Concordia University

Combatting Visual Misinformation on Social Media:

A Review of Strategies and Concepts

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An Essay

submitted in Partial Fulfillment of the Requirements

for the Degree of Masters of Arts (Digital Innovation in Journalism)

to the Department of Journalism

of the Faculty of Arts and Sciences

at Concordia University

Montreal, Quebec, Canada

April 2022

Abstract

Misinformation is an issue many journalists have tried to tackle as the popularity of the Internet and social media has boomed. The proliferation of visual misinformation has been a concern for journalists today as they grapple with the rise of bad actors and the increased ease of posting online. In the past decade, the public's trust of journalists has decreased, and the presence of visual misinformation online has only fueled that mistrust. Social media platforms, such as Facebook and Twitter, have played a role in spreading misinformation online, especially since the 2016 US presidential elections. Only in the past few years has research on the topic of visual misinformation increased, but not enough data have been collected on the long-term effects of such in the online world or on the audience. In this essay, I summarize what visual misinformation is and describe the impact that social media has had on it. Highlighting some existing practices and programs, I will explain how journalists and the public can protect themselves from visual misinformation. Three main concepts will be discussed as to how to deal with visual misinformation in relation to social media. The three main concepts that will be discussed are the roles of social media platforms, journalistic practices, and media literacy. This essay aims to further research on the long-term effects of visual misinformation.

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Introduction

The spread of visual misinformation on social media platforms is a relatively new phenomenon that is currently being investigated by researchers around the world. With this in mind though, most of the focus and research has been on textual misinformation and disinformation and their effects. Notably, there does not seem to be a full understanding of how visual misinformation on social media impacts journalism and journalists themselves. At the same time, the spread of misinformation and disinformation online has happened since the advent of the Internet, and mass communication has greatly increased as more people globally began interacting on social media (Tsfati et al., 2020; Waisbord, 2018).

Misinformation is false or inaccurate information that is circulated by an actor without the intent to harm or deceive (Jahng et al., 2021). On the other hand, disinformation is defined as false or inaccurate information that is circulated by an actor who intends to cause harm or make profit (Jahng et al., 2021). Visual misinformation is multimedia, images and videos being used to unintentionally create false information or harm the public. It can elicit emotional and behavioral reactions and be more persuasive than textual misinformation (Sikorski, 2021). Visuals are better at transmitting information and more easily retained in people's memory than textual information (Vaccari & Chadwick, 2020). Visuals provide a sense of familiarity and are like a mirror of the real world, which can allow false images to deceive people and trigger their emotions (Vaccari & Chadwick, 2020).

Furthermore, it should be noted that the term "fake news" will not be used in my paper when addressing the concepts of misinformation and disinformation. The term

"fake news" is similar to the terminology I use in that it captures information with the intent of unintentionally or intentionally spreading false information online or through mainstream news (Mugai, 2019). However, the word has not been used with the intention its name would suggest; rather, politicians have called mainstream news "fake" because they may view journalists as the enemy. In that regard, in this paper, only the terms "misinformation" and "disinformation" will be used to address false information.

Further, "fake news" will not be used in my essay because the phrase can seem to mean everything: misinformation, spin, conspiracy theories, mistakes, and reporting that people just don't like (Wendling, 2018). The term is also influential beyond just propagating false information online: it affects the entire information ecosystem (Wardle, 2017). According to Wardle of First Draft News, the term "fake news" doesn't describe how complex information is and the different types of motives behind or reasons for why it spreads. Using the term "fake news" doesn't cover the complexity of misinformation online nor does it really mean that the identified information is false. It is a phrase that has lost its meaning and has weaponized the process of fact checking and journalists being objective when writing news stories (Wendling, 2018).

According to Waisbord (2018), the 2016 US election was a tipping point of sorts, and since then he argues that the proliferation of misinformation and disinformation online has increased immensely and that combating the spread of such is getting harder for journalists. The 2016 elections and the usage of social media propelled the spread of false misinformation. Everyone in the public sphere had something to say about novel forms of propaganda, news deliberately produced to trick public opinion, and beliefs grounded in invented facts (Waisbord, 2018). While research has focused on the

impacts of text-based misinformation, visual forms of misinformation have received less attention (Sikorski, 2021). This is a concern as audiences tend to be more responsive to visual news (Sikorski, 2021) as it seems closer to reality (Messaris & Abraham, 2001). Seeing a visual such as a video, for example, can tap into the audience's emotional response more so than text (Powell et al., 2015). Sikorski's article, "Visual Mis- and Disinformation, Social Media, and Democracy," discusses the gaps in the research that false images have on social media and audiences. There isn't enough data on how visual misinformation can be effectively debunked, such as what it looks like and how to inoculate audiences against visual misinformation (Sikorski, 2021). The social media landscape promotes a constant and demanding 24-hour news cycle, making it difficult for journalists to identify and report visual misinformation. Many forms of visual misinformation spread on social media, such as the rise of deepfakes. A deepfake is a machine learning AI software platform that is used to create convincing videos of a person by superimposing the face and expressions of one person on another (Vaccari & Chadwick, 2020). Visuals such as deepfakes create mistrust and uncertainty in the public, which affects what people see as being true or false.

Visual misinformation about Covid-19 has flourished on social media, promoting false information and tapping into people's emotions and biases around the virus. Research by Brennen, Simon and Nielsen (2020) analyzed different types of visual misinformation on Covid-19 and how that information spreads, such as through medical efficacy visuals, false authoritative agency visuals and even xenophobic or intolerant visuals. Their research shows the importance visuals had in spreading misinformation about Covid-19 on social media (Brennen et al., 2020). Regardless of the topic, the

emergence of visual misinformation on social media platforms is a threat to the well-being of journalists, citizens and democracy at large according to journalists Waisbord, Ireton, and Posetti. According to Waisbord (2018), misinformation challenges the role of journalists in a democracy because they distribute the news to the public. Visual misinformation negatively affects journalists in a democratic society because it may lead people to not see them as truthful or reliable anymore (Ireton & Posetti, 2018). In this essay, I will explain how visual misinformation influences social media and the ensuing repercussions. Multiple steps and changes must be made in the journalistic and social media landscape to slow the spread of visual misinformation, which can then emphasize the need for more research (Sikorski, 2021).

In this essay, I outline different existing practices and concepts that can be used to combat the rise in visual misinformation. To start, journalists' practices and techniques use traditional methods to debunk online misinformation: "As our interviewees' answers indicate, journalists create narratives about themselves and their profession's legitimacy to defend themselves and their work, but they also create acceptable interpretative ranges for each single story, event, or phenomenon" (Jahng et al., 2021). These methods to fact-check real people or get interviews may be too slow to stop misinformation on social media (Thomson et al., 2020). Visuals on social media are created quickly at a large scale, and while there are online verification tools for journalists, not all have access or the education to use them efficiently (Thomson et al., 2020). Sikorski's (2021) article discusses standard methods of debunking to a different type of method called pre-bunking.

The debunking and fact-checking of visual misinformation can seem to fall solely on journalists; yet as Maksl et al. (2015) argue in *Measuring News Media Literacy*, it should be seen as requiring an equal effort by the public. The spread of misinformation and disinformation by bots and government officials is causing the public to be confused about and distrustful of the news (Magdalena, 2020). In the 2021 Reuters Digital News Report, only 29% of US citizens said they trust the news, and only 13% said they trust the news on social media (Jenkins & Graves, 2021). There is also a link between political views and beliefs about fairness: 52% said they trust the news if they believe their political beliefs are covered fairly, but that doesn't mean that the news they get is accurate (Fletcher, 2021). Implementing news literacy education enables critical thinking and skepticism to combat misinformation (Vraga & Tully, 2021) and be developed to be more accessible to the public. News literacy allows one to understand the news process and consumption as it takes place in the normal news ecosystem and on social media (Vraga & Tully, 2021). According to Bulger and Davison (2018), a good way to increase news literacy is with educational programs aimed at young children, in particular, those with a focus on critical thinking skills taught in a school setting and oriented towards making one better at identifying accurate information. Collaboration between teachers, schools and government can create standards that adapt to the news ecosystem on social media to promote news literacy skills in students that will follow the students as they become adults (Bulger & Davison, 2018).

With mass amounts of misinformation online, it is important for the public to be able to navigate and identify visual misinformation (Maksl et al., 2015). Steps in the past years have been taken by organizations to bring a helping hand to journalists, social

media, and the public in the US, such as Factcheck.org, News Literacy Project (NLP) and American Press Institute (API). NLP, for example, provides resources for the public and educators to teach media literacy and be better at recognizing false information online. API helps news organizations to be adaptive as their audience and technology change, as well as to provide better transparency for the public.

Media literacy programs can focus on journalists as well as the public. While it may seem that many in the field believe they are creating truthful news for the public and upholding democracy, not all journalists have strong skills when it comes to fending off visual misinformation (Thomson et al., 2020). While news literacy training is critical for journalists, one obstacle to rolling out training in all organizations is cost. According to Pew Research, newspaper revenue declined 62% from 2008 to 2018, from $37.8 billion to $14.3 billion. The decline in revenue results in a decline in newsroom budgets, with newsroom executives only able to spend about $500 per person or even nothing at all for training (Kees, 2002).

While it is acknowledged that journalists and the general public would benefit from news literacy training, there is an overwhelming sense that social media companies should bear greater responsibility for information disorder: mis-information, dis-information, and mal-information (Wardle & Derakhshan, 2017). This is because news readers increasingly get their information through social media platforms such as Facebook or Twitter. During the 2016 US elections, Facebook faced major criticism for the amount of misinformation on the platform (Levin, 2017) and for not taking the issue seriously. Since then, Facebook and other social media companies like Twitter and YouTube have ramped up their efforts to combat misinformation. These companies

have taken some responsibility to combat the spread of false information, but their

efforts have not been enough to have an impact (Bellemare & Ho, 2020). Facebook has

introduced a new fact-checking program, but it still continues to see a large diffusion of

misinformation, as engagement with false news sites averaged 60 million per month in

2019 (Allcot et al., 2019). This showcases that Facebook is still the main source of news

for many people (Walker & Matsa, 2021). Flagging information programs are not as

efficient as some social media platforms believed them to be, as other websites can

spread misinformation without such being detected. Progress is being made as

companies like Facebook work with Reuters to detect misinformation, provide

corrections and digital and social media tools to identify content such as visual

misinformation (Vaz-Álvarez et al., 2021). Collaborations and accountability are

important for social media platforms to be able to better aid in stopping visual

misinformation as it spreads on these various platforms.

 By examining the categories of social media, journalistic practices, and media

literacy, this essay will go in-depth about how each plays a role in combating visual

misinformation. This essay hopes to create conversations on how the existing practices

can be improved to handle visual misinformation and what further research can be done

to help improve those practices in the future.

What does Visual Misinformation Look Like?

 Visual information can take many forms: examples can include out-of-context

images, digitally altered images or deepfakes. Deepfakes according to Sikorski (2018),

are audiovisual forgeries that suggest a person said or did something when those things

did not actually happen. The application takes images of one person, which it then

grafts on another (Vaccari & Chadwick, 2020). One well-known example occurred in 2019 when a video was published by the government of Gabon. The video purportedly featured the President of Gabon, Mr. Ali Bongo, making a New Year's address, despite reports that he was sick and out of the country (Breland, 2019). Many believed the video was strange, citing that President Bongo's eye movements were out of sync with his jaw movements. Hany Farid, a computer science professor at Dartmouth who specializes in digital forensics, explained that President Bongo's speech patterns and appearance looked different from previous videos (Breland, 2019). While Farid couldn't make a definitive assessment as to whether it was a deepfake, having this uncertainty was still problematic (Breland, 2019). This video of the president led critics to be skeptical of his health, which some believe led to a failed coup attempt by the Gabon military a week later. While Western governments are afraid of the negative effects that deepfakes could have on society, there is more worry about the impact that such can have on developing countries (Breland, 2019). While not every deepfake will cause a coup, the impact of deepfakes and other visual misinformation can lead to uncertainty regarding facts or truth, which can in turn devalue journalists and democracy (Vaccari & Chadwick, 2020).

While deepfakes are high-tech types of visual misinformation that are a cause for concern, it is really lower-tech visual misinformation that is more commonly used (Fazio, 2021). A common technique is using old images and videos and then recycling them in the context of current events (Fazio, 2021). One example, as cited by Evon (2019), describes an image of an empty grocery aisle with text reading, "Everyone understands the importance of free markets…eventually." The photo in question was posted on

Facebook by Turning Point USA, a conservative group that commonly posts about the ill effects of socialism (Fazio, 2021; Evon, 2019). Fact-checked by the website Snopes, the photo was actually taken in a grocery store in Japan after the 2011 earthquake; Snopes noted that the caption misled viewers because the original image had nothing to do with socialism (Evon, 2019). Snopes website explains the process they use to verify information, the following steps were outlined: first, research was conducted to contact the originator of the source for elaboration and supporting information; then reporters contacted organizations with knowledge of the subject at hand and searched through printed materials regarding the topic; finally, the story went through a robust vetting process before the final fact-checked version was published (Snopes, 2022).

Another way visual misinformation can mislead is when images or videos are taken out of context. During the 2020 US elections, conservative groups, members of Congress and former President Donald Trump insinuated that the election was rigged. This prompted mass distribution of mis/disinformation online about the election and voting process all the way up to election day and for weeks afterwards. The conservative group Restoration PAC posted a surveillance video on their Facebook page of Georgia poll workers pulling out suitcases of ballots to count after telling monitors they had finished counting ballots for the night (Restoration PAC, 2020). The video was claimed to be a "smoking gun" indicating election fraud, but it was shown to be false when it was fact-checked (Brown, 2020). According to USA Today, the video showed pollsters pulling out containers of absentee ballots that were being put in their proper boxes and pulled out when poll workers thought they were done counting them (Brown, 2020). This shows that while the video wasn't altered in any way, providing out-

of-context misinformation about election fraud that only fueled the rhetoric that many believed the election was stolen.

What these examples have in common is an issue regarding misinformation combining visuals with textual content. Combining textual misinformation with visuals can make the content appear more credible than that with just text alone (Hameleers et al., 2020; Brennen et al., 2021). Since visuals are already seen as closer to reality and truth, the addition of text can lead a person to think those visuals are legitimate because they are seen as an index of real life (Hameleers et al., 2020). The article "A Picture Paints a Thousand Lies? The Effects and Mechanisms of Multimodal Disinformation and Rebuttals Disseminated via Social Media" by Hameleers et al. (2020) did a study on the perceived credibility of texts and text-plus-visuals and considered the effects those sources had on fact-checkers in refuting disinformation on school shootings and refugees. The study used fake tweets, which it combined with inaccurate pictures, to see if people perceived the tweets with images as truthful. The study found that the effects of the multimodality of visual and textual disinformation were shown to be seen as slightly more credible than textual disinformation alone. The visuals helped lower a person's suspicion of the source as portraying any sort of misinformation, which is likely because, as was stated prior, visuals are closer to reality (Hameleers et al., 2020).

Why Research is needed for Visual Misinformation

According to Emily Saltz, Claire Leibowicz and Clair Wardle, "While several recent visual misinformation studies do exist, they approach the problem through typological analysis of examples or assessing perceptions of image editing artifacts shown outside of platform contexts. Though valuable, existing studies lack insight into

how people react to these types of visual misinformation examples in their everyday lives" (2020). The collecting, storing and analyzing of visual content poses logistical challenges (Brennen et al., 2021) since about 3.2 billion photos and 720,000 hours of video are created daily (Thomson et al., 2020). The massive amount of visual content is too much to sort through, and there isn't enough research on the speed that visual misinformation is being produced (Thomson et al., 2020). In encouraging more research on this issue, different techniques and changes need to be made to handle the overhaul of visual misinformation online (Brennen et al., 2021). Verification methods need to be developed, improved and focused to better track and verify visual misinformation online (Brennen et al., 2021).

Why is Misinformation on Social Media?

The social media platforms that journalists post the news on must take on more responsibility for stopping the spread of visual misinformation (Bellemare & Ho, 2020; Woo, 2021). But we have to understand how misinformation has flooded social media. Economist Ekaterina Zhuravskaya explains that social media is the first type of mass communication allowing users to create and share information online; this helps us understand how social media has gotten so big (Woo, 2021). Social media allows easy access to opportunities to share and connect with others: just with a simple click you can repost or share easily on these platforms. This then exemplifies how mis- and disinformation can spread so fast and how information overload makes sharing false stories so easy. Cognitive biases may lead us to share information that is partly or completely untrue, as we tailor our social media accounts to communicate information that aligns with our beliefs (Menczer & Hills, 2020). This is then reinforced by search

engines on social media that provide personalized recommendations based on the data they have on users' past preferences (Menczer & Hills, 2020). Social media companies, such as Facebook and Twitter, have switched from chronological timelines to algorithm-based timelines (Meserole, 2018). On Twitter, for example, its algorithm combs through data on the platform and prioritizes content that has greater engagement, such as getting multiple retweets and mentions (Meserole, 2018). Bots and bad actors do spread misinformation online; a majority of the interactions are through regular users and may be amplified through human super-spreaders like politicians or celebrities (Woo, 2021). With misinformation online spreading like wildfire, social media platforms have taken steps to thwart these problems, but their responses raise the question if they have done enough.

How social media is impacting visual misinformation

Visual misinformation has circulated online, and much of it is distributed on social media platforms, more specifically on Facebook and Twitter (Walked & Matsa, 2021). Many journalists and news companies have migrated towards these platforms to provide news as the news landscape has changed to be more digital and online. The Pew Research Center recorded that about 48% of US adults get their news from social media (Walker & Matsa, 2021). While social media provides increased convenience and speed in spreading news, it also enables the spread of misinformation online (Suciu, 2021). Social media users can be the ones spreading false information, as journalists are largely absent from the discussion or not popular as gatekeepers (Hameleers et al., 2020). Since the 2016 US elections, social media companies have taken drastic steps to fund and create fact-checking programs to stop misinformation. While these efforts

have helped minimize the growth of misinformation, many say they are not enough; for instance, Brooke Binkowski, the managing editor of Snopes, has made that claim. Misinformation online tries to look like real news, but it is produced with the intention of spreading misinformation to advance political goals or generate revenue (Tsfati et al., 2020).

Two prevalent examples were during the 2016 US elections, when teenagers from Macedonia and a US company called Disinfomedia created false websites that looked like real journalist sites, such as USAToday.com and WashingtonPost.com (Tsfati et al., 2020). These websites spread pro-Trump and anti-Clinton news stories prior to the elections, all of which were false and misleading. To combat these types of false articles from spreading, Facebook will flag an article if it detects false information. The flagging process isn't perfect, however, as the same article can pop up on another website undetected and fly under the radar of Facebook's flagging system. Journalists may not have the tools or the time to properly fact-check misinformation on social media, let alone have the skills and applications to review visual misinformation (Thomson et al., 2020; Tsfati et al., 2020).

The popularity in recent years of posting and sharing news on social media platforms has fueled the spread of visual misinformation. According to the Reuters 2021 Digital News Report, 63% of active users on social media apps are exposed to Covid misinformation, as compared to 45% of non-users; users are also less trusting of news organizations. The emphasis on and priority assigned to visual misinformation on social media needs improved tools and research to understand the impact it has on journalists and the implications it has for the public (Sikorski, 2021; Fazio, 2020).

The response and failure of social media companies

Just as journalists and the public should be diligent in identifying visual misinformation online, social media companies that run the platforms where this information spreads also need to be held accountable (Levin, 2017). A movement has been brewing to do so, as Australia recently passed the law, the News Media Bargaining Code (Khalil, 2021). According to Australian correspondent Shaimaa Khalil (2021):

> The news code encourages tech giants and news organizations to negotiate payment deals between themselves, and commits Facebook and Google to invest tens of millions of dollars in local digital content. If negotiations fail, an independent arbitrator can set the price they pay domestic media - something analysts say benefits the news groups.

Tech giants and social media companies such as Google and Facebook made up a combined 60% of the digital ad industry in the US, which equals about $65 billion in revenue (Wagner, 2017). In the past couple of years, social media platforms have improved the methods they use to curb misinformation, but Brooke Binkowski, the managing editor of Snopes, believes they've been too slow to do so and have not had enough of an impact (Levin, 2017). Regarding Facebook flagging misinformation, issues have surfaced of similar forms of false information not having a tag indicating that they are disputed information; this reflects the spread of false information across the platform and without enough transparency regarding the number of articles disputed on the website (Levin, 2017). Twitter is able to flag tweets about Covid-19 misinformation, for example, but Twitter users are not able to report a tweet as misinformation (Bellemare &

Ho, 2020). Another issue that social media platforms engage with is deleting visual misinformation completely. While it may seem reasonable to delete visual misinformation, doing so doesn't change the attitudes of others who have already seen the content (Vaz-Álvarez et al., 2021). This approach is also not fast enough to be able to pull down all versions of misinformation online, as false stories can be reposted, screenshotted or shared somewhere else, which less effective methods for deleting misinformation may miss entirely. It is very difficult to identify every false fact and story on social media because, according to Marcus Woo, "These cross-platform links mean that the efforts of social media companies to take down election- or Covid-19-related misinformation are only partly effective" (para 18, 2021). The endless scrolling and data collecting algorithms make it possible for misinformation to run rampant, as it seems there is no end in sight. This is also seen in private Facebook groups, which do not limit the number of members or have regulations intended to curb the spread of misinformation on the platform (Sanz & Thorbecke, 2020). In the US, 48% of adults use social media to read the news, whereas 31% said they get their news from Facebook (Walker & Matsa, 2021), which shows why it is difficult to regulate and monitor all forms of mis/disinformation online.

Efforts Made by Social Media Companies

After the 2016 US elections, social media platforms, Facebook in particular, faced considerable scrutiny of how the circulation of misinformation was handled. After the elections, Facebook created a system where users could report false or misleading stories and have independent fact-checkers verify the information (Levin, 2017). With Covid-19 misinformation being a major issue online, social media companies have

ramped up their efforts to label content that is incorrect or harmful and to attach warning

labels on content that has been verified and provided by official sources (Bellemare &

Ho, 2020). For example, Twitter has taken down and challenged tweets related to

Covid-19, as well as taken measures such as limiting who can see these tweets,

requiring users to remove a harmful tweet, or providing a warning label on a tweet

before making it accessible to the public (Bellemare & Ho, 2020). Google, Twitter, and

Facebook have also developed transparency websites that publish their reports of the

current situation of misinformation on their platforms (Webb, 2020). According to

Facebook's transparency website statement, "We publish regular reports to give our

community visibility into how we enforce our policies, respond to data requests and

protect intellectual property, while monitoring dynamics that limit access to Meta

technologies" (Meta, Transparency Center). During the 2020 US elections, social media

platforms took steps to curb voter misinformation and claims of fraud. Facebook and

Instagram, for example, banned content that aimed to intimidate or interfere with voting

and pinned voting information based on the state a user lived in at the top of their news

feed (Paul, 2020). Another platform, TikTok, updated its policies to also include banners

and guides to help curb the spread of Covid-19 and 2020 election misinformation (Paul,

2020). Along with social media companies, governments have taken actions to also

curb misinformation on these platforms. For example, in Canada, the Health Minister

announced a new bill to address "hate groups and online hate and harassment,

ideologically motivated violent extremism and terrorist organizations" (Solomun et al.,

2021). According to Solomun et al. (2021), this bill will enact a policy in which a

regulator will oversee social media platforms' management of unlawful online speech

and be able to enact financial penalties if these platforms don't comply with the measures intended to regulate such. This type of law can help set the stage for better oversight and accountability of social media companies, and neither freedom of expression nor public participation need to be undermined to uphold democratic ideals online (Solomun et al., 2021).

How Social Media Companies Can Improve

The policies and methods used to dismantle visual misinformation by social media companies may seem too little, too late and not aggressive enough (Paul, 2020). Different approaches from these platforms and better outreach for help can hopefully become more successful as ways to combat misinformation online. One way to address this problem is to implement the use of Google trends on social media platforms to track real-time data of what is being searched for and presented to users on these websites (Shane, 2020). First Draft is a project that collaborates with journalists around the world to investigate and verify stories, as well as to conduct research and share digital tools to help handle misinformation online. For example, First Draft's approach to creating a dashboard to monitor the demand for credible information for vaccines can hopefully be translated to and implemented on social media (Shane, 2020). These trends hope to deal with data voids; according to Golebiewski and Boyd, "Data voids lead to low quality or low authority content because that's the only content available. They come about both naturally and through manipulation" (p. 5, 2019). While platforms like Facebook and Instagram have analytics, those approaches are not detailed enough. Tommy Shane from First Draft News (2020) suggests the implementation of measures designed

to gather detailed data on what is being searched, which can help track spikes in misinformation and quickly get that under control by providing more factual information.

Another important step social media companies can take to better handle misinformation is to have outsiders provide a new perspective on the groups to help the organizations improve their policies. While companies like Facebook and Twitter may have their own analytics to look out for misinformation, Madelyn Webb's article, "We need independent platform oversight in 2021," suggests that independent internal audits would be useful to make sure policies are working and to allow specialists to determine what needs to be adjusted (2020). It is important that these social media companies have independent auditors to make sure their data is correct and have an outsider's perspective, which will allow them to be more transparent (Webb, 2020). With how much misinformation is out online, it is naive for social media companies to go at it alone; they should be collaborating with journalists and other outsiders like independent auditors (Webb, 2020; Bellemare & Ho, 2020). Collaborating with journalists by doing things such as providing them with improved data tools to help identify visual misinformation and verify information would be helpful. This would also benefit social media companies by helping them to create the technology necessary to identify and understand the main characteristics of visual misinformation online and how to better counter those sources. Journalists should not be alone in combating visual misinformation: social media companies must partner with them to be more transparent and create more tools for journalists and audiences alike to report misinformation (West, 2017).

Journalism and Visual Misinformation

With the rise of the internet and social media, the flow of misinformation and disinformation has skyrocketed (Allcott et al., 2019). Nowadays, sharing and posting are easier than before, and the role of journalists is not as clearly defined anymore (Ireton & Posetti, 2018). This swift change has allowed actors to spread misinformation, conspiracy theories, or alternative facts to question the credibility of mainstream news and journalists (Ekström, 2020). Mass public support of mainstream news media has been diminishing, and the rise of misinformation online is further eroding that trust.

Regarding misinformation on social media, Jahng et al. interviewed journalists and found that most use traditional methods for fact-checking and debunking that information. As with text, they use the same techniques to verify online information, such as meeting with a source to verify information and identify where the origins of their data (Jahng et al., 2021).

Current Methods Used

The methods used by journalists to debunk misinformation on social media are a crucial step in the news writing process. Journalists now verify and debunk misinformation online as they have in their traditional counterparts, such as in written print. Methods include verifying the authors' identities and backgrounds (Jahng et al., 2021), getting on the phone with an organization to verify if an event actually happened (Brandtzaeg et al., 2016), checking out other legacy news organizations to see what they have posted (Jahng et al., 2021) and/or manually comparing visuals if misinformation is detected (Thomson et al., 2020). While journalists have adapted to the

rise of social media and the way news is shared, there has been less research done on the verification of visuals, especially in time-sensitive, breaking news contexts (Thomson et al., 2020; Matatov et al., 2018). Organizations such as First Draft, The Journalistic Resource, and the Shorenstein Center have developed tools and research for journalists to learn and enhance their verification skills. With visual misinformation being more rampant, hopefully, these organizations will continue promoting more research and organizations to tackle this issue and support journalists.

This new digital age has created questions as to who can be a journalist, as nowadays anyone can post anything online and self-claim their information to be newsworthy (Jahng et al., 2021). According to Jahng et al. (2021), from 2008 to 2018, newsroom employees were reduced by 25% to offset the losses in advertising and subscription revenues. As journalism has transitioned to the digital space, the need for new roles to fact-check and verify information online only has increased (Tsfati et al., 2020). But with the news culture being fast-paced and constantly updated, journalists need more time to verify information so as to avoid spreading false information (Thomson et al., 2020).

With these new developments over the years, verification tools were developed to help journalists spot visual misinformation. These tools include RIS, TinEye, FotoForensics, InVID verification plugin and Fake Image Detector. These reverse image programs allow journalists to identify and find out where a photo was taken and to fact-check the source. Other programs, such as the Journalist Decision Support System (JDSS), help identify tweets in real-time that contain linguistic patterns associated with claims that have been previously recognized as false in other posts (Thomson et al.,

2020; Middleton, 2017). Reuters has teamed up with Facebook to launch a new and free course called "Identifying and Tackling Manipulated Media," which features modules that include how to identify deepfakes as well as explanations of the workflow for how to verify information (Thomson et al., 2020). Journalists observe and collect data on a story circulating on social media to see if it was a journalistic article or if it was published by questionable sources (Jahng et al., 2021). They use programs such as Google Image Search, Tineye, and Exif Viewers for photo and video verification by checking thumbnails or verifying the location of the video through Google maps or the program Storyful (Jahng et al., 2021; Brandtzaeg et al., 2016). But these methods still stem from traditional journalism practices, and some of these programs only consider the surface level (Thomson et al., 2020). Applying existing practices by journalists can stop the spread of misinformation, though new methods need to be developed and current ones need to be enhanced to match the speed of the digital sphere (Thomson et al., 2020).

Are They Creating More Harm?

One of the main components of a journalist's role is to produce factual information for the public, as misleading information can easily be widely distributed. Journalists of different fields in the profession feel the need to debunk misinformation because they view their role as being to uncover the truth and expose what isn't true (Tsfati et al., 2020). Mainstream journalists believe fact-checking to be an important element of their profession (Tsfati et al., 2020), but it could backfire. Repeating false misinformation may lead it to be perceived by some audience members as truthful

(Tsfati et al., 2020). As mentioned previously, during the US 2016 elections, web searches and mentions about "fake news" spiked as truth and reality were questioned (Waisbord, 2018). Many people believed false news stories, such as the Pizzagate story, where it was believed the Clinton campaign had ties to a pedophile ring (Tsfati et al., 2020). As Tsfati et al. (2020) point out, "To illustrate, a LexisNexis search in 12 American mainstream outlets found 2,787 hits for 'fake news' in 2016. The term 'Pizzagate,' as an illustrative example, was covered 34 times in these mainstream outlets…." Outlets such as the New York Times, The Associated Press and USA Today, to name a few, amplified and spread this false story online even though their intention was to debunk it (Tsfati et al., 2020).

Inoculation Theory: Prebunking

Debunking is one of the main methods journalists use to verify misinformation online. "Debunking" refers to being able to detect false facts with the intention of pointing out that those facts aren't important or true (Kvetanová et al., 2020). While debunking follows the more traditional methods of journalism, it is near impossible to debunk every false story and news report online as it takes more resources to debunk online misinformation (van der Linden & Roozenbeek, 2021). Fixing and bettering debunking methods according to van der Linden and Roozenbeck won't stop misinformation from spreading; corrections take too long, and the damage is already done (2021).

To better deal with visual misinformation online and identify it before it spreads, we should be looking into prebunking (Sikorski, 2021). According to First Draft News, prebunking is the process of debunking lies, tactics or sources before they strike

(Garcia & Shane, 2021). The idea of prebunking came from the theory of inoculation, which is the medical practice of introducing a weakened virus through a vaccine into a person and triggering protective responses (van der Linden et al., 2020). This theory then can be applied to visual misinformation; in this case, that would mean providing a weakened version of the information to a person and thus providing subconscious protections from future misinformation online. The inoculation process also builds resistance to persuasion, especially if the information is a threat, such as vaccine misinformation, and aims to block it (Banas & Rains 2010).

One way of using prebunking is through a logic-based method of explaining and recognizing the tactics used to manipulate. According to First Draft's website, journalists should seek out the topics their audience could have questions about or material that may be confusing (2021). From there, it is important to choose a topic carefully, such as false information before elections or recurring topics such as climate change (2021). It is important the truth is first mentioned and emphasized, and a warning should be provided to prepare the audience for future reports of misinformation. The journalist should explain why the information is false and provide details: that way, the audience can use similar tactics in the future.

Another way to use the prebunking method is by playing online games. Online games are a practical application of inoculation theory (van der Linden et al., 2020), and these games allow users to gain skills and confidence in identifying online misinformation (Sikorski, 2021). Inoculation theory allows exposure of a weakened dose of misinformation, thus allowing for the production of "antibodies" against it (Sikorski, 2021). Research by Roozenbeek and van der Linden suggest online games lead to

physiological resistance to misinformation strategies. One example, the game *Go Viral!*, allows users to take visuals and create out-of-context social media posts to spread misinformation about Covid-19 (Sikorski, 2021). The game allows the users to expose misinformation in a social media setting within a controlled environment (Sikorski, 2021). The game's purpose according to van der Landen et al. (2020) is to "...resist three manipulation techniques commonly used to spread misinformation about the coronavirus: fearmongering, the use of fake experts, and conspiracy theories." The game allows users to see how visuals can be taken out-of-context, provoke emotional responses and manipulate the audience (Sikorski, 2021). Players start out as a normal social media user, then gradually the choices get more intense regarding posting Covid-19 misinformation, as do the depictions of how these posts can affect their followers and other actors such as the government or a scientist. A study by Basol et al. (2021) called "Towards psychological herd immunity: Cross-cultural evidence for two prebunking interventions against COVID-19 misinformation", examined people playing the game and how the prebunking intervention increased their ability to spot Covid-19 misinformation on social media. The skills learned from the game during the study were retained a week after playing (Basol et al., 2021).

A similar game, *Bad News*, is a free choice game that has the user take on the role of a misinformation content creator and learn six misinformation techniques (Roozenbeek et al., 2020). Like *Go Viral!,* players in *Bad News* interact with a fictional social media website and post misinformation online with the goal of gaining credibility and followers (Roozenbeek et al., 2020). The player employs six techniques:

1. impersonating people or organizations online,

2. using emotional language to evoke fear or anger,

3. using divisive language to drive groups in society apart (polarization),

4. spreading conspiracy theories,

5. discrediting opponents by using gaslighting and red herrings, and

6. baiting people into responding in an exaggerated manner (trolling).

The game allows users to identify misinformation in a social media setting with weakened exposure techniques to lead to long-term resistance to misinformation (van der Linden & Roozenbeek, 2021). Prebunking is an important method to incorporate in news organizations and on social media, as fact-checking after the misinformation is out takes too long. With the positive effects of prebunking, research has shown that playing the game *Go Viral* allows inoculation to last up to three months (Lewsy, 2021). But further research and studies need to be done on how inoculation can last after three months and how to create lasting immunity (Maertens et al., 2020).

Other Methods Journalists Should Practice

To combat the spread of visual misinformation, journalists themselves need to understand what they're posting and if there are any implications of posting visual misinformation online. It is important to provide evidence of misinformation online by showing these visuals and then taking steps to refute and provide evidence against it (Shane, 2021). But problems arise by doing this, as Tommy Shane puts it,

First, the misinformation that you feature in a story can reproduce its messages and emotion for your readers, perhaps bringing it to more people than the original post…second, the image you use in your story can be copied or screen grabbed

and reused in other contexts, possibly with good intentions, possibly not (para 4-

5).

News and media organizations can amplify and disseminate false stories even though

they have the intention of correcting the fabricated information (Tsfati et al., 2020). The

problem is false stories and misinformation provide more hits or can be more

memorable, thus erasing the intention of journalists to give out the correct data. The

Journalism Trust Initiative (JTI) helps news organizations to be more transparent. The

JTI allows news media to fill out a self-assessment document and see what can be

improved in their approach to transparency. Then the assessment provided by JTI can

be published to improve transparency by the news organization and assist them to

better themselves. Another solution to combat the possibility of accidentally exposing

more misinformation online is to provide overlays on visuals. Overlays on an image can

give context to the audience and prevent amplification as well as present designs to

stop manipulation from happening (Shane, 2021). Another method that can be further

developed is having categories for labeling misinformation. The Pinocchio Scale is a

part of the program The Fact Checker, which was developed by Glenn Kessler and

used by the Washington Post to fact-check the claims of a politician, political candidate,

diplomat or interest group (Kessler, 2017). Journalists can use this scale to determine

the truthfulness of textual misinformation, ranging from that which is completely false, to

that which is factual but misleading and so on (Benton, 2020). How could this then be

applied to visual misinformation, if the color is off in an image or it is deemed false or

one needs to differentiate deepfakes from cheapfakes? MediaReview was created by

Reporters' Lab's Bill Adair and Joel Luther to identify different levels of misinformation

on visuals (Benton, 2020). According to Adair and Luther, their current proposal would include that, "... images or videos to be "Authentic," "MissingContext," "Cropped," "Transformed," "Edited," or "ImageMacro," each with its own definition" (Benton, para 8, 2020). This type of scale would allow for a more fluid way to identify visual misinformation, much like in text in the examples above, as context and intent matter. The prebunking method and different approaches journalists take in reducing visual misinformation can positively enable users to identify misinformation and establish better transparency when evaluating social media.

Media Literacy: What is it and Why Do We Need It?

More emphasis should be placed on media and news literacy as misinformation has evolved from textual to visual representations on social media (Muratova et al., 2019). Defending against the spread of misinformation online isn't just a journalism or social media issue, it is something we as a society need to combat together and collaboratively (Vraga & Tully, 2019). In the US, for example, different programs and organizations provide resources to help the public and schools to teach and learn how to spot misinformation, such as the NLP and Media Literacy Now. Especially with Covid-19, the CDC and the Surgeon General of the US have released information on what misinformation is and how to combat Covid misinformation online (Murthy, 2021).

Media literacy is having a skill set that promotes critical engagement with messages produced by the media (Bulger & Davison, 2018), or it can be considered to encourage critical thinking skills (Ascott, 2020). The point of media literacy is that critical thinking and skepticism play a role in identifying and rejecting misinformation (Vraga & Tully, 2021). With the endless amount of information online, being able to recognize

misinformation and disinformation online may seem difficult and time-consuming. Not many people know how to identify false information on social media, especially when our biases get in the way (Vraga & Tully, 2021). Also, not being media literate could have social consequences, as shown with information around and about Covid-19. For example, in Brennen et al.'s (2021) article, "Beyond (Mis)Representation: Visuals in COVID-19 Misinformation," they explain that a visual falsely claimed drinking lots of water and gargling salt water or vinegar would get rid of the infection. This type of visual could mislead many about Covid-19, especially if they are not equipped to identify visual misinformation that looks legitimate. As the virus itself was spreading, misinformation online was spreading faster, and the WHO had to declare the information situation an 'infodemic' that had to be fought along with the virus (Nguyen & Catalan-Matamoros, 2020). The consequences of this could be, according to Professor William V. Pelfrey, Jr. of the Wilder School of Government and Public Affairs at Virginia Commonwealth University that, "If the government is telling you to get vaccinated, and social media is telling you that vaccines and Covid are a hoax, the easiest thing to do is ignore all of it. That leads to tremendous public health risk" (Suciu, 2021). Data from 2019 show that only 26% of US adults were very confident they could spot misinformation, dropping from 39% in 2016 (Watson, 2022). This data set shows how, since 2016, misinformation has confused the public in knowing what is true and false. Efforts need to be made to ready individuals and journalists alike against online misinformation, making them able to understand how the news works and how to identify key components of misinformation.

News Literacy isn't Only for Journalists

Journalists understand that their role in a society where misinformation is very prevalent is to tell the truth. Journalists need to constantly improve their skills in verifying information, using and creating new fact-checking methods and tools for identifying mis/disinformation (Muratova et al., 2019). It is more imperative now that journalists use those core journalistic skills in the digital setting, as much of the public gets their news from social media. As journalists debunk misinformation, it is very important they do the very same when confronting their own mistakes and not confuse or unintentionally mislead audiences who are already struggling with identifying misinformation online. Building increased transparency regarding mistakes on digital media posts and highlighting mistakes instead of deleting them can help build the audience's trust of news organizations (Jahng et al., 2021).

As previously mentioned though, the responsibility doesn't fall only on journalists to identify and correct misinformation online: the public must have a role in doing so, too. The News Literacy Project, for example, is a US-based organization that provides lesson plans and programs for educators and the general public to learn about media literacy. The group's website has a tab where everyone and anyone can get access to games about identifying misinformation, read a glossary of keywords or see examples of online misinformation (News Literacy Project, 2022). For example, the website breaks down a tweet spreading misinformation that Covid-19 tests are used for human data collection without consent. The organization breaks down a tweet from the Centers for Disease Control and Prevention (CDC) explaining that it is true that some testing samples are collected using genomic sequencing, but those are of the genomic

sequencing of the virus. The tweet was then taken out of context by vaccine deniers and misconstrued (News Literacy Project, 2022).

Another step that can be taken at the individual level is checking beyond the headline and photo, as social media companies display information snapshots before presenting the entire story (DiMauro, 2021). Another method is to check the sources of news stories. It is important to do this, as sources shape the perspective and content of the story; thus, researching the sources allows us to determine if they are reputable or not (DiMauro, 2021).

Organizations such as Journalists for Human Rights (JHR) and ProPublica have been making an effort to provide resources and training for journalists to use. For example, JHR provides a program to train Canadian journalists and journalism students about online misinformation, and it provides free resources to do so. ProPublica provides grants and opportunities for local reporters to do investigative reporting in their communities, as many do not have the funds to do so. These organizations and others are making progress in providing media literacy for journalists, and hopefully they can spark a bigger movement towards such in the future.

Still, it is understandable not everyone has the time or skill set to be rigorous in practicing media literacy on their own or even knowing where to start with such. Especially if many citizens don't feel confident in their ability to identify misinformation online, it is imperative to develop programs and curricula that create an informed, empowered public.

Media Literacy in Curriculum

According to Bulger and Davison (2018), "Media literacy education makes visible what are often invisible structures, with a goal of creating watchful buyers, skeptical observers, and well-informed citizens." Media literacy among school children can be vital in creating news literate citizens and emphasizing that these skills are important to have. According to the Pew Research group, 95% of teens in the US have access to a smartphone, and, of that, 45% of teens are constantly online (Anderson & Jiang, 2018). As said by John Silva, Senior Director of Professional Learning for the NLP, "One of the big challenges in education has always been that—certainly in the last twenty years or so—education doesn't keep up with technology" (Harris, 2021).

It is important that kids and teens learn the skills needed to identify visual misinformation (Thompson, 2018), as students use social media much more than before as a result of smartphones. Media literacy isn't just about teaching textual and visual misinformation but also explaining how misinformation gets created and why, as well as the techniques necessary to identify false information online. Teachers and journalists should collaborate and work together to create a standard curriculum of media literacy so that students can be helped to know if they're hitting the marks of learning those skills or not.

At a basic level, students should be able to evaluate misinformation laterally, meaning they can use additional sources and material to search for information about and in the original news story (Thompson, 2018). Thus, this means students should consider how other news outlets cover a story, what is different in the coverage, and if there are reputable news sources reporting on the story (Thompson, 2018). These

media literacy initiatives can engage students in the production of media by empowering them to feel ownership as creators and gain experience with how content is created and disseminated (Bulger & Davison, 2018). Students can also learn about and use free programs to image search visuals on social media, as well as learn about metadata and identify the captions to go along with visuals (Thompson, 2018). It is imperative that students gain skills in identifying visual misinformation online, as visuals are being used more often.

Media literacy is important, but it is difficult to gauge a curriculum that can tell educators that their students mastered the skills; what would that curriculum look like? Research by Maksl et al. (2015) in "Measuring News Media Literacy", references James Potter's cognitive literacy model to create a set of standards to measure media literacy in schools. These are the five basic "knowledge structures" about media content:

1. knowledge about media industries,

2. knowledge about media effects,

3. knowledge about the real world, and

4. knowledge about the self, i.e., how these interact with a person's combination of drives, needs, and intellectual abilities (Maksl et al., 2015).

These guidelines allowed researchers to figure out the level of media literacy of about 500 teens based on Potter's cognitive model (Maksl et al., 2015), which could set a benchmark for educators to fill in the gaps with other programs and activities.

Media literacy should also be applied to higher education, especially for incoming journalism students (Schmidt, 2012). It has been stressed in recent years that it is necessary to incorporate media literacy in K-12 schools in the US, but not much can be

said about the inclusion of such in the universities. While courses taught in higher

education and in journalism programs may emphasize media literacy skills, they neglect

topics related to media creation and usage (Schmidt, 2012). This is not to say that

media literacy isn't being taught, but rather that it is taking much longer to be

implemented than the pace of the evolution of misinformation and digital technology

would require. Similar examples from the K-12 curriculum can be used in universities;

journalism students need to know the basic skills. Media literacy classes should be

implemented more in journalism programs, as we are all conducting news online and

need to be aware of the changes social media poses for news and journalism.

The Problems and Future of Media Literacy

Incorporating media literacy into the curriculum and teaching applied methods for

using those skills can have a positive impact on individuals when they are dealing with

misinformation online. An important impact that media literacy can have on the public is

in how it can increase critical thinking skills. A study found that 2,000 middle school

students in Los Angeles who had media literacy training increased their ability to

engage in critical approaches to media, their understanding of how people approach

media differently and their ability to recognize the effects of violence in the media

(Bulger & Davison, 2018). Media literacy also encourages the audience to be skeptical

as media consumers, i.e., being aware of the sources used in and content of news

stories (Vraga & Tully, 2021). Skepticism leads people to question the stories they're

reading and make sure they are truthful. While these initiatives can help people in

identifying misinformation, media literacy may still fall short.

One of the main issues is that regardless of whether you try teaching an individual to be media literate, their confirmation bias could get in the way. People's social identities and biases can warp their knowledge (Ascott, 2020). Individuals would need to work overtime on their cognitive biases to be able to better identify misinformation, as media literacy may not be able to completely solve the impact of those biases. A research study by Vraga and Tully (2021) in *News literacy, social media behaviors, and skepticism toward information on social media*, found that those with higher levels of news literacy were less likely to be exposed to news and political content, whether good or bad, and they are less likely to share new stories than is someone with lower news literacy. This means that people with a better understanding of media literacy aren't posting or sharing as much truthful content on social media; therefore, people with weaker media literacy skills are more heavily exposed to misinformation (Vraga & Tully, 2021). Something else that is important is that research and studies in media literacy do not take into account the socioeconomic or cultural differences in media use (Bulger & Davison, 2018). Individuals of different backgrounds may view news organizations differently based on where they come from and if they have access to a smartphone or a computer. Different computer, reading and comprehension skills could alter the effectiveness of media literacy, which could pose a challenge (Bulger & Davison, 2018). But, overall, introducing and improving media literacy for the public is important to combat misinformation. Media literacy isn't one size fits all: it must adapt to meet the needs of different groups of the population. New and existing forms of media literacy are being developed to help curb the spread of

misinformation online, as the public has the responsibility of helping journalists and social media companies to identify disinformation online.

Conclusion

Applying new debunking tools and increasing media literacy can aim to dismantle visual misinformation on social media platforms with the increased support of these companies. For journalists, better debunking and verification methods are needed to address visuals that are created to mislead or be untruthful. A different type of debunking, prebunking, follows the inoculation theory in providing weak forms of misinformation to the public (Sikorski, 2021). Other ways for journalists to improve is to be more mindful of the misinformation they post, such as giving more context for why the content is false and providing better warning labels to prevent bad actors from spreading false information (Shane, 2021).

Along with journalists, social media companies need to continue to update and step up their methods of dismantling visual misinformation on their own platforms. Promoting more collaborations with outside organizations that can better help identify the overwhelming amount of misinformation can take the load off these companies' hands, as well as be more effective. Social media platforms can increase their use of independent audits to keep the misinformation in check and keep themselves in check, too (Bellemare & Ho, 2020).

Finally, media literacy needs to be improved and implemented in schools and for the public. Easy-to-use applications can help make individuals feel more comfortable when identifying misinformation, as well as getting students to start gaining these skills. These three key components together can help target misinformation online, especially

visual misinformation. Using what we know and applying that knowledge to these practices can hopefully encourage further research into visual misinformation in these categories. Visual misinformation waits for no one to stop it; we must be proactive in dismantling it and seeing it as a threat to democracy.

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