

Evaluating the effectiveness of educative nudges on reducing older adults' susceptibility to misinformation

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ABSTRACT

The spread of misinformation is of increasing concern worldwide. Although older adults are understood to be particularly susceptible to misinformation, there is little empirical research on this population within the literature. To address this, a study was conducted to design and test the effects of educative nudges on reducing older adults' susceptibility to misinformation. This pictorial illustrates the design process undertaken, and the final experiment conducted.

AUTHORS KEYWORDS

Misinformation. Older adults. Nudges. Human-centred design. Design thinking.

INTRODUCTION

Misinformation is defined as information that is not based on empirical evidence or expert opinion, therefore making it objectively inaccurate and empirically falsifiable [1,2,3,4]. Research has indicated that people aged over 55 (hereafter referred to as older adults) are less likely to recognise misinformation online [5]. Despite this, interventions to misinformation have remained heavily focused on younger audiences [6]. This study aimed to address this gap in the literature by designing an intervention to reduce older adults' susceptibility to misinformation. This pictorial documents how the study followed the 5 stages of the Stanford d.school designing thinking methodology to create a user-centred intervention for older adults (see Figure 1).

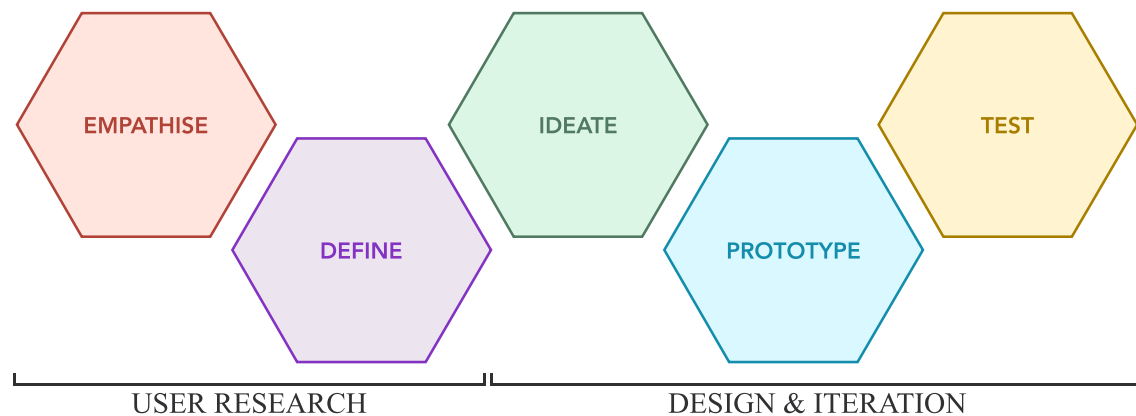


Figure 1: Stanford d.school designing thinking framework [7].

MISINFORMATION SUSCEPTIBILITY

Much of the literature on misinformation is underpinned by the ideal of an informed citizen [5]. Indeed, misinformation only becomes a problem when it reaches an audience that is not equipped to recognise or reject it [5]. It is

therefore important to understand what makes people susceptible to misinformation when designing interventions. Factors affecting older adults' susceptibility are outlined in Figure 2.

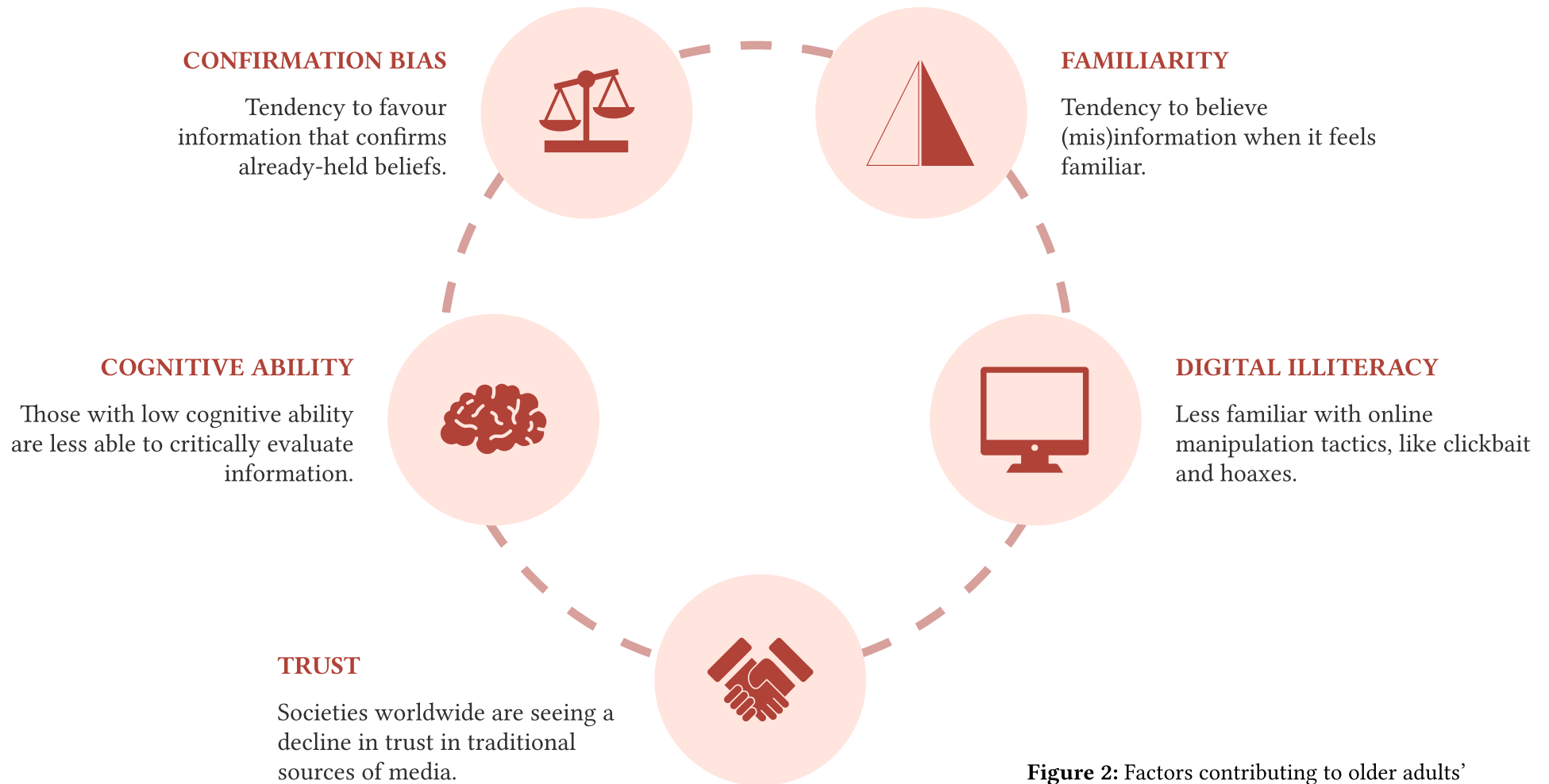


Figure 2: Factors contributing to older adults' susceptibility to misinformation online [6,8,9,10, 11,12,13].

MEDIA AND INFORMATION LITERACY

Media and information literacy (MIL) refers to the skills and knowledge individuals need in order to navigate information in a mindful and critical way [14]. To understand what is the best practice for cross-checking

information online, a review of recommended steps was conducted. The most frequently recommended steps are outlined in Figure 3.



Figure 3: Recommended steps for cross-checking information [15,16].

NUDGES

Researchers emphasise the need for misinformation countermeasures to educate users on how to critically evaluate information, and how to change their behaviour when encountering information online [17, 18]. To do this, many interventions have employed behavioural design techniques such as nudging, gamification and inoculation [5]. A nudge is “*any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any option or significantly changing their economic incentive*” [19].

There are multiple ways to ‘nudge’ users. This study focuses on educative nudges, which seek to improve critical thinking by enhancing the role of deliberation and considered judgement [20]. Figure 4 demonstrates the differences between educative and non-educative nudges. The remainder of this pictorial demonstrates how a user-centred approach was followed in order to design an intervention to reduce older adults’ susceptibility to misinformation.

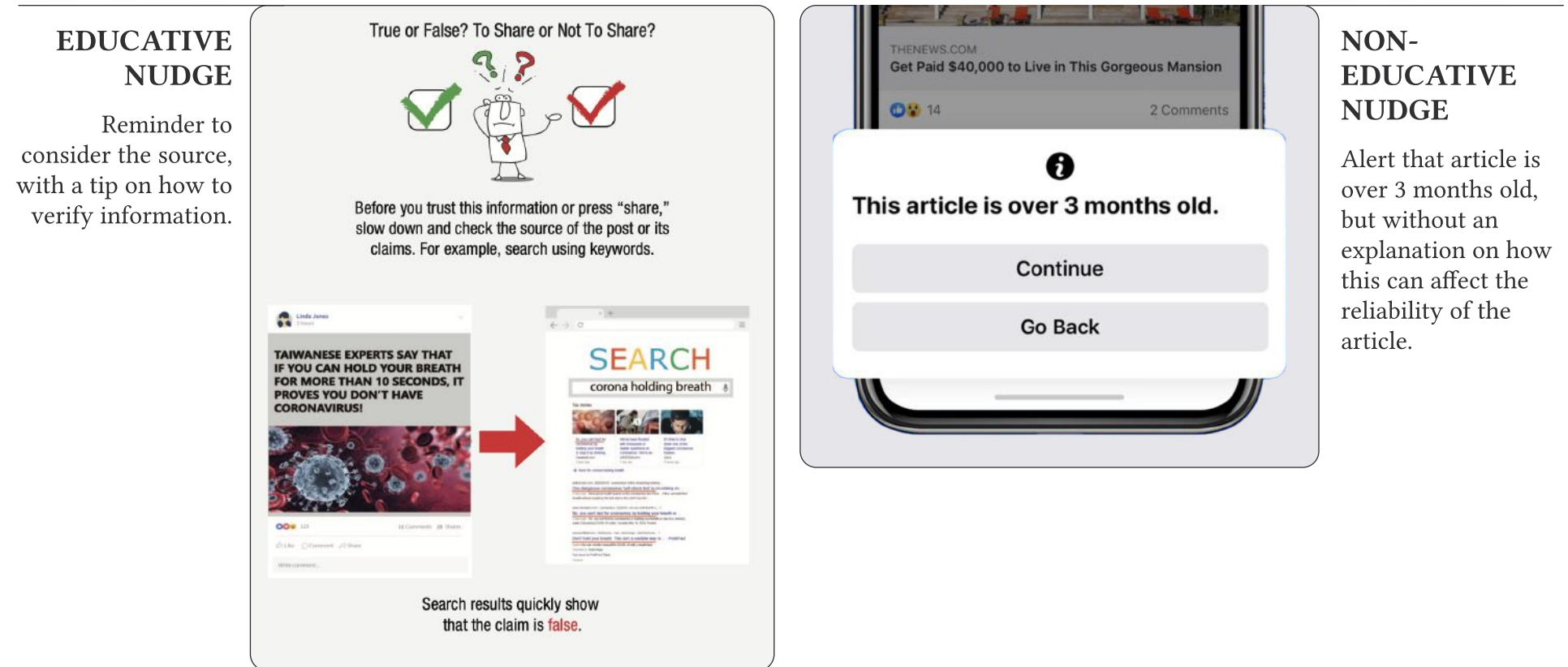


Figure 4: Educative nudge [20] and non-educative nudge [21].

1 - EMPATHISE

Following a review of the literature, user research was conducted. The goal of this phase was to understand older adults' news consumption habits and attitudes. Key findings are outlined below.

Expert Interviews



Older adults tend to be more trusting of information because they grew up in a time when the media was highly regulated.



Doubts were expressed about the suitability of game-based interventions for older adults.



Alternatively, one expert expressed how nudge interventions are “critical” to protecting people from misinformation.

“Nudging is how people end up . . . consuming misinformation, so I think we need to be using the same techniques to nudge people out of it.”

 *Expert 3, Co-Ordinator of Media Literacy Ireland*

Online Survey



145 responses
(aged 55+).



84% use multiple sources
to stay informed.

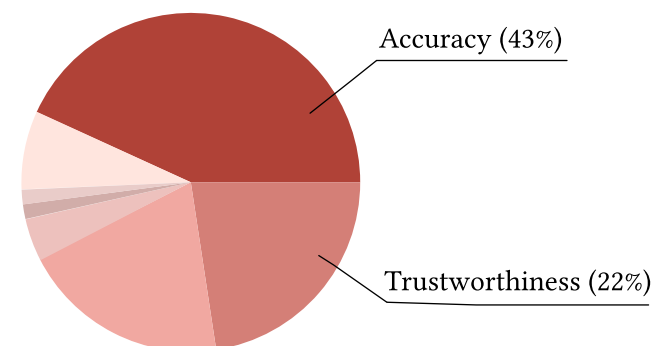


Approaches to
fact-checking:
Google & no steps
at all.



49% lack confidence in
their ability to verify
information online.

Q. What is the most important attribute of a news source?



Observations



5 participants
(aged 61-79).



Preference for tablet
devices.

“[I feel] weary and afraid of the Internet.”



Female, aged 63.



Preference for nudge-based
interventions over game-based
interventions.

“I do not have the time or the resources
to be cross-checking information.”



Male, aged 71.

2 - DEFINE

The goal of this phase was to define the UX problem at hand. This was done through analysing insights from user research, and communicating these through personas and journey maps.

Persona: Bríd



01. Confidence in ability to fact-check.



02. Awareness of when to fact-check.



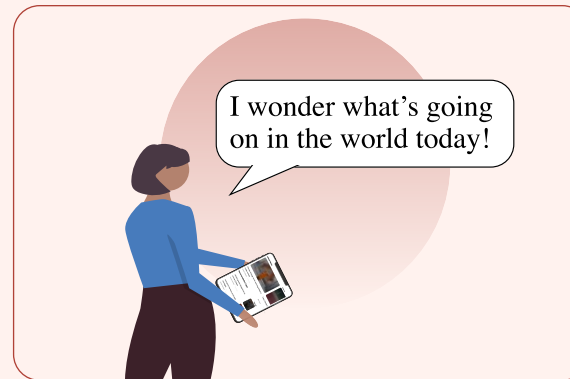
03. Fearful of the Internet.



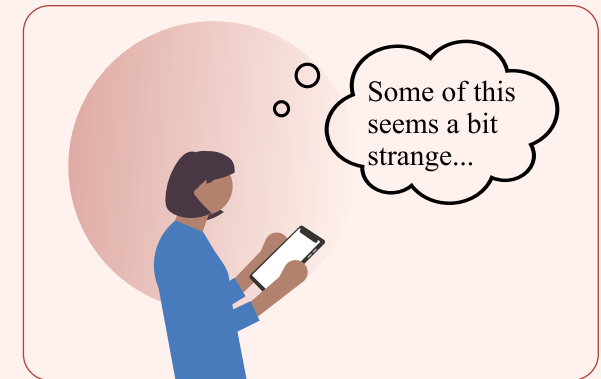
04. Motivation to fact-check.



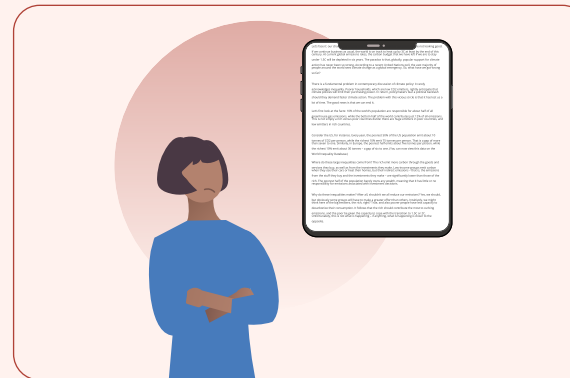
As-Is Storyboard



01. Bríd decides to read the news on her iPad.



02. She starts reading an article, but feels a bit uncertain about some of the claims it is making.



03. However, the article looks professional so Bríd assumes the journalist has done their research and the information can be trusted.

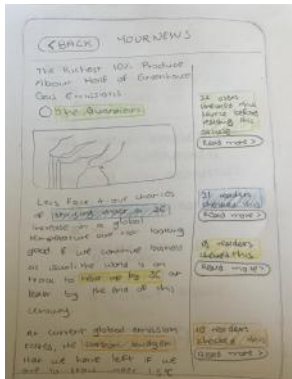


04. When Bríd tells her husband about the article, he is suspicious and cross-checks it online. He tells her it was misleading and can't be trusted. Bríd is left feeling confused and frustrated.

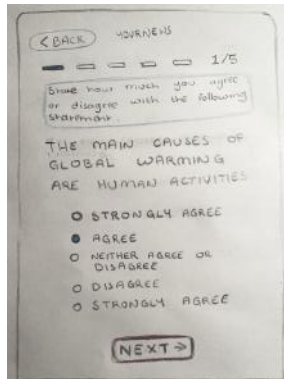
3 - IDEATE

This phase involved brainstorming solutions to the needs and pain points identified in the Define phase. Sketching helped visualise concepts, while the To-Be scenario helped guide the design process [7].

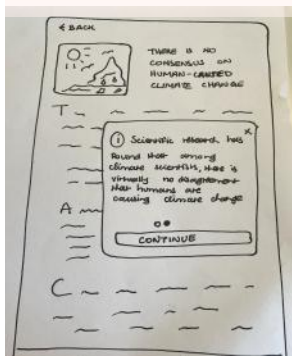
Brainstorming



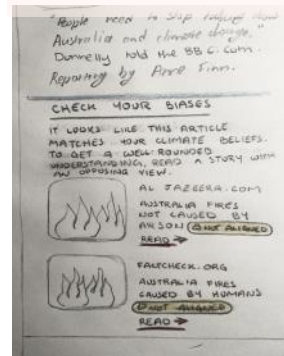
Social Proof - view what other users fact-checked.



User quizzed on article they just read.



Notification informing user of facts.

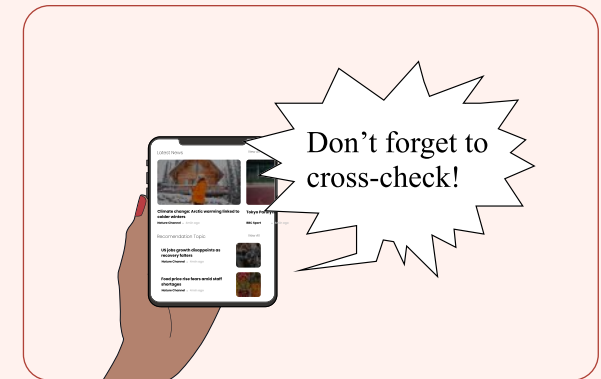


Alternative perspectives at end of article.

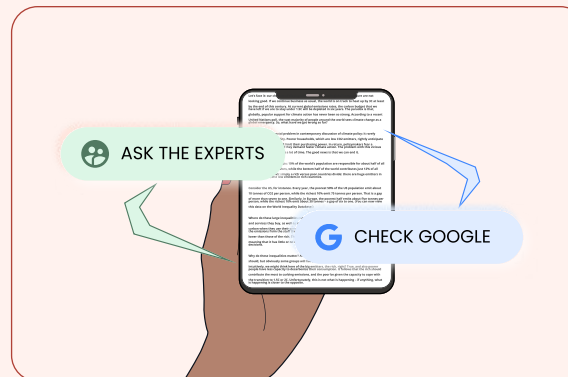
To-Be Storyboard



01. Brid's co-workers tell her about a news app called NewsFlash. She downloads it to her iPad.



02. As Brid browses the newsfeed, a prompt reminds her to look beyond the headlines. She was unaware this was important, so appreciates this.



03. As she reads an article, she is reminded to fact-check information. She doesn't normally think to check something, so she likes this.

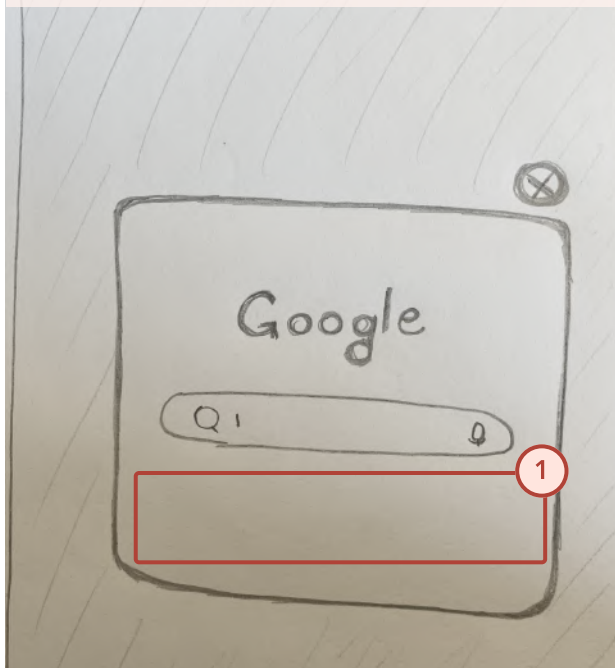


04. Brid doesn't know how to fact-check, but NewsFlash explains how to determine if information is reliable. Brid feels more confident when reading the news now.

4 - PROTOTYPE/ LOW-FI

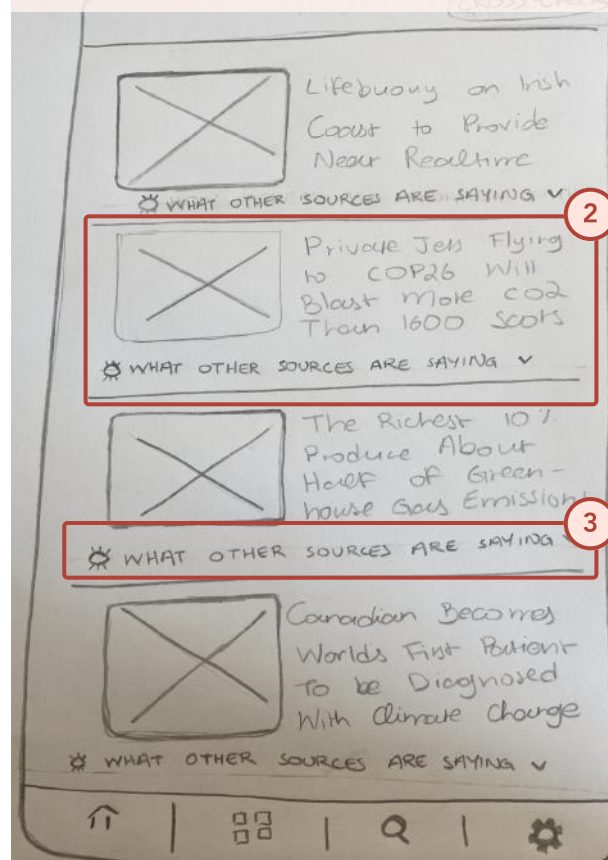
Paper prototypes were created with the goal of exploring solutions to user problems identified in the first 3 phases [7]. This phase involved testing and iterating in quick succession to facilitate the rapid exploration of ideas. Feedback from guerilla testing is outlined below.

Task: Fact-check information in this article using Google.



1 **Suggested keywords:** "Love this, but I'd like if there were suggested search terms to help me know what to search."

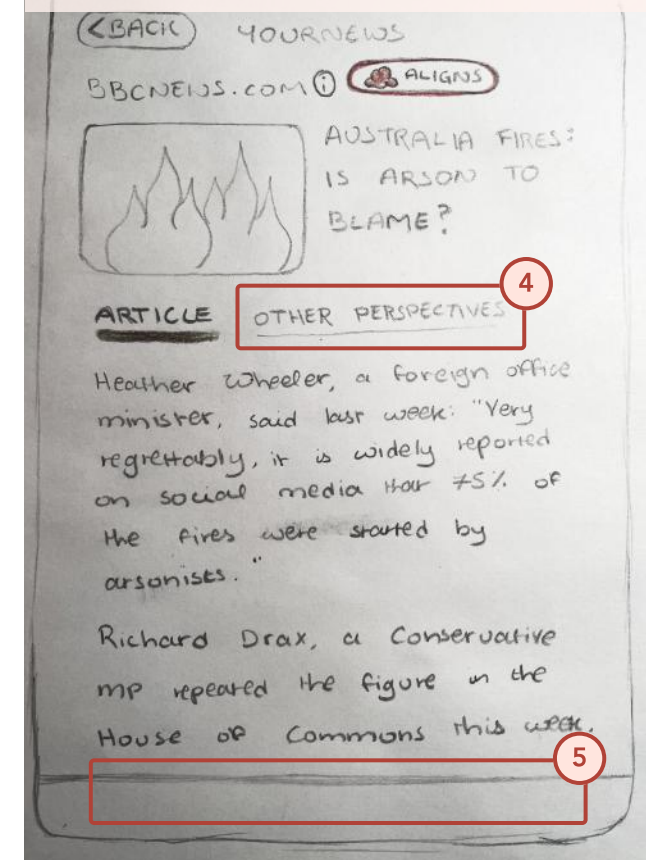
Task: Browse the newsfeed.



2 **Selecting article:** "I didn't realise I can click into articles by tapping the headline. That's not obvious, there should be a 'Read' button."

3 **Other sources:** "I like this, but it's not obvious it's a dropdown button."

Task: Read an article.



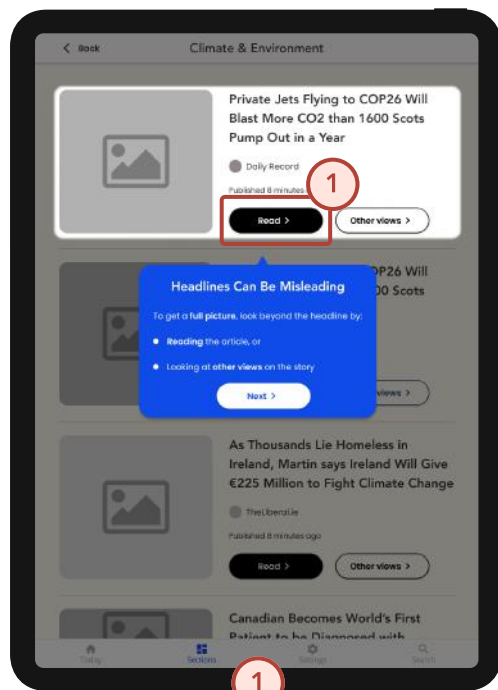
4 **Other perspectives:** "This should be after reading the article. I won't just swipe across half-way through reading the article."

5 **Fact-check:** "Would be nice if I can search things as I read and fact-check them."

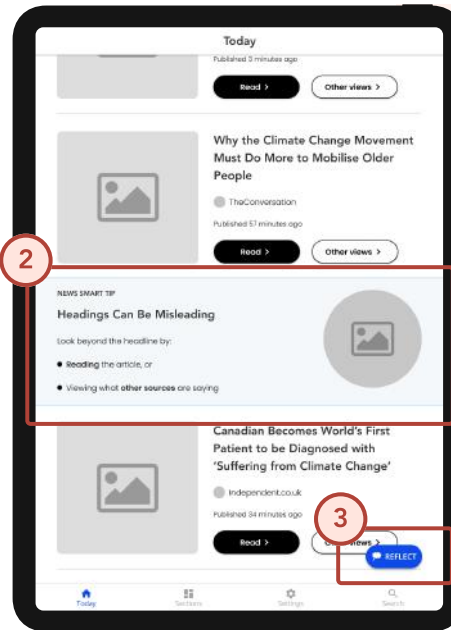
4 - PROTOTYPE/ MID-FI

Feedback from testing guided the design of a mid-fidelity prototype created in Figma. This was guerrilla tested with 3 users, with the goal of understanding how they interacted with the re-design.

Task: go through the onboarding.



User is confused by walkthrough onboarding. Tries to click in and read the article, rather than select 'next' to continue onboarding tour.



Task: browse the newsfeed.

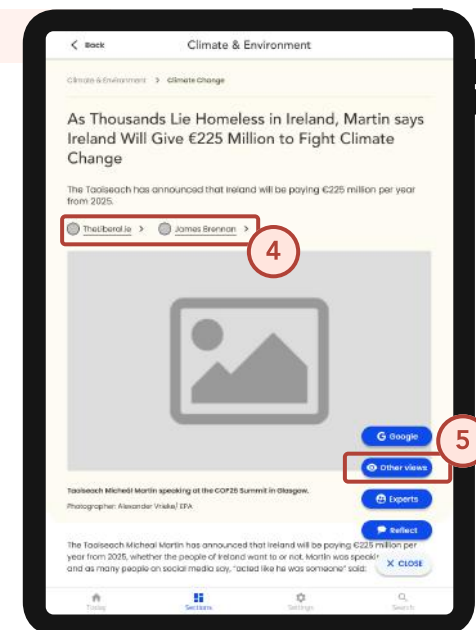
“This feels like an ad, I wouldn’t pay attention to it.”

“What does ‘Reflect’ mean? I wouldn’t know what to expect from clicking that.”

Task: browse the newsfeed.

User does not realise that these are dropdowns.

“It’s not necessary to have ‘Other Views’ here, I can already view other sources in the newsfeed and at the end of the article.”



4 - PROTOTYPE/ HIGH-FI

Feedback from testing informed the final design of two high-fidelity prototypes. Two news applications for an iPad device were designed using Figma. The prototypes featured articles from multiple news sources, and included features which allow users to fact-check from within the app, such as: searching Google, viewing how professional fact-checkers rated the accuracy of information, and the ability to compare perspectives from

from multiple sources. Group A contained educative nudges, and Group B did not (Figure 5). A design system helped main consistency across the prototypes (p.11). Accessibility was a key consideration when creating the design system, as this helped ensure older adults could navigate and understand the prototypes [22].

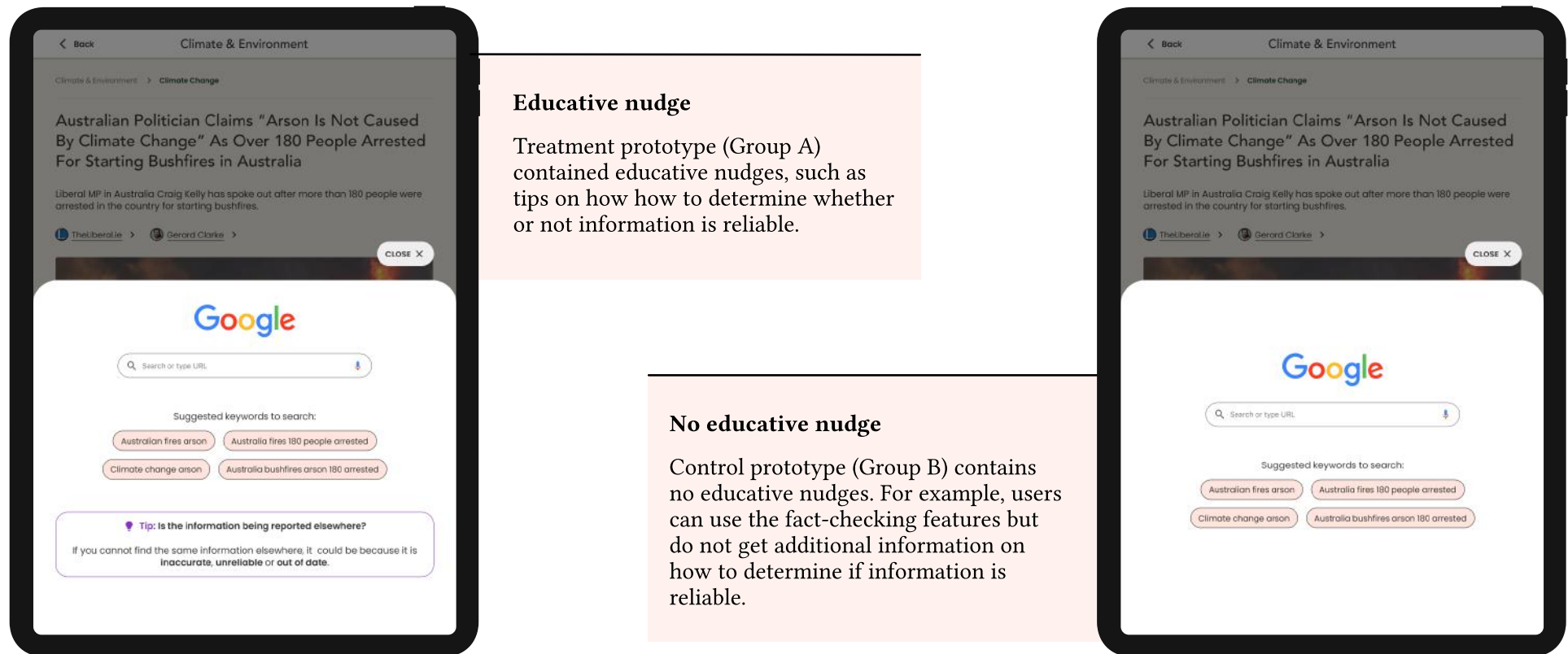
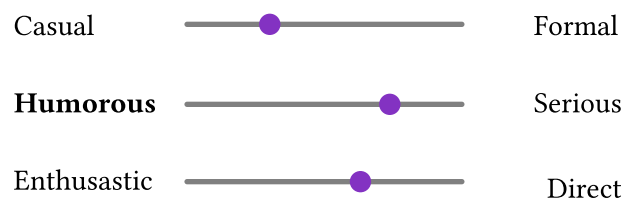


Figure 5: Example screens showing the difference between the treatment and control prototypes.

DESIGN SYSTEM

Tone of Voice



Typography

Sans-serif font for higher readability [1].

Headline: Avenir 24px

Body: Poppins 16px

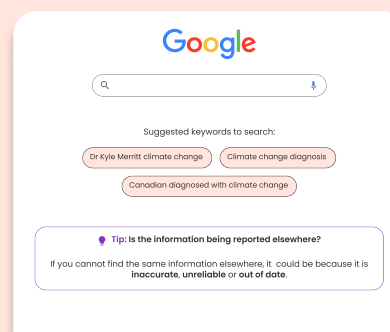
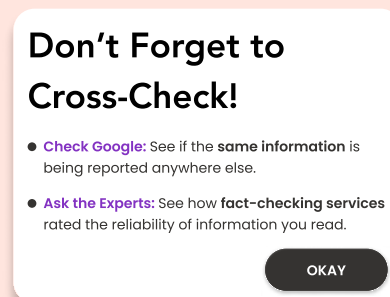
Illustrations



Buttons



Cards

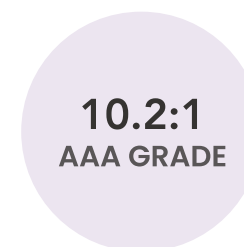


Colours

Web contrast accessibility requires an **AAA grade** of at least 4.5:1 [22].



#8332C2
#FFFFFF



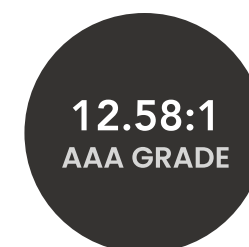
#ECEF0
#353331



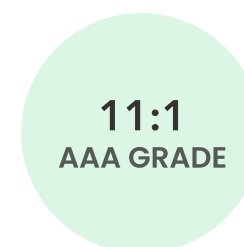
#314A6A
#FFFFFF



#FFE5DE
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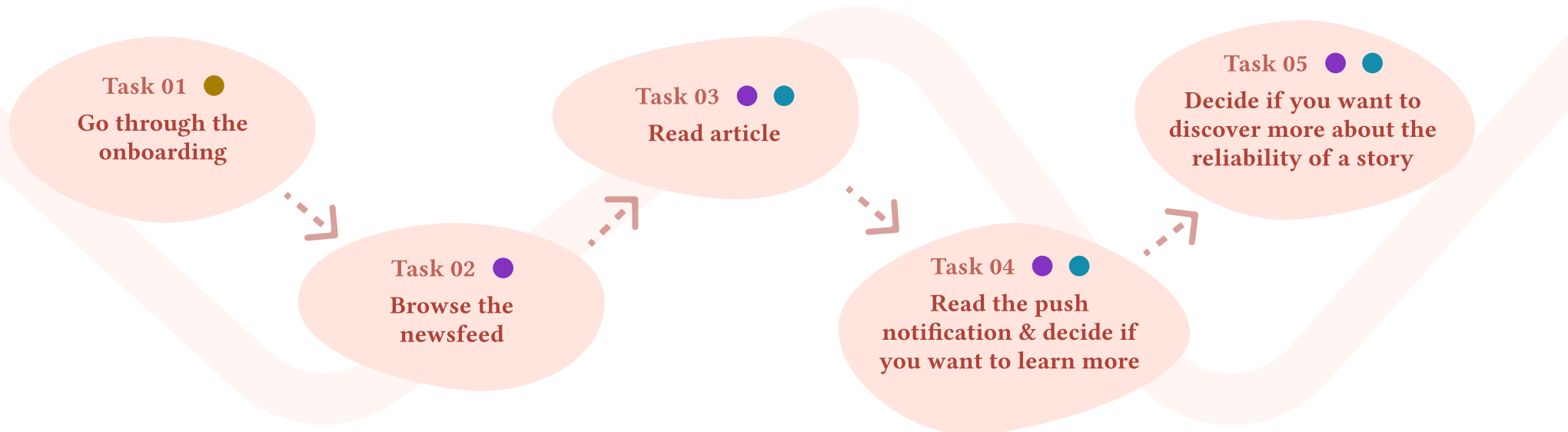


#DCF646
#353331

5 - TEST & RESULTS

The final prototypes were tested in a between-subjects experiment with 51 participants. The independent variables were the presence of educative nudges, and participants were randomly assigned Group A (prototype with educative nudges) or Group B (prototype without educative nudges). The Misinformation Susceptibility Test measured participants' susceptibility to misinformation before and after the intervention [23]. To ensure consistency, participants were given the same tasks (see Figure 6). The study found that the

educative nudges improved older adults' ability to detect fake news, but had no effect on their ability to detect real news or distinguish between real and fake news. These findings indicate that an educative intervention increases older adults' skepticism of fake news, without increasing their distrust of news in general (hyper skepticism) [23]. These results are a starting point for further research both on older adults' susceptibility, and on educative nudges as a countermeasure to misinformation.



Aim of Task

- Familiarise user with prototype.
- Expose Group A to educative nudge.
- Encourage user to cross-check.

Figure 6: Tasks given to participants during the final experiment. The colour codes indicate the aim of each task.

CONCLUSION

This pictorial contributions to the literature on misinformation susceptibility by designing and testing an intervention for older adults. Findings from a between-subjects experiment indicate that educative nudges are a promising strand of research, in that they were found to improve older adults' ability to detect fake news.

Limitations and future work

Participants exposed to the educative nudges performed better at identifying fake news than those exposed to the control prototype. However, the MIST scales used to measure the effect of the nudges were below the recommended reliability level [23, 24]. The results therefore cannot be considered entirely reliable.

The final experiment used the testing software, Maze. Participants with smaller screens struggled to see aspects of the prototypes, and upon contacting Maze's support services it was discovered that Maze is not compatible with tablet prototypes. It is possible that this impacted the results, as participants' judgements of Maze may have affected their judgement of the prototypes.

Finally, there are different ways to 'nudge' people in behavioural design. Prior research indicates that accuracy nudges may be effective in reducing misinformation susceptibility. Future work that compares the effects of educative nudges with other nudges, like accuracy, on misinformation susceptibility is encouraged.

REFERENCES

- [1] Edda Humprecht. 2018. Where 'fake news' flourishes: A comparison across four Western democracies. *Information, Communication & Society* 22, 13: 1973–1988. <http://doi.org/10.1080/1369118x.2018.1474241>
- [2] Michael Hameleers. 2020. Separating truth from lies: Comparing the effects of news media literacy interventions and fact-checkers in response to political misinformation in the US and Netherlands. *Information, Communication & Society* 25, 1: 110–126. <http://doi.org/10.1080/1369118x.2020.1764603>
- [3] Peter Van Aelst, Jesper Strömbäck, Toril Aalberg, et al. 2017. Political Communication in a high-choice media environment: A challenge for democracy? *Annals of the International Communication Association* 41, 1: 3–27. <http://doi.org/10.1080/23808985.2017.1288551>
- [4] W Lance Bennett and Steven Livingston. 2018. The Disinformation Order: Disruptive Communication and the decline of democratic institutions. *European Journal of Communication* 33, 2: 122–139. <http://doi.org/10.1177/0267323118760317>
- [5] Eileen Culloty and Jane Suiter. 2021. Disinformation and manipulation in digital media information pathologies. Routledge Taylor & Francis Group, London.
- [6] Nadia M. Brashier and Daniel L. Schacter. 2020. Aging in an era of fake news. *Current Directions in Psychological Science* 29, 3: 316–323. <http://doi.org/10.1177/0963721420915872>
- [7] Rikke Friis Dam. 5 stages in the design thinking process. The Interaction Design Foundation. Retrieved May 3, 2022 from <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
- [8] Sarit Barzilai and Clark A. Chinn. 2020. A review of educational responses to the “post-truth” condition: Four lenses on “post-truth” problems. *Educational Psychologist* 55, 3: 107–119. <http://doi.org/10.1080/00461520.2020.1786388>
- [9] Raymond S. Nickerson. 1998. Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology* 2, 2: 175–220. <http://doi.org/10.1037/1089-2680.2.2.175>
- [10] Gordon Pennycook and David G. Rand. 2019. Lazy, not biased: Susceptibility to partisan fake news is better explained by lack of reasoning than by motivated reasoning. *Cognition* 188: 39–50. <http://doi.org/10.1016/j.cognition.2018.06.011>
- [11] Liesbet van Zoonen. 2012. i-Pistemology: Changing truth claims in popular and political culture. *European Journal of Communication* 27, 1: 56–67. <http://doi.org/10.1177/0267323112438808>
- [12] Sophie J. Nightingale, Kimberley A. Wade, and Derrick G. Watson. 2017. Can people identify original and manipulated photos of real-world scenes? *Cognitive Research: Principles and Implications* 2, 1. <http://doi.org/10.1186/s41235-017-0067-2>
- [13] Santosh Vijaykumar, Yan Jin, Daniel Rogerson, et al. 2021. How shades of truth and age affect responses to covid-19 (mis)information: Randomized survey experiment among WhatsApp users in UK and Brazil. *Humanities and Social Sciences Communications* 8, 1. <http://doi.org/10.1057/s41599-021-00752-7>

- [14] Soeun Yang, Jae Woo Lee, Hyoung-Jee Kim, Minji Kang, EunRyung Chong, and Eun-mee Kim. 2021. Can an online educational game contribute to developing information literate citizens? *Computers & Education* 161: 104057. <http://doi.org/10.1016/j.compedu.2020.104057>
- [15] International Federation of Library Associations and Institutions (IFLA). 2017. How to spot fake news. IFLA Repository. Retrieved December 3, 2021 from <https://repository.ifla.org/handle/123456789/167>
- [16] Facebook. (n.d.). Facebook - Tips to Spot False News. Retrieved November 8, 2021, from https://www.facebook.com/unsupportedbrowser?helpref=uf_share
- [17] John D. Gould and Clayton Lewis. 1985. Designing for usability: key principles and what Designers think. *Communications of the ACM* 28, 3: 300–311. <http://doi.org/10.1145/3166.3170>
- [18] Melissa Tully, Emily K. Vraga, and Leticia Bode. 2019. Designing and testing news literacy messages for social media. *Mass Communication and Society* 23, 1: 22–46. <http://doi.org/10.1080/15205436.2019.1604970>
- [19] Ana Caraban, Evangelos Karapanos, Daniel Gonçalves, and Pedro Campos. 2019. 23 ways to nudge. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems. <http://doi.org/10.1145/3290605.3300733>
- [20] Anastasia Kozyreva, Stephan Lewandowsky, and Ralph Hertwig. 2020. Citizens versus the internet: Confronting digital challenges with cognitive tools. *Psychological Science in the Public Interest* 21, 3: 103–156. <http://doi.org/10.1177/1529100620946707>
- [21] John Hegeman. 2020. Providing people with additional context about content they share. Meta. Retrieved January 4, 2022 from <https://about.fb.com/news/2020/06/more-context-for-news-articles-and-other-content/>
- [22] Accessibility. Material design. Retrieved February 10, 2022 from <https://material.io/design/usability/accessibility.html>
- [23] Rakoen Maertens, Friedrich Martin Götz, Claudia R. Schneider, et al. 2021. The misinformation susceptibility test (MIST): A psychometrically validated measure of news veracity discernment. <http://doi.org/10.31234/osf.io/gk68h>
- [24] Jum C. Nunnally. 1967. *Psychometric theory*. McGraw-Hill.