International Journal of Communication 18(2024), 3960-3981 1932–8036/20240005

Source-Critical Affordances in Social Media Apps

STÅLE GRUT[1]
University of Oslo, Norway

Research has demonstrated how erroneous information thrives in digitized media environments, leading social media companies to introduce features for assessing media content's trustworthiness. Using the walkthrough method, this article examines whether eight social media apps requested information on sources or relevant context when uploading media content. By introducing the concept of *source-critical affordances*, which connect source criticism with affordances, it investigates how social media apps shape users' abilities to provide information about media content. Results show that no app request that uploaders provide information about images' sources or origins; thus, uploaders are effectively treated as primary sources. This contrasts the platforms' extensive sociotechnical infrastructure for retrospectively providing contextual information and sources for media content. Despite efforts to improve end users' abilities to judge media content's trustworthiness, a considerable gap in current measures is apparent, indicating the need for more comprehensive approaches to erroneous information that encompass the upload process.

Keywords: social media, source criticism, images, disinformation, information disorder, affordances, app studies, mobile apps

Although social media has become a popular means of staying informed about what is happening in society, studies have demonstrated how fraudulent and erroneous information thrives in digitized media environments, accelerating its speed, scale, and reach (Kapantai, Christopoulou, Berberidis, & Peristeras, 2021; Neyazi & Muhtadi, 2021). This phenomenon has elevated disinformation to a global concern, sparking scholarly and societal debates about how to understand, approach, and mitigate its spread; consequently, research on trust has emerged as a key issue within communication studies (Aharoni et al., 2024; Bak, Walter, & Bechmann, 2023; Weeks & Gil de Zúñiga, 2021). This article contributes to this research by examining how features of social media apps influence end users' abilities to assess media content's trustworthiness. This investigation is particularly relevant as critically informed media and information literacy (MIL) approaches to new media technologies are receiving

Ståle Grut: stale.grut@media.uio.no
Date submitted: 2023-07-14

[1] This article is part of the research project "Photofake—Visual Disinformation, the Digital Economy and the Epistemology of the Camera Image" funded by the Research Council of Norway (Project No. 316376).

increased attention in light of society's rapid adoption of such technologies for using, producing, and sharing information (Johansson & Limberg, 2017).

In social psychology, human-computer interaction, and visual online communication fields, several studies on image sharing in social media have focused on end-user practices related to specific platforms or apps (Lobinger, Venema, & Kaufhold, 2022). Other relevant articles have investigated how apps treat sources and contextual information. For instance, Kaye, Rodriguez, Langton, and Wikström (2021) found that nearly one-third of investigated videos were misattributed by TikTok's automatic attribution system, leading the average TikTok user to "be misled, accidentally or intentionally, by a system designed to promote proper attribution" (p. 3210). In addition, Ibrahim (2017) analyzed how content moderation policies can strip images of their contextual and historical significance, illustrated by Facebook's banning and subsequent restoration of Nick Ut's iconic "Napalm Girl" photograph.

This article investigates how heightened societal attention toward the trustworthiness of online information is reflected in social media apps. Specifically, it examines the image-sharing process in eight apps popular in Norway, a country long characterized by high levels of interpersonal and institutional trust, although these levels have fluctuated somewhat in recent years (Organisation for Economic Co-operation and Development [OECD], 2022; Skirbekk, Magellsen, & Conradsen, 2023). Accordingly, it is guided by the following research question: What source-critical affordances (SCAs) are entailed when posting an image using a social media app, and what are the potential implications? To address this question, the article introduces a novel theoretical contribution, the notion of SCAs, by combining affordances with source-critical methodology. It provides a background on contemporary interest in media literacy and demonstrates how SCAs can be used to study social media platforms and how these incorporate functionality related to source criticism.

Conceptual Framework

In communications research, especially in studies of social media and mobile apps, affordances are a central analytical concept. Similarly, the methodology of source criticism is a central aspect of discussions about media literacy (Abalo & Nilsson, 2021). These concepts are used to form a conceptual framework: the notion of SCAs. Affordances play a crucial role in an end-user's ability to make judgments about the trustworthiness of online content because an application's design shapes access to information about its sourcing. An example is how an application that prioritizes trust could provide end users with easy access to two central pieces of information to aid source-critical practices:

- **Information about a source**: the creator or photographer of an image or the place where the image was first published.
- **Relevant contextual information**: any information that can contribute to identifying an image's origin, provenance, or source (for example, camera, device, machine learning model, or information about where the image was first shared or found before being uploaded through the app).

It is common to upload media originating from one social media platform to another (O'Reilly, 2015). For example, the most popular Facebook posts in Q2'2022 contained media originating from

outside Facebook: (1) an Instagram post containing a video from a U.S. TV show, (2) TikTok video, (3) video distributed by licensing company ViralHog, (4) Instagram post portraying a Twitter post, and (5) a "viral" image with unclear provenance posted to Twitter at least a month before the Facebook post in question (Facebook, 2022b). Although modern smartphone cameras capture an unprecedented amount of sensorial input, generating extensive data attached to any image or video, both metadata and social contextual information are typically stripped from images when shared on social media platforms—a practice often justified by citing concerns about uploaders' privacy (Lehmuskallio, 2016; Pasquini, Amerini, & Boato, 2021; Tayeb et al., 2018). However, information related to the image's source and provenance is considered key when evaluating its credibility (Sherman, Stokes, & Redmiles, 2021).

According to a much-cited report by Wardle and Derakhshan (2017), contemporary social technology faces a novel "information disorder," exemplified by:

> information pollution at a global scale; a complex web of motivations for creating, disseminating and consuming these 'polluted' messages; a myriad of content types and techniques for amplifying content; innumerable platforms hosting and reproducing this content; and breakneck speeds of communication between trusted peers. (p. 4)

They identify three notions of information disorder, where intent is central—*disinformation*: false information knowingly shared to harm; *misinformation*: false information shared without intending to harm; and *malinformation*: based on reality but contorted for harm (e.g., hate speech and harassment; Wardle & Derakhshan, 2017). However, Farkas and Schou (2023) highlight that the hunt for untainted terms, such as "information disorder" and "disinformation," is impossible, as no way exists to "engage in distinctions between societal truths and falsehoods without also engaging with historical and political struggles" (p. 22). Fathaigh, Helberger, and Appelman (2021) criticize, among others, Wardle and Derakhshan's definition of disinformation for failing to encompass aspects such as the *method* of dissemination. Similarly, Kapantai et al. (2021) suggest that modern disinformation studies require new analytical tools and multidisciplinary approaches that go beyond the realm of political communications theory. This is reflected in the emergence of digitally oriented scholarship within fields such as library and information sciences, which critically examines the modern information landscape, including the effects of algorithms, search engines, and social media (Kalsnes, 2023; Tallerås & Sköld, 2020). Furthermore, Steensen, Bélair-Gagnon, Graves, Kalsnes, and Westlund (2022) argue that disruptive changes in the public sphere, of which "information disorder" is an example, have created a need to better scrutinize "the credibility of sources and the material they produce" (p. 2).

Social media platforms have responded with an array of interface changes and features. These provide labels, official sources, fact checking, contextual information, or richer information about the sources of posts and media content (Bradshaw, Grossman, & McCain, 2023; Skopeliti & Bethan, 2020; see Table 1). This is meant to help end users judge the origin and trustworthiness of popular posts, media content, and user accounts (Nekmat, 2020). Researchers refer to labeling and contextualization as "soft moderation," contrasting "hard moderation," which involves content removal (Bradshaw et al., 2023).

Table 1. Inexhaustive List of Features That Provide Sources or Relevant Contextual Information to End Users of Digital Platforms and Services.

Platform	Functionality name/description	Intent
Facebook	Context button	Information about sources of articles in the news feed
Snapchat	Context cards	Information about a location
YouTube	Information panel	Background information from independent partners
Twitter	Community notes	Information and original sources of claims/content/images
Twitter	Content labels	Labels "misleading," "manipulated," or "false" content
Spotify	Now playing view	Display more information about the song and artist
Google Maps	Editorial summaries	Help end users make informed decisions more quickly
Telegram (web interface)	Context button	See individual messages as they appear in a thread
Instagram & Facebook	False information label	Warning from fact-check partner

Source Criticism

Source criticism is an epistemological methodology that raises questions about how knowledge is obtained and how information sources can be evaluated for credibility (Kalsnes, 2023; Thurén, 2005). It originated within historical scholarship during the 1800s and was marked by a breakthrough in empirical scrutiny of sources, closely associated with German historian Leopold Von Ranke (Allern & Pollack, 2019; Rosenlund, 2015). It has since evolved in different directions, regions, and fields. In contemporary Scandinavian languages, the term "source criticism" functions as a colloquial expression similar to "MIL" in English, particularly within political discourse and social debate.

Source criticism is a key tenet of influential knowledge-producing professions such as journalism (Allern & Pollack, 2019) and has been proposed as a way to mitigate the current "information disorder" (Steensen et al., 2022). It has high standing in Scandinavian society, government, and education (Allern & Pollack, 2019; Bertilsson, 2021; Tallerås & Sköld, 2020). Scandinavian authorities frequently argue that educating the population about source criticism can help solve problems posed by disinformation and its potential impact on democratic societies. In this view, source criticism is an example of *responsibilization*. Here, states reallocate specific responsibilities from the state to citizens, providing them with certain "technologies of the self" to master unpredictable political environments and build a safe, open, and democratic society (Bertilsson, 2021; Haider & Sundin, 2022b). Central to the source-critical process, as it is practiced in Scandinavia today, is a range of questions that can be directed at any potential source. These questions' applicability to numerous contexts and source types makes them important to this conceptual framework. Orgeret (2021) summarizes fundamental questions as: "Who is the source?" and "How trustworthy is the claim?" The

critic should assess a source and source material's trustworthiness, objectivity, accuracy, tendency, origin, and suitability through research (Orgeret, 2021). Thus, Steensen (2019) argues that the source-critical process "goes beyond methods of fact checking and verification and incorporates critical scrutiny of qualitative aspects of sources and information, as well as how the combination of sources and pieces of information affects the knowledge claims produced and distributed" (p. 188).

Central Source-Critical Concepts

In a digital environment that enables swift generation, reproduction, downloading, and uploading of media content, the terms *provenance* and *attribution* have become central to the source-critical process. This process typically seeks to establish a primary source, relevant contextual information, and how the content is propagated through websites and social media. The more information is unearthed about who created the content and how and where it spread online, the quicker a more informed conclusion about its origin and credibility can be reached. Attribution specifically refers to the practice of ascribing content creation to a particular individual/group or simply determining authorship (Bolz, 2023). Although a relatively new practice in journalism, transparent attribution allows the audience to ascribe levels of credibility to photographs (Caple, 2019). Provenance refers to an object's origin and—in the art world—describes the history of ownership of an object (Herning, 2014). McNulty (2014) describes it as an artwork's *social life* or *story* that, if of good stature, can substantially improve its value. In a social media context, provenance data can include information about how content has been modified and propagated and how the owner of the information is connected to its transmission (Barbier, Feng, Gundecha, & Liu, 2013). Including data on provenance can help dispel rumors, clarify opinions, and confirm facts, as well as aid end users to "assess how much value, trust, and validity should be placed on the information" (Barbier et al., 2013, p. 9).

Critiquing Source Criticism

Despite source criticism's centrality in Scandinavian societal discourse, much of the scholarly debate surrounding it points to challenges by assuming source criticism can establish the factuality of claims and content (*truth*) when it is more appropriate for establishing the origins of sources (such as images and documents) and subsequently assessing their credibility based on that information. With the scholarly reform of source criticism beginning in the 1950s in Scandinavia, discussions of historians' subjective decisions replaced the leading paradigm, in which the sources' objectivity was derived from the method used to investigate them (Melve, 2018). The *material* concept of sources, wherein the inherent properties of the source confer credibility, has been replaced by a *functional* concept of sources; this new approach assumes the questions posed to the source determine its credibility and practical utility (Melve, 2018). Thus, scholars have critiqued the prevalent Scandinavian characterization of source criticism as an essential, universal, or even necessary methodology. Instead, it is recognized as one methodology among others suited to answering specific questions and agendas and arranging historical understanding in specific ways (Edelberg & Simonsen, 2015; Rosenlund, 2015). Haider and Sundin (2022b) highlight how traditional institutions of knowledge in society (e.g., schools, libraries, public authorities, and media) view source criticism as a neutral methodology, whereas certain political actors identify it as a political concept. This perspective is justified by Haider and Sundin, as the politicization of information sources extends

beyond their *aboutness* to include various (functional) mechanisms that must be applied from a position—that can never be *nowhere*—to establish the information's trustworthiness (Haider & Sundin, 2022b).

Affordances

The concept of "affordances" was introduced by psychologist James Gibson, who focuses on "how we see" and argues that people perceive the world around them (the environment) in terms of the opportunities for action that it provides rather than simply as a collection of objects (Bucher & Helmond, 2017). To Gibson, the affordance of an object, such as the ability to sit on it, is *relational* as it is determined by the combination of the object's features and the actor's abilities (Bucher & Helmond, 2017). Norman (1998) introduced this concept in design studies by focusing on object properties and how they can become self-explanatory through good design. Thus, "affordances mediate between a technology's features and its outcomes. Technologies don't make people do things but instead push, pull, enable, and constrain. Affordances are how objects shape action for socially situated subjects" (Davis, 2020, p. 6).

Bucher and Helmond (2017) envision social media platforms as Gibson's terrestrial environment and describe how features of various platforms enable or constrain end-user action, arguing that affordances play a crucial role in media studies and research on social media because of their ability to capture "the relationship between the materiality of media and human agency" (p. 239).

Considering the broad literature on affordances in the context of communication and technology research, it has been argued that the usage of the term has been highly divergent. Evans, Pearce, Vitak, and Treem (2017) suggest three criteria for a more consistent approach to conceptualizing and applying the term *affordance*: (1) describing dynamic relationships enabling specific uses; (2) representing the actions technology allows, which are distinct from outcomes; and (3) offering a range of user engagement rather than binary options. For example, the smartphone's camera is a *feature*, the ability to capture imagery of someone, somewhere, or something—recordability—is an *affordance*, and documenting human rights violations is an *outcome* (Evans et al., 2017). Nagy and Neff (2015) propose the substitute term *imagined affordance*, which highlights the existing false consensus and clarity around the original term, as also indicated by Evans and colleagues (2017). They argue that it reflects end users' and designers' expectations and imaginations, emphasizing the dependence on human perception and interaction. Oltmann (2023) offers a pertinent summary of both arguments: "Users imagine what can be done with certain *features*, then enact the *affordances* that (they think) will yield the *outcomes* they desire" (p. 7207).

Introducing Source-Critical Affordances

This article employs *low-level* or *feature-oriented* affordances related to technical features of the (end) user interface, drawing on Norman's designed-informed conceptualization of the term (Bucher & Helmond, 2017). It conceptualizes the notion of SCA to offer a framework for analyzing how platforms incorporate functionality relevant to source criticism, encompassing features that facilitate assessment and verification related to digital content's credibility and origin. It combines the methodology of source

criticism with the concept of affordances. Within the SCA framework, "sourceability" is a key affordance representing the specific ability to include information about the origin and provenance of media content, thus directly addressing core questions in source criticism. More specifically, in SCA, a *feature* represents any functionality that allows inputting or retrieving text or metadata related to a digital object when shared online, whereas an *affordance* is "sourceability"—the ability to add information that can clarify the origin, provenance, and attribution of media content; it typically answers central questions in source criticism—and an *outcome* can include decreasing viewers' time spent critically evaluating content, as they immediately obtain more information that can be cross-checked with other independent sources. Sourceability meets Evans and colleagues' (2017) definition of an affordance as it: (1) does not describe a static feature but the dynamic relationship emerging from the interaction between the end user and technology; (2) enables actions, such as adding information about content origin distinct from outcomes (e.g., enhanced critical evaluation); and (3) implies variability, as the extent and type of source information can vary. Platforms with prominent SCAs, such as Wikipedia and Flickr, display images' metadata and dedicated fields for source information and other relevant contextual details throughout their interfaces to discern their credibility and legality concerning licensing.

Method

This section explains the examined apps and outlines the *walkthrough method*. Its visual and meticulous approach to mobile apps makes it suitable for analyzing affordances. According to Dieter and colleagues (2019), apps pose empirical challenges to media researchers owing to a tendency to move into the background while simultaneously becoming entangled with the more extensive data-intensive infrastructures and economic models of platforms. The systematic documentation and abstraction of app interface features from their normative infrastructural setting allow the exploration of how apps "script" end users, as developers aim to guide users toward specific things and change their practices, something the walkthrough method can reflect (Dieter et al., 2019).

The embedded ways in which platforms and their apps seek to protect trade secrets and design architectures complicate their examination. Visually focused methods are beneficial, as other avenues of research into apps, such as APIs and official data sets, are often severely limited (Haider & Sundin, 2022a; Perriam, Birkbak, & Freeman, 2020). The walkthrough method represents a way around this, as it enables an in-depth visual analysis of the design and functionality of an app and how it appears to an average end user. Importantly, apps can change and offer different content or functionality depending on where the end user is located, among other factors.

The Walkthrough Method

The walkthrough method describes an approach to engage directly with app interfaces, their embedded cultural references, and their technological mechanisms (Light, Burgess, & Duguay, 2018). By observing and documenting step-by-step activity flows, features, and app screens, apps can be critically analyzed (Light et al., 2018). Such critical app analysis unites approaches from science and technology studies (STS) that trace technological systems with cultural studies techniques that recognize discursive and symbolic representations (Light et al., 2018). The method originally engaged with a single app

interface to examine embedded cultural references and technological mechanisms, guiding end users and shaping their experiences (Davis, 2020; Light et al., 2018). However, this article modifies the original method by Light et al. (2018) by drawing on Dieter and colleagues (2019) to compare specific functionalities across similar apps. The method's visual approach makes it ideal for studying the presence and design of SCAs.

Data gathering consisted of "walking through" the image upload section of each individual app, with step-by-step observation and documentation of the screens. Features and flow of activity were recorded by video and screenshots, documenting each individual step (screen) when posting content to the app's "main news feed." This feed is important to distinguish, as many of the apps investigated also offer to post in various formats and feeds, including short videos dubbed "story" or "reel" or "short." Every button and menu were selected and exhausted during the walkthrough to obtain a complete overview of the possibilities that an end user had when posting an image to a platform. The starting point for all apps was the opening screen, where all offered a button to initiate the posting process. It ended back on the same screen, displaying the uploaded content. During the walkthrough, observations and reflections were recorded as voice notes comprising descriptions of the content on the screen, informed by SCAs.

App Selection

Although Norwegian society is characterized by high levels of both interpersonal and institutional trust, Norwegian authorities are currently concerned about the possibility of disinformation impeding citizens' abilities to be adequately informed (Samuelsen, 2023; Skirbekk et al., 2023). Given the population's high rate of technology and social media adoption (Warembourg, 2022), it is relevant to investigate the conditions under which media content is disseminated via popular social media apps in Norway.

Apps were selected based on Ipsos' survey data (Warembourg, 2022). Q1'2022 lists Facebook (Meta Platforms, Inc., 2022a), Snapchat (Snap, Inc., 2022), Messenger (Meta Platforms, Inc., 2022b), Instagram (Instagram, Inc., 2022), YouTube (Google, 2022), and TikTok (TikTok Ltd., 2022) as the most popular social media platforms in Norway. The rising popularity of WhatsApp (WhatsApp Inc., 2022) and Pinterest (Pinterest, 2022) was highlighted; therefore, these apps were also included. Apple's iOS (version 15.6.1) was chosen as the operating system to investigate the apps. Apple has a less fractured market than its competitors, enabling quicker development and dissemination of new functionalities (Dredge, 2013). In contrast to other countries, iOS's dominant market position in Norway makes it relevant for studying how apps appear to the average Norwegian end user (Fogh, 2020; Thormundsson, 2023).

The apps were downloaded to an iPhone 11. A photo taken with the phone was the default object to upload, with a video as a backup for apps that did not allow the photo to be uploaded as the primary object of a post. Walkthrough screenshots and transcribed voice notes from the visual analysis formed the data. The data were collected in September 2022, processed using NVivo, and coded into themes related to source-critical practices through the reflexive thematic analysis framework (Braun & Clarke, 2021).

Results

The results were grouped into three main themes related to source-critical practices: "visual alteration, text," and "interactive elements, data, and sharing." A detailed overview is presented in Table 2. Generally, content sharing is clearly afforded by all apps. A large button containing a + symbol or similar iconography that opens the process of publishing text or visual material is central to the interfaces of all apps.

Visual Alteration

Many apps offer a basic photography editing toolbox with features such as image resizing, rotating, and adjusting brightness. Facebook (Meta Platforms, Inc., 2022a) and TikTok (TikTok Ltd., 2022) offer a broad range of advanced effects for videos and audio. These include automatic improvements in audio, such as noise reduction, and various advanced editing features, such as animations and transitions, in addition to effects and filters for images and videos. Similarly, Snapchat (Snap, Inc., 2022) has a wide range of advanced filters and visual effects that can alter faces or even full bodies. Evident almost across the board is a form of image detailing or embellishment in which the end user is invited to add layers of content on top of the image, such as text, drawings, GIFs, animations, emojis, or sounds. Facebook, Snapchat, WhatsApp (WhatsApp Inc., 2022), and TikTok also have the functionality to add stickers to images. The stickers have custom designs in each app, and some can be informed by data such as time or location. Importantly, these stickers do not pull any data from an uploaded image file; instead, they rely on data or sensory input at the time of upload.

Text

All apps, except Messenger (Meta Platforms, Inc., 2022b), allow end users to include text attached to the post and media content, making it the most commonly identified feature, referring to it as "caption" or "description" or "title." Messenger allows text to be sent, albeit as separate messages. This text comes in addition to text that can be overlaid on the image. Except for video apps such as YouTube (Google, 2022) and TikTok (TikTok Ltd., 2022), no app provides information on how this text field works or the functionality it supports, other than inputting unformatted text. YouTube and TikTok explicitly encourage users to connect content with others on the platform by tagging a profile in this text field. TikTok states that the end user could "mention creators that inspired you," whereas YouTube suggests tagging another channel when writing a title. There is no explicit suggestion to add attribution or information about content origin. Facebook (Meta Platforms, Inc., 2022a), Instagram (Instagram, Inc., 2022), and Pinterest (Pinterest, 2022) include an ALT-text field used to add text. Generally, this entails a description of the image's content, purportedly to aid viewers with visual impairments and support accessibility. ALT-text arguably also serves as relevant metadata for the platforms to be used in various ways. One could easily envision that this functionality could also be repurposed or used as an SCA.

Interactive Elements, Data, and Sharing

Five apps, except WhatsApp (WhatsApp Inc., 2022), Messenger (Meta Platforms, Inc., 2022b), and Pinterest (Pinterest, 2022), allow associating other profiles when posting content through a "connection box." Although the core functionality is identical, the language used to describe it varies. The functionality is described using the terms "tag" and "mention," while the apps suggest doing this with a "face" (Facebook; Meta Platforms, Inc., 2022a), Instagram (Instagram, Inc., 2022), "name" (Facebook), "account" (TikTok; TikTok Ltd., 2022), "channel" (YouTube; Google, 2022), or "people" (TikTok, Instagram). Although the apps allow tagging another profile on the corresponding platform, only TikTok allows *any* text input in their mention field. YouTube and TikTok encourage "mention" of other profiles with pop-ups and textual instructions when posting content for the first time. YouTube's title field states "type @ to mention a channel" in gray letters before the end user starts text input. Only Instagram allows inviting another profile to appear as a coauthor of a post and share that post on their profile. Location data can be added to all apps except Pinterest and TikTok. Messenger and WhatsApp allow sharing of location data, albeit via separate messages. The apps show a list of nearby places; thus, end users can easily include information about a nearby or current location at the time of posting. However, again, the image's metadata are not used. Two apps explicitly afford the inclusion of a Web address (URL). Snapchat (Snap, Inc., 2022) allows it on an equal footing with including a location or sticker. For Pinterest, URLs are crucial because the app centers around the curation of images found on the Web. Except for WhatsApp, all apps encourage sharing posted content on more platforms. This feature is particularly prevalent on Facebook and TikTok. TikTok also includes a watermark when exporting a video from the app. Thus, the app's logo and end-user's username are visible throughout the video if shared on another platform. Three options recur in connection with such sharing: (1) automatic sharing to another platform, (2) using the menu in one app to open another app and share the content, and (3) downloading the photo before/after posting to manually share in another app. Two apps afford detailed controls over possible reuse of content by other end users, associated with the features "Duet" and "Stitch" on TikTok and "Remix" on Snapchat.

Table 2. Overview of Whether Apps Support an Identified Type of Functionality Related to Source-Critical Practices.

Social media platform app	Classic photo edits	Advanced editing	Description text field	Profile tagging	Collaboration	Location data	Include source URL	Upload from URL	Post privacy settings	Post remix settings	Multiple feed formats	Continued sharing	ALT-text	Stickers
Facebook	✓	✓	✓	✓	✗	✓	✗	✗	✓	✗	✓	✓	✓	✓
Snapchat	✓	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗	✓
Instagram	✓	✗	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✗
Messenger[A]	✓	✗	✗	✗	✗	✗[B]	✗	✗	✗	✗	✗	✓	✗	✓
YouTube[C]	✗	✗	✓	✓	✗	✓	✗	✗	✓	✗	✓	✓	✗	✗

TikTok[C]	✗	✓	✓	✓	✓	✓[D]	✗	✗	✓	✓	✓	✓	✗	✓
WhatsApp[A]	✓	✗	✓	✗	✗	✗[B]	✗	✗	✓	✗	✗	✗	✗	✓
Pinterest	✗	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✓	✗

[A] Messaging app allows more functionality, albeit via separate messages from visual material.
[B] Location data cannot directly be tied to an image; however, they can be sent in a separate message.
[C] Video app with limited or no support for only posting images.
[D] The feature exists in the app; however, it was not available in Norway at the time of the study. TikTok's help pages state that "in some regions, you can add a location to your TikTok video" (TikTok, 2023, para. 13).

Discussion

Three levels of image alteration are clearly afforded and easy to access through corresponding symbols in the interface across all apps, except Pinterest (Pinterest, 2022). They are overlaid on the content and remain visible throughout the upload process.

The first level includes "classic" photography editing features, such as cropping, rotating, and increasing brightness. The iconography is simple yet recognizable, such as the "crop" symbol in black/white. The second level includes advanced visual or audio effects, such as 3D effects, face replacement, video transitions, and voice effects. They alter the image or camera input and can thus be understood as a functionality that removes content further from the original source. These have detailed and colorful symbols, icons, and previews that arguably entice play and experimentation by affording such functionality.

The third level adds layers to the image, including drawings, text, emojis, and stickers. Stickers impact both social media apps' economic models and social dynamics. Japanese chat app LINE's early and successful implementation of stickers as a principal form of content caused stickers to proliferate in other social media apps (Steinberg, 2020). Today, stickers are a common feature of social media apps and a source of revenue for end users who create and sell them, as well as the app that distributes them (Steinberg, 2020). The apps with stickers all offer them a distinct visual style. Stickers informed by data, such as date, time, and location, are in this article termed "contextual data stickers" as they provide a type of contextual information related to the media content or uploader. However, relying on the data from the time of upload rather than the time of image creation obfuscates, rather than clarifies, information about a source. Simultaneously, a trace is left to provide information relevant for identifying the provenance of the media or working one's way backward in time to identify the first time the image was posted. TikTok's (TikTok Ltd., 2022) sticker that allows mentioning another end user is a free-text field. Envisioned as an SCA, this enables writing names of people not registered on the app, crediting a photographer or website, or providing information about the content source. Thus, TikTok provides something that can be regarded as an SCA; however, it is not presented as such. Using some, or indeed all, the alteration functionality outlined above results in a new composition that could be substantially removed from the image initially uploaded and thus could work *against* the viewer's source-critical practices. However, the traces left by apps can also contribute to source-critical processes. A possible explanation for why the mention-functionality in TikTok and YouTube (Google, 2022) is clearly afforded is

the popular and distinct video genre "response videos," allowing users to respond to a video with a video (Lewis, Marwick, & Partin, 2021).

Although technological developments have improved the camera and connected it to more sensors, the subsequent increasingly detailed metadata are not used by social platforms at the upload stage to inform end users about the media content they are presented with. Uploading images to all apps removes and alters metadata. Although the metadata can provide information relevant to source-critical practices, a potential for misuse should also be noted. Such data are machine-readable and can be used for data processing, informing algorithms, and other software used by the platforms. These platforms already employ various methods for data extraction, and end users providing more details could also increase the platforms' potential to map and survey end users and even monetize such data by passing it to third parties or to comply with law enforcement.

Opening the possibility of providing more information can also make it easier for images to be intentionally and strategically mislabeled. Qian, Shen, and Zhang (2022) described a fundamental source of misinformation as "out-of-context visual misinformation," where media content is presented as depicting something it does not. This can easily be achieved by providing fictitious or edited (meta) data. The ease of downloading and uploading media content across the Web and social media has made tools, including Google's reverse-image search, central to both end users and journalists searching for the original version of an image or video posted online or trying to locate the first instance when it was shared on a platform (Brandtzæg, Lüders, Spangenberg, Rath-Wiggins, & Følstad, 2016). Other circumvention strategies have been identified among journalists and fact-checkers, who use digital forensic techniques including "geolocation" and "chronolocation" to establish details about an image without relying on metadata (Grut, 2023). To support Amnesty International's human rights investigators' source-critical practices, the organization suggests sending an image as a *document* to trick WhatsApp into keeping its metadata intact (Marin, 2020).

Location data have long been a prioritized feature of social media platforms and are considered an important data source (Wilken, 2014). Most studied apps clearly afford this functionality with buttons and expansive menus of locations. This can provide relevant contextual information; however, location data are another example of the apps gathering information at the time of upload rather than from the image file. Thus, this can contribute to obfuscating source information.

Except for a company logo, colorful icons and logos are rarely found in the apps. Iconography is minimalist in color and design across all apps, rendering uploaded media the most eye-catching aspect. In line with Dieter and colleagues (2019), this demonstrates how the app moves into the background. However, when sharing (or *exporting*) content to other platforms, most apps change visuals from toned-down to colorful and recognizable logos of other social media apps. Sharing is explicitly afforded by YouTube (Google, 2022), TikTok (TikTok Ltd., 2022), Snapchat (Snap, Inc., 2022), Instagram (Instagram, Inc., 2022), and Facebook (Meta Platforms, Inc., 2022a) through centrally located icons and menus. Snapchat even offers a granular sharing menu, where the end user can choose to share an image to either Instagram's regular news feed or "stories" feed. Although TikTok does not afford settings related to watermarks, Li (2022) argues that the watermark it adds

increases the authenticity of the content and acts as marketing for TikTok. Watermarks can aid the source-critical process by allowing quicker identification of the source or provenance.

Social media platforms have scarcely afforded functionality for associating interactive URLs with content, subjecting URLs to capricious policies and functionality. However, it is not uncommon that including a URL or adding formatting to a text field makes it clickable or formats the text, despite such functionality not being afforded during posting. Although URL functionality is not afforded in the studied apps, except Snapchat (Snap, Inc., 2022) and Pinterest (Pinterest, 2022), including a URL may render it interactive after posting. YouTube describes external links as an "advanced" feature that demands certain requirements of the end user posting the content, such as verification of ID, a phone number, or a "sufficient channel history" (YouTube, 2023, para. 4). Writing "link in bio" in uploaded content's caption is a common way to direct viewers to a profile page, where the end user usually can add one external URL—updating this field whenever posting new content. The lack of this functionality on individual posts has spawned a circumvention industry where companies offer different ways to connect posted content to external links (Stokel-Walker, 2023).

None of the apps explicitly ask for information about the source when uploading an image. As that information could clear up misunderstandings or help viewers establish trustworthiness more rapidly, this is at odds with the social media platforms' rich sociotechnical infrastructure built to provide more context and fact checking for content on their platforms. By demanding more information about a source or context, the need for fact-checking and such infrastructure can be reduced. The ease of downloading and uploading a photo online and the demonstrated popularity of reposting media content on social media, as exemplified in Facebook's most viewed content report, represent a dilemma for the platforms. None of Meta's apps explicitly asks for information about an image's source or contextual information to determine its origin. All apps treat the end user uploading an image as its primary source. Pinterest offers what can be regarded as the SCA "sourceability" by suggesting that users add a "destination website" during image uploading, despite not explicitly tying this to a source.

This constraint on SCAs could be attributed to legal considerations or the companies' terms of service, suggesting that one is not allowed to upload someone else's content. Facebook's (2022a) terms of service state that: "You may not use our Products to do or share anything [. . .] that infringes or breaches someone else's rights, including their intellectual property rights (such as by infringing another's copyright or trademark)" (para. 26).

Source criticism prefers primary sources, and rigorous verification processes in journalism and elsewhere emphasize the importance of locating the primary source for an image, quote, or claim (Caulfield & Wineburg, 2023; Kjeldstadli, 1992). Without the uploader actively adding information about the source or origin, a viewer lacking proper heuristics can easily draw erroneous conclusions about the trustworthiness of images and social media posts. Not offering more options to add information about a source and relevant context at the time of upload seems contradictory when it is deemed so crucial to social platforms that they form partnerships with fact-checkers and make changes to their platform to add this information retroactively. Facebook exemplifies this epistemic dichotomy. It states that "we don't have a policy that stipulates that the information you post on Facebook must be true" (Harwell, 2019,

para. 6), while simultaneously introducing a range of features, design changes, and partnerships with fact-checking organizations that make judgments of content trustworthiness.

Currently, there are many ways to generate and create images with a photorealistic style, causing epistemic concern; thus, SCAs may present an opportunity to display which camera, machine learning model, and tools were used to create or edit an image. If adding rich data about an image in designated fields is normalized, it could potentially lead to the instinctive scrutiny of content that lacks or has fabricated such information. SCAs that encourage including information about a source and relevant contextual details would allow for more rapid scrutiny of the content by the viewer. When posting an article on Facebook, the platform automatically retrieves and displays contextual information about the source. Similar functionality can be introduced for images as internal or external data sources can be used to obtain and display information related to an image's source or provenance on a platform. Given the increasing importance of these platforms in the dissemination of information and news and the concerns about the declining trustworthiness of online information, these findings raise questions about the potential responsibilities and solutions proposed by the platforms to combat this development.

Conclusion

This article investigated SCAs in eight popular social media apps, as well as how apps constrain or enable the inclusion of relevant contextual information or an image's source. Interconnecting the methodology of source criticism and the concept of affordances allows a deeper understanding of how digital environments, such as social media apps, shape an end-user's ability to provide information about uploaded images. The apps were analyzed using the walkthrough method, documenting the stages when uploading a photo (in two cases, a video) in the apps. As the uploader is treated as the primary source of an uploaded image, despite the ease of uploading any image, the findings contradict the work done by industry initiatives aiming to improve end users' abilities to judge the trustworthiness of media content, the platforms' own fact-checking efforts, and the rich sociotechnical infrastructure many of them have built to provide information about a source and relevant context. The article reveals an epistemic dichotomy. On one side, social media apps provide rich and explicit features to alter, embellish, and share content. They simultaneously see a need to provide end users with more information and context in enough cases to warrant considerable changes to their design. However, the apps do not ask or facilitate for their end users to improve trustworthiness through asking for or providing dedicated fields to mention information about a source or relevant context when uploading images. Incorporating SCAs that encourage including information about a source and relevant contextual details at the crucial upload stage could allow for more rapid scrutiny of the trustworthiness of the content by the viewer.

Limitations

This article included a limited selection of apps popular in one country and designed for a specific operating system. Studies have shown that end-user practices related to posting content on social media platforms vary depending on the device (Suh & Hargittai, 2015). This provides avenues for future research on more apps, operating systems, devices, and regions. Furthermore, no end users were interviewed or studied to uncover their practices related to SCAs. Costa (2018) argues that such non–media-centric

approaches are beneficial for studying social media because of a focus on usage practices within situated environments rather than the architecture of social media platforms, as is the case here. Further research could engage directly with end users or developers and employ surveys or interviews to gain a more nuanced understanding of how users add or understand information about the sources of visual content in social media apps.

References

Abalo, E., & Nilsson, J. (2021). Fostering the truthful individual. *Nordicom Review, 42*(1), 109–123. doi:10.2478/nor-2021-0032

Aharoni, T., Tenenboim-Weinblatt, K., Kligler-Vilenchik, N., Boczkowski, P., Hayashi, K., Mitchelstein, E., & Villi, M. (2024). Trust-oriented affordances: A five-country study of news trustworthiness and its socio-technical articulations. *New Media & Society, 26*(6), 3088–3106. doi:10.1177/14614448221096334

Allern, S., & Pollack, E. (2019). *Källkritik!* [Source criticism!]. Lund, Sweden: Studentlitteratur.

Bak, P. P., Walter, J. G., & Bechmann, A. (2023). Digital false information at scale in the European Union: Current state of research in various disciplines, and future directions. *New Media & Society, 25*(10), 2800–2819. doi:10.1177/14614448221122146

Barbier, G., Feng, Z., Gundecha, P., & Liu, H. (2013). *Provenance data in social media*. San Rafael, CA: Morgan & Claypool Publishers.

Bertilsson, F. (2021). Source criticism as a technology of government in the Swedish psychological defence: The impact of humanistic knowledge on contemporary security policy. *Humanities, 10*(1), 13. doi:10.3390/h10010013

Bolz, A. (2023). *A regulatory framework for the art market? Authenticity, forgeries and the role of art experts*. Cham, Switzerland: Springer International Publishing. doi:10.1007/978-3-031-18743-8

Bradshaw, S., Grossman, S., & McCain, M. (2023). An investigation of social media labeling decisions preceding the 2020 U.S. election. *PLoS One, 18*(11), e0289683. doi:10.1371/journal.pone.0289683

Brandtzæg, P. B., Lüders, M., Spangenberg, J., Rath-Wiggins, L., & Følstad, A. (2016). Emerging journalistic verification practices concerning social media. *Journalism Practice, 10*(3), 323–342. doi:10.1080/17512786.2015.1020331

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. London, UK: SAGE.

Bucher, T., & Helmond, A. (2017). The affordances of social media platforms. In J. Burgess, A. Marwick, & T. Poell (Eds.), *The SAGE handbook of social media* (pp. 233–253). London, UK: SAGE. doi:10.4135/9781473984066

Caple, H. (2019). *Photojournalism disrupted: The view from Australia*. Abingdon, UK: Routledge. doi:10.4324/9780429455469

Caulfield, M., & Wineburg, S. (2023). *Verified: How to think straight, get duped less, and make better decisions about what to believe online*. Chicago, IL: The University of Chicago Press.

Costa, E. (2018). Affordances-in-practice: An ethnographic critique of social media logic and context collapse. *New Media & Society, 20*(10), 3641–3656. doi:10.1177/1461444818756290

Davis, J. L. (2020). *How artifacts afford: The power and politics of everyday things*. Cambridge, MA: MIT Press. doi:10.7551/mitpress/11967.001.0001

Dieter, M., Gerlitz, C., Helmond, A., Tkacz, N., van der Vlist, F. N., & Weltevrede, E. (2019). Multi-situated app studies: Methods and propositions. *Social Media + Society, 5*(2), 1–15. doi:10.1177/2056305119846486

Dredge, S. (2013, August 15). If Android is so popular, why are many apps still released for iOS first? *The Guardian*. Retrieved from https://www.theguardian.com/technology/appsblog/2013/aug/15/android-v-ios-apps-apple-google

Edelberg, P., & Simonsen, D. G. (2015). Changing the subject: Epistemologies of Scandinavian source criticism. *Scandinavian Journal of History, 40*(2), 215–238. doi:10.1080/03468755.2015.1021276

Evans, S. K., Pearce, K. E., Vitak, J., & Treem, J. W. (2017). Explicating affordances: A conceptual framework for understanding affordances in communication research. *Journal of Computer-Mediated Communication, 22*(1), 35–52. doi:10.1111/jcc4.12180

Facebook. (2022a). *Terms of service*. Facebook. Retrieved from https://www.facebook.com/legal/termshttps://www.facebook.com/legal/terms

Facebook. (2022b). *Widely viewed content report: What people see on Facebook | Q2 2022 report*. Meta. Retrieved from https://transparency.fb.com/en-gb/data/widely-viewed-content-report

Farkas, J., & Schou, J. (2023). *Post-truth, fake news and democracy: Mapping the politics of falsehood* (2nd ed.). New York, NY: Routledge. doi:10.4324/9781003434870

Fathaigh, R. Ó., Helberger, N., & Appelman, N. (2021). The perils of legally defining disinformation. *Internet Policy Review, 10*(4), 1–25. doi:10.14763/2021.4.1584

Fogh, B. (2020, June 10). The Norwegian mobile phone market: Moving from gut feelings to facts. *Shortcut*. Retrieved from https://medium.com/@Shortcut/the-norwegian-mobile-phone-market-moving-from-gut-feelings-to-facts-b63cf1413aca

Google. (2022). *YouTube* (Version 17.35.3) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/youtube/id544007664

Grut, S. (2023). *Evaluating digital sources in journalism: An introduction to digital source criticism*. Oxon, UK: Routledge. doi:10.4324/9781003449461

Haider, J., & Sundin, O. (2022a). Information literacy challenges in digital culture: Conflicting engagements of trust and doubt. *Information, Communication and Society, 25*(8), 1176–1191. doi:10.1080/1369118X.2020.1851389

Haider, J., & Sundin, O. (2022b). *Paradoxes of media and information literacy: The crisis of information*. London, UK: Routledge. doi:10.4324/9781003163237

Harwell, D. (2019, May 24). Facebook acknowledges Pelosi video is faked but declines to delete it. *Washington Post*. Retrieved from https://www.washingtonpost.com/technology/2019/05/24/facebook-acknowledges-pelosi-video-is-faked-declines-delete-it

Herning, K. (2014). Provenance meets source criticism. *Journal of Digital Humanities, 2*(3), 60–64.

Ibrahim, Y. (2017). Facebook and the Napalm Girl: Reframing the iconic as pornographic. *Social Media + Society, 3*(4), 1–10. doi:10.1177/2056305117743140

Instagram, Inc. (2022). *Instagram* (Version 251.0) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/instagram/id389801252

Johansson, V., & Limberg, L. (2017). Seeking critical literacies in information practices: Reconceptualising critical literacy as situated and tool-mediated enactments of meaning. *Information Research, 22*(1). Retrieved from http://InformationR.net/ir/22-1/colis/colis1611.html

Kalsnes, B. (2023). Introducing digital source criticism: A method for tackling fake news and disinformation. In S. Maci, M. Demata, M. McGlashan, & P. Seargeant (Eds.), *Routledge handbook of discourse and disinformation* (pp. 52–63). London, UK: Routledge. doi:10.4324/9781003224495-5

Kapantai, E., Christopoulou, A., Berberidis, C., & Peristeras, V. (2021). A systematic literature review on disinformation: Toward a unified taxonomical framework. *New Media & Society, 23*(5), 1301–1326. doi:10.1177/1461444820959296

Kaye, D. B. V., Rodriguez, A., Langton, K., & Wikström, P. (2021). You made this? I made this: Practices of authorship and (Mis)attribution on TikTok. *International Journal of Communication, 15*, 3195–3215. Retrieved from https://ijoc.org/index.php/ijoc/article/view/14544

Kjeldstadli, K. (1992). *Fortida er ikke hva den en gang var* [The past is not what it once was]. Oslo, Norway: Universitetsforlaget.

Lehmuskallio, A. (2016). The camera as a sensor: The visualization of everyday digital photography as simulative, heuristic and layered pictures. In E. Gomez Cruz & A. Lehmuskallio (Eds.), *Digital photography and everyday life* (pp. 243–266). Oxon, UK: Routledge.

Lewis, R., Marwick, A. E., & Partin, W. C. (2021). "We dissect stupidity and respond to it": Response videos and networked harassment on YouTube. *American Behavioral Scientist, 65*(5), 735–756. doi:10.1177/0002764221989781

Li, J. (2022). TikTok: A must-have app. In *Proceedings of the 2022 2nd International Conference on Enterprise Management and Economic Development (ICEMED 2022)*. Advances in Economics, Business and Management Research (pp. 1015–1018). Dordrecht, The Netherlands: Atlantis Press. doi:10.2991/aebmr.k.220603.165

Light, B., Burgess, J., & Duguay, S. (2018). The walkthrough method: An approach to the study of apps. *New Media & Society, 20*(3), 881–900. doi:10.1177/1461444816675438

Lobinger, K., Venema, R., & Kaufhold, A. (2022). Hybrid repertoires of photo sharing: Exploring the complexities of young adults' photo-sharing practices. *Visual Communication, 21*(1), 73–96. doi:10.1177/1470357219894038

Marin, M. (2020, April 20). *Sending encrypted photos while preserving metadata*. Amnesty Citizen Evidence Lab. Retrieved from https://citizenevidence.org/2020/04/20/sending-encrypted-photos-while-preserving-metadata

McNulty, T. (2014). *Art market research: A guide to methods and sources*. Jefferson, NC: McFarland & Company.

Melve, L. (2018). Kildekritikk—en kort historikk [Source criticism—a short history]. In L. Melve & T. S. Ryymin (Eds.), *Historikerens arbeidsmåter* [The historian's working methods] (pp. 34–43). Oslo, Norway: Universitetsforlaget.

Meta Platforms, Inc. (2022a). *Facebook* (Version 382.0.0.23.104 (394200712) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/facebook/id284882215

Meta Platforms, Inc. (2022b). *Messenger* (Version 377.0) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/messenger/id454638411

Nagy, P., & Neff, G. (2015). Imagined affordance: Reconstructing a keyword for communication theory. *Social Media + Society, 1*(2), 1–9. doi:10.1177/2056305115603385

Nekmat, E. (2020). Nudge effect of fact-check alerts: Source influence and media skepticism on sharing of news misinformation in social media. *Social Media + Society, 6*(1), 1–14. doi:10.1177/2056305119897322

Neyazi, T. A., & Muhtadi, B. (2021). Comparative approaches to Mis/disinformation| Selective belief: How partisanship drives belief in misinformation. *International Journal of Communication, 15*, 1286–1308. Retrieved from https://ijoc.org/index.php/ijoc/article/view/15477

Norman, D. A. (1998). *The design of everyday things*. Cambridge, MA: MIT Press.

Organisation for Economic Co-operation and Development (OECD). (2022). *Drivers of trust in public institutions in Norway*. Paris, France: OECD Publishing. doi:10.1787/b7d1e606-en

Oltmann, S. M. (2023). Outcomes and affordances: Examining why people use encryption. *International Journal of Communication, 17*, 7203–7223. Retrieved from https://ijoc.org/index.php/ijoc/article/view/21271/4408

O'Reilly, L. (2015, November 12). *A YouTube video that claims Facebook is "stealing billions of views" is going viral*. Business insider. Retrieved from https://www.businessinsider.com/how-facebook-is-stealing-billions-of-views-youtube-video-goes-viral-2015-11

Orgeret, K. S. (2021). *Kildekritikk* [Source criticism]. Store norske leksikon. Retrieved from http://snl.no/kildekritikk

Pasquini, C., Amerini, I., & Boato, G. (2021). Media forensics on social media platforms: A survey. *EURASIP Journal on Information Security, 2021*(1), 4. doi:10.1186/s13635-021-00117-2

Perriam, J., Birkbak, A., & Freeman, A. (2020). Digital methods in a post-API environment. *International Journal of Social Research Methodology, 23*(3), 277–290. doi:10.1080/13645579.2019.1682840

Pinterest. (2022). *Pinterest* (Version 10.31) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/pinterest/id429047995

Qian, S., Shen, C., & Zhang, J. (2022). Fighting cheapfakes: Using a digital media literacy intervention to motivate reverse search of out-of-context visual misinformation. *Journal of Computer-Mediated Communication, 28*(1), 1–12. doi:10.1093/jcmc/zmac024

Rosenlund, D. (2015). Source criticism in the classroom: An empiricist straitjacket on pupils' historical thinking? *Historical Encounters, 2*(1), 47–57. doi:10.52289/hej2.100

Samuelsen, R. J. (2023). Farlige ord: De hemmelige tjenestenes forståelse av desinformasjon som en samfunnstrussel [Dangerous words: Secret agencies' understanding of disinformation as a societal threat]. *Norsk medietidsskrift, 30*(2), 1–16. doi:10.18261/nmt.30.2.3

Sherman, I. N., Stokes, J. W., & Redmiles, E. M. (2021). Designing media provenance indicators to combat fake media. In *Proceedings of the 24th international symposium on research in attacks, intrusions and defenses* (pp. 324–339). New York, NY: Association for Computing Machinery. doi:10.1145/3471621.3471860

Skirbekk, H., Magelssen, M., & Conradsen, S. (2023). Trust in healthcare before and during the COVID-19 pandemic. *BMC Public Health, 23*(1), 863. doi:10.1186/s12889-023-15716-6

Skopeliti, C., & Bethan, J. (2020, March 19). *Coronavirus: How are the social media platforms responding to the "infodemic"?* First Draft. Retrieved from https://firstdraftnews.org/articles/how-social-media-platforms-are-responding-to-the-coronavirus-infodemic

Snap, Inc. (2022). *Snapchat* (Version 11.94.0) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/snapchat-chat-med-venner/id447188370

Steensen, S. (2019). Journalism's epistemic crisis and its solution: Disinformation, datafication and source criticism. *Journalism, 20*(1), 185–189. doi:10.1177/1464884918809271

Steensen, S., Bélair-Gagnon, V., Graves, L., Kalsnes, B., & Westlund, O. (2022). Journalism and source criticism. Revised approaches to assessing truth-claims. *Journalism Studies, 23*(16), 2119–2137. doi:10.1080/1461670X.2022.2140446

Steinberg, M. (2020). LINE as super app: Platformization in East Asia. *Social Media + Society, 6*(2), 1–10. doi:10.1177/2056305120933285

Stokel-Walker, C. (2023, April 19). Did Instagram just kill Linktree? *Wired UK*. Retrieved from https://www.wired.co.uk/article/did-instagram-just-kill-linktree

Suh, J. J., & Hargittai, E. (2015). Privacy management on Facebook: Do device type and location of posting matter? *Social Media + Society, 1*(2), 1–11. doi:10.1177/2056305115612783

Tallerås, K., & Sköld, O. (2020). What they talk about when they talk about the need for critical evaluation of information sources: An analysis of Norwegian and Swedish news articles mentioning 'source criticism'. In A. Sundqvist, G. Berget, J. Nolin, & K. I. Skjerdingstad (Eds.), *Sustainable digital communities* (pp. 380–388). Cham, Switzerland: Springer International Publishing. doi:10.1007/978-3-030-43687-2_30

Tayeb, S., Week, A., Yee, J., Carrera, M., Edwards, K., Murray-Garcia, V., . . . Pirouz, M. (2018). Toward metadata removal to preserve privacy of social media users. In *2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC)* (pp. 287–293). Piscataway, NJ: IEEE. doi:10.1109/CCWC.2018.8301741

Thormundsson, B. (2023). *Market share held by the leading mobile operating systems in Norway as of October 2023*. Statista. Retrieved from https://www.statista.com/statistics/621158/most-popular-mobile-operating-systems-in-norway

Thurén, T. (2005). *Källkritik* [Source criticism]. Stockholm, Sweden: Liber.

TikTok. (2023). *Location information on TikTok*. TikTok Help Center. Retrieved from https://support.tiktok.com/en/account-and-privacy/account-privacy-settings/location-services-on-tiktok

TikTok Ltd. (2022). *TikTok* (Version 25.9.0) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/tiktok/id835599320

Wardle, C., & Derakhshan, H. (2017). *Information disorder: Toward an interdisciplinary framework for research and policy making*. Council of Europe. Retrieved from https://edoc.coe.int/en/media/7495-information-disorder-toward-an-interdisciplinary-framework-for-research-and-policy-making.html

Warembourg, N. E. (2022). *Ipsos SoMe-tracker Q'22*. Ipsos. Retrieved from https://www.ipsos.com/nb-no/ipsos-some-tracker-q122

Weeks, B. E., & Gil de Zúñiga, H. (2021). What's next? Six observations for the future of Political Misinformation Research. *American Behavioral Scientist, 65*(2), 277–289. doi:10.1177/0002764219878236

WhatsApp Inc. (2022). *WhatsApp Messenger* (Version 2.22.18.76) [Mobile application software]. Retrieved from https://apps.apple.com/no/app/whatsapp-messenger/id310633997

Wilken, R. (2014). Places nearby: Facebook as a location-based social media platform. *New Media & Society, 16*(7), 1087–1103. doi:10.1177/1461444814543997

YouTube. (2023). *Access to YouTube tools and features*. YouTube Help. Retrieved from https://support.google.com/youtube/answer/9890437