, “You’re a disgrace to the world” (Bradley). The child backs away to take a picture of Trump as he nervously leaves. The clip was shared by hundreds of thousands of people on social media and appeared real (Bradley). Though Sanchez did not share the video, he certainly found it to be plausible. Other friends and colleagues he considered intelligent and trustworthy had shared it, and he saw nothing to indicate it might be untrue.

However, the video was indeed fake. Sanchez had viewed a clip from a new Comedy Central program titled *The President Show*, where an actor dressed as Trump blurs the line between comedy and the president’s real-life controversies (“You’re a Disgrace”). The video was shared as a real story and spread to thousands of people who believed the scenario was plausible. Since the original video tweet dropped the “Comedy Central” logo and made its origin unclear, many were duped by the same story. Eventually, sites like Snopes and news organizations such as *Vanity Fair*, *NY Mag*, and *Huffington Post* all released stories detailing exactly how this video was fake. Though this particular video was fairly benign, it showcases how vulnerable we all are to “fake news.” While there are many ways to define fake news, here we take it to refer to a story that, while fabricated, presents itself and is received as a credible news story. Based on a person’s political ideologies, cultural perspectives, biases, and the unconscious ways they interact with technology, anyone can be susceptible. In this essay, we point to what we believe is an important and underexplored factor for how people fall for fake news: the software applications used for its creation, distribution, and access.

As Sanchez’s anecdote underscores, fake news cuts across many demographics, political

ideologies, and agendas, including those of the president himself. According to the digital Trump Twitter Archive, Trump tweeted an astonishing 979 times between his election and January 8, 2021, when Twitter permanently banned him from the platform, and his tweets illustrate how the term itself has been co-opted for a range of political or propagandistic purposes (Brown). While Trump makes frequent use of the term, the rhetorical context of that usage suggests a range of definitions. In some instances, Trump refers to fake news similarly to the way we use the term in this piece, such as his tweet from January 11, 2017: “Intelligence agencies should never have allowed this fake news to ‘leak’ into the public. One last shot at me. Are we living in Nazi Germany?” (Brown). Here, Trump is referring to the infamous dossier from his trip to Moscow, and he uses fake news to mean a story that is fake but presents itself as real. However, the difference in this usage is that Trump is unconcerned with whether or not the dossier is true or false—its claims remain unverified—and is instead only interested with the fact that *he* considers it fake. Other times, Trump uses the term to refer to any news story that turned out to be incorrect, such as his January 28, 2017 tweet: “The failing @nytimes has been wrong about me from the beginning. Said I would lose the primaries, then the general election. FAKE NEWS!” (Brown). In this instance, opinion pieces and political analyses on news platforms are deemed fake if they turned out to be wrong in their predictions. More commonly, however, Trump uses the term to refer to news reports that utilize unnamed sources—“FAKE NEWS media, which makes up stories and ‘sources,’ is far more effective than the discredited Democrats - but they are fading fast!”—reports that are broadcast on “mainstream” platforms—“Don’t believe the main stream (fake news) media. The White House is running VERY WELL. I inherited a MESS and am in the process of fixing it”—or, his favorite, any news reports that are unfavorable to him—“Any negative polls are fake news, just like the CNN, ABC, NBC polls in the election. Sorry, people want border security and extreme vetting” (Brown).

So, while Hillary Clinton correctly described fake news as a “danger that must be addressed and addressed quickly” (Schor) in the aftermath of the 2016 election, the problem of combating it is made more complicated by the very different ways the term is used on different platforms and taken up by people based on their existing beliefs. Likewise, efforts to combat it have emerged across several fronts. Mark Zuckerberg wrote in December 2016 that his company, Facebook, has a “new kind of responsibility” to vet fake news articles shared on its platform (Lomas). In the field of journalism, one solution offered is called “The Trust Project,” an initiative of the Markkula Center for Applied Ethics at Santa Clara University, which partners with media organizations to assign “trust indicators” of reliability and ethical reporting. Moreover, advocacy groups like Media Literacy Now argue that combating fake news requires instituting media literacy standards in high school curricula (Thomas).

And while rigorous media literacy standards are important, studies show that more and more people are vulnerable to fake news. Stanford researchers claim fake news transcends age and education level. Students from middle school, high school, and even college show what researchers called a “dismaying” inability to differentiate between credible and fake news stories (Stanford). However, as David Uberti from the *Columbia Journalism Review* has argued, more alarming is how “social networks allow smut to hurtle through the public imagination—and into pizza parlors—at breakneck speed. People at or near the top of the current administration have shared fake news

casually, and it's appearing in news organizations' own programmatic ads." While media literacy could help students identify the *people* and *intentions* behind fake news, we argue that it is equally important to think deeply about the software applications that enable information to flow into our newsfeeds. Following Timothy Laquintano and Annette Vee's argument that fake news "is only one instantiation of a shift that literacy studies will need to reckon with to understand how people encounter texts on an everyday basis: a shift to the reliance on computational and automated writing systems to circulate texts and amplify their distribution" (43), we hope our contribution will enable teachers to help their students reckon with how software applications are implicated in the ways both news and fake news are delivered, remembered, and forgotten.

In *Expressive Processing: Digital Fictions, Computer Games, and Software Studies*, Noah Wardrip-Fruin states, "It is essential for our political future that people develop the ability to think critically about software systems" (xii). Because rhetoric and composition already works to develop critical awareness of a wide range of literacy practices, we contend that teachers and scholars are ideally positioned to engage the essential work Wardrip-Fruin identifies. We propose that fake news makes exigent the need for *critical software literacy*: a skeptical and reflective questioning of how software filters the information users consume in order to help users, as stated in the introduction to this book, "not take for granted that the writers they encounter are seeking a fair exchange of ideas" (Introduction). Digital media theorists have argued that making visible the effects of software's ubiquity should become a central concern for humanities research in an emerging field Lev Manovich has termed "software studies" (*Language of New Media*). To make software's role in fake news visible, we consider the well-known #PizzaGate story and analyze it with respect to particular features that give it credibility, such as shares and likes. After discussing #PizzaGate, we suggest some effective practices for helping people become more aware of the role software literacy plays in fake news, and we point to university library guides as sites where rhetoric and composition teacher-scholars can help implement these suggestions.

First, we review some of the major scholarship from software studies and make two claims about how our own field can become more aware of software in order to address fake news: 1) how the spread of personal computing was made possible by proliferating visual data through the concealment of computer processes; and 2) how software is expressive through specific *operational logics* that shape how audiences respond to digitized information. In making these claims, we also want to emphasize what software literacy does *not* entail. Becoming software literate does *not* require users know how to code. Being software literate does *not* require users to program or design software. And being software literate does *not* require users to have expert knowledge of the computer processes. What it *does* require is taking seriously just how important software is in our daily lives, how it gains power and relevance through being "visibly invisible" (Chun), and how it influences the ways audiences receive digital media generally. Being software literate means that readers "approach [software applications] warily, aware that the writers they are encountering can be motivated to confuse, obscure, and trick" (Introduction).

## Making #Pizzagate Possible: Visible Invisibility and the Eliza Effect

The ubiquity of software cannot be overstated. Software appears in the GPS applications we use to navigate unfamiliar towns, the applications we use for correspondence, or the course management software we use to structure and deliver content to students. While there is no shortage of scholarship describing the affordances of digital rhetorics (Ball; Bogost; Brooke) or the possibilities of networked spaces (Jones; Murray; Rickert), we contend that addressing fake news should focus more specifically on software because software applications embody and codify particular relations, motivations, and intentions between individuals and larger power structures that are typically unseen by users. In Lev Manovich's landmark book *Software Takes Command*, he makes the case that while the creation of software is a cultural achievement on par with the printing press, the history of its development remains occluded:

None of the new media authoring and editing techniques we associate with computers are simply a result of media "being digital." The new ways of media access, distribution, analysis, generation, and manipulation all come from *software*. Which also means that they are the result of the particular choices made by individuals, companies, and consortiums who develop software—media authoring and editing applications, compression codecs, file formats, programming and scripting languages used to create interactive and dynamic media such as PHP and JavaScript. (148)

We take Manovich's claim to mean paying close attention to software and its ubiquity *by definition* requires one to confront those "particular choices made by individuals, companies, and consortiums who develop software" (148). While it is tempting to claim there is nothing particularly new about fake news, we contend that its dependence on software makes it unique from more traditional forms of propaganda, disinformation, and misinformation. In this collection, Drew Virtue shows how the emerging technology of television heightened and amplified propagandistic messaging in unique ways during McCarthyism; fake news is in many ways made possible by emergent software authoring practices that often go unseen due to the simultaneous ubiquity and invisibility of software. Critical software literacy makes clear that fake news is generated, manipulated, distributed, accessed, and analyzed using particular software applications with material histories that are significant to when, where, and how stories are received.

One critical move made by designers in the development of software has been to hide or "blackbox" computer processes and replace them with visualizations. While that has made computers more usable to the general public, it also obfuscates how and why software applications deliver fake news to our screens. In *Programmed Visions: Software and Memory*, Wendy Hui Kyong Chun describes a paradox of computers being less understood today even as they are more widely used than ever. As computers were commodified and commercialized, a market-driven need emerged to make computers more accessible to the average person. Software applications that automate underlying computer processes play a central role in the commercialization of personal computing. They do this by—using Chun's terminology—making computerized information "visibly invisible" (10). In other

words, computers generate tremendous amounts of information by simultaneously proliferating visual data and concealing procedural data. The clearest way to understand this move is by tracing the history of operating systems, the software that supports a computer's most basic functions, such as scheduling updates and managing memory. Operating systems in the 1980s required users to know much more about how their computer worked than do contemporary operating systems. PC DOS, for instance—while fairly simple—required users to know long lists of written commands to perform basic functions such as saving and moving files. Contemporary operating systems, such as macOS Sierra, can be operated by someone with virtually no knowledge of commands or how the system operates. Working with computers has become more of a visual and less of a procedural experience. The result of this move is that many computer processes are “blackboxed” to prevent users from accidentally harming their systems.

The “visibly invisible” effect Chun describes can also be observed through changes to programming languages, and such an example helps to illustrate how more people are able to use computers today as a result of choices made by software engineers, even while knowing less than previous users about how computers operate. The earliest computers required users to work with the physical hardware of the machine to change its basic functions. As software entered the scene, programmers could rely on machinic languages (think binary or hexadecimal) to use code in place of interacting directly with hardware. Slightly higher-level programming includes things such as assembly language (think BASIC or x86) that remove the user even further from the machine's operations, and high-level languages (think JAVA or C++) are so abstracted from the machine that a person with a basic understanding of those languages can literally read them. As the way we interact with computers comes to look more and more like everyday life—computer code that resembles human language, “grabbing” content from a touch screen—computers become easier to access and use. It also becomes easier to lose track of the computer processes that enable such access.

So what does all this mean for fake news? It means that fake news has emerged in an era where more people are using computers than ever before, but the average computer user knows less about how their machine works than at any point in the past. Software is deeply implicated in this fact. At the same time, computer processes are now so fast that software seems to disappear. Chun claims that “software emerged as a thing—as an iterable textual program—through an axiomatic process of commercialization and commodification that has made code *logos*: a word conflated with and substituting for *action*” (9). In other words, any “coding” we put into a computer—from swiping left on our iPhone to entering a command to run a program—happens so quickly that one might conflate it with the machine's actions. This is not to suggest that using a touchscreen interface is some new form of coding, but instead to explain how visual interfaces close the temporal gap between procedure and action. For example, if someone were using an old computer system to locate a file stored in its memory, they might have to manually input a command to tell the operating system where to look for the file, then another command to tell the system what to do with the file (open or delete, for instance). Now, a user might simply touch the screen of their device and point to file itself (such as an image stored on the memory of an iPhone) and open or delete it based on which part of the screen they touch. Those commands the user once had to manually enter are still being

generated, but they are done through automation on the back end and concealed from the user. This acceleration and ease of working with files is made possible through software applications, and these same software applications make finding and sharing fake news easier and faster than ever before. Therefore, if teachers are to help students adequately understand how fake news operates, they must work to make software's role in the ease and acceleration of its creation, distribution, and access visible. However, as Chun states, this "is not a call to return to an age when one could see and comprehend the actions of our computers. Those days are long gone" (92). Cultivating critical awareness of the influences and effects of software on activities such as getting our news does *not* mean that every user needs a nuanced understanding of code or the machine, or even that they can necessarily conduct a deep analysis of any given application. But it does require, at minimum, that we begin to *see that software is present*. Even taking the basic steps of asking oneself, "What kinds of software are involved in delivering this content to my screen? Who made that software, and why?" go a long way toward critiquing software and its products, such as fake news. As we have stated in previous sections, any software has a specific material history that is bound up with the motivations of both individuals and corporations. While software has been made to feel transparent through commercialization, we must begin to see again in order to expose how those motivations deliver news to our screens.

This brings us to our second main point in this section. By making software visible, teachers can expose particular effects it has on audiences, or what Noah Wardrip-Fruin calls *operational logics*. Operational logics describe emergent patterns between various elements in Wardrip-Fruin's model of digital media: *data*, the prefabricated media such as text and images; *process*, the procedures that make software run; *surface*, what media users actually experience; *interaction*, the "change to a state of the work . . . that comes from outside the work" (11); *authors*, the people who create digital media with software; and *audiences*, the many people who share and consume digital media. According to Wardrip-Fruin, these elements of digital media work together to create specific types of effects—operational logics—on media users. These can take the form of assumptions or beliefs about how computers work based on common ways they are used. The terms in Wardrip-Fruin's model are purposefully broad in order to account for a range of patterns they contain across the history of computing. Interaction, for example, refers broadly to a change in the state of a work that comes from outside the work in order to contain the myriad of ways users make changes to works on a computer across different iterations of software. *Interaction* could therefore cover anything from manually deleting a file through commands in the operating system, to editing an image in an early version of Photoshop, to editing an image using only one's right index finger with the Photos app on an iPhone.

For fake news, the most important operational logic is the *Eliza Effect*. Named after a Rogerian Psychology Bot called Eliza, this operational logic refers to the tendency for humans to assume complex processes beneath a computer program when its surface appears complex. According to Wardrip-Fruin, "[w]hen a system is presented as intelligent and appears to exhibit intelligent behavior, people have a disturbingly strong tendency to regard it as such" (33). While the software application known as "Eliza" actually ran on a small handful of simple commands, users consistently attributed to it deep complexity. As Wardrip-Fruin states,

When we interact with a piece of software . . . we don't get a clear picture of how it actually operates internally. And Dr. Sagan and I were not alone regarding Eliza/Doctor, its audiences often developed mistaken ideas about its internals. They assumed that since the surface appearance of an interaction with the program could resemble something like a coherent dialogue, internally the software must be complex. Some thought it must be something close to the fictional HAL: a computer program intelligent enough to understand and produce arbitrary human language. (31-32)

The Eliza Effect helps account for the power of fake news to trick even those versed in critically analyzing sources. If we return to the anecdote from our introduction, where a fake video featuring Donald Trump carried credibility for many, one can see the Eliza Effect influencing the credibility assigned to sources based on assumptions regarding the complexity of their production. While most people are aware that software applications such as web browsers customize the information in our feeds based on aggregated data, few of us could explain the underlying processes that make such customization possible. This lack of knowledge could lead a user to assume that the process for delivering a video to their desktop is complex enough to “weed out” dubious content. Based on our preconceived notion of complex computer processes, fake news can therefore be delivered to our desktops with a kind of pre-packaged credibility. In other words, users may also assume an exaggerated complexity for making such a fake video and think it simply would not be worth all that effort to fabricate something so complicated. Moreover, they may also assume that the algorithms software uses to customize their sources are so “smart” that any story that reaches their screen has already been vetted by complex computer processes. For example, in Safiya Noble's 2018 book, she illustrates how Dillon Roof was convinced that a variety of white supremacist conspiracy theories were true simply because they were on the first page of results returned from a search about “white genocide” on Google (110-118). Even the simple belief that creating a fake news story and getting it to trend on social media with the use of Twitter bots is complex might lead a user to believe trending stories. While the effects of the Eliza Effect were perhaps not intended by software engineers, it is still a result of those choices made by the pioneers of software: namely, to hide processes from general users, which opens the possibility space for those users to then make assumptions about the shape and complexity of such processes.

The assumptions generated by the Eliza Effect crumble with the slightest scrutiny. Therefore, even the simple step of having users slow down and take notice of the software they use can be critical for recognizing fake news. But slowing down is easier said than done, especially in an age where conspiracy theories of the vilest ilk spread rapidly as legitimate interpretations of real events. Take, for example, the infamous #PizzaGate story and the technological processes that made it potent. In the following section, we analyze the rhetorical and technological components of #PizzaGate and its consequences in an effort to make visible some elements of fake news that sometimes go unseen, such as how software boosts ethos claims and enhances the viral spread of stories.

The scandal that came to be known as #PizzaGate involves the dubious claim that Hillary Clinton was involved in a pedophilia ring at a Washington, DC pizza shop called Comet Ping Pong, and while its premise is laughable, the rumor culminated frighteningly with a heavily armed man,

Edgar Welch, shooting an AR-15 rifle multiple times into the Comet Ping Pong pizza shop. Though there are competing timelines on how to mark the “beginning” of this story, many have pinpointed its genesis in a single tweet. The *Washington Post* notes that someone with the Twitter handle @DavidGoldbergNY first tweeted that new evidence in the Clinton email scandal “point to a pedophilia ring and @HillaryClinton is at the center” on October 30, 2016 (Fisher et al.). A few important points are noteworthy. First, there is no “David Goldberg” working for any news agency. He seems not to exist outside of a Twitter handle. Second, by adding “NY” to the handle, Goldberg establishes some faux credibility with a Twitter audience because, most of the time, officials associated with a state or journalists associated with a region add state abbreviations to their handle. Therefore, the first circulation of this fake story began with a tweet from an incredible, anonymous source that eventually attracted over 6,000 retweets and warranted even more “faves” and interactions. The ease with which someone can use bots or fake profiles on Twitter plays a key role in the story’s credibility, especially as the Eliza Effect means audiences tend to over attribute complexity to such processes. The ease of distribution of a fake news story like this can create a digital trail of staggering range. According to a *Rolling Stone* story, even after Welch’s arrest, “[i]t took the better part of a year (and two teams of researchers) to sift through the digital trail. We found ordinary people, online activists, bots, foreign agents and domestic political operatives” (Robb). While a user might reasonably wonder, “Who has the time to fabricate something so complex? I’m seeing it everywhere,” software applications like Twitter bots make that distribution easier than one would expect, especially when the retweets of a bot are taken up and shared by social media users with large followings.

The story eventually found its way into different social media websites and fringe news organizations. Websites like Reddit and 4chan spread the story, and it was eventually picked up by Alex Jones and Infowars, with Jones claiming on his November 4 YouTube video, “When I think about all the children Hillary Clinton has personally murdered and chopped up and raped, I have zero fear standing up against her” (Fisher et al.). With these fringe sites promoting and spreading the story, Comet Ping Pong eventually felt the real effects of fake news. James Alefantis, owner of Comet, received threatening messages on social media the weekend before election day.

Approximately one week after the election, Jack Posobiec, a leader of a pro-Trump grassroots organization, took matters into his own hands after obsessively reading online stories. He and an unnamed friend went to the restaurant and spent forty-five minutes searching unsuccessfully for secret hiding areas before being asked to leave. This incident inspired Edgar Welch to later enter Comet and shoot three rounds inside the building. Welch, unable to find any hidden passages, surrendered without incident. On March 24, 2017, Welch plead guilty to federal and city firearm and assault charges with a four-year prison sentence (Hermann).

PizzaGate began in late October and virtually ended on December 4th, illustrating not only how fast fake news spreads but also how fake news can have real consequences. Rhetorically, it might be easy to understand the implications of this story and why it caught on so quickly. Outlandish conspiracy theories are generally compelling to those with particular ideological biases. But outside of the ethos appeals extending from the “@DavidGoldbergNY” Twitter account, we also see how *copia*, or a copious amount of material, fueled this firestorm. Over a period of two months, #PizzaGate



received thousands of mentions on Twitter, Facebook, 4chan, Reddit, and other online social media and alternative news platforms. Popular outlets such as InfoWars and famous alt-right figures such as Ben Swann promoted the conspiracy.

Therefore, for an uninformed reader, the evidence would appear abundant against Clinton and Comet merely through the attention generated on social media. Moreover, the constant use of the hashtag to describe the story built a level of “truth”—how could a story be dubious if its hashtag is trending online? We see how conspiracy rhetoric hinges on making anything evidence (Aisch et al.). For example, many commenters online argued that some of the language and pictures on the Comet and nearby stores’ websites and menus were code for their child pornography ring. For instance, “cheese pizza” stood for “child pornography.” However, when the businesses attempted to address the concerns by removing the reported “code” or discussing them openly, new conspiracy theorists argued that this was further evidence of truth. Bolstered by their digital support, propagators of this story created a fail-safe for their own propositions: if one does not address the issue being reported, it demonstrates guilt; however, if one tries to disclaim these reports or even acknowledge the fake news claims, that also demonstrates guilt. Fake news stories such as #PizzaGate rely on these rhetorical fallacies, and they exploit the affordances of software to generate, distribute, and discuss the “evidence” for fake news.

What, then, does #PizzaGate tell us about fake news in general and the need for critical software literacy in particular? For one, #PizzaGate provides a lens to see the reach of fake news stories. The underpinnings of their genesis may be completely meritless, but interest builds so quickly that interest itself functions as faux-credibility. Moreover, with regard to software literacy, if we think back to our discussion of the Eliza Effect, we see that the way a story trends through the use of hashtags and bots *seems* like such a complex technological function that—to someone who cannot see the presence of software in the story’s distribution—#Pizzagate might just be crazy enough to be true. Software allows unfounded knowledge to aggregate and, while some fake news stories are satirical—like the Trump story from our introduction—others may end in brutal violence.

As we suggested in our introduction, one potential way to address this as scholars and teachers of writing is to develop a set of effective practices for thinking through software literacy. Below we propose two key suggestions for emphasizing ways to spot the software tools that fake news stories utilize to go viral: university-library partnerships and more purposeful pedagogical practices. Though we do not claim that these are by any means foolproof tools to distinguish fake news, we think that these are good starting points.

## Software Literacy through Cross-Institutional Partnerships

One way to implement best practices for software literacy is through partnerships with university libraries. First Year Composition (FYC) reaches more students than perhaps any other course, and it is also a place where issues of sourcing and credibility are discussed frequently. Since FYC programs frequently partner with their university libraries, and since many university libraries either already have or are in the processes of developing fake news guides for students, we believe these guides are

a good place to implement some of the knowledge from software studies we have discussed in this essay. However, current library guides that address fake news are significantly lacking in critical and sustained discussions of software literacy. How frequently are such guides being made and used? What kinds of suggestions do these guides make? How might they effectively incorporate software literacy moving forward?

To answer these questions, we searched through schools in the Big 12 for online library guides having to do with fake news. Of the ten schools in the conference, three schools, Oklahoma State, Iowa State, and Baylor did not have any library guides dedicated to fake news that we could find. Two others, the University of Texas (UT) and Texas Christian University, addressed fake news in a fleeting or cursory way. For example, UT's library guide "How to Spot Fake News" primarily links to other sources: an infographic on spotting fake news, a PBS column on how librarians are helpful for spotting fake news, and a list of popular fact-checking sites ("How to Spot Fake News"). Similarly, TCU's library guide, "Is it 'Fake News?'"—housed in the "Presidential Power" library guide—contains the statement, "to really understand what's going on in our world it's important that you're getting correct information from reliable sources," and then links to the same handful of fact-checking websites as UT ("Presidential Power").

A few of the Big 12's library guides situated fake news in terms of literacy. For example, the University of Oklahoma library guide was called "News Literacy," which it defined as "critical thinking skills necessary to evaluate news publications for their credibility and reliability" and contained tabs with resources for faculty and students and of course, fact-checking websites ("News Literacy"). The University of Kansas defined their fake news library guide in terms of "Media Literacy" and included similar resources for faculty and students ("Media Literacy"). At Kansas State, the library guide is called "Breaking Your News Bubble," and while it does not explicitly refer to literacy in its title, it nevertheless situates fake news in terms of critically consuming and evaluating various kinds of news media ("Breaking your News Bubble").

Only two university library guides in the Big 12, Texas Tech University and West Virginia University, dedicate entire library guides to fake news. At Texas Tech, the library guide is called "Fake News, Misinformation, Propaganda, and Pseudoscience: Databases, Journals, and Articles." West Virginia's library guide might be the only true "fake news" library guide, though; it includes a headnote emphasizing the importance of being "skeptical of the news we consume" and a list of resources for deciphering fake news stories, as well as heuristics for critically investigating potential fake news stories. For instance, on the "Let's check a claim" tab of West Virginia's library guide, the audience sees a screenshot from a dubious website claiming that the Earth is hollow ("Fake News"). The image is marked up with arrows pointing to various aspects of the site that are red flags for fake news, such as unreliable URLs, wild claims without evidence, and easily disprovable arguments. And finally, Kansas State's library guide mentioned technology briefly, touching on how algorithms that collect users' personal data can filter the news in potentially troublesome ways: "Such online personalization is convenient when we're shopping on Amazon," it says, "but can be divisive and polarizing when it comes to our news" ("Breaking your News Bubble").

Overall, though, most of the Big 12 library guides on fake news were very similar, many of

them linking to the same resources or making the same suggestions to students and faculty about being diligent about finding *reliable sources*. For example, the University of Oklahoma, University of Texas, University of Kansas, and West Virginia University all linked to the same infographic from the International Federation of Library Associations and Institutions (IFLA) on “How to Spot Fake News.” Moreover, nearly every library guide linked to the same fact-checking websites like *PolitiFact*, *Snopes*, and the *Washington Post Fact-Checker*. These suggestions reinforce a static definition of literacy as skills-acquisition or that being *duped* by fake news is simply a byproduct of lazy research.

While we aren’t saying that we don’t need to be diligent in fact-checking and ensuring adequate sourcing in the news we consume, we are saying that a software-based approach to fake news needs a stronger presence on university library guides. For example, we found that only three university library guides offer any resources having to do with technology. The University of Kansas library guide, for example, offers a section called “Fact Checking Technology” with tips on reverse image searching on Google and various video analysis tools (“Media Literacy”). The library guide at Kansas State University offers tips on how to adjust social media settings to “address the order in which you see new posts in your social media,” and the library guide at Texas Tech offers resources for browser plug-ins that utilize technology to help students identify and critique fake news (“Breaking Your News Bubble”; “Fake News, Misinformation, Propaganda, and Pseudoscience”). While promising, we believe university library guides can benefit from even more concerted and sustained efforts to prepare students for literacy based on software awareness and understanding. There is, of course, no single or one-and-for-all model of what either literacy or software literacy entails, as literacy practices change both across history and across contexts. In discussing effective literacy practices pertaining to software as we find it today, we are attempting, as Miller and Leon write, to “bridge the expanding gap between the literacies we teach and the ones our students enact” (11-12).

## Cultivating Software Literacy through Purposeful Pedagogy

The classroom is a vital location for the development of critical software literacy, and we believe the needed pedagogical practices involve not just renunciations of *unreliable sources*, but rather, practices that ask students to look critically at the technologies they use to access information, just as students would consider issues of genre as described in this collection by Genevieve García de Müeller and Randall W. Monty. We suggest that writing classrooms take a little time to read about the software applications they are using when they access news stories. For example, readings from texts such as the books in the *Software Studies* series from MIT Press could be just as useful in a writing classroom as traditional readings from prominent FYC textbooks. Moreover, for the significant number of students who access news and information primarily on social media, we believe writing teachers can also increase student understanding of fake news by supplementing course readings on software-centric stories, such as the recent information breach of Facebook data by the company Cambridge Analytica. Stakeholder analysis, a staple of writing pedagogy, is just as useful for unpacking software. Who are the stakeholders in Facebook’s news feed algorithm, for example? How and why is content delivered on that platform? Such questions and readings might

help students begin thinking about the material and economic realities of the software applications they use and, as the authors state in their introduction to this book, “to imagine a writer/creator behind the [software application] they encounter” (“Introduction”).

Potential assignments that frontload critical software literacy might begin by having students reflect on the social media sites they use to find news and ask them to question how these applications potentially disseminate fake news through their algorithms. Instead of focusing on the mathematical equations associated with these platforms, instructors could ask students to explore ways these sites exploit fake news differently (such as through trending topics on Facebook and trending hashtags on Twitter) and how understanding that the way information is circulated in each case should affect the way we interact with each application. More recently, rhetorical studies of circulation might come in handy for these kinds of activities. To put this another way, the field of rhetoric and writing studies already knows a lot about how textual products circulate as well as how and in which rhetorical contexts they are taken up and remembered at various sites, including anything from presidential speeches to national libraries to public monuments and memorials. In this collection, Eric Leake’s essay “The Multiple Lives of News Stories” certainly points in this direction, as he rightly offers an assignment sequence focused on making students aware of how news stories are repurposed and repacked across different news sites based on audience. Similarly, we believe that rhetoric and writing teachers and scholars should both work to apply what they already know about the circulation of texts to the role software plays and actively work to supplement what they know with emergent knowledge in the relatively new area of software studies. Attending to the major role of software in the fake news crisis requires us to attend to both audience and application, to both circulation and subjective algorithms.

Potential projects that students and teachers can work on in the classroom have to do with the subject of fake news itself. Downs and Wardle discourage teaching first year writing in terms of “how to write in college” or as generalizable skills that govern how to write *in general* (553). Instead, they encourage a *writing about writing* pedagogy, which asks students to study “the ways writing works in the world and how the ‘tool’ of writing is used to mediate various activities” (Downs and Wardle 558). In a similar way, it is not too far off to suggest that software literacy is a pathway toward learning *how writing works* to circulate discourse, and how software *as writing* impacts the ways audiences view, understand, and respond to information. A recent Pew Research Report suggests that nearly 40% of people solely get their news online (and this is a growing group) (Mitchell et al.). Thus, we believe that critical software pedagogy should revolve around the ways news is spread through software applications as a way to engage students in how they perceive and interpret certain news stories or adjudicate the veracity of what they read.

For example, students might create “news media tracking” projects, where they design research investigations into their own media consumption. They might deliberately only read news using a particular application for small stretches of time, tracking what news stories come onto their feed, keeping note of the titles, authors, headlines, and positions, and then reflect on how the software application influenced their interpretation of the news. This work could also transfer to group discussions where students compare and contrast their experiences with their peers. Students

could write about the degree to which they are being *fed* content by software, or the factors they imagine that went into those decisions. An example of how software feeds people different versions of information based on that person's prior choices is the well-known "Blue Feed, Red Feed: See Liberal Facebook and Conservative Facebook, Side by Side" comparison of the different types of content Facebook shows users based on what the application knows about a user's political leanings (Keegan). What might students see if they created a "Facebook Feed" vs a "Snapchat Feed" for the news stories they see? In a literal sense, this kind of comparison of the information they are fed by software applications reveals what those applications know or presume to know about a student's interests or beliefs. Moreover, students could envision other ways software can help or hinder the circulation and interpretation of information—since literacy, as we know, changes, as do the tools and skills we develop to mediate knowledge. Such assignments could help students become more aware of how the very applications they download on their phones determine what kinds of stories they tend to see.

Finally, teachers should take time to reflect on the ways that software invisibly structures their own work. While we should be more critical of our work and news outlets in comparison to students, as Sanchez's vignette at the beginning of this piece notes, all of us can fall prey to a fake news story. Our critical literacy should not only lie with the ways we are *fed* news and information via software applications; it should also apply to the way we use software in our pedagogy. How might our teaching be affected by software algorithms? Does the work we do in the class change due to the software we use? Perhaps the most apt way teachers can critically examine their pedagogical software practices is through course management software or any software program they use to do their writing, lesson planning, and so on. Teachers should make concentrated efforts to work often in different applications—and work using analog mediums that don't use software—and carefully reflect on how their work changes based on which applications they use. Are there noticeable changes in how the classroom functions or how information is displayed if they move from a software-based system to an analog one? Not only can this practice help teachers become more aware of the specific ways software creates and defines workable spaces for us, but it could also become pedagogical fodder in the classroom itself. If a teacher notices a change in the way they teach through this process, they could discuss its effects with students in order to highlight the importance of software literacy as an everyday reflective practice.

Based on how vital we believe software literacy to be, we want to close by emphasizing that it is critical for our field to develop robust practices for raising awareness of software's role in the fake news crisis, and to acknowledge that this work will likely look quite different for all of us depending on our university context. The authors of this essay, for instance, work in very different institutional settings, from a land-grant university to a public research university to a private liberal arts college. This means that our students will have not only different kinds of preparation coming into the classroom but also different levels of access and exposure to technology both at home and in their schools. Likewise, our solutions will have to be adaptable to local contexts and circumstances and attend to meeting our students where they are. Josh and Tyler, for instance, both work in writing program administration and regularly partner with their university libraries on projects as it is, so extending

that already-existing relationship to tackle fake news is a logical extension of their day-to-day work. James, on the other hand, does not work in writing program administration and may better address the issue at his institution through his service: organizing workshops or colloquia for other faculty members to help them develop classroom practices attentive to software applications, for instance. Though extending already-existing relationships and/or reorienting the service components of our work toward information literacy will indeed require creativity and hard work on our parts, understanding how our job titles and universities position us to act differently, we argue, is vital to the future of our democracy. Moreover, our field is deeply invested in the type of knowledge that makes us ideally positioned to act. By leveraging our positions to act in whatever way we can, we believe students and teachers will be better equipped to question the next fake news story, whether it is set in a pizza parlor or on our own campuses.

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