How Students Access, Filter, and Evaluate Digital News: Choices That Shape What They Consume and the Implications for News Literacy Education

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Abstract

Being a discerning news consumer in the digital age requires an ability to wade through a torrent of online content to find credible and diverse information from trustworthy sources. This mixed-methods study examines how students ($n = 37$) at a large U.S. public university access, filter, and evaluate news about a topic of interest in an open-web setting, and measures participants' awareness of their choices that shape what news they consume. Concurrent think-aloud verbal protocols and subsequent semi-structured interviews revealed that students relied heavily on news sources that aggregate content, and trusted their social networks and technology to filter news. They often relied upon cognitive heuristics and lacked awareness of the strategies and evaluation criteria that potentially affect the credibility and diversity of news consumed. Theories of cognitive processing and communication flow help frame the implications for news literacy education and research.

Keywords

Cognitive heuristics; interpersonal networks; news credibility; news literacy; journalism studies

Being a discerning news consumer in the digital age requires an ability to wade through a torrent of online content to find credible and diverse information from trustworthy sources. Doing so requires conscious awareness of the search strategies and evaluation criteria used when accessing and assessing news. However, constant connectivity and information overload often lead people to rely on cognitive heuristics – mental shortcuts used to make quick judgments – and automatic routines rather than consuming news with a critical eye.

Critically examining messages produced by the media is a core tenet of media literacy (Bulger & Davison, 2018), a central component of literacy research (Livingstone, Van Couvering, & Thumin, 2008). News literacy, often considered an offshoot or subset of media literacy (Mihailidis, 2012), examines how news "works," including the media and technological systems that support certain meanings embedded in media texts and the creative process that yields them (Reese, 2012). This study defines news literacy as demonstrating the critical thinking skills and awareness necessary to access, filter, and evaluate credible news from diverse sources.

Recent efforts to refine news literacy education have focused on developing learning outcomes, experimenting with instruction, and creating assessment tools (Beyerstein, 2014; Bulger & Davison, 2018). Assessments often measure students' ability to critically evaluate messages before and after exposure to news literacy lessons. Teachers or researchers – rather than the students themselves – select the media messages used in assessments. Studies rarely measure the cognitive strategies used by students during their typical online information seeking and filtering routines (Hargittai, Fullerton, Menchen-Trevino, & Thomas 2010). Students need to think critically not only when presented with news to evaluate but when independently searching for and selecting news in a real-world setting.

This mixed-methods study contributes to the understanding of the strategies and criteria applied during the news seeking and evaluation process. It examines how students ($n = 37$) at a large U.S. public university access, filter, and evaluate news about a topic of interest in an open-web setting, and measures participants' awareness of their choices that shape what news they consume. Concurrent think-aloud verbal protocols, a method of gathering detailed qualitative data about cognitive aspects of reading, and subsequent semi-structured interviews revealed that students relied heavily on news sources that aggregate content, and trusted their social networks and technology to filter news. They often relied upon cognitive heuristics and lacked awareness of the strategies and evaluation criteria that potentially affect the credibility and diversity of news consumed. Theories of cognitive processing and communication flow help frame the implications for news literacy education and research.

This study begins by examining literature on how young adults access, filter, and evaluate online news, including mental shortcuts taken to limit information overload and the influence of interpersonal networks and algorithms. It continues with an overview of news literacy assessments and how this study's naturalistic approach differs from previous research.

Literature Review

Accessing and Filtering Online News

The vast majority of young adults in the United States are daily news consumers who say that keeping up with news is important to them (Media Insight Project, 2015). Their pathways to news include a blend of seeking it out and letting it find them through social (e.g., Facebook, Twitter, traditional word-of-mouth), curated (e.g., search engines, aggregators, and blogs), and reportorial media (e.g., legacy and digital-only publishers) (Media Insight Project, 2015). U.S. young adults most commonly access news through peer discussions or on social media, followed

by news websites/apps, television, radio, and print (Head, Wihbey, Metaxas, MacMillan, &

Cohen, 2018; Shearer, 2018).

Worldwide, nearly two-thirds of people prefer to get news through a "side door" rather

than going directly to a news website or app, and just over half prefer to access news through

interfaces that use ranking algorithms to select stories (e.g., search engines, social media, or

news aggregators) rather than interfaces driven by humans (e.g., homepages and mobile

notifications). Young adults are the most likely of any age group to use social media and search

to access news (Newman, Fletcher, Kalogeropoulos, Levy, & Nielsen, 2018).

Through observing participants – including but not limited to college students – reading a

national news site, Tewksbury, Hals, and Bibart (2008) identified two main types of news

consumers: "selectors" (who focus on specific content defined by individual interests and needs)

and "browsers" (who use the news media to find information on a broad range of topics across

news domains). Antunovic, Parsons, and Cooke (2018) identified a three-stage process of news

consumption among college students: routine surveillance (the intentional and ritualized practice

of scanning news websites/social feeds or receiving news alerts), incidental consumption

(serendipitous news encounters), and directed consumption (seeking out additional information

about a specific news story). These stages overlap and build on each other, leading to a complex

process through which young adults keep up with news (Antunovic, Parsons, & Cooke, 2018).

Accessing online news involves cognitive processing decisions about what information to

pay attention to and ignore, and then evaluation of the information found (O'Brien, 2011).

Increased news exposure is positively associated with feeling overloaded (York, 2013), and

cognitive demands increase as more articles are presented to online readers (Wise, Bolls, &

Schaefer, 2008). More than two-thirds of U.S. college students report that the amount of news

available to them is overwhelming and find the "fire hose of news" frustrating (Head, Wihbey, Metaxas, MacMillan, & Cohen, 2018). Metacognitive awareness helps readers successfully navigate and make sense of online content, and is likely to foster a deeper understanding of texts they encounter (Coiro, 2011). Designing educational interventions is difficult unless researchers know more about metacognitive processing during interactions with a range of texts (Denton et al., 2015; Potter, 2004b).

Dual-process theories suggest that people make sense of their environment in both conscious and automatic ways, mixing effortful and effortless processing depending on the context (Bellur & Sundar, 2016). Potter's (2004a) cognitive theory of media literacy postulates that when interacting with media, people are flooded with information, and as a defense mechanism remain in a mostly unconscious state in which their attention is governed by automatic routines. Automaticity allows users to quickly sift through digital content and avoid information overload, but it may narrow their online experience and weaken their ability to construct meaning and think critically (Potter, 2004a). Becoming media literate requires overriding automatic routines and activating higher-order thinking strategies (Potter, 2004b).

Because systemically processing message content is time consuming and cognitively demanding, web users commonly rely upon heuristics (Metzger, Flanagin, & Medders, 2010; Rieh & Hilligoss, 2008), quick strategies for filtering online information and assessing its credibility (Metzger & Flanagin, 2013). The following section describes these heuristics in detail and other ways in which people use cues to evaluate news credibility.

News Credibility Evaluation

Determining credibility in the digital age is made difficult by the low barrier of entry to publishing online, a lack of gatekeepers to monitor quality, the convergence of information

genres such as news and advertising, and the flattening effect that seemingly puts all content on

an equal playing field (Flanagin & Metzger, 2007; Metzger, 2007). Young web users are

particularly challenged in identifying credible information, placing them at greater risk for

falsely accepting a source's self-asserted credibility (Flanagin & Metzger, 2008). They

commonly rely on sources that are convenient, even if they do not consider them credible (Jarvis,

Stroud, & Gilliland, 2009; Kohnen & Saul, 2017).

Researchers often measure how web users assess source, medium, and message

credibility (Armstrong & Collins, 2009). Source evaluations can be based on surface credibility

(cursory inspection of superficial characteristics) or experienced credibility (firsthand experience

with a source) (Tseng & Fogg, 1999). Credibility indicators commonly include authority,

currency, objectivity/bias, factuality, and trustworthiness (Metzger, 2007). Message credibility,

in the context of news, can be measured by asking news consumers about accuracy, authenticity,

and believability (Appelman & Sundar, 2016).

Hilligoss & Rieh (2008) found that students make credibility judgments by forming

definitions (e.g., truthfulness, believability, trustworthiness); applying heuristics to a variety of

situations; and interacting with specific content cues (the message itself), peripheral cues (eg:

affiliation and reputation of the source or institution; past experience with a source), and object

cues (eg: aesthetics or presentation of information). In an online experiment in which thousands

of people evaluated a range of web sites (including news sites), Fogg (2003) found that

credibility judgments usually were based on visual cues such as design and navigability rather

than content or source information.

Cues found in sources, mediums, or messages hold the potential to trigger heuristics

(Bellur & Sundar, 2016). Among these mental shortcuts used to evaluate credibility are the

"reputation heuristic," a reliance on the name recognition of websites (Metzger, Flanagin, & Medders, 2010) – found to be the most important cue when people determine what news sources to read (Winter & Kramer, 2014). Students often perceive popularity, one measure of reputation, as a form of endorsement, believing that information sources that are widely used are more likely to be credible (Hilligoss & Rieh, 2008). Other commonly used heuristics include the "source heuristic," taking cues about whether a source is familiar or unfamiliar; the "authority heuristic," trusting people or institutions in positions of power – a concept also known as reputed credibility (Tseng & Fogg, 1999); and the "endorsement heuristic," perceiving information or sources as credible if endorsed, recommended, or otherwise upheld as knowledgeable by trusted individuals (Hilligoss & Rieh, 2008; Metzger, Flanagin, & Medders, 2010).

Jessen and Jorgensen (2012) argued that with the rise of social media, online users pay less attention to the authority and perceived expertise of the sender of information and more attention to social feedback and collective judgment when evaluating credibility. Their "aggregated trustworthiness" theory suggests that users collect multiple streams of trustworthiness cues, including large-scale social validation (e.g., comments, likes, and shares), profiles (e.g., a person's Twitter stream or personal website), and authority and trustee (being a known brand or authority) (Jensen & Jorgensen, 2012). Their theory is based, in part, on research showing that young adults gather credibility cues from a range of sources, including but not limited to experts (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010).

Web users frequently outsource credibility assessment (Taraborelli, 2008) to the crowd's wisdom or to websites that aggregate news (Hargittai, Fullerton, Menchen-Trevino & Thomas, 2010). News consumers' trust in sources that algorithmically select news stories is known as the "machine heuristic" (Sundar, Knobloch-Westerwick, & Hastall, 2007). College students consider

news digests (curated by algorithms and humans) as "trusted gatekeepers" that filter and identify

the most important stories (Newman, Fletcher, Kalogeropoulos, Levy, & Nielsen, 2018).

Some of the above phenomena are encapsulated in the two-step flow model of

communication, in which ideas flow first from the mass media to opinion leaders, and from

opinion leaders to the broader public (Katz & Lazarsfeld, 1955). Bennett & Manheim (2006)

argued that public communication has moved from a two-step to a one-step flow, in which

personalized messages reach individuals directly, and the key interactions are between the

technology and the individual audience member. Thorson & Wells (2012) incorporated elements

of the one-step flow and two-step-flow into their own framework, curation of flows, which

considers not only information choices being made by opinion leaders but also peer social

curation, individual channel selection habits, and algorithms that deliver customized content.

Exposure to media messages is dependent on both individual agency (choosing to read content or

participating in a social network) and outside influences (push notifications and algorithms).

Little work in online credibility assessment has considered how the information-seeking

process figures into the final evaluation of content people encounter (Hargittai, Fullerton,

Menchen-Trevino, & Thomas, 2010). Research participants are often asked to evaluate features

of a mock website without regard for how they might come across it in the first place. According

to Metzger (2007), "Researchers have suggested myriad factors that may play into credibility

assessments, but only a few studies have examined what criteria people actually employ" (p.

2081). Metzger argued that studies should go beyond self-reported information and gauge users'

actual information-seeking behavior. "Future online credibility research should be as

anthropological, naturalistic, and unobtrusive as possible" (Metzger, 2007, p. 2087). The

following section describes how researchers have attempted to measure students' ability to

evaluate news credibility and critically analyze messages through news literacy assessments.

Assessing News Literacy

Most studies of literacy attainment are quantitative and summative, focusing on what

students have learned at the end of a course, unit, or presentation (MacMillan, 2009). Scores on

pre- and post-tests measure change in skill or knowledge attainment over time but do not shed

light on the reasons for improvement. In news literacy assessments, scholars commonly ask

students to evaluate the credibility of news stories that are selected for them, typically from a

variety of mediums (e.g., Ashley, Lyden, & Fasbinder; Ashley, Poepsel & Wills, 2010), or to

reflect on their attitudinal and behavioral changes after taking a news literacy course (e.g.,

Maksl, Craft, Ashley & Miller, 2017). Research typically does not examine decisions students

make about where to start a news search, and how the search process may affect the credibility or

diversity of the news accessed, or influence an individual's assessment of content credibility.

Several studies have used qualitative or mixed methods to examine how college students

seek out and assess the credibility of online content (Hargittai, Fullerton, Menchen-Trevino, &

Thomas, 2010; Tylor, 2015), make meaning of media messages (Ashley, Lyden, & Fasbinder,

2012), and determine what makes online news engaging (O'Brien, 2011). Research shows that

tracking students' literacy skills using direct observation is an effective way to learn about their

thought processes, strategies, and evaluation criteria (MacMillan, 2009).

Researchers have used think-aloud protocols to examine how college students interpret

and understand text meaning (Denton et. al, 2015) and utilize online reading comprehension

strategies (Coiro, 2007), but less attention has been paid to how they process online information

and decide what sources to read and trust (Goldman, Braasch, Wiley, Graesser, & Brodwoinska,

2012). Hargittai, Fullerton, Menchen-Trevino, and Thomas (2010) found that the information-seeking process is often as important as verifying the results in terms of assessing the credibility of online content. Yet news literacy assessments tend to rely on scholars' or educators' prescribed treatments (Ashley, Lyden & Fasbinder, 2012) instead of allowing students to choose content to analyze. Pingree (2011) criticized experiments in which students read a news story selected for them as artificial given that "in the real world, people self-select news stories to attend to, making effects on high-interest readers arguably more externally valid than those on low-interest readers" (p. 41). Fleming (2010) found that news literacy lessons are more powerful when students choose the media content they deconstruct.

Cognizant of Metzger's (2007) advocacy of naturalistic studies that go beyond self-reported information, Hargittai, Fullerton, Menchen-Trevino, and Thomas' (2010) observation and analysis of web users' actions from the information-seeking through the credibility evaluation process, and O'Brien's (2011) simulated task scenario and post-task semi-structured interviews, this study builds on previous research by examining how students access and assess news topics of stated interest in an open-web setting. To promote authenticity and increase the likelihood of participant motivation, this study asked students to select news items to analyze. This allowed for an examination of how the information-seeking process may affect the news consumed and factor into students' evaluation of news sources and news items.

This study measures the extent to which students are aware of the strategies and criteria they use during the news search and evaluation process, and how they are influenced by their peers or technology when accessing news. In this study, awareness refers to the ability to identify (with or without prompting) the search strategies and evaluation criteria applied when consuming news. Specifically, this study poses three questions:

RQ1: What strategies do students use to filter online news in an open-web setting?

RQ2: What criteria do students use to evaluate news outlet credibility?

*RQ*3: What criteria do students use to evaluate news item credibility?

Method

Sample

This study sought out college students with a range of academic backgrounds, as news literacy education typically targets students across disciplines rather than focusing primarily on journalism or communication majors. To recruit a diverse pool, undergraduates at a major East Coast university enrolled in large lecture courses open to all majors, and members of student groups or interdisciplinary residential communities were invited to take part in the study. Participants were evenly split between male (51.4%) and female (48.6%), and were most often underclassmen ($M = 19.3$ years old, $SD = 1.12$). They were enrolled in a range of colleges, with only 8.6% majoring in journalism and 16.7% having taken a media literacy course.

Instrument

Data sources included concurrent think-aloud verbal protocols, computer screen captures recorded as participants conducted a news search, and subsequent semi-structured interviews. Concurrent think-aloud protocols elicited contemporaneous descriptive data about participants' search and filtering strategies, and criteria for evaluating news outlets and items. Participants verbalized what they thought and did as they completed a task. The think-aloud methodology is well-suited to explore strategic processing of online information and reduce assumptions in analysis of observational data (Afflerbach & Cho, 2009). Its unique contribution is "describing the relations that may exist among sense-making, evaluating, and monitoring processes during reading and how these may influence online navigation decisions" (Goldman, Braasch, Wiley,

Graesser & Brodowkinska, 2012, p. 359). However, there is not always an exact relationship

between people's words and their thoughts (Pressley & Afflerbach, 1995), and there are concerns

about participants' ability to attend to simultaneous tasks and verbalize normally silent activities

(Denton et al., 2015).

Images of the websites participants visited during news seeking tasks were recorded

using screen capture software to facilitate semi-structured interviews and to later analyze the

news items selected. Interviews provided data about choices students made during their news

searches, including the strategies and criteria observed by the researcher but not mentioned

contemporaneously by participants.

Procedure

Participants were selected by a computerized random-number generator. Lab sessions

involved the researcher and one participant, who sat in front of a desktop computer, keyboard,

mouse, and audio recorder used for taping the session. The decision to evaluate computer rather

than mobile news searches was made to allow participants to make best use of an open-web

setting (rather than being in a walled-in app environment) and to allow the researcher to use

screen-capture software to facilitate participant conversations. Although the computer may have

been configured differently from a participant's own computer (they were not able to use pre-

programmed tabs), this approach controlled for the quality of web connection and software

differences, and ensured that all participants experienced similar conditions.

The researcher instructed participants to find credible news (text, audio, or video) on a

topic of interest by starting at the website they most often use when beginning a news search.

Participants were purposefully given no further instructions about how to conduct the news

search because the goal of the study was to take a naturalistic approach by allowing participants

to be guided by their interests and typical news consumption habits rather than impose an

artificial constraint such as a task to find specific information.

Participants had five minutes to complete the search and could navigate anywhere on the

web to select a news item they considered credible. News was defined broadly as "information

about current events or issues." No definition of credibility was provided so that students could

describe their own evaluation criteria. Participants were instructed to verbalize reasons for

visiting each news source, how they navigated it, how they made credibility evaluations, and

what they considered when selecting or rejecting a news item. To avoid priming participants, the

researcher remained silent as participants searched for news, only interjecting if they asked for

clarification about the task or were silent for more than 10 seconds. The researcher recorded a

screen capture of each step taken by participants – clicking on a link, toggling between news

items, opening a new web page, etc. Once participants selected the news item they considered

credible, the researcher saved the URL with the screen captures for later analysis. Participants

were instructed to close their browser and begin a second news search about a topic of stated

interest, following the same instructions except to start at their second-most-often-visited site.

After selecting a second news item, participants took part in semi-structured interviews

(Appendix A) that focused primarily on the two searches. The researcher used screen images

recorded during each search as a frame of reference for participants to answer questions about

search strategies and evaluation criteria. Follow-up questions helped the researcher understand

participants' thought processes while making decisions. To avoid priming participants, the

researcher asked only about comments made or actions taken during their news searches.

Data Analysis

Emergent coding was used to analyze qualitative data. During the initial phase of

analysis, the researcher reviewed transcripts that included everything participants verbalized

during the think-aloud and in subsequent interviews, taking notes about broad themes and

patterns. An original coding scheme was developed because no existing scheme adequately

measured news consumers' strategies and credibility evaluation criteria. An inductive approach

was used to detect and summarize students' strategies and self-awareness of these strategies.

Data were separated into discrete segments that reflect participants' strategic behavior

and compared to other segments in order to determine the broader categories to which they

belong (Lindlof & Taylor, 2002). O'Brien and Toms (2008) provided the framework for the

stages of user engagement with media (point of engagement, sustained engagement, and

completion of activity), which were adapted for the purpose of news seeking to include "initial

strategy used in news search," "search strategies used to filter news" and "criteria used to

evaluate news outlets and items."

Before starting, participants decided whether to conduct a broad search without specific

information in mind (coded "information scanner") or search for specific information (coded

"information seeker") – terms adapted from Tewksbury, Hals, and Bibart's (2008) information-

seeking classifications ("selectors" and "browsers"). Once an initial news search strategy was

selected, a variety of strategies for "filtering news," or narrowing down the news items to

consider, were employed before opening any news item. All participants expressed some

evaluative judgments about the news *outlets* (defined as a journalistic organization that produces

original content) they used to begin a search and those they encountered during the course of

their task. Actions students took and attributes of a news item they considered in order to

evaluate individual news stories rather than news outlets that produced them are considered news *item* evaluation criteria.

Coders tracked whether participants cited use of a strategy or criteria during the think-aloud task or during the interview.[1] Comments made during the think-aloud protocol were considered the most accurate measures of contemporaneous thinking because they were shared without prompting. Coders noted participant actions taken during the lab search – and recorded by the screen-capture software – that were not mentioned contemporaneously or during the interview. This demonstrated lack of awareness given that no basis exists to presume they were part of a conscious strategy.

Two coders independently coded a randomly selected sample of 10% of the think-aloud and interview transcripts and resolved disagreements in discussion. They coded the remaining protocols, emerging with a .933 intercoder reliability using the Krippendorff's Alpha (KALPHA) test. A KALPHA result of .80 or greater is considered optimal (Hayes & Krippendorff, 2007).

Results

The majority of news searches (63.5%) began at websites that rely heavily or entirely on aggregated rather than originally produced content (marked with an asterisk below), led by Google (13.5%), Facebook (9.5%), Twitter (9.5%), and Yahoo News (9.5%).

Table 1: Websites at which participants began news searches

Website	Searches	Percentage of Searches
Google*	10	13.5%
CNN	7	9.5%
Facebook*	7	9.5%

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[1] The coding sheet tracked whether a participant mentioned a strategy or criteria, but not the number of times it was mentioned. The researcher felt that quantity of a participant's references to a particular search strategy or evaluation criteria was an imprecise metric. Multiple references could simply mean that the researcher asked follow-up questions that elicited repeat responses.

Twitter*	7	9.5%
Yahoo News*	7	9.5%
Reddit*	5	6.8%
Google News*	4	5.4%
BBC News	3	4.1%
New York Times	3	4.1%
Huffington Post	2	2.7%
Instagram*	2	2.7%
The Daily Beast	2	2.7%
Washington Post	2	2.7%
Bleacher Report	1	1.4%
BuzzFeed	1	1.4%
ESPN	1	1.4%
MSN*	1	1.4%
Newser*	1	1.4%
Newsweek	1	1.4%
NPR	1	1.4%
Pinterest*	1	1.4%
Politico	1	1.4%
Real Clear Politics*	1	1.4%
Student Newspaper (name withheld)	1	1.4%
Tumblr*	1	1.4%
Yahoo Search*	1	1.4%
TOTAL:	74	100.0%

The first research question asked what strategies students used to filter online news in an open-web setting. Results are presented in narrative form and in tables below showing the percentage of participants (*n* = 37 unless otherwise noted) who in at least *one of two searches* used a particular search strategy or evaluation criteria[2], and the *percentage* of searches (*n* = 74 unless otherwise noted) in which participants used each strategy or criteria.

Initial Strategy in News Search

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[2] The researcher considered one such example as sufficient evidence that a participant used or cited a strategy or criteria during the study rather than requiring examples in both searches.

News searches far more often began with a participant searching without any specific

news in mind (83.8%) than for a specific news item (16.2%). Nearly three-fourths of participants

(73%) had no news item in mind for either search. Information scanners found news

serendipitously by scrolling through news feeds and news aggregation websites, or browsing a

news site's home page. Those who started their search on social media, search engines, and other

news aggregation websites were almost exclusively scanners, with a Twitter user commenting

that, "I usually scroll through, not looking at anything in particular," and a Facebook user

explaining, "I'm not really looking to read news when I'm on Facebook. It's just there in front of

me." Unlike information seekers, who were goal-oriented and sought a specific news story or

answer to a specific query (almost always by starting at Google), information scanners left open

the possibility of finding news they had not originally set out to read or watch.

Information seekers were less likely than information scanners to look for surface-level

cues such as visual presentation or source reputation when filtering news and determining source

and news item credibility, and more likely to draw upon firsthand experiences with a source

(citing credibility indicators such as authority and trustworthiness) and specific news item cues

(e.g., accuracy and attribution). Information seekers also generally displayed a greater

willingness to verify information by cross-referencing facts and clicking on links to assess

authoritativeness of sources cited.

Strategies to Filter News

The most common strategy used by both information seekers and scanners to filter news

(81.1% of participants) was going to a top-ranked or listed story. Participants who began their

search on websites that aggregate news (most notably, Google and Facebook) overwhelmingly

narrowed down their choices by considering only the first few news items listed in a news feed

or on a search results page. Notably, in nearly half of these searches (45.5%), participants did not cite their use of this filtering strategy during the think-aloud or in the subsequent interview when asked to explain their thought process, an indication that they lacked awareness of their reliance on algorithmically sorted news. Two who contemporaneously referenced highly ranked stories during their search explained, "We'll go here first since it's highlighted as the top story" and "Usually one of the best stories [on Yahoo News] is right at the top – I'm more likely to click on one of the stories there than on a link below." When asked why he quickly clicked on the top-ranked story on Google's results page as his news item without going any further, one participant commented: "It was the first thing I saw."

Table 2. Strategies used to filter news

Strategy	Operationalization	Participants	Searches
Top-ranked/listed stories	Clicked on the first or one of the first items when presented with a list of news stories	81.1%	59.5%
News outlet reputation*	Began search on social media, search engine, or other news aggregator and considered the reputation of a news outlet	78.6%	55.6%
Headline	Headline drove decision on what news items to consider	73.0%	54.1%

Visuals (photos/graphics)	Gravitated toward (or away from) news items because they were accompanied by visuals (still photos, slideshows, videos, etc.)	73.0%	58.1%
Landing page/specific section	Visited topic-orientated landing pages such as "business" or "technology" or, in the case of Reddit, subreddits	70.3%	48.6%
Social currency in peer group	Searched for news to discuss with friends or in the classroom	40.5%	21.6%
Crowd's recommendation	Prioritized items with the most user "upvotes" (Reddit) or considered items listed under "most read"/"most-emailed" (news outlets)	35.1%	17.6%
Friend's recommendation	Narrowed a news search on social media by looking for items posted or endorsed by friends, or searched for news because of a friend's recommendation	29.7%	16.2%
Trending topics	Narrowed a search to items listed under a "trending" heading (Twitter) or horizontal row directly under a masthead and above the top story (news outlets)	21.6%	12.2%
Item summarization/digest*	Considered digest/short summaries of full stories that appear below the headline and are generated by news algorithms or written by editors	14.3%	13.3%

For participants, n=28; for searches, n=47

Another strategy that the majority (78.6%) of participants used was considering the

reputation or familiarity of the news outlet as an initial gauge of credibility when presented

options by a website that aggregates news. Almost everyone who used this strategy (92.1%) cited

it during their think-aloud narrative. Before selecting from a long list of news items to consider

on Google's search results page, one participant said that, "There are many choices – of the

options given I think Huffington Post, U.S. News, and The New York Times sound trustworthy."

A Reddit user scanning links posted to the social news aggregation website commented, "I

always look at the source before clicking."

Scanning headlines, photos, and graphics allowed participants to make snap judgments

about a story's appeal – yet many expressed a need to further narrow down choices by going to a

landing page or specific section of a website because they felt home pages, social media feeds,

and search results pages were overwhelming. Focusing on a section or type of news story "cuts

out the middle work a little bit" of having to sift through pages of possible news items, as a CNN

user noted during the post-task interview.

Most participants (65%) relied on the crowd's recommendation, a friend's

recommendation, or social currency of the topic in a peer group as a filtering mechanism in at

least one of their searches. Each of these strategies was contemporaneously identified in less than

half of the searches by participants who used them, another indication that they were unaware of

their reliance upon social and algorithmic recommendations. Only one participant mentioned

looking at the "most-viewed" section of a news website. Participants rarely gravitated toward

"trending" items on news outlet homepages, and they almost never looked at those that were

most-read or most-shared. Instead, participants who trusted the crowd more commonly narrowed

their search by considering news items that were "upvoted" (endorsed) by others. Two Reddit

users commented that, "I'll trust that other people have validated it before me" and "If these

people say it was really good and interesting, it must be…I'm going with the crowd."

Participants who started their search on Facebook trusted friends both to find and

interpret news. One noted that, "Usually if a bunch of people share it I'll click on it because the

more people that share it the more trustworthy it is I guess." Another said, "Coming from

someone I know, him explaining [the news] is better than having the news do it." An example of

social currency was the participant who commented, "I'm not going to take the time to watch the

news but if everyone is talking about stuff I want to know what everyone's talking about."

Criteria to Evaluate News Outlets

The second research question asked what criteria students used to evaluate news outlet

credibility. When evaluating journalistic organizations, the greatest share of participants (75.7%)

considered perceived reputation or prominence. They commonly relied on others to vet sources

for them, commenting that they perceived legacy, "brand-name" news outlets as being credible

and having earned their trusted reputation.

Table 3. Criteria used to evaluate news outlets

Criteria	Operationalization	Participants	Searches
Perceived outlet reputation or prominence	Recognizable brand name or strong reputation as decided by others	75.7%	47.3%
Perceived fairness/balance	Overall tone of coverage is evenhanded	59.5%	37.8%
Breadth/exposure to variety of viewpoints	Exposes readers to a wide array of news sources and/or opinions	59.5%	40.5%
Authoritative source	Go-to place to find credible information on a given topic	48.6%	25.7%

Identifies and/or links to sources	Forthcoming about the source of information and attributes (with links to the original source) when appropriate	40.5%	20.3%
Perceived accuracy	Information published is correct	40.5%	21.6%
Timeliness	Quick to provide news updates	35.1%	18.9%
Usability/visual appearance	Easy navigation and a pleasing user interface	35.1%	21.6%
Trustworthy journalist	Recognizable or trustworthy journalist who works at a news outlet	29.7%	14.9%
Quality of writing and reporting	Overall level of writing and reporting – based on a holistic evaluation	27.0%	17.6%
Use of editors	News outlet employs editors to verify information	13.5%	6.8%
Site domain	Website's top-level domain (.com, .edu, .gov, etc.)	10.8%	5.4%
Aligns with beliefs	Outlet perceived as sharing the reader's worldview	5.4%	2.7%

One participant commented during his news search that, "The name behind [The New York Times] definitely carries a lot of weight. Better than, oh yeah, I went to TMZ and looked up entertainment news. I went to The New York Times and looked up some entertainment news." Another noted that The Washington Post "has been around for a really long time" and "seems traditional."

In several searches, participants made credibility judgments based on surface-level evaluations of keywords in a news outlet's name. In a Google search for news about Coachella, one participant clicked on the first source listed, The Los Angeles Times. Instead of commenting

on the specific content produced by the newspaper or even its reputation as the newspaper of

record in Los Angeles, the participant said that, "Anything that says Times to me is definitely

credible." Others commented in their think-aloud narrative that: "[60 Minutes] has been around

for awhile. A lot of people trust it" and "I deem [CNN] to be fairly credible. It just seems more

universally accepted." Those who did not reference news outlet reputation during the think-aloud

commonly cited it during the post-task interview when asked to explain how they evaluated

sources of information.

References to perceived fairness and balance tended to be vague, with participants

explaining during interviews (rather than during the search) that they commonly assess whether a

news outlet is "biased" or "evenhanded." However, they never defined these terms or pointed to

specific examples of how they made such evaluations during their news searches. Participants

who cited authoritativeness as an outlet evaluation criterion also tended to be unspecific,

explaining during interviews that they generally trust outlets that have national or international

audiences, or that are viewed as a local news leader. Breadth and exposure to a variety of

viewpoints was a common reason given for preferring to start news searches at websites that

aggregate content – particularly Google, Reddit, Twitter, and Facebook – rather than at a news

outlet homepage, as illustrated by the think-aloud comment, "I don't go to NYTimes.com and

see what their headlines are. I'd rather see a lot of different stuff." No participants cited breadth

of coverage as a criterion for evaluating a specific news outlet.

Several participants, however, did not base their news outlet evaluation on perceived

reputation, brand credibility, or vague notions of trustworthiness and authority. They

demonstrated in their news searches – and their think-aloud narratives – an ability to apply

evaluative judgments to specific cases. One participant found on Twitter what he considered a

trusted and authoritative journalist who wrote for Scientific American, which he said "is credible

because the writers usually have some scientific background." Another participant cited the

importance of news outlets doing original reporting, commenting that: "I feel like a lot of times

when I'm reading articles on other sites they will copy and paste what The New York Times said

and use their content as their own." A third participant checked for source identification, saying

"[The Daily Beast] is less credible than The Washington Post because they seem to be getting

their information from several different sources. And sometimes the sources have names that I

haven't heard of before." Yet think-aloud comments indicating that participants had previously

evaluated a news outlet's journalistic output (e.g., quality of writing and reporting, use of editors,

accuracy, or balance) or made a quick assessment during their news searches were rare.

Criteria to Evaluate News Item Credibility

The third research question asked what criteria students used to evaluate news item

credibility. The most common criterion (used by 81.1% of participants) was assessing the

trustworthiness of the news outlet that produced the news item, as illustrated by the interview

comment: "After choosing The New York Times, I assumed that whatever I saw there would be

credible." Participants most commonly selected news items from major national or international

news outlets such as CNN ($n = 8$), The New York Times ($n = 5$), Yahoo News ($n = 5$), BBC ($n =$

4), Bleacher Report ($n = 3$), The Washington Post ($n = 2$), ESPN ($n = 2$), Sports Illustrated ($n =$

2), Fox News ($n = 2$), and Huffington Post ($n = 2$).

Table 4: Criteria used to evaluate news items

Criteria	Operationalization	Participants	Searches
Trustworthiness of news outlet	Decision based on the reputation of the news outlet that supplied the content rather than the merits of the news item	81.1%	55.4%

Content of headline*	Based news item evaluation on the headline (rather than using it merely as a sorting mechanism)	50.0%	34.8%
Authoritativeness of sources cited	Whether the sources cited are reputable and knowledgeable	48.6%	32.4%
Authoritativeness of content producer	Whether reporter or other content producer is reputable and knowledgeable	48.6%	27.0%
Factuality/opinions*	Truthfulness or lack thereof	38.9%	25.8%
Depth of reporting*	Length of a news item, number of interviews conducted, and amount of space spent explaining a concept	36.1%	21.2%
Attribution	Whether sources of information are cited	29.7%	16.2%
Usability/visual appearance	Visual appeal or accessibility/usability	27.0%	27.0%
Checked multiple sources for comparison	Cross-referenced information found in one news item to others across the web	24.3%	12.2%
Links**	Clicked on the links and evaluated the information supplied	16.2%	15.8%
Name of content producer	Reporter or content producer's name is included on a news item	16.2%	8.1%
Prominence or placement/rank	Placement of item near the top of a webpage or article ranking	16.2%	9.5%
Evenhandedness*	Bias, fairness or similar terms	13.9%	9.1%

*For participants, n=36; for searches, n=66
*For participants, n=34; for searches, n=57

Some participants were at a loss to determine how to evaluate a news item and instead relied on

the news outlet's reputation as a proxy, as explained in this interview response: "I try to stick to

CNN because CNN has never screwed me over before. There's not really a good way to figure

out if [this article] is credible or not. I just look at the source and I trust CNN for the most part."

Many seemed aware of limitations in using the outlet's reputation as the sole proxy for an item's

credibility, but found the simplicity of the approach appealing. One participant stated during his

search, "Generally I just trust MSN. That's probably a bad decision, just trusting things. But

because it's such a simple, straight-forward story I thought I'd trust what MSN says."

Participants more often referenced news outlet reputation as a reason to select a news item when

asked in interviews to explain their decision than contemporaneously during the search.

Just as participants used headlines and visuals to make snap judgments about a story's

appeal while filtering news, some also used these cues to make quick assessments about a news

item's credibility without examining the content of the story itself. In nearly 6 of 10 searches

(59.5%) participants just considered the headline, subhead, or digest compiled by a news

aggregator or editor, or clicked through to the entire article but only skimmed the first few

sentences. When asked how she evaluated the credibility of an article she selected, one

participant responded, "There's an author. The picture looks pretty intense. There are names and

dates. I don't really see anything about it that would make it seem not credible."

Mostly in cases in which participants sought specific information about a news story they

had been following, they performed a more critical analysis of news items by evaluating the

authoritativeness of journalists and the sources they included in a story. Two participants said

during interviews that they "wanted to see people [quoted] who were directly linked to the

event," and "wanted to hear [information] from an official and not just a bystander." Yet most

did not check for the existence of attribution, instead making more surface-level evaluations such

as: "Within the first two paragraphs they talk about specific people. They have quotations. They

cite a person and her age." Few (16.2%) checked for the existence of links in a news item or

clicked on them to find primary source material, although one participant did so in an effort to

better understand the context of a blog post: "I read this and it said 'Tells Sports Illustrated.' I

knew that they would have the actual interview; this [blog post] would just have snippets."

Another participant made the assessment that, "The more links [articles] have the more research

they have done and in my opinion they are a more legitimate source."

Few (24.3%) checked multiple sources for comparison. When considering a *BBC* article

on the earth's core, one participant clicked on a link and was frustrated by receipt of an error

message. "Hmm. Broken link – that's great. I have no way of checking the plausibility of that

article." She assessed the authoritativeness of sources cited, saying when she came across an

expert quoted in the article during the think-aloud, "Cool, let me look at this guy." She then did a

Google search for the expert quoted and was satisfied when she found the original study on

which the *BBC* article was based. "I'm trying to cross-reference what the article says with what

the abstract said. It looks pretty similar. I don't think they made any wild claims."

This type of fact checking and cross-referencing was unusual, however. Participants who

cited evenhandedness and truthfulness as news item evaluation criteria almost exclusively cited

these in interviews rather than during a news search, rarely gave specific examples of how they

reached these conclusions, and did not demonstrate that they had made an effort to examine the

veracity of the information. Few participants (36.1%) referenced depth of reporting as a criterion,

and whose who did cited the length of a news item and the use of statistics rather than more

nuanced evaluations of the completeness of reporting or the source of the data used in a story.

Discussion

This study examined how students access, filter, and evaluate news in an open-web

setting in an effort to understand the search strategies and evaluation criteria that warrant

targeting or greater emphasis in news literacy curricula and assessments. Think-aloud protocols

and subsequent in-depth interviews measured participants' awareness of their choices that shape

what news they consume. A goal of news literacy education should be to seek an outcome in

which students (a) have the most conscious awareness of the strategies and criteria they use in

the process of accessing and evaluating online news and (b) acquire an understanding of how

their choices affect the credibility and diversity of what they consume.

Results show that participants overwhelmingly conducted open-ended searches with

awareness of a goal (to find credible, topical news) but with no specific news or question in mind

– defined in this study as information scanning. Routine surveillance and incidental

consumption, information-gathering processes described by Antunovic, Parsons, and Cooke

(2018), were far more commonplace than directed consumption. Even after participants who

found news serendipitously began evaluating a news item, as they were instructed to do, few

sought out additional information by cross-referencing or clinking on hyperlinks. Finding news

serendipitously during news searches rather than targeting a specific topic may indicate that

participants were not following many particular news stories as part of their typical routine –

even in high areas of interest. Those who sought out news about a particular topic of interest

were likelier than news scanners to demonstrate effortful processing of information rather than

outsourcing evaluations to others or relying upon heuristics.

Consistent with recent research on news habits of young adults (Newman, Fletcher,

Kalogeropoulos, Levy, & Nielsen, 2018), participants often began a news search on a website

that selects and filters the news sources and items displayed. Students' preference to access news

through news aggregation platforms makes them reliant on algorithms that employ non-

transparent factors to select and rank news, often through content personalization. Educators

should consider ways to teach students about how personalization potentially leads to consuming

a narrow selection of news and topics with less diverse perspectives.

Regardless of the initial search strategy used, consumers are likely to face the task of

narrowing down news items to consider from the heavy stream now available online to manage

information overload. The most-often-used strategy to narrow down news choices, going to a

top-ranked or listed news item, is not inherently problematic. A news item's ranking or

placement on a page has long been considered an indicator of newsworthiness. But this is largely

a function of the traditional role of editorial judgment in assessing an item's news value.

Reliance on top-ranked news items by habit or the assumption that prominent placement always

reflects newsworthiness or credibility suggests a lack of understanding of how online

information is selected, distributed for publication, and ranked. The increasing use of

personalization technology and the ability of publishers to spread false or misleading information

makes a news item's high ranking or prominent placement an uncertain indicator of credibility or

newsworthiness. This often reflects instead an item's popularity with an undefined group of

people; likely appeal based upon users' search history, geolocation, or demographic profile; its

status as trending, most shared, or most liked/upvoted; its being a promoted (paid) post or

content; or its use of search engine optimization keywords to attract web traffic.

Participants' think-aloud comments revealed significant trust in sites that rely on

algorithms to prioritize the most newsworthy items and a reliance on the "machine heuristic"

when evaluating credibility (Sundar, Knobloch-Westerwick, & Hastall, 2007). College students

have been found to be very trusting of Google's ability to rank results by their true relevance to

the query (Hargittai et al., 2010), and to overwhelmingly select top-ranked entries out of

convenience. In this study, nearly one-third of participants never went beyond a top-ranked or

listed story when selecting news. In nearly half of all searches in which participants used an item's top-ranking or listing as a filtering mechanism, they failed to mention this during the think-aloud protocol or interviews.

Social media platforms make it substantially easier for users to tap into their personal networks to access, filter, and evaluate news. Nearly two-thirds of participants relied on the crowd's recommendation, a friend's recommendation, or social currency of the topic in a peer group when filtering news. This finding is consistent with previous research showing that students often perceive popularity as a form of endorsement (Hilligoss & Rieh, 2008). Getting news from well-informed friends or trusted members of the crowd can be a smart strategy. However, participant comments and actions showed a broad willingness to let others shape much of the news they consume, and a tendency to rely upon authority or endorsement heuristics and uncritically trust the crowd's ability to promote the most relevant or reliable content. Jessen and Jorgensen's (2012) "aggregated trustworthiness" theory best explains participants' tendency to value social feedback and collective judgment when filtering news and evaluating its credibility.

These results suggest that interpersonal networks are central to the process by which students access and filter digital news. The two-step flow model of communication helps explain the common use of several search strategies and filtering criteria. Several students referenced trusting opinion leaders (news junkies and social media power users) to identify news they otherwise would have missed or explain news they would not have bothered to understand on their own. However, modifications to the two-step flow model (suggested to a degree in previous research) are necessary to accurately reflect students' search and filtering strategies. The ease of sharing information on social media and news sites, and providing endorsements through "likes," "shares" and "upvotes," has lowered the barriers to becoming an influencer. This study also

found that members of the crowd, even when personally unknown, can influence the ways in

which students filter and evaluate the credibility of news. Students may at once rely on human

influencers to post and comment on news, and push notifications or personalization technology

to filter the news they find. An updated model of communication flow should include the role of

opinion leaders referenced in the two-step flow (Katz & Lazarsfeld, 1955), personalized

messages and echo chambers central to Bennett & Manheim's (2006) one-step flow, and

individual agency and outside influences (push notifications and algorithms) in Thorson &

Wells' (2012) curation of flows.

Many participants who began their search on a website that aggregates news considered

the news outlet when deciding what to read. However, participants largely did not

contemporaneously explain *how* they evaluated news outlets, suggesting less overall conscious

awareness of this than for strategies or criteria for initial filtering of news or to evaluating news

items. The most commonly-used criterion for assessing outlet credibility, perceived prominence

or reputation, is an unreliable way to filter news or evaluate news outlets, reflecting qualities or

characteristics as judged by others. Dependence on reputation and source heuristics reflects an

unwillingness or inability to make independent assessments about a news outlet – a central

objective of news literacy education.

An individual's firsthand experience with a news outlet over time can compensate for

limitations in a particular group's judgment. However, participants were often unable to give

specific reasons for believing that an outlet warranted a presumption of credibility, and instead

relied upon surface-level characteristics such as the presence of the word "Times" in the outlet's

name. Source evaluations based on surface credibility (cursory inspection of superficial

characteristics) rather than experienced credibility (firsthand experiences) are problematic in the

age of fake news and misinformation, when untrustworthy outlets have names meant to resemble credible sources of news.

A significant portion of lab participants did not evaluate a news outlet based on perceived fairness/balance/lack of bias, authoritative sources on a topic, or accuracy. Because participants were not asked to explain how they judge inaccuracy and bias, no findings can be presented about the merits of the basis for the evaluations made. However, the limited extent to which these criteria were used alone suggests that students should be taught the importance of doing so with respect to news published online.

Despite explicit directions to evaluate credibility, most participants did not closely read or watch the news items they selected, instead making quick judgments by scanning the headline or relying on reputed news outlet trustworthiness as a proxy. Rather than examining a range of content cues, they often relied on peripheral cues (outlet reputation) and object cues (aesthetics or presentation). The explosion of news and news sources available online makes it increasingly important that items accessed are evaluated based on more than surface-level characteristics. Relatively few participants demonstrated critical thinking by evaluating the authoritativeness of sources cited or of the content producer, the factuality and depth of reporting, or evenhandedness/balance of the news item. News literacy curricula should cover the above criteria for evaluating item credibility.

This study indicates that participants were often in a state of automaticity when exposed to the constant flow of digital content. A significant share of participants failed to contemporaneously acknowledge the strategies and criteria they used to filter news, and to evaluate news sources and news items. The explosion of news available online likely contributes to the extent to which news search behavior appears to be habitual or automatic, rather than a

conscious strategy. In short, when asked to explain the thought processes underlying their news

searches, many students lacked a conscious awareness or understanding of the strategies and

evaluation criteria that potentially affect the credibility and diversity of news consumed.

Reliance on automatic processing to filter information deemphasizes critical thinking and often

results in others making decisions about the news accessed. These results suggest that in addition

to giving students a better understanding of how the way they access news online affects the

credibility and diversity of what they consume, news literacy educators should help students

become more conscious of the strategies and evaluation criteria they use.

Limitations & Directions for Future Research

A true probability sample would allow for a stronger claim about the generalizability of

findings to all college students. During lab sessions, the presence of the researcher may have led

to normative responses from participants or actions they would not typically take while searching

for news. While the researcher remained silent during the news searches to avoid priming

participants or interrupting their typical routine, the instruction to talk aloud during the search

may have caused them to modify their behavior. For some participants, the instruction to select a

credible news item also may have changed their typical routine given research showing that

students often access news that is convenient and rely on sources they do not consider credible.

Additionally, the instruction to seek out news may not reflect their normal way of coming across

news while doing other things, and the lack of guidance on what to search for may explain the

high share of participants who were information scanners rather than seekers. Finally, some

participants may have used a search strategy or evaluation criterion without verbalizing it during

the session, or without demonstrating it clearly enough for screen-capture software to track.

This study focused exclusively on how participants search for and select news on a computer. A logical follow-up to this study would investigate college students' mobile news consumption. This study attempted to control for motivation and familiarity in the lab setting by instructing participants to seek topics of stated interest, and to start their search where they typically begin. Future studies could make interest and familiarity independent variables by instructing subjects to conduct searches on topics in which they are both interested and disinterested, and on sites in which they are both familiar and unfamiliar. Participants in this study were instructed to find news items they deemed credible, but those items selected were not reviewed and rated for attributes of credibility. Future studies could add this step to the method employed here to identify correlations between the other indicators and the extent to which news selected had potential issues regarding credibility.

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Appendix A: Interview Questions for Lab Participants

General Questions:
- How is [name of website] part of your daily online route?
- Why do you typically start with [name of website] when searching for news on a topic of interest?
- How would you rate the credibility of the information included on this site? How do you evaluate this?

Questions About News Search:
- What was the first thing you looked for on this page and why? (Repeated for each screen capture)
- How did you decide what to scan or read on this page and what to ignore? (Repeated for each screen capture)
- What specifically about the item led you to consider it?

Questions About News Item Selected:
- Why did you select this news item?
- How did you make credibility evaluations?