Digital News Navigator: A Design Fiction Raising Ethical Considerations about Systems that help Older Adults to Recover from Exposure to Misinformation

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Older adults are highly susceptible to misinformation, due to the emotions involved with several key factors related to aging. Research is needed to speculate about the potential ethical, legal, and social implications (ELSI) associated with technologies that help older adults to recognize, respond, and recover from an exposure to misinformation delivered via social media. Our research applied a design fiction-based approach to reflect on the ELSIs related to a hypothetical system called the "Digital News Navigator" (DN2) service, presented as an App Store description with reviewer comments and ratings. DN2 illustrates a new class of services that enhance the content people share within and among media channels. Using the Digital Health Checklist for Researchers (DHC-R) as a guide, our analysis connects a broad range of academic literature—from digital mental health to deliberation systems—in order to contribute specific considerations related to ELSIs. These include technology usability, unintended use, and non-use.

CCS Concepts: • **Human-centered computing** → **HCI design and evaluation methods**; **HCI theory, concepts and models**; **Collaborative and social computing**.

Additional Key Words and Phrases: news, social media, mental health, misinformation, design fiction

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1 INTRODUCTION

Emotions play a key role in our ability to recognize, respond, and recover from an exposure to misinformation [13, 54]. Reading about traumatic and difficult topics ("hard news") can leave people feeling more depressed than when they consume news about uplifting and entertaining topics ("soft news") [11]. When people are feeling depressed they are also more likely to adopt false beliefs associated with misinformation [57]. While people may not initially recognize when they have been exposed to misinformation, factors related to the content as well as the social contexts of misinformation can diminish motivation to respond (e.g., engaging with factual information) [40]. The content of misinformation can elicit strong emotions, such as anger and anxiety, feelings that tend to polarize people toward their initial beliefs about a topic [64]. Misinformation also spreads quickly among family and friend networks (called rumor clustering), which can create social contexts where there is pressure to maintain a false belief in order to preserve a relationship [22, 40].

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In these and other ways, emotional stability is an important factor in how people recognize, respond, and recover from exposure to misinformation.

Older adults are particularly susceptible to misinformation in social media, due to factors related to aging: (1) reduced cognitive processing speed, (2) social isolation and loneliness, as well as (3) limited access to digital literacy training [13]. The global rate of news consumption through social media has continued to increase, particularly among older adults [10, 46, 47]. While evidence about the effect of social media use on mental health is mixed [16, 45], many older adults use social media to build resilience to feelings of loneliness [29, 31]; however, repeated exposure to misinformation can erode these benefits, increasing their risk of physical and psychological harms associated with adopting false beliefs [13, 57]. Older adults are exposed to a lot of misinformation, but how much is difficult to quantify. During the 2016 presidential election in the United States of America (USA), older adults shared substantially more misinformation on Twitter [27] and Facebook [28] than other demographic groups. Due to limitations in measuring digital news consumption, existing data may substantially underestimate the exposure of older adults [4]. How might we help older adults to recognize, respond, and recover from exposure to misinformation delivered via social media?

In this paper, we present a design fiction-based approach to consider the ethical, legal, and social implications (ELSIs) related to services intended to help older adults recognize misinformation, and then generate a corrective response towards their recovery and resilience to misinformation. Specifically, the fiction illustrates a new class of services that enhance the content people share within and among media channels. Typically, a shared link to a news article will include a message: e.g., "Did you see what the President said about Ivermectin?" Rather than a simple text-based message, the shared content could include protocols for facilitating a deliberation, role-playing game, storytelling or other discussion-based activities related to a news article. The paper details the fictitious "digital news navigator" (DN2) service, which provides older adults with customizable conversation prompts to share along with a news article, and that correspond with their emotional stability (as educational scaffolds [12, 58]).

The discussion applies the Digital Health Checklist for Researchers (DHC-R) to highlight how features of the DN2 service raise considerations related to ELSIs. These include: Access and Usability, Privacy, Risks & Benefits, and Data Management. Together the paper also reports findings based on a design method that researchers from health sciences, engineering, information science, and other fields can apply to investigate ELSIs related to *not-yet-possible* technology.

2 DESIGN FICTION

Systematic and scoping literature reviews are useful for synthesizing research, establishing standards, surfacing new opportunities, and so on. A design fiction is a literature informed narrative, which is intended to prompt considerations, in our case specific to ELSIs, by leaving much of the specific details related to a hypothetical scenario open for interpretation [6, 7, 49]. A design fiction is not a literature review but may help readers to identify new opportunities for research and collaboration. In practice, a design fiction includes two primary components: (1) a fictitious scenario, which is followed by (2) an author statement to highlight different ways that ethics play into the fiction [6].

Our Digital News Navigator (DN2) App Store Description and Reviews were drafted by the first-author. All co-authors reviewed the DN2 draft, and shared what they noticed and wondered about the fiction as well as any related literature. The (parody) conspiracy "Birds Aren't Real" (BAR) is referenced by several of the App reviewers to illustrate potential unintended consequences [41].

Digital News Nagivator

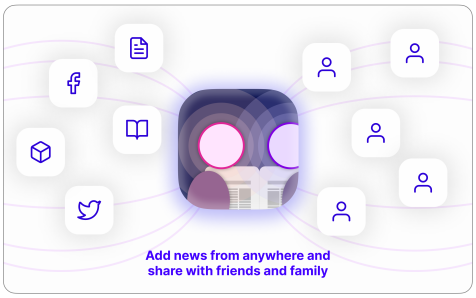
University Spin-off Company
Personal Assistant for Social Media

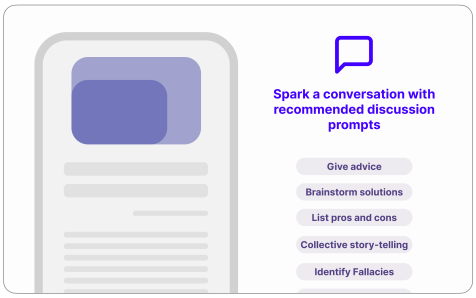
Everyone

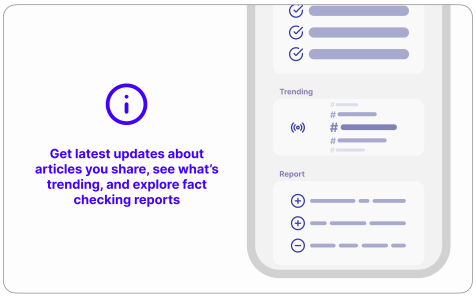
Contains Ads
Offers In-App Purchasing

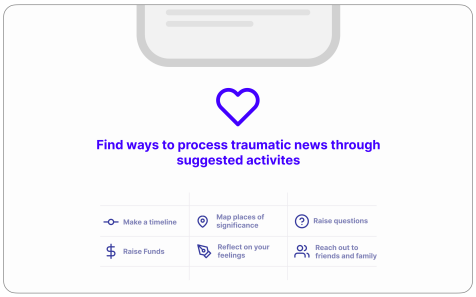
Editors' Choice

Install









App Description

Tired of not knowing what to say when you want to share something in the news? Are you worried that you might unwittingly share fake news or propaganda with your friends and family? Has paying too much attention to the news left you feeling depressed? Let the Digital News Navigator transform your online and in-person conversations about the news.

The Digital News Navigator is a personal assistant that adds new steps to the process of sharing news articles with family and friends across any platform. Rather than sharing an article link via text message or a social media application, like Twitter, simply share the link to the Digital News Navigator first to access support for prompting conversation about the article as well as relevant background information and credibility statistics. When you are happy with the message that the Digital News Navigator has helped you to prepare, simply click the "send" button to share it with friends and family across any media channel(s). The Digital News Navigator will also help you to manage responses to the news you share, regardless of where the responses appear (e.g., comments at the New York Times website, Facebook, Twitter, email).

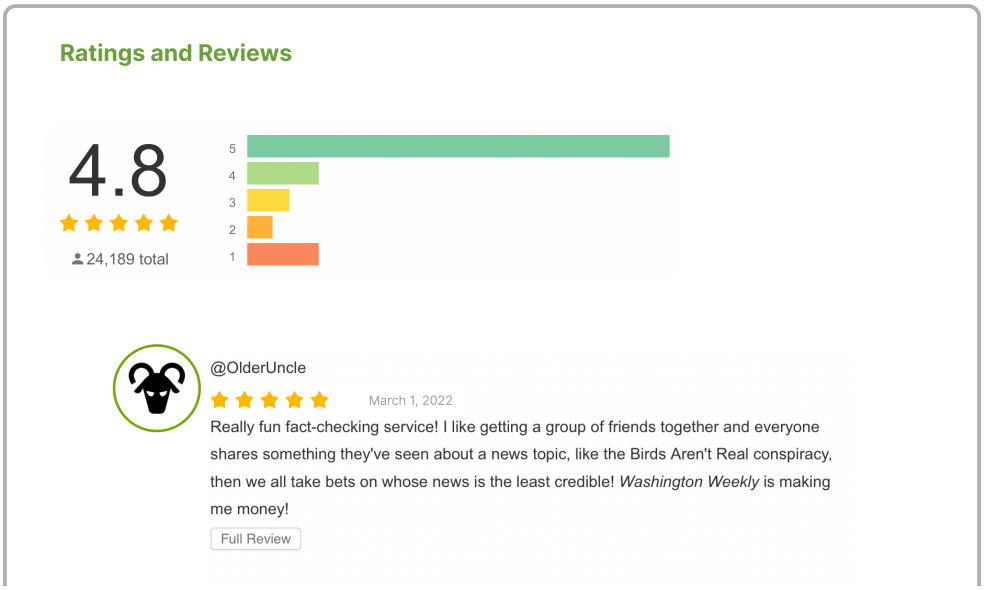
EXCITING UPDATE: Sync your Digital News Navigator and EmotionTracker-AI accounts to unlock personal support for processing difficult and traumatic stories in the news.

- *Stop sharing and start talking*: When you share a link to a news article with your friends or family via the Digital News Navigator, your personal assistant will help to kick start the conversation. Specifically, the app will recommend discussion questions for each article as well as tips on how to phrase your message based on the social context (e.g., posting to social media, responding to toxic online messages, preparing for an in-person conversation).

- *Protect your loved ones from misinformation*: When you share links to a news article with the Digital News Navigator, you will gain access to a dashboard of information and statistics about the article, publisher, and news topic. As breaking stories evolve, the article dashboard will automatically update with credibility statistics, public statements from recognized experts, as well as pro-con lists reflecting the major arguments associated with the topic.

- *Enhance your emotional resilience*: Sync up your Digital News Navigator account with EmotionTracker-AI to gain personalized support processing the "hard" news of our time (e.g., COVID-19 pandemic, war in Ukraine, racial injustice, access to housing and health care). EmotionTracker-AI will monitor your mood stability over time and the Digital Navigator will recommend news articles based on your emotional state as well as self-reflection prompts to help you process the news by yourself or with family and friends using the EmotionTracker-AI Banter Buddy Rooms.

Download the app today and transform your life with better conversations about the news.



@ProudPapa

★★★★★ December 19, 2021

My grandkids would never respond to any of the links I shared, then I downloaded this App! The custom conversational prompts are great, I like how even the question phrasing changes based on who you select as recipient. Now, my grandkids are over every weekend to talk about how Scrub Jays and Seagulls are really robots controlled by the deep state.

Full Review

@OffToLunch

★★★★☆ December 19, 2021

Every day before I head down to the cafeteria in my retirement home, I always check out a few news stories in the Digital News Navigator dashboard to read over the pro-con argument lists for topics that I want to talk about over lunch with my friends.

Full Review

@ConcernedSon

★★★★☆ December 19, 2021

My mom was starting to get caught up in the whole Birds Aren't Real movement, but then I added this App and EmotionTracker-AI to her phone and synced our accounts. We were able to share news with each other in our own Banter Buddy Room and the personal navigator helped me to intervene with my mom gently.

Full Review

@AmICrazy

★★★☆☆ December 19, 2021

Good app, like the interface, but I noticed that after I installed EmotionTracker-AI, suddenly I was seeing more advertising for therapy services, like Calm, Better Help, and Talk Space. Does the app think I'm mentally unstable?

Full Review

@AppleOrNothing

★☆☆☆☆ February 21, 2022

no iOS version? What personal data are you really harvesting through this creepy app to create those custom conversational prompts and mood-altering exercises?!

Full Review

@CrowdWorker

★☆☆☆☆ March 24, 2022

AVOID! I worked for this company for 6 months as part of the navigator team. TERRIBLE training program, low pay, and no support for my own wellbeing! I mean, behind the scenes you get exposed to so much of this propaganda, managing 25-75 news article shares every hour every day. See the conspiracy stuff enough and you start believing this Birds Aren't Real crap!

Full Review

ADDITIONAL INFORMATION

Updated	Size	Installs
March 1, 2022	50M	50,000+
Current Version	**Requires Android**	**Content Rating**
1.0.1	5.0 and up	Everyone Learn more
Permissions	**Report**	**Offered By**
View details	Flag as inappropriate	University Spin-off Company
Developer		
Visit website Privacy Policy		

3 AUTHORS NOTE

Emotional stability is an important factor in how people recognize, respond, and recover from exposure to misinformation in social media. For this fiction, we chose to write an App Store Description and Reviews for a digital mental health service designed to support older adults who may be exposed to misinformation. People access digital mental health services through App Stores, such as Google Play, and use App descriptions to evaluate these services. However, people face numerous risks when selecting a digital mental health service, as many App descriptions include unsubstantiated claims [38, 61] and data privacy policies that do not accurately reflect the technology [30]. Additionally, there are inconsistencies across rating systems (e.g., PsyberGuide) [15]. People commonly share their experiences navigating these and other risks in the App Reviews section.

The DN2 service was inspired by a prototype system called *Media Parcels* [67], which is meant to facilitate inter-generational conversation. The two-part facilitation process starts by collecting media that sparks specific memories for a user (e.g., images, video), and then the platform "wraps" the media with text-based annotations written by the user, in order to convey the emotional context for people receiving the media [67]. The DN2 service was also inspired

by the Torous et al. [61] call for "digital navigators" to help people diagnose their mental health needs and identify appropriate support services [61]. The following sections discuss the intent behind five key aspects of the DN2 design fiction, as well as the potential for unintended ELSIs based on existing literature.

3.1 Sharing news with a navigator, before sharing it with other people

An important observation about the spread of misinformation during the 2016 US Presidential election is that older adults who do not typically share messages on social media were responsible for the majority of misinformed posts [27, 28]. For this reason, our fictitious DN2 service adds new steps to the user-initiated process of sharing news with other people. Similar to the *Media Parcels* platform, DN2 provides users with resources to help recognize possible misinformation within an article, evaluate how a user has responded emotionally, and prepare a message to share with others, as the user recovers by using the news article to prompt a healthy discussion. In this way, the news-sharing-process could become an opportunity for people to use current events to promote personal reflection and practice various conversational skills (e.g., debate, storytelling).

Researchers might analyze user activity data collected by the service to estimate the volume of misinformation in circulation. Digital news consumption is difficult to measure, because people are exposed to many sources of news. Additionally, online platforms, such as Facebook, provide researchers with minimal access to user activity data related to their services [4]. As a result, there are digital blind spots in news consumption research, such as how news circulates through group messaging and what headlines people have seen in newsfeeds, but have not opened, shared, liked, or otherwise engaged with in digitally identifiable ways. Encouraging people to route news through the DN2 service could help to create a networked understanding of where misinformation originates and how it can spread across multiple media channels.

However, some aspects of the user design may limit access to the service. First, many older adults do not share content regularly. Additionally, sharing content with yourself for personal reflection may feel unnatural. Hutto et al. [31] discuss three common patterns of use related to social media consumption among older adults to consider in design: (1) passive consumption, (2) direct communication, (3) broadcast communication [31]. Second, the demographic grouping "older adult" is not a monolith, as there are significant differences in access to technology and digital literacy skills among people who are 65 and older that relate to gender, age, race, socioeconomic status, and myriad other factors [55]. Not properly attending to the differences among older adults in terms of their patterns of use and demographic characteristics could unintentionally limit access for people who are already vulnerable to misinformation.

3.2 Recognizing misinformation in news

It can be difficult to recognize when misinformation enters the news cycle. Disinformation organizations that promote propaganda around news may work across multiple media platforms to spread misinformation [65]. As more people become exposed to rumors related to a news event, it can become difficult for people to distinguish fact from fabrication [2]. A key tactic to counter misinformation is to promote experts and official responses [2, 59, 65]. In our fictitious DN2 service, users gain access to a "dashboard" of relevant information for each article, which could be updated in real-time. Dashboards related to news consumption are not uncommon, for example, presenting people with aggregate information about their political news consumption can nudge them toward a more balanced diet of diverse sources [50]. Online discussion moderators also use a variety of sources to fact-check user generated content for misinformation. For instance, community moderators at the New York Times (NYT) report using multiple sources to help them recognize

misinformation, which include paying attention to public officials on social media, monitoring fact-checking websites, and reviewing prior reporting [42].

Moderators at the NYT also rely on members of the online community of regular readers to fact-check information [42]. Social media platforms have started to leverage their online community in a similar way, to support collaborative fact-checking, most notably Twitter's crowd-based initiative to monitor and respond to misinformation (called "Birdwatch") [17]. While commenting about the news is common, people can also be coordinated to contribute perspectives and relevant expertise in other ways (e.g., argument maps, thematic summaries). For example, the *Living Voters Guide* (LVG) enables people to create pro-con lists by collaboratively writing and borrowing existing arguments related to voter ballot measures through a system called *ConsiderIt* [36]. As another example, the platform *BudgetMap* enables people to share their feelings about community projects by annotating municipal budget documents [33]. These existing platforms demonstrate the capability of computing systems to elicit, aggregate, and represent various perspectives and positions about issues facing a community (see deliberation platforms [1, 18, 20, 25, 62, 66]).

However, it is less clear what labels to use for "misinformation" without drawing too much attention to the false beliefs. Repeated exposure to misinformation increases the likelihood that people, particularly older adults, will incorporate the false beliefs, even when the content is labeled as false [57]. Recent user interface strategies to label misinformation include adding flags, graying headlines, and attaching warnings to the content; however, the effectiveness of these strategies is mixed and can even increase the likelihood that people expose themselves to the content [21, 53]. Another approach is to add on-demand fact-checking services to social media. Kriplean et al. [35] worked with a team of librarians to provide fact-checking services as part of the LVG project but found that many people used the service to challenge views that were counter to their own [35]. Inspired by this dilemma, our fictitious App Reviews describe emergent social activities that promote misinformation.

3.3 Paying attention to the emotional responses to news

As emotional stability plays an important role in whether people recognize misinformation as well as how they respond to the content, a core component of the DN2 service is the role played by EmotionTracker-AI. The App Description shares few details about EmotionTracker-AI, which we felt reflects the lack of information about data practices for many digital mental health services [30]. This tension unfolds in the App Reviews. Existing research about how social media use plays into mental health is mixed, because of inconsistencies in the conceptional definitions, operational measures, and research contexts [45]. There are similar limitations in existing efforts to infer mental health state based on social media activity (e.g., posts, likes, scrolling, hovering) [16]. Through research based on DN2 data, researchers might identify a breadth of emotions that people experience in response to news. What types of DN2 data might we use to infer emotional state?

Rather than apply a purely statistical approach to infer emotional state, several digital mental health services crowdsource these judgements. The term "crowdsourcing" refers to services that are performed by coordinating groups of people and computing resources to complete a sequence of micro-tasks [26]. For example, the *Media Parcels* platform involves a human facilitator to help scaffold the inter-generational communications among family members. Popular digital psychiatry services integrate a mix of volunteer and contracted crowd workers who provide therapeutic support for users, including *Cheeseburger Therapy* and *7 Cups of Tea* [24]. Providing therapeutic support through an online service can be a way for people to gain skills, contribute to the wellbeing of others, and earn money [34]. In our fiction, crowd workers are simply referred to as "Navigators," who we learn about through a single App Review.

Crowdsourcing can provide programmatic access to human intelligence, but there are risks associated with online crowd labor markets. The relationships between the person requesting a service and the crowd worker(s) providing a service may be tenuous, anonymous, and exhibit a power asymmetry that could be open to exploitation [43]. Additionally, the platform may provide little support for crowd worker mental health. For instance, there has been increasing attention to the psychological concerns associated with content moderation work, as repeated exposure to heavy doses of misinformation can result in, what Steiger et al. [60] refer to as a *vicarious trauma* [60]. In the past, there have been calls to create standards, professional development programs, and incorporate artificial intelligence support systems to alleviate risks associated with crowd labor [34], but this vision has yet to be realized.

3.4 Recovering and building resilience to misinformation

In teaching and learning literature, an "educational scaffold" refers to a step-by-step recipe that a student can apply repeatedly to perform a task, while they are still learning a lesson [12, 58]. As the student masters the lesson, the teacher can progressively begin to fade the scaffold, so that the student is required to draw on their memory of the lesson to perform the task. Educational scaffolds are used throughout HCI research as a way to help novices perform expert level tasks with minimal training [26]. In our design fiction, a Navigator would select an appropriate educational scaffold to help the user personally reflect on news they have shared with the DN2 service or to support their conversation about the news with a friend or family member, in an online discussion or in-person.

Educational scaffolds could be used to support various social activities related to news, whether that involves direct and broadcast communication about news or passive news consumption [31]. For example, Kriplean et al. [37] present the *Reflect* platform, which operationalized principles of active listening into a sequence of tasks to promote meaningful online discussion. The *Reflect* workflow requires people responding to a comment to highlight and synthesize key points in the comment, which must be confirmed by the original author, before their reply is posted to the discussion. Similar user engagement sequences could be developed to scaffold direct communications that exhibit thoughtfulness, compassionate critique, and deliberation, among other patterns of discourse.

Educational scaffolds can also be used to promote personal reflection on traumatic and difficult events. The *Hollaback!* Platform raises awareness to street harassment by inviting victims to anonymously share their experiences on a digital street map [23]. Rather than communicate a personal narrative of the event, which may retraumatize authors, the *Hollaback!* platform provides educational scaffolding to assist an author in problematizing the incident, recasting it as an example of a systemic issue for a community to resolve. In this example, educational scaffolding can be part of a process of recovery and community empowerment. Such scaffolding can also be extended to involve other stakeholders [56]. In our fictitious Reviews, **@ConcernedSon** shares how the App helped them to connect with their mother about the Birds Aren't Real (parody) conspiracy.

However, these novel systems may feel difficult to navigate, particularly for older adults with limited access to digital literacy training [55]. Introducing new technologies to older adults can be challenging, for several key reasons. First, older adults today have less time available for leisure activities than past generations [39]. Second, there may be factors related to their living and social environment that limit their interest or access to these technologies [48]. Third, many older adults have trouble finding technical support [19]. Whatever the reasons, when confronted by these and other challenges there is an additional risk that an older adult user may become frustrated, lonely, and further isolated "non-users" of the technology [63]. The review by **@DeletedNextDay** illustrates this risk.

3.5 Wondering how design decisions may nudge user behaviors

Thanks to design features, such as infinite scrolling and auto-play, many people have mindlessly consumed social media for extended periods [5]. To *hook* people in as regular users, system developers have operationalized psychology research in design decisions that effectively *nudge* people to take specific actions and adopt behaviors in predictable ways [8, 14]. For example, *social influence nudges* leverage people's desire to conform and comply with what they believe is socially expected. Caraban et al. [14, pp. 7-8] present examples of how systems take advantage of this desire and nudge people to reciprocate when they receive value, such as by making it easy for people to *reply* when they receive responses from other users. Receiving a *response* can feel rewarding. Social media platforms can exploit this sensation by regulating when and how people receive cognitive rewards. Rather than delivering social media responses as they arrive, distributing them randomly over time can prompt users to routinely check and recheck the application for new notifications. Restricting these rewards may also prompt users to shift into a scarcity mindset, in which they feverishly produce more content in an effort to increase their likelihood of a response [8].

Providing users with information about their usage can promote mindfulness in social media consumption. Baughan et al. [5, pg. 11] presents results from a series of experiments that used a Twitter client to test strategies to disrupt mindless social media consumption. For example, Baughan et al. [5] suggest adding a line into a news feed that states, "*You've been scrolling for [X] minutes*," to help users self-regulate. Baughan et al. [5] also recommend creating opportunities for people to actively reflect on content, such as by adding meta-commentary options in Tweet threads and topic lists, akin to transforming comment threads into topic summaries [68] and conversation prompts [44]. Although, mindless consumption can also provide an emotional release, as people willingly use social media to disassociate [5]. When is passive social media consumption the result of being nudged into specific behavior patterns or does it reflect an intentional decision to take time for an emotional release?

The App Description does not include hi-fidelity images of the DN2 user interface, because we wanted to leave the emotional design of the system up to the readers imagination and open for debate. Services like DN2 may elicit various emotions, whether through routine use of the technology [5, 8, 14], exposure to specific news topics [11] and misinformation [54], etc. Researchers studying these services will need to pay careful attention to the emotional triggers and stability of user behaviors over time.

4 DISCUSSION

Social media algorithms can reinforce misinformation among individuals who share political, cultural, or religious views. In this paper, we present the fictitious DN2 service as a potential intervention that adds a layer of resources into the process of sharing news with other people, whether online or facilitating in-person conversations about current events. The purpose for the design fiction is not to present a viable service, but to speculate, from several perspectives, about potential ELSIs related to services intended to help older adults recognize, respond, and recover from exposure to misinformation in social media.

Design fiction is a familiar method in human-computer interaction (HCI) research, but not yet in health science and bioethics research. Baumer et al. [6, pg. 245] describe the use of design fiction to explore ethical decisions: "In some ways, all (design) fiction might be considered ethical, in so far as both ethics and fiction deal with what people, real or imagined, either should or would do in specific scenarios." For health scientists, ethical implications are determined by using accepted principles of research and bioethics (see Belmont [32] and Menlo Reports [3]). These principles of respect for persons, autonomy, beneficence, non-maleficence, justice and respect for law and public interest can help to

shape the design of technologies for people. In health science research, frameworks such as the Digital Health Checklist for Researchers (DHC-R) offer a guide for applying accepted principles of ethical research described in the Belmont [32] and Menlo Reports [3] to studies involving information communication technologies, such as artificial intelligence and wearable sensors [51].

Using the DHC-R framework and companion checklist as a guide, we explore the possible ELSIs associated with the DN2 service. The DHC-R was created to help researchers to think prospectively about whether a specific technology was a good fit for a digital health research study and, the people who would participate [51]. The DHC-R supports researchers by providing reflection prompts to improve the application of ethical principles in the design of a study. In addition to ethical considerations, the legal and regulatory landscape must be reimagined to be responsive to emerging technologies [9], which takes time. Moreover, thinking about the *unknown unknowns* that have social implications requires that all stakeholder accept responsibility for their part in the digital health ecosystem [52].

For example, respect for persons may be demonstrated through an exchange of information between the service provider and the person who may use the service such that they can make an informed choice about whether to accept the terms of services and privacy policy. This requires that they have sufficient cognitive capacity and agency to make an informed decision to use the services. Legal implications typically fall into the regulatory landscape and statutes, which can vary depending on whether state or federal laws apply. Social implications take into account the uncharted landscape and societal expectations. This can include generational and cultural differences that influence a person's expectations around privacy and sharing of personal information.

The DHC-R organizes the ELSIs across four domains: 1- Access and Usability, 2- Privacy, 3- Risks and Benefits, and 4- Data Management. With respect to the DN2, we pose the following questions and possible solutions for discussion.

4.1 Domain: Access and Usability

Access and Usability is about whether those who the product was developed for are able to access the services and, if so, are able to use the service as intended. The DN2 App Reviews include examples of non-use, such as **@DeletedNextDay**, as well as unintended uses of the technology, which include taking bets on the credibility of news sources (i.e., **@OlderUncle**). With respect to usability, it is important to know whether the product has been developed in consultation with the target population, in this case, older adults.

Challenge: Older adults may lack experience using an AI support tool, such as the EmotionTracker-AI. This could lead to frustration and lack of confidence, if the recommended conversational prompts or personal reflection activities do not feel useful. Technology costs can also be a barrier to access and should be considered when designing a tool for use by older adults.

DHC-R Recommendation: Consider working with older adults during the design phase to inform the system design and support services. Provide onboarding information as needed to support people with little/no technology literacy. Make finding support easy to minimize frustration.

4.2 Domain: Privacy

Privacy is a domain that prompts consideration of the types of personal information that is collected and whether those using the product understand the nature and granularity of personal information that will be accessed by the service.

Challenge: Sharing information about how news topics relate to the emotional state of individual users as well as their social network of family of friends, may reflect a substantial breach of trust with the users. Moreover, an older

adult may be confused about how inferences are made about their mental health status, which may further affect their trust in the DN2 services.

DHC-R Recommendation: Develop terms of service and privacy policies that are aligned with the values of people who are using the services and that can be read and understood by the general public, but especially the primary users and the other stakeholders in their mental wellbeing (e.g., family, friends, clinicians). The business model should not be dependent on the sale of personal information in exchange for an affordable or free product.

4.3 Domain: Data Management

Data Management addresses how data about those using the service are collected, stored, shared and the extent to which the data are accessible by other systems.

Challenge: Personal data collected from those using the product are leveraged by vendors and how these data are used may not be visible to the person obtaining the service. Data misuse could introduce risks to the person using the service. Additionally, representing the ways that data and services are coordinated within a crowdsourcing system is not trivial, particularly for complex services.

DHC-R Recommendation: Make explicit what data are collected and used to infer behaviors or mental health. Explain who has access to data collected at the point of enrollment and while using the services. Describe any system vulnerabilities so that those considering use of the product can make an informed decision. Communicate regularly with crowd workers to understand their experience facilitating different parts of the services.

4.4 Domain: Risks and Benefits

Risks and Benefits are determined by evaluating the probability and magnitude of potential harms and discomforts weighted against the potential benefits. Risk assessment includes defining the type of harm (e.g., physical, economic, psychological) along with duration, severity and intensity.

Challenge: Understanding a potential harm should include consideration of possible economic, social, reputational, physical and psychological impacts. The duration, severity and intensity of harm should also be informed through engagement with people involved with using the service or supporting its use (e.g., crowd worker) as it is being designed and tested. The risk of harm could vary between the person using the service and the navigator supporting the user.

DHC-R Recommendation: Involve people for whom you are developing the DN2 to better understand their experiences. Invite people who are rating the product to meet and discuss their experiences and identify ways of mitigating experiences that were both considered beneficial and harmful. Involve the navigators in developing strategies to support their own wellbeing and professional development as crowd workers supporting the service delivery.

5 LIMITATIONS

It is difficult to evaluate the quality of a design fiction by the writing alone [7]. Design fiction offers a structured method of speculating with other people about the ethical considerations related to a hypothetical scenario [6, 49]. We invite you (dear reader) to critique our analysis of the DN2 service, as our team approached the considerations to ELSIs through the lens of our own personal and professional backgrounds. People from other disciplines and backgrounds will likely recognize different and more nuanced considerations. By continuously inviting new voices into the conversation about a design fiction, opportunities for research, design, and policy will follow.

6 CONCLUSION

Older adults have seen and shared a lot of misinformation in social media [27, 28]. Support services are needed to help older adults to recognize, respond, and recover from exposure to misinformation. This paper presents a design fiction-based approach to investigate the possible ethical, legal, and social implications (ELSIs) associated with these support services. Through a multifaceted analysis of the fictitious Digital News Navigator (DN2) service, we discuss potential ELSIs related to: Access and Usability, Privacy, Risks & Benefits, and Data Management. Additionally, the paper demonstrates how a design fiction process can be used in conjunction with ethical frameworks, such as the Digital Health Checklist for Researchers (DHC-R), to foster a literature-focused conversation about the unknown unknowns of a *not-yet-possible* technology.

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