21 OCTOBER 2020

EDUCATING FOR MISUNDERSTANDING:

HOW APPROACHES TO TEACHING DIGITAL LITERACY MAKE STUDENTS SUSCEPTIBLE TO SCAMMERS, ROGUES, BAD ACTORS, AND HATE MONGERS

WORKING PAPER A-21322

SAM WINEBURG, JOEL BREAKSTONE, NADAV ZIV, AND MARK SMITH | STANFORD UNIVERSITY

✉ The Stanford History Education Group: sheg@gse.stanford.edu

C O N T E N T S

Executive Summary

Russian troll farms sow disinformation. Fake news runs amok on social media. Bots impersonate real people. Real people assume false identities. How do we know what's true? The only thing certain in our digital age is our uncertainty.

This confusion impairs our ability to make wise, fact-based decisions that shape our nation's future. What has been the educational response to this predicament? The most common approaches—"media literacy," "news literacy," "digital literacy," and even that catch-all, "critical thinking"—share a commitment to teaching people how to tell truth from fiction, recognize hoaxes, and practice caution before passing along dubious content to family and friends. Are these approaches effective in helping today's college students make thoughtful choices about what to believe?

The Study

To address this question, we surveyed 263 college sophomores, juniors, and seniors at a large state university on the East Coast. On one task, students evaluated the trustworthiness of a "news story" that came from a satirical website. On a second task, students evaluated the website of a group claiming to sponsor "nonpartisan research." In fact the site was created by a Washington, D.C., public relations firm run by a former corporate lobbyist. For both tasks, students had a live internet connection and were instructed to "use any online resources" to make their evaluations.

The Results

Students struggled. They employed inefficient strategies that made them vulnerable to forces, whether satirical or malevolent, that threaten informed citizenship.

- **Over two-thirds** never identified the "news story" as satirical.

- **Ninety-five percent** never located the PR firm behind the supposedly "nonpartisan" website.

Often students:

- *Focused* exclusively on the website or prompt, rarely consulting the broader web

- *Trusted* how a site presented itself on its About page

- *Applied* out-of-date and in some cases incorrect strategies (such as accepting or rejecting a site because of its top-level domain)

- *Attributed* undue weight to easily manipulated signals of credibility—such as an organization's non-profit status, its links to authoritative sources, or "look"

Students Learned What We Taught Them

Alarmingly, students' approach was consistent with guidelines that can be found on many college and university websites. Sometimes these materials are just plain wrong. Sometimes they are incomplete. Sometimes they are so inconsistent that they offer scant guidance for navigating the treacherous terrain of today's internet.

Educational institutions must do a better job helping students become discerning consumers of digital information. Our society and its democratic institutions depend on it.

INTRODUCTION

Educators have addressed the information crisis in a variety of ways. Common to each is a commitment to teaching young people how to tell truth from fiction, recognize hoaxes, and practice caution before passing along dubious content to family and friends. Do these approaches help today's college students make informed choices about what to believe?

The answer to this question has implications that extend beyond students' college years. Recognizing the duty to prepare informed citizens, dozens of colleges are weighing requirements in "civic literacy," with some proposing that students pass a test in order to graduate.[1] Ensuring that students understand the checks and balances of American government or the freedoms guaranteed by the Bill of Rights is important. But a civics test worthy of our digital age must assess students' ability to distinguish between reliable and misleading information. A free society that can't tell the difference jeopardizes its freedom.

For nearly every issue facing today's young people—from climate change and income inequality to student debt and the legalization of marijuana—the place to find up-to-date information is the internet. However, both reliable information and deceitful sources flood students' screens. To thrive as members of a democratic society, students must be able to sort through this digital thicket.

THE STUDY

The internet is an indispensable fixture of college life. Across the curriculum, students are asked to go online to do research and complete course assignments. College and university websites provide guidelines about evaluating a range of sources. As misinformation and fake news have become features of modern life, these websites commonly provide advice aimed at helping students evaluate digital content.

To understand how today's students evaluate digital sources, we surveyed sophomores, juniors, and seniors at an East Coast university enrolling over 16,000 undergraduate students. According to the 2019 rankings of *U.S. News & World Report*, this university is considered "selective."

We sent out a description of the study to professors across a range of departments. Twelve professors agreed to give up thirty minutes of scheduled class time to participate. Students were drawn from courses in biology, architecture, public health, classics, history, social work, education, and anthropology. In all, 263 students participated: 89% were juniors or seniors and 11% sophomores. We excluded freshmen because we wanted to study students who had already completed introductory college courses.

In each classroom, a member of the research team described the study and explained that participation was voluntary. Students who volunteered logged on to the university's network with their own laptops and typed their answers into Qualtrics, an online survey platform. About half of the students completed a task about "fake news"; the other half a task about a website that hid its true backers. As a token of appreciation, students were provided with a link to redeem a $5 Starbucks gift card.

Task 1: Fake News
This task presented students with an image of a messaging app that showed what appeared to be a news story from a publication called *The Seattle Tribune*. The story carried the headline "Government Considers Further Discussion

Surrounding Religion in School." Students were asked to evaluate the trustworthiness of the article and could use "any online resources" to make their evaluation. A timer that counted down from seven minutes appeared in the right corner of their screens.

Students who typed "Seattle Tribune" into their browsers were able to answer the prompt in seconds **(Figure 1)**. They quickly found that *The Seattle Tribune's* website contained a disclaimer explaining that it was a satirical site and that all its news articles were "fictional." A junior sports and recreation major wrote that the site "appears to be much like *The Onion* . . . It should be taken with a grain of salt." A junior architecture major quoted directly from *The Seattle Tribune's* disclaimer **(Figure 2)**: "'*The Seattle Tribune* is a news and entertainment satire web publication. . . . All news articles contained within *The Seattle Tribune* are fictional and presumably satirical.'"

Responses like these, however, were decidedly in the minority. About two-thirds of the students (83/125) failed to recognize *The Seattle Tribune* as a satirical site **(Figure 3)**. They either judged the article as trustworthy (25/125) or rejected it based on an irrelevant feature, such as its top-level domain (58/125). In both cases, students' attention remained glued to the article itself, hardly ever leaving the prompt to search the open web.

Among students who judged the article as credible, some provided responses that showed little effort. Others diligently read the item and justified their responses by noting that the story came from "local news," that it "looks professional," that it addressed a "timely subject," or that it matched "what I think." These students placed their faith in weak signals such as the appearance of the article or used their personal beliefs as barometers for credibility. A senior majoring in anthropology based her assessment on the fact that the story contained "statistical facts" that "can be checked if needed."

Figure 1
The Seattle Tribune Task

Figure 2
The Seattle Tribune Disclaimer

The Seattle Tribune
Informing The Nation

FRONT PAGE   FEATURED   POLITICS   CRIME   RELIGION   HEALTH   BUSINESS   WORLD   SCIENCE/TECH

Disclaimer

The Seattle Tribune is a news and entertainment satire web publication. The Seattle Tribune may or may not use real names, often in semi-real or mostly fictitious ways. All news articles contained within The Seattle Tribune are fictional and presumably satirical news – with the exception of our 'list style' articles that include relevant sources. The content published on The Seattle Tribune is intended to be entertainment and is often intended to generate thought and discussion among its readers. Any resemblance to the truth is purely coincidental. Advice given is NOT to be construed as professional. If you are in need of professional help, please consult a professional. The Seattle Tribune is not intended for children under the age of 18.

Task 2: Cloaked Website

On the cloaked website task, students judged the credibility of an article that appeared on *minimumwage.com*, a site that claims to provide nonpartisan information about minimum wage policy. Its About page sends readers to the site's sponsor: the Employment Policies Institute (EPI; www.epionline.org), which describes itself as "a non-profit research organization dedicated to studying public policy issues surrounding employment growth." Students were given twelve minutes to assess the trustworthiness of the information provided by *minimumwage.com*. *Minimumwage.com* and its parent organization, the Employment Policies Institute, embody how many public policy campaigns are waged on today's internet. Sites proclaiming to offer nonpartisan research often turn out to be the work of special interests. *Minimumwage.com* and the Employment Policies Institute are run out of the offices of the Washington, D.C., public relations firm of Berman and Company. The firm, headed by former lobbyist Richard Berman, receives funding from the restaurant lobby, an interest group dedicated to keeping the minimum wage low.[2]

Figure 3
Detecting Fake News/Satire

34%
CORRECT
Identified site as satire

66%
INCORRECT
Did not identify site as satire

n = 125
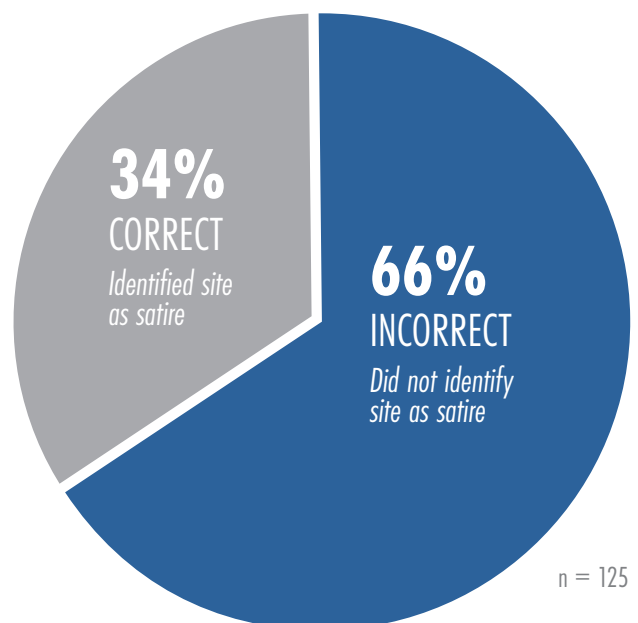
Establishing the connection between the Employment Policies Institute and Berman's PR firm takes less than a minute by searching for "Employment Policies Institute" **(Figure 4)**. Students who did so easily found information that cast doubt on the group's "nonpartisan" stance. A senior history and anthropology major

wrote that "a quick internet search shows that the 'institute' is run and owned by a restaurant industry lobbyist who has a vested interest in not having the minimum wage increased." A senior English major looked past the site's neutral language and searched the open web: "While the [website's] language seems professional, and the article mentioned newspapers of record . . . closer research into the validity of the website reveals that it is a pseudo think-tank website that is funded by groups with corporate interests against labor unions, workers rights and labor rights."

Answers like these two were exceedingly rare. Eighty-five percent of students never turned to the broader internet to investigate the trustworthiness of *minimumwage.com*. Instead, they relied on the information provided by the site itself. Nearly forty percent (54/138) judged *minimumwage.com* trustworthy. Forty-five percent (63/138) rejected the site but based their judgment on irrelevant features, like the site's top-level domain. Ten percent (14/138) remained unsure of the site's quality. Only seven students out of 138 connected *minimumwage.com* to the public relations firm of Berman and Company **(Figure 5)**.

STRATEGIES THAT FAIL

Students approached these tasks with an array of strategies. Too often, however, their strategies were ineffective or, worse, led them astray. Why did so many of these college students make simple mistakes? Alarmingly, many of the strategies they used were ones recommended by college and university websites.

The most ubiquitous tool for teaching web credibility at the college level is known as the CRAAP test, a set of guidelines corresponding to the categories of Currency, Relevance, Authority, Accuracy, and Purpose (hence, CRAAP).[3] A Google

Figure 4
Search Sequence for Identifying Group Behind
minimumwage.com

STEP 1

Minimumwage.com indicates it is a project of the Employment Policies Institute

STEP 2

Employment Policies Website

STEP 3

A search for Employment Policies Institute returns sites that cast doubt on the Institute's trustworthiness
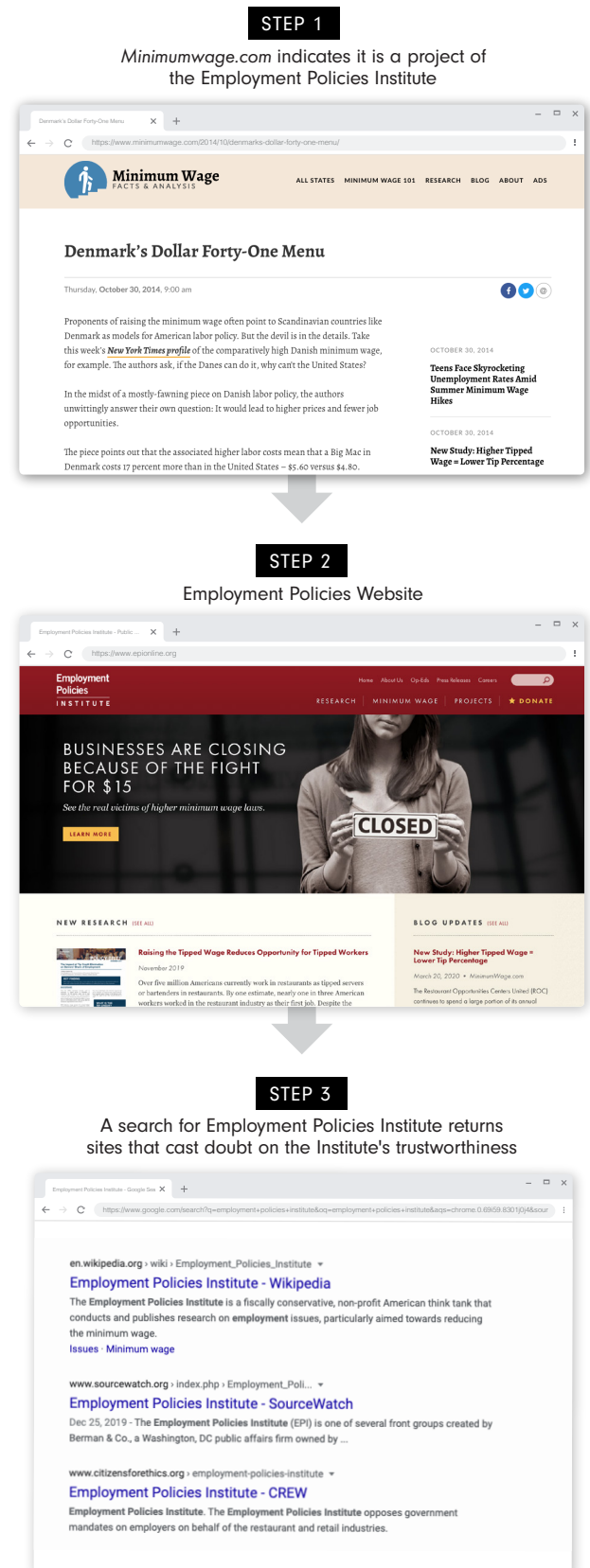
search brings up more than 100,000 results for the CRAAP test, which can be found on the websites of elite research universities, regional colleges, and scores of institutions in between **(Figure 6)**. The CRAAP test prompts students to ask questions (sometimes as many as 30) to assess a site's credibility.[4] While the kinds and number of questions vary, most versions of the CRAAP test direct students' attention to a site's top-level domain, the information on its About page, the authority of its links, the presence or absence of banner ads, the listing of contact information, and the currency and frequency of updates. The basic assumptions of the CRAAP test are rooted in an analog age: Websites are like print texts. The best way to evaluate them is to read them carefully. But websites are not variations of print documents. The internet operates by wholly different rules.

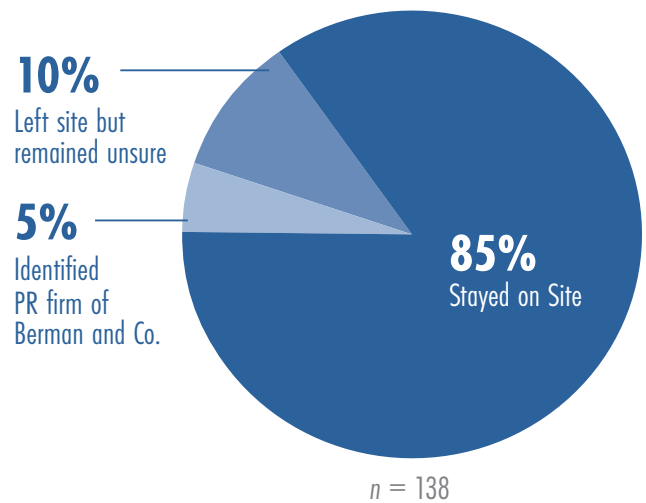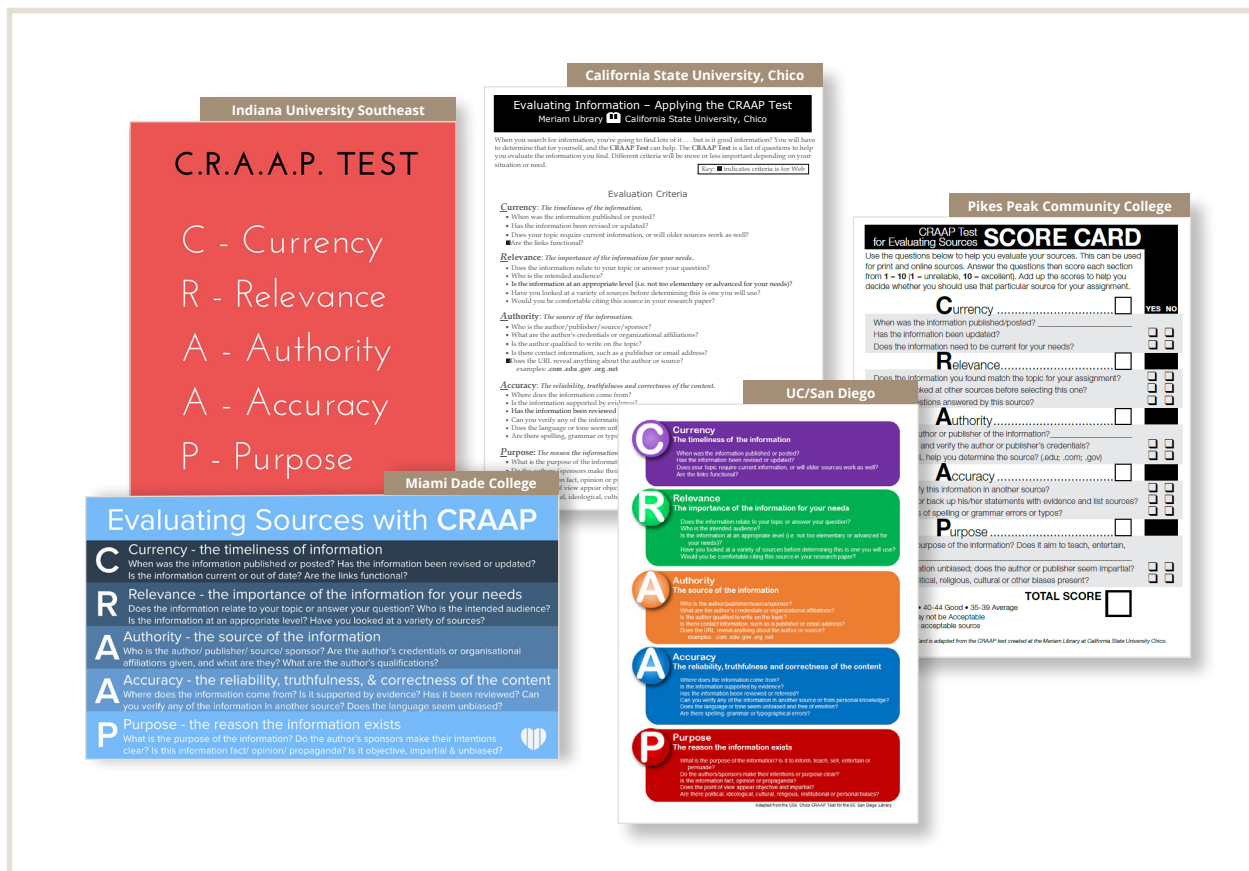**Figure 5**
Students' Search Strategies for *minimumwage.com*

10%
Left site but remained unsure

5%
Identified PR firm of Berman and Co.

85%
Stayed on Site

n = 138

Figure 6
Examples of CRAAP Test from College and University Websites

Deceived by Domains

Instructional materials like the CRAAP test train students' attention on a site's top-level domain. They warn that the commercial nature of dot-coms makes them less trustworthy than dot-orgs or dot-edus. "Anyone can get [a dot-com]," alerts one college guide. "Be cautious in using these. Confirm the information somewhere else."[5]

Evaluating a site by its top-level domain courts error. Some students rejected *The Seattle Tribune* not because they identified it as "fake news." Rather, their evaluations began—and abruptly ended—at the URL bearing the letters com. A junior education major wrote, "You see a .com and a random URL name. This is not a reliable source." A senior parks and recreation management major concluded, "It is a .com so I would not consider it very trustworthy." A junior interior architecture major noted, "[*The Seattle Tribune*] is not that trustworthy because the website ends in .com." In total, more than 10% (13/125) of students referred to the site's top-level domain in their evaluations.

A similar pattern emerged on the second task. More than 15% (21/138) included the site's URL in their explanations of the trustworthiness of *minimumwage.com*. A junior classics major reasoned, "The dot-com is a giveaway that it received revenue based on advertisements and clicks." A junior special education major seconded: "What is throwing me off is the .com at the end of the website. I was always taught during research assignments not to trust those."

The problem with judging a site by its top-level domain—in these cases, flatly rejecting dot-coms—is that practically every bona fide news source, from *The New York Times* to *The Wall Street Journal* to *The Washington Post*, is registered as a dot-com. The wholesale rejection of dot-coms leaves students little recourse for learning about the political and social world.

If dot-coms ignited students' suspicion, what boosted their confidence? A website that ended in dot-org. On the cloaked website task, a sophomore social work major elaborated: "I do not think this is a reliable source because the most reliable sources have .org at the end of their URL." A senior majoring in English and education added, "Any time I am completing any sort of research, I prefer to use .org and .edu sites." On the fake news task, a junior education major maintained, "In order for it to be trustworthy it should have a .edu, .org, or a .gov." Another education major answered similarly, "The article is not very trustworthy because the website is not from a .gov or .org website."

Students' belief about the benevolence of dot-org sites is widely shared. A 2013 survey showed that half of Americans (and greater percentages in France, India, and Brazil) believed an organization had to pass an approval process and "meet criteria" to register as a dot-org.[6] Such beliefs are not only wrong. They're dangerous. Dot-org is a "legacy" domain, one of the top-level domains created by the U.S. government in the mid-1980s. The dot-org domain was created as a "catch-all," a category to slot sites that didn't fit neatly in domains such as .edu (education), .gov (government), or .mil (military).[7] Unlike these three domains, each of which maintained a vetting process from the start, dot-org was created—and has remained— "open" (in that sense, just like dot-com). Anyone can buy a dot-org domain without filing special paperwork, without proving benevolent intent, or even without showing nonprofit status.[8]

There are over ten million registered dot-orgs.[9] Many are legitimate groups that have 501(c)(3) tax-exempt status from the United States Internal Revenue Service (IRS). Many others, however, don't. In fact, there's nothing to prevent a commercial site from obtaining a dot-org

Table 1:
College and University Advice about Dot-Org & Nonprofit Status[12]

Institution	Advice*
Harvard University	"Is the Web document linked to a federal agency (.gov), **a non-profit site (.org)**, an educational institution (.edu), or a business (.com)?"
Northwestern University	"**.org:** typically used by **non-profit** entities that are not educational or commercial entities."
Boston College	"**.org** for **nonprofit** organizations"
Pennsylvannia State University	"Who is supplying the information? Is it an educational institution (.edu extension)? A government agency (.gov)? A commercial supplier (.com)? **A non-profit organization (.org)?**"
University of Washington	"**.org - Non-Profit Organization**"

emphasis ours

domain. Craigslist, one of the largest classified advertising sites in the world, is registered as *craigslist.org*. Religious cults, tobacco industry (and now vaping industry) trade groups, and groups associated with "dark money," such as the Koch brothers' *Americans for Prosperity Foundation*, all bear the dot-org domain. More menacingly, a study of the groups listed on the Southern Poverty Law Center's 2019 "Hate Map" showed that among those sites that maintain a web presence, forty-nine percent carried the dot-org domain.[10]

College and university guidelines often give dot-orgs a free pass. Some guidelines equate dot-orgs with nonprofits and say nothing more—a stance that fuels the misconception that the dot-org brand alone makes a site credible.

Web evaluation guidelines often link dot-org with tax-exempt status, a designation issued by the United States Internal Revenue Service (**Table 1**). On the cloaked website task, ten students cited the Employment Policies Institute's non-profit status when justifying the trustworthiness of *minimumwage.com*. A senior English major reasoned: "[Employment Policies Institute] is a not-for-profit organization that has been operating since 1991. I don't see any bias, and it appears that they are primarily research and

data driven." A senior geography major approved of the site by explaining that "the information is cited from a NON-profit research organization." Yet, like a dot-org domain, tax-exempt status does not ensure that a group acts on behalf of the public good. Hundreds of trade associations and lobby groups carry the designation. Each year the IRS is overwhelmed by applications for tax-exempt status. In 2015 alone, it reviewed 101,962 applications. Of these, 94%, or 95,372, were approved. Research by the Stanford Center on Philanthropy and Civil Society concluded that obtaining non-profit status "is an embarrassingly easy thing to do. It is hardly an exaggeration to say that when it comes to oversight of the application process to become a public charity, nearly anything goes."[11]

About Page

A website's About page figures prominently on many college and university guides. Northwestern advises students to consider whether the site has an "about" section or "introductory/background information that you can review to help determine a mission, point of view, or agenda," and Brandeis tells students to "read the 'About' page carefully." When guiding students how to assess

an organization's credibility, Penn State points students to "look for an 'About Us' link on the homepage."[13]

Many students accorded a special status to About pages. They failed to realize that for many groups the About page could just as easily be called the spin page. For cloaked websites, deceit reaches its apex on the About page. Although students may understand that a friend's social media profile is a curated depiction of how they want to appear, they seemed to think that an organization's About page provided an official—perhaps even vetted—description of its intent.

This pattern finds support in what students are taught. Savannah Technical College tells students to "go to the 'About' page" of a site and "look for the credentials of the person or organization and a contact address."[14] But without corroborating this information on other sites, how can one trust an organization's self-portrayal? Putting stock in a site's About page is advice that's widely shared. National Public Radio, in an article entitled "Fake or Real? How to Self-Check the News and Get the Facts," tells readers that the language on an About page should be "straightforward" and advises them to be skeptical if a site's About page

Figure 8
NPR's "How to Self-Check the News"

Read the "About Us" section

Most sites will have a lot of information about the news outlet, the company that runs it, members of leadership, and the mission and ethics statement behind an organization. The language used here is straightforward. If it's melodramatic and seems overblown, you should be skeptical.

npr

language is "melodramatic"—implying, perhaps unwittingly, that if language is neutral and dispassionate, a site might be more trustworthy.[15]

The objective-sounding language of the About pages from *minimumwage.com* and the Employment Policies Institute achieved its intended effect. Fourteen percent (20/138) of students relied upon information from the About pages to make their evaluations. A senior public health major wrote that *minimumwage.com* was reliable because its About page said that "Minimum Wage is a project of the Employment Policies Institute (EPI). Founded in 1991, EPI is a non-profit research organization dedicated to studying public policy issues"—a direct quote from the website. Other students followed suit, such as a junior social work major: "It is a project coming from an organization known as the Employment Policies Institute founded in 1991. The research is being conducted by independent economists from major universities. https://www.minimumwage.com/about/."

Sites like the Employment Policies Institute hide their real sponsors. The most important thing to know about such groups—and others whose intent is to hide their backers—is that they are incredibly good at what they do. They know how to create compelling websites. They know how to manipulate signals of credibility. And, above all, they know how to create About pages that project authority and objectivity.[16]

Links

Students used a website's links as proxies of trustworthiness. This feature of web evaluation also finds support in university guidelines, where students are instructed to check if a site's links are in working order. In the early days of the internet, broken links signaled unprofessionalism and decreased a site's credibility. But today, making sure that links work is a trivial task for anyone with a modest budget. Functional links are no longer a signal that differentiates between trustworthy and dubious sites.

Universities also advise students to weigh the prestige and authority of a site's links. More prestigious links, the thinking goes, indicate a more reliable site. Cornell University recommends that students ask whether "the links on [a] site lead to other reputable sites" **(Table 2)**. Rare were colleges that warned students that links to prestigious sources can themselves be tools of deception.

On the cloaked website task, ten percent of students (15/138) interpreted links to recognizable sources as markers of reliability. *Minimumwage.com* linked to both the *New York Times* and the *Columbia Journalism Review*. Seeing these links boosted many students' confidence in the site's trustworthiness **(Table 3)**.

When a site like *minimumwage.com* links to *The New York Times* or the *Columbia Journalism Review*, the hope is that the reputation of the link will carry the day—just as it did for these college students. *Minimumwage.com* bets that typical users will hover over a link just long enough to identify it as legitimate or, if they click on it, will be satisfied with a cursory glance.[17] Among the 138 respondents, only one, a sophomore biology major, read enough of the linked *New York Times* article to realize that it *failed* to support *minimumwage.com's* claims: "The link within the page that connects to *The New York Times* is contradicting what the minimumwage.com has to say. *The New York Times* explains that Denmark is actually thriving when it comes to higher minimum wage. The Minimum Wage website is suggesting the opposite."

Today's hyperlink is the grandchild of the scholarly reference: the footnote. But there are

Table 2:
College and University Advice About Links[18]

Institution	Advice*
Cornell University	"Do **links** on this site lead to other reputable sites?"
Binghamton University	"Is there a bibliography or a source list? Are there footnotes or **links** to reputable cited sources?"
Boston College	"Do the **links** still work?"
University of Notre Dame	"Are **links** or references to other sources up to date?"
Rutgers: The State University of New Jersey	"Are there **links** to other sources to back up the facts?"

emphasis ours

big differences between footnotes appearing in scholarly journals and links on unregulated websites. For established scholarly journals, the practice of citation is held in check by overlapping safeguards that range from peer reviewers acquainted with the scientific literature to the reputation of the authors to the self-correcting nature of science. None of these safeguards apply to unregulated websites. *Minimumwage.com* demonstrates the danger of using links as proxies of credibility. Had students read the *Columbia Journalism Review* link **(Figure 9)**, they would have found a damning indictment of *minimumwage.com's* sponsor. The article's penultimate paragraph dismisses the Employment Policies Institute as "Rick Berman's restaurant-lobby front," labeling the so-called think tank an "anti-labor industry shill"—hardly a ringing endorsement for an organization that claims nonpartisanship.[19] More than anything, this example shows how a website can enhance its reputation by linking to authoritative sources— even if those sources undermine its credibility.

Table 3:
Student Evaluations Based on Links

Year	Major	Response
Senior	**Biology**	"minimumwage.com is reliable because it cites sources like https://mobile.nytimes.com/2014/10/28/business/international-al/living-wages-served-in-denmark-fast-food-restaurants.html"
Senior	**Education**	"The article gives you a link to an article by *The New York Times* which is believed to be a credible source of information. Also the *Columbia Journalism Review* is used and it seems to be a credible source, but maybe it is less credible than *The New York Times*."
Sophomore	**Social Work**	"The links on the site work, some of the sites it cited are sites I have heard of."

Aesthetics

Looks matter. Judging a site by its "look" receives support from a range of universities. Among guidelines offered by the University of Arizona, students are told to favor sites that look "professional" as judged by their "colors/fonts" **(see Figure 10)**.[20] Brigham Young University tells students to consider "the look and feel of the website," adding that, "reliable websites usually have a more professional look and feel than personal Web sites."[21] The University of Illinois recommends that students ask, "Does the page look professional and function well?"[22]

Students' reliance on such surface features echoed loudly. A senior biology major noted that *minimumwage.com* "looks reliable and it seems like it provides factual information." The site's graphics similarly impressed a senior history major: "The interactive map [on] the page offers a visual while looking at other states' minimum wage. The blog feature allows people to give their own personal opinions and media helps give a visual to show what is being portrayed." In an age of slick website templates and inexpensive hosting, relying on a site's aesthetics plays into

Figure 9
Excerpt from *Columbia Journalism Review*

the hands of rogues seeking to manufacture an impression of respectability.

IMPLICATIONS

If the future of our democracy depends on young people's ability to distinguish trustworthy from spurious information, we've got a lot of work ahead of us. College students embraced

ways of navigating the internet that made them vulnerable to the very forces that threaten informed citizenship. But young people are not to blame. The roots of their strategies can often be found in the materials educators have designed.

Common sense seems to dictate that we should examine a website carefully in order to judge its credibility. That's the advice many colleges recommend: consider a site's domain, examine its About page, search for the telltale signs that something's off (like flashing banner ads or clickbait), check to see that the site provides contact information, and verify that its links are in working order. This approach, however, does more than mislead. Spending precious minutes scouring a site before first determining whether it's worth the effort is a colossal waste of time.

Misplaced effort was especially apparent in this architecture major's lengthy response to the Fake News task **(Figure 11)**. On its face, this student provides an intelligent analysis. She examined the article from top to bottom. She looked for bias and detected coded language. She noticed missing references and the absence of bibliographic pointers. She concluded that the author is someone who supports the teaching

Figure 10
University of Arizona's Evaluating Web Resources

Figure 11
The Seattle Tribune **Task & Student Response**

Look at the message below and answer the question that follows.

thesseattletribune.com

Religion

Government Considers Further Discussion Surrounding Religion In School

By **Editing Staff** · September 20, 2016   👁 1794   💬 6

Image: High school student reading his personal bible during his lunch break

In attempt to further the divide between church and state, the United States Federal Government has discussed a new regulation prohibiting any public school student or faculty member from bringing their personal bibles to school or from discussing any religious content with other students or faculty members while on school grounds.

The topic of religion in public schools has long been an issue of great controversy and has caused debate among those who believe religion has a place in schools and those who oppose the topic of religion within the educational system.

"The article provides no citations or sources or specific references. Additionally the article is tagged under a 'religion' tag rather than politics or education. This suggests that the intended audience for the article carries a religious bias at the outset. The article also specifically references the Bible, not religious texts in general so the article bears a bias toward one religion. The article's most prominent graphics are the social media icons which suggests that the content is intended to be attention-grabbing. This is reinforced by the religious bias. The opening statement 'further the divide between church and state' implies that the author does not support the fundamental constitutional idea of total separation of church and state, further reinforcing a biased perspective."

of religion in public schools. In isolation, none of these statements is wrong.

What's wrong is the entire approach.

The student mistakes this satire as a legitimate source worthy of sustained attention. She expends considerable mental effort. It's as if she's answering a school writing prompt: "Analyze this text and defend your position with evidence from the article." Despite having a live internet connection at her fingertips, the student never left the screen displaying *The Seattle Tribune* prompt.

We should view this student's response against the backdrop of traditional schooling, which does little to prepare students for the challenges of a digital environment. The SAT, long considered a gold standard of academic achievement, presents students with predigested passages and orderly multiple-choice questions. Students are never asked whether the passage should be believed, whether it's reliable, or whether its creators have a hidden agenda.

Advanced Placement exams present students with "Document-Based Questions" (DBQs) containing multiple documents from different points of view. But DBQs never include the kinds of sources that slither in today's digital swamps: concocted evidence, Photoshopped images, and pseudo-scholarly accounts studded with footnotes that lead to nonexistent archives. No wonder students are baffled trying to find truth in a digital environment.

Students don't merely lack the skills they need to thrive in a digital environment. It's worse. They've been taught ineffective ones.

Professional Fact Checkers
Research we have conducted with professional fact checkers reveals a different approach to evaluating digital content.[23] Fact checkers

approach their screens knowing that things are not what they seem. They know that signals like the top-level domain, links to reputable sources, or a dispassionate About page provide scant evidence of an organization's true intent.

They understand that the Web *is* a web: an interconnected network of information, where probing a single node (particularly an unfamiliar node) requires locating it in a vast matrix of linked information.[24] An entomologist studying the complexity of a spider's web would never restrict an analysis to a single strand. Similarly unwise is the act of evaluating an unknown site without first consulting the wider Web. Failing to do so approaches a 21st-century problem equipped with rusting tools of the 20th century.

Presented with an unfamiliar site, fact checkers always turned to other sources before reaching a conclusion. They engaged in a kind of reading uniquely suited to the internet. Rather than dwelling on a single site, they *read laterally*, opening up multiple tabs across the horizontal axis of their browser to get a fix on the original site.[25] In fact, sometimes their first stop was a site many educators tell students to avoid: Wikipedia.

But fact checkers used Wikipedia differently than many students do. They skipped the main article and dove straight to references, where more established sources can be found. They knew that the more controversial the topic, the more likely the entry was to be "protected" through the various locks Wikipedia applies to prevent changes by anyone except high-ranking editors. Further, the fact checkers knew how to use a Wikipedia article's "Talk" page, the tab hiding in plain sight next to the main entry—a tab that few students know about, let alone consult. The "Talk" page is where an article's claims are established, disputed and, when the evidence merits, altered.

Figure 12
Fact Checker's Screenshot with Seven Open Tabs in 30 Seconds
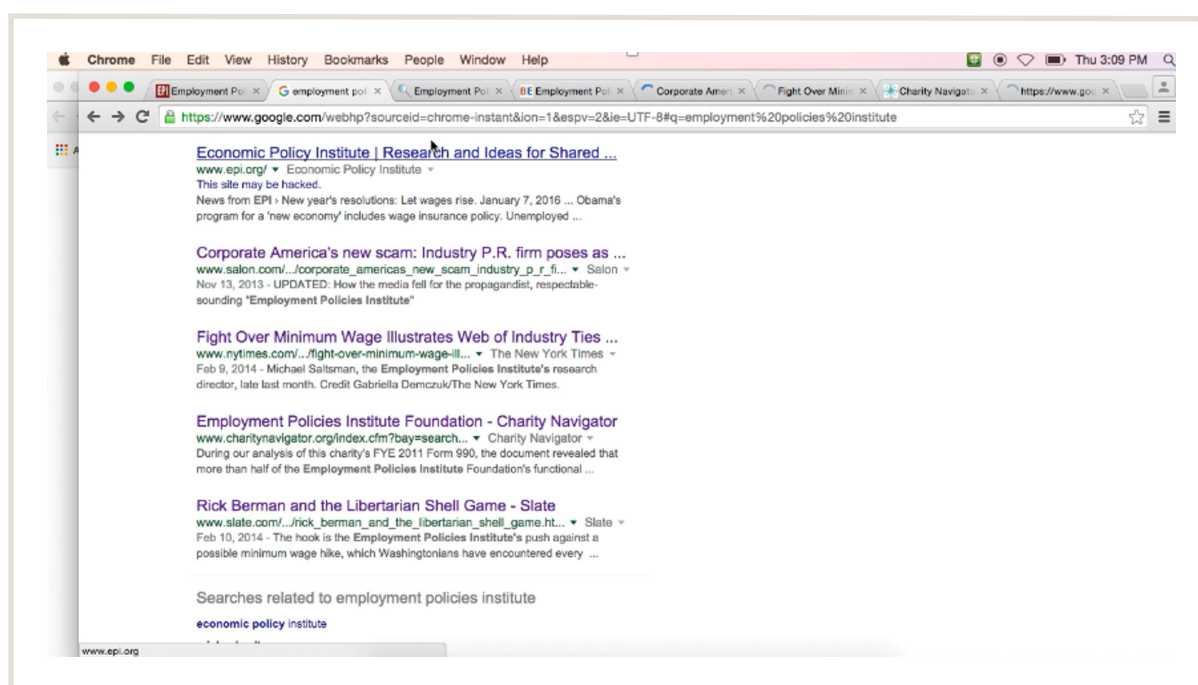
Screenshot of professional fact checker evaluating the Employment Policies Institute. Landing on the site, the fact checker immediately leaves it, types the name of the organization into the browser, and in less than thirty seconds has opened seven different tabs, including one that ties EPI to Berman's Washington, D.C., public relations firm.

Miseducation

In medicine, the term *iatrogenic disease* is a euphemism for a physician-caused malady: a patient who develops sepsis because the doctor forgot to wash her hands; an open-heart surgery patient who dies because an errant latex glove was sewn into a patient's chest cavity.

Rarely are educators' mistakes so grave. But in the aggregate, they have serious consequences for the choices students make about major social issues.

No student is born distrustful of dot-coms and favorably predisposed toward dot-orgs. No student opens up a webpage for the first time believing that the About page is the go-to place for trusted information. Students bring such beliefs to the internet because they have internalized the lessons we have taught them.

As internet theorist and blogger Mike Caulfield has shown, the roots of the widely-disseminated CRAAP test predate the internet. The original list of questions was formulated to help librarians make decisions about which print materials to buy on a limited budget.[26] To retrofit the test for evaluating websites and to make it easy to remember, a librarian at California State University, Chico replaced the O for "objectivity" with P for "purpose," resulting in "CRAAP." Today, thousands of college students are given a tool devised in 1978, a time of 8-track tape players and shoebox-sized cellphones, to deal with the challenges of information overload wrought by high-powered computers that fit snugly in their back pockets.

RECOMMENDATIONS

Anxiety over misinformation around the 2016 presidential race led to a flurry of legislation, including in California, the nation's most populous state. Senate Bill No. 830, signed into law by Governor Jerry Brown, mandated that by 2019 the California State Board of Education must provide schools and teachers with "resources and instructional materials on media literacy . . . including media literacy professional development programs for teachers."[27]

This legislation, however, presumed we already know what to do. But what if these "best practices"—the approaches widely taught by our nation's colleges and universities—are not helpful? Worse, what if they make students more susceptible to misinformation? The results of this study suggest that may be the case.

We offer the following recommendations for improving students' web savvy. Some of these recommendations are easy to implement and can be pursued immediately. Others will require more sustained investment.

What Can Be Done Now?

Cut the CRAAP. Colleges and universities must make sure that they are not doing harm by dispensing guidelines that make students susceptible to misinformation.

(a) Provide updated information about the nature of dot-orgs and the dangers of using top-level domains as proxies for credibility.

(b) Help students understand that by itself, an organization's tax-exempt status is no guarantee that it is working on behalf of the public good. Provide vivid and concrete examples of non-profits that students recognize as advocacy groups (or better, hate groups) that have nothing to do with social benevolence.

(c) Eliminate suggestions that a site can be judged by its "look." In an age of inexpensive web templates, a slick-looking site is ludicrously easy to produce.

(d) Warn students not to take a site's About page at face value. Students understand that their friend's Instagram account is a cultivated view of how their friend wants to be seen. An organization's About page is no different.

(e) Explain that links to authoritative sources do not guarantee credibility. Links have to be evaluated. Sites may link to sources for the sheer allure that the source radiates—even if the link has nothing to do with the original claim or, in extreme cases, undermines it.

(f) Encourage the responsible use of Wikipedia as a fact-checking resource. Had students bothered to go to the Wikipedia entry on the Employment Policies Institute they would have found warning signs in the first few sentences. Wikipedia is not perfect. Yet used intelligently, it is invaluable to any searcher.

(g) Provide students with simple internet search skills. Telling college students not to use Google and to use only librarian-approved databases, as some information specialists do, makes as much sense as telling them to practice abstinence-only birth control.[28] We need to teach students basic Google search skills—the selection of effective keywords, the ease of doing a reverse image search, or even something as simple as locating a single word on a dense, text-laden webpage by using Control or Command-F (something that, according to Google's internal research, 90% of users don't know how to do).[29]

The following three steps will require substantial planning and investment:

(1) At many colleges and universities, first-year students are required to take "college success" or "composition and rhetoric" courses. Many of these courses have not been retooled since they were added to the curriculum. In addition to traditional ways of reading, today's students need to be taught how to *read laterally* in a digital environment: how to turn to the broader Web to determine the credibility of digital information.[30]

(2) Institutions need to follow the example of forward-looking librarians and information specialists at the vanguard of new approaches to dealing with misinformation—often on shoestring budgets at liberal arts colleges and state universities. Consider the example of librarians at Stonehill College, a small Catholic institution south of Boston. They issue this sage advice about evaluating the About page: "Checking out a website's 'About' page can be useful, if the reader remembers that the 'About' page is written by the author of the website in question. If the website is untrustworthy, then what the site says about itself is most likely untrustworthy too." Andrea Baer, PhD, and Daniel Kipnis at New Jersey's Rowan University have substantially enhanced their library website, and at the time of this writing are conducting groundbreaking research to improve their students' web savvy. Finally, Robert Detmering and Amber Willenborg, librarians at the Ekstrom Library at the University of Louisville, have produced a series of polished videos (with just the right dose of snark) that provoke college students to reevaluate their online behavior. We hope these and similar efforts will shine a light on a path for other colleges and universities to follow.[31]

(3) Beyond these efforts, a suite of new courses will need to be developed, piloted, and evaluated. The idea that students will become effective web searchers after a one-off presentation is wishful thinking. Any college or university that claims to prepare students for civic participation but fails to provide systematic instruction in web credibility is engaging in educational malpractice.

Together, these changes will require the assistance of university librarians and information scientists. But it would be a grave mistake to ask these specialists to shoulder this responsibility alone. At a time when knowledge is under assault, when facts are assailed, and when expertise is discounted, the challenge of preparing students for the digital age must be borne by every member of the higher education community.

Endnotes

[1] Colleen Flaherty, "And Civics Literacy for All," *Inside Higher Ed,* February 24, 2020, https://www.insidehighered.com/news/2020/02/24/purdue-looks-adopt-civics-knowledge-undergraduate-requirement.

[2] Eric Lipton, "Fight Over Minimum Wage Illustrates Web of Industry Ties," *New York Times,* February 9, 2014, https://www.nytimes.com/2014/02/10/us/politics/fight-over-minimum-wage-illustrates-web-of-industry-ties.html.

[3] "Evaluating Information — Applying the CRAAP Test," Meriam Library, California State University, Chico, https://web.archive.org/web/20200825103508/https://library.csuchico.edu/sites/default/files/craap-test.pdf.

[4] For more on the problems with the CRAAP test, see Joel Breakstone, Sarah McGrew, Mark Smith, Teresa Ortega, and Sam Wineburg, "Why We Need a New Approach to Digital Literacy," *Phi Delta Kappan* 99, no.6 (March 2018): 27-32, https://kappanonline.org/breakstone-need-new-approach-teaching-digital-literacy/.

[5] "The ABC's of Evaluating Web Sites," San Diego Mesa College, https://web.archive.org/web/20200902211513/https://www.sdmesa.edu/library/documents/Mesa-Library-Research-Instructions-Evaluating-Websites.pdf.

[6] *Public Interest Registry Dashboard: January through June 2013,* report published by Public Interest Registry, https://docplayer.net/13026868-Public-interest-registry-dashboard.html.

[7] "The history of .ORG," Public Interest Registry, March 31, 2014, http://web.archive.org/web/20140602095149/https://pir.org/the-history-of-org.

[8] Sam Wineburg and Nadav Ziv, "The Meaninglessness of the Dot.Org Domain," *New York Times,* December 5, 2019, https://www.nytimes.com/2019/12/05/opinion/dot-org-domain.html.

[9] See the Annual Report of the Public Interest Registry for 2018, https://thenew.org/app/uploads/2019/09/PIR-2018-Annual-Report.pdf.

[10] Stanford History Education Group, "Research Note: Dot.Orgs and Hate Groups," November 23, 2019, https://purl.stanford.edu/vt471sv7857.

[11] Rob Reich, Lacey Dorn, and Stephanie Sutton, "Anything Goes: Approval of Nonprofit Status by the IRS," Stanford University Center on Philanthropy and Civil Society, October 2009, https://pacscenter.stanford.edu/wp-content/uploads/2015/08/Anything-Goes-PACS-11-09.pdf. The researchers also compiled a list of the most "Eccentric Public Charities" approved by the IRS, which included the "Grand Canyon Sisters of Perpetual Indulgence," an international order of drag nuns; the Metempyrion Foundation, where "people with intuitive and telepathic potential will be given an opportunity to enhance their skills," and "Planet Jelly Donut" located in Hawaii but registered in California whose goal it is to spread "the common belief that the core essence of the human spirit is goodness."

[12] "Evaluating Web Sources," Harvard University, https://web.archive.org/web/20200930182834/https://usingsources.fas.harvard.edu/evaluating-web-sources; "Evaluating Sources (Archive): Evaluating Websites," Northwestern University, https://web.archive.org/web/20200930183526/https://libguides.northwestern.edu/c.php?g=119278&p=946214; "Evaluating Internet Sources: Authority," Boston College, https://web.archive.org/web/20200930185239/https://libguides.bc.edu/c.php?g=44018&p=279570; "Evaluating Information Rubric," Penn State, https://web.archive.org/web/20200930185611/https://libraries.psu.edu/research/how/evaluating-information-rubric; "Savvy Info Consumers: Internet Domains," University of Washington, https://web.archive.org/web/20200925202604/https://guides.lib.uw.edu/research/evaluate/domains.

[13] Northwestern University, https://web.archive.org/web/20200930183526/https://libguides.northwestern.edu/c.php?g=119278&p=946214; Brandeis University, https://web.archive.org/web/20200902221446/https://guides.library.brandeis.edu/evaluatinginfo/web-and-social-media; Penn State, https://web.archive.org/web/20200930185611/https://libraries.psu.edu/research/how/evaluating-information-rubric.

[14] See Savannah Technical College's web evaluation guidelines, https://web.archive.org/web/20200902221938/https://www.savannahtech.edu/student-affairs/evaluating-websites/.

[15] Wynne Davis, "Fake or Real? How to Self-Check the News and Get the Facts," *NPR,* December 5, 2016, https://www.npr.org/sections/alltechconsidered/2016/12/05/503581220/fake-or-real-how-to-self-check-the-news-and-get-the-facts.

[16] Suzanne Goldenberg, "Lobbyist Dubbed Dr Evil Behind Front Groups Attacking Obama Power Rules," *The Guardian,* February 23, 2015, https://www.theguardian.com/environment/2015/feb/23/lobbyist-dubbed-dr-evil-behind-front-groups-attacking-obama-power-rules.

[17] Microsoft researchers found that "dwell time" on websites was "no more than 70 seconds on 80% of the 205,873 pages" that users visited. See Chao Liu, Ryen W. White, and Susan Dumais, "Understanding Web Browsing Behaviors through Weibull Analysis of Dwell Time" (presentation, Proceedings of the 33rd International ACM SIGIR Conference on Research and Development in Information Retrieval, Geneva, Switzerland, 2010).

[18] "Introduction to Research," Cornell University, https://web.archive.org/web/20200220055353/https://www.library.cornell.edu/research/introduction; "Web Page Evaluation," State University of New York, Binghamton, https://web.archive.org/web/20200220060107/https://www.binghamton.edu/libraries/research/guides/web-page-checklist.html; "Evaluating Internet Sources: Currency," Boston College, https://web.archive.org/web/20200220060337/https://libguides.bc.edu/c.php?g=44018&p=279573; Library Research and Information Literacy Tutorial, University of Notre Dame, https://web.archive.org/web/20200220060621/https://potofgold.library.nd.edu/evaluating/?page=7; "Evaluating News Sources: Steps for Evaluating the News," Rutgers University, https://web.archive.org/web/20200220060927/https://libguides.rutgers.edu/fake_news; "Student Resources: Evaluating Information," Stockton University, https://web.archive.org/web/20200220061250/https://library.stockton.edu/c.php?g=830109&p=5926889.

[19] Ryan Chittum, "The Minimum Wage and the Danish Big Mac," *Columbia Journalism Review,* September 5, 2013, https://archives.cjr.org/the_audit/the_minimum_wage_and_the_danis.php.

[20] See University of Arizona's web evaluation guidelines, https://web.archive.org/web/20200220061527/http://www.library.arizona.edu/tutorials/evaluating_web_resources/ and https://web.archive.org/web/20200304155127/http://www.library.arizona.edu/sites/default/files/users/blakisto/Evaluation%20Checklist.pdf.

[21] See Brigham Young University's web evaluation guidelines, https://web.archive.org/web/20200903034546/https://guides.lib.byu.edu/c.php?g=216340&p=1428399.

[22] See University of Illinois's web evaluation guidelines, https://web.archive.org/web/20200902224745/https://www.library.illinois.edu/ugl/howdoi/evaluate_sources/.

[23] See Sam Wineburg and Sarah McGrew, "Lateral Reading and the Nature of Expertise: Reading Less and Learning More When Evaluating Digital Information," *Teachers College Record* 121, no. 11 (2019): 1-40, https://www.tcrecord.org/Content.asp?ContentId=22806. A fuller version is available without a paywall, Sam Wineburg and Sarah McGrew, "Lateral Reading: Reading Less and Learning More When Evaluating Digital

Information" (Stanford History Education Group Working Paper No. 2017-A1, October 6, 2017), https://ssrn.com/abstract=3048994. For a short summary of this research see Katy Steinmetz, "How Your Brain Tricks You Into Believing Fake News," *Time Magazine,* August 9, 2018, https://time.com/5362183/the-real-fakenews-crisis/.

[24] We are indebted to Michael Caulfield for helping us understand this point. See Michael Caulfield, *Web Literacy for Student Fact-Checkers* (2017), https://webliteracy.pressbooks.com/.

[25] For a brief video on using Wikipedia wisely, see the "Civic Online Reasoning" website of the Stanford History Education Group, https://cor.stanford.edu/videos/how-to-use-wikipedia-wisely, as well as John Green's *Crash Course* video (done in collaboration with the Stanford History Education Group), https://www.youtube.com/watch?v=ih4dY9i9JKE&list=PL8dPuuaLjXtN07XYqqWSKpPrtNDiCHTzU&index=6.

[26] Michael Caulfield, "A Short History of CRAAP," September 14, 2018, https://hapgood.us/2018/09/14/a-short-history-of-craap/.

[27] California Senate Bill No. 830 (September 17, 2018), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB830.

[28] Lisa Rose-Wiles, "Reflections on Fake News, Librarians, and Undergraduate Research," *Reference and User Services Association of the American Library Association* 57, no. 3 (2018), https://journals.ala.org/index.php/rusq/article/view/6606/8827. "The primary challenge of getting students to use vetted library sources is simply getting them there, as opposed to using a web search engine such as Google. . . . Assuming we can convince our students to use library resources."

[29] Daniel M. Russell and Mario Callegaro, "How to Be a Better Web Searcher: Secrets from Google Scientists," *Scientific American,* March 26, 2019, https://blogs.scientificamerican.com/observations/how-to-be-a-better-web-searcher-secrets-from-google-scientists/.

[30] See Nadav Ziv and Adrian Liu, "The Rhetoric of PWR," *Stanford Daily,* September 25, 2019, https://www.stanforddaily.com/2019/09/24/the-rhetoric-of-pwr/. For research showing that it is possible to move the needle on students' skills see: Sarah McGrew, Joel Breakstone, Mark Smith, Teresa Ortega, and Sam Wineburg, "Improving University Students' Web Savvy: An Intervention Study," *British Journal of Educational Psychology* 89, no. 3 (2019), https://onlinelibrary.wiley.com/doi/abs/10.1111/bjep.12279; Sarah McGrew, "Learning to Evaluate: An Intervention in Civic Online Reasoning," *Computers & Education* 145 (2019), https://doi.org/10.1016/j.compedu.2019.103711; Jessica E. Brodsky, Patricia J. Brooks, Donna Scimeca, Ralitsa Todorova, Peter Galati, Michael Batson, Robert Grosso, Michael Matthews, Victor Miller, Tracy Tachiera, and Michael Caulfield, "Teaching College Students the Four Moves of Expert Fact-Checkers," (presentation, Annual Meeting of American Psychological Association).

[31] Stonehill College, https://web.archive.org/web/20200902234651/https://libguides.stonehill.edu/lateral; Andrea Baer and Daniel G. Kipnis, "SIFTing and Four-Moving Online: Opportunities and Challenges with Teaching Lateral Reading through an Online Module" (presentation, LOEX Conference, May 7, 2020), https://rdw.rowan.edu/lib_scholarship/19; University of Louisville Libraries, https://web.archive.org/web/20200930192006/https://library.louisville.edu/citizen-literacy/home and https://youtu.be/GZvsGKvqzDs. See as well the efforts of Sara Sharun and Erika E. Smith at Calgary, Alberta's Mount Royal University, "Educational Development Partnerships and Practices: Helping Librarians Move Beyond the One-Shot," *College & Research Libraries News* 81, no. 9, (2020): 445, https://crln.acrl.org/index.php/crlnews/article/view/24644/32464.