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STUDY ON SINGAPOREANS AND FALSE INFORMATION PHASE TWO AND PHASE THREE — IMMUNITY AND INTERVENTION

CAROL SOON
SHAWN GOH
NANDHINI BALA KRISHNAN

IPS Institute of Policy Studies

LKY Lee Kuan Yew School of Public Policy
National University of Singapore

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Institute of Policy Studies
Lee Kuan Yew School of Public Policy
National University of Singapore
1C Cluny Road House 5
Singapore 259599
Tel: +65 6516 8388
Web: www.lkyspp.nus.edu.sg/ips
Registration Number: 200604346E

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Executive Summary

EXECUTIVE SUMMARY

This study on Singaporeans and false information, funded by the Ministry of Communications and Information (Digital Readiness and Learning Division),[1] was conducted in three phases and examined three aspects of Singaporeans and false information — susceptibility, immunity, and intervention. Phase 1 of the study, which was completed in December 2020, comprised a survey with more than 2,000 Singaporeans and examined Singaporeans' susceptibility to false information.[2] This report focuses on Phase 2 and Phase 3 of the study, which examined Singaporeans' immunity against false information and how effective current interventions are at equipping Singaporeans with the knowledge and skills to protect themselves from false information.

Phase 2 comprised 50 self-confrontation interviews conducted with Singaporeans from diverse backgrounds, selected from the initial sample of respondents from Phase 1. The interviews examined their news and information-seeking practices online, responses to false information, and information verification strategies — to understand why some Singaporeans have stronger immunity against false information than others.

The key findings of Phase 2 are:

1. Respondents' news and information-seeking practices were both intentional and incidental, and were influenced by their interest, perceived relevance and novelty of a topic, and other informational and social needs. Their news and information-seeking routines were also largely "mobile first and digital first", as driven by the ubiquity of social media, search engines and news apps.

2. Respondents made strategic decisions when choosing to use different media sources and digital platforms to meet different informational needs. For example, they relied on sources like *The Straits Times* and Channel NewsAsia for "serious" news and turned to sites like Mothership for "light" news. They also relied on social networking sites like Facebook and Twitter as "one-stop portals" for comprehensive and timely news updates, while turning to discussion forums like Reddit to hear the opinions of others on various news topics.

[1] The contents of this report, including the methods, findings, and results, are solely the authors' responsibility and do not represent the endorsement and views of the Ministry of Communications and Information.
[2] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf.

3. Respondents practised strategic information navigation. To cope with the information avalanche, they relied heavily on trusted sources such as *The Straits Times* and Channel NewsAsia, and performed rapid surveillance of the news by scanning news headlines. Other informational characteristics like visuals and "bite-sized summaries" attracted their attention amidst the information clutter. To discover news of interest and relevance to them, they relied on algorithm-driven personalisation of content on digital platforms.

4. Respondents turned to signposts such as source, style, balance and currency to assess the credibility and trustworthiness of a piece of information. Balanced news reporting and neutrality added to the perception of credibility, but this also meant that commentaries and opinion pieces were seen as less trustworthy. Those who were more information-savvy and had stronger immunity against false information adopted a more nuanced approach — they distinguished between news from official sources and from their social circles, and were more circumspect with sponsored articles and manipulated data and statistics.

5. When it came to information authentication, respondents engaged in both internal and external validation. Again, those who were more information-savvy adopted a more nuanced approach when performing vertical reading (e.g., going beyond assessing manifest informational characteristics to considering underlying agendas and intentions) and were also more likely to engage in lateral reading.

6. Respondents' definitions of "fake news" were wide-ranging. Some associated falsity with the lack of "facts", in particular, the absence of figures and statistics, while others focused on the communicator's intent, such as whether there was a motive to deceive, manipulate or to sow discord. A small minority (who tended to be the more information-savvy) highlighted that the definition of "fake news" is subjective as there can be many shades of the truth.

7. Respondents recognised that both individual and institutional actors play a role in addressing the problem of false information. Individuals were seen as a key part of the solution as the online space was simply too expansive for any single entity to manage. However, some remained reluctant to call out false information when it was sent to them as they found it challenging to be "100 per cent sure" of its veracity and did not want to strain personal relationships when correcting others. Institutional actors such as the government, media outlets and digital platforms were seen as responsible for addressing the problem, especially among those who were less information-savvy and exhibited less agency.

Phase 3 of the study comprised a mixed method of a survey and an experiment, which was conducted with more than 1,000 respondents, similarly selected from the initial sample of respondents from Phase 1. It compared the effects of different modalities (i.e., PowerPoint, infographic, video) that were used to deliver the National Library Board (NLB)'s S.U.R.E. framework, a digital literacy framework that promotes the importance of information verification. Phase 3 also examined whether certain modalities produced better learning outcomes for certain demographics.

The key findings of Phase 3 are:

1. Among the three modalities, the PowerPoint consistently performed best in terms of perceived clarity, perceived usefulness, how interesting it was, and respondents' gain in new knowledge. The video came in second in terms of the aforementioned dimensions, but was perceived to be most visually attractive among the three. The infographic fared most poorly across all dimensions.

2. In general, the S.U.R.E. framework was well-received for being clear, easy to understand, systematic and well-substantiated. However, a small minority of respondents who were already familiar with its content felt that it was too basic. Suggestions for improvements include making the infographic less wordy, shortening the length of the video and slowing down its speed of information delivery, and making the modalities available in vernacular languages.

3. Among the three modalities, the PowerPoint also led to more positive impact — it resulted in a greater understanding of the S.U.R.E. framework than the other modalities, a higher level of self-efficacy in discerning between real and false information, and a higher level of self-efficacy in executing each of the S.U.R.E. steps.

4. Demographic factors such as age, education, and socio-economic background (i.e., housing type and income) influenced the efficacy of the modalities and the S.U.R.E. framework. In general, seniors were least likely to find the S.U.R.E. framework useful, clear, helpful and applicable to their everyday lives. Seniors also performed the most poorly at accurately recalling information about the framework. Respondents with tertiary education, and those from higher socio-economic backgrounds (i.e., lived in private housing or had a monthly household income above the national median) were better at accurately recalling information about the S.U.R.E. framework.

Considering the findings from Phases 2 and 3 of the study, we make the following recommendations:

1. **Leverage the modality that works best.** Existing digital literacy programmes in Singapore are headed in the right direction and must continue given the observable positive impact on Singaporeans. To strengthen existing digital literacy programmes through design, policymakers and practitioners should expand the use of multimedia modalities (e.g., PowerPoint) to deliver their content. As mentioned, Phase 3 showed that the S.U.R.E. framework when delivered using the PowerPoint modality performed best in various dimensions including clarity, usefulness and knowledge gained by respondents. These findings, together with existing literature, also suggest that the "talking head" element in the PowerPoint was a unique strength of the modality that contributed to better learning outcomes by invoking a more conversational and narrative style of content delivery. To tap on such potential, the delivery of the S.U.R.E. framework using multimedia modalities — comprising a combination of text, graphics and a "talking head" — should be adapted beyond classrooms and be used in more public settings.

2. **Strengthen the S.U.R.E. framework.** The strengths of the current S.U.R.E. framework lie in its systematic approach of teaching information verification, coupled with its catchy acronym for easy recall and application. However, its content can be enhanced in a few ways. For example, one way to enhance the "R" ("Research") step would be to delve deeper into the importance of lateral reading and provide the specific steps to do so. Phase 3 also showed that the "E" ("Evaluation") step, which stresses the importance of exercising fair judgment to assess if a piece of information has been manipulated, was least clear among respondents. This is complicated by the fact that people's interpretations of what "fake news" constituted were subjective and sometimes even erroneous, as the self-confrontation interviews highlighted. As such, enhancements to the "E" step could include clearer instructions on the types of statements that can be fact-checked, the questions one should ask during information verification, and the tools available to aid Singaporeans' verification. Finally, Phase 3 findings suggest that most respondents were already familiar with the lessons in the "U" ("Understand") step, thus presenting an opportunity for its content to be upgraded with more advanced concepts and techniques.

3. **Expand digital literacy efforts.** In addition to enhancing the design and content of the S.U.R.E. framework, the findings also lay a strategic direction that guides Singapore's continued expansion of digital literacy

efforts in general. First, literacy initiatives should focus on building workman-like techniques (i.e., the "how-to") by incorporating more hands-on exercises to aid Singaporeans' internalisation of information verification skills and their ability to apply these skills in everyday situations. Second, with an increasingly complex information landscape, literacy efforts should adopt a more contextualised approach to teaching source evaluation and help Singaporeans better assess the wide array of sources encountered when navigating different information environments (e.g., websites, social media, search engines, and chat apps). Third, more needs to be done to increase public awareness of both local and international fact-checkers (e.g., Factually.sg, Snopes) to nudge their adoption into Singaporeans' information diet. Finally, literacy programmes should impart not only the "hard skills", but also the "soft skills" to empower Singaporeans to be able to sensitively and effectively call out falsehoods circulated in their social networks and build Singapore's network immunity.

4. **Target and tier literacy programmes.** Current and future literacy programmes should also be increasingly tailored to meet the specific needs of different communities. For example, those who are savvier and with stronger immunity against false information (i.e., younger and better educated) should be given opportunities to pick up higher-order information verification skills. One example would be to incorporate fact-checking lessons in existing cyber-wellness programmes in schools, especially for students in secondary schools and tertiary institutions who are already digitally competent. On the other hand, rolling out more foundational and simplified literacy programmes would benefit those who may need to start smaller (e.g., seniors and those who are less educated). Specifically for seniors, content designed to build their competencies in information search and verification on mobile devices could be incorporated into the existing Seniors Go Digital programme. Furthermore, literacy efforts could go beyond programme curation to engage in greater outreach, such as by expanding the recruitment of seniors who are digitally savvy so that they can serve as a trusted information node whom other seniors can turn to.

5. **Public messaging to build resilience against false information.** A key weak link in Singapore's resilience against false information may stem from Singaporeans' inaction and apathy towards taking a more proactive role in calling out false information circulated in their social networks, as well as a prevalence of optimism bias and sense of complacency that other groups of Singaporeans are more susceptible to false information than themselves. Moving forward, public messaging to strengthen Singapore's resilience against false information should

appeal to Singaporeans that no one is immune to false information, but everyone should and can play a role in these fighting falsehoods. Debunking efforts such as public corrective information should also mobilise key informational characteristics to capture people's attention and increase its reach and impact.

Chapter 1

Introduction

CHAPTER 1: INTRODUCTION

This study on Singaporeans and false information, funded by the Ministry of Communications and Information (Digital Readiness and Learning Division), was conducted in three phases. It used a mixed methodology (a combination of a survey, self-confrontation interviews, and an experiment) to examine three aspects of Singaporeans and false information — susceptibility, immunity, and intervention.

Phase 1 of the study looked at Singaporeans' susceptibility to false information, using survey data collected from more than 2,000 citizens and Permanent Residents. Drawing from diverse disciplines including media studies, political science and cognitive science, the survey took a holistic approach to understand the impact of false information on Singaporeans. It examined how Singaporeans' susceptibility to false information was influenced by both their demographic (e.g., age, education, socio-economic background) and non-demographic traits (e.g., information-seeking behaviours, psychological traits), and evaluated Singaporeans' exposure to and belief in different types of false information, as well as their ability to assess the veracity of information that they encountered online. The report for Phase 1 report was published on 17 December 2020.[3]

This report focuses on Phase 2 and Phase 3 of the study, which examined Singaporeans' immunity against false information and how effective current interventions are in equipping Singaporeans with the knowledge and skills to protect themselves from false information.

Phase 2 of the study looked at Singaporeans' news and information-seeking practices online, their responses to false information, and their information authentication strategies, in order to understand why some Singaporeans possess stronger immunity against false information than others. The findings for Phase 2 were based on self-confrontation interviews conducted with 50 respondents selected from the initial 2,011 respondents from Phase 1, and from diverse backgrounds. Specifically, we investigated the following research questions:

1. What are some of the common practices that people engage in when seeking and consuming news information and current affairs online? How do these practices affect people's susceptibility to and immunity against false information?

[3] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf.

2. What do people do when they receive false information? What authentication strategies do they adopt and what are the underlying cognitive and affective processes that guide these actions?

3. Which segments of the population have stronger immunity against false information? What traits do they share and what practices do they observe?

4. What are people's attitudes towards the problem of false information in Singapore? How do they define "fake news"? How concerned are they about the problem and what are their attitudes towards countermeasures to the problem?

The findings of Phase 3 of the study were based on data collected from 1,015 respondents, using a mixed method of an experiment and a survey. Similarly, these 1,015 respondents were selected from the initial 2,011 respondents from Phase 1. Phase 3 examined the effects of different modalities (i.e., PowerPoint, infographic, video) that were used to deliver National Library Board (NLB)'s S.U.R.E. framework, a digital literacy framework that promotes the importance of information verification to the general public. Phase 3 also examined whether certain modalities produced better learning outcomes for certain demographics. This phase of the study was guided by the following research questions:

1. How do different modalities (i.e., PowerPoint, infographic, video) affect people's attitudes towards the NLB's S.U.R.E. framework (e.g., perceived usefulness, perceived applicability)?

2. How does the effectiveness of different modalities compare in terms of equipping people with the knowledge, understanding, and skills to discern online falsehoods?

3. Do certain modalities of delivering the S.U.R.E. framework work better for certain demographic groups?

Building on the findings from Phase 1 of the study, the insights gathered from Phase 2 and Phase 3 will add to our knowledge on the impact of false information on different segments of the Singaporean public. The findings also provide the much-needed data points for designing and improving interventions that suit local needs. In particular, the findings highlight key issues for consideration as organisations such as the NLB and the Media Literacy Council evolve their literacy programmes, as well as the implications for broader policy communications relating to the topic.

In the next section, we review existing research relating to the topics studied in Phase 2 and Phase 3 of the study. Following which, we discuss the methodologies that were used to collect the data for both phases. The findings are organised into two main sections, with each section focusing on the key findings from each phase of the study (i.e., Phase 2 and Phase 3 respectively). We then conclude the report by discussing the key themes, and their implications for policy and practice in Singapore.

Chapter 2

Literature Review

CHAPTER 2: LITERATURE REVIEW

This section provides an overview of the existing research that has been conducted on the topics that were studied in Phase 2 and Phase 3 of the study. The topics include people's information-seeking practices online, indicators of trustworthiness and credibility, information authentication strategies, and responses to false information. It also reviews topics such as assessing the effectiveness of literacy interventions delivered through different modalities and examining the influence of demographic factors on the efficacy of different modalities.

2.1. Navigating today's information age

In the current hyper-mixed media ecosystem, information consumers are inundated with a multitude of sources on different communication and media platforms. As Phase 1 of the study established, non-legacy media now assumes a large part of people's information diet — the two most frequently used media types for news information and current affairs among Singaporeans were social networking sites and Instant Messaging platforms (Soon & Goh, 2021). Digital platforms have become the main go-to sources for individuals seeking news and information, given their convenience and mobility, a phenomenon that is even more pronounced among younger users (Poindexter, 2012). Due to information clutter, people's attention to news, especially on social media, also tend to be brief and fragmented (Boczkowski et al., 2018).

To help them navigate the information ecosystem, information consumers rely on different strategies. Existing research classified information-seeking processes into "incidental" and "deliberate". This classification bears similarities to the information acquisition modes proposed by Niederdeppe et al. (2007) — "*information acquisition that occurs within routine patterns of exposure to mediated and interpersonal sources that can be recalled with a minimal prompt*" (information scanning) versus "*active efforts to obtain specific information outside of the normal patterns of exposure to mediated and interpersonal sources*".

From his study on news consumption among college students, Antunovic et al. (2018) developed a three-stage process of consumption — routine surveillance, incidental consumption, and directed consumption. When individuals engage in routine surveillance, they perform the simple and habitual act of news checking of a routinised and recurring set of sources, such as a particular daily newspaper, a TV news programme, or a news site or repertoire of preferred news sites. News apps and news aggregators also

help individuals perform routine surveillance by allowing users to curate what they want to routinely read.

Several factors contribute to the rise of incidental exposure: (1) the pervasive use of mobile devices for various everyday communications that results in anytime, anywhere exposure to news and information; (2) people's almost constant connection to social media platforms that expose them to news; and (3) the increasing presence of news stories on those platforms. An outcome of incidental exposure to copious amounts of information is that people tend to focus their attention mostly on headlines, accompanying images and leads as they perform quick information scans (Boczkowski et al., 2018).

Researchers from the Reuters Institute for the Study of Journalism at the University of Oxford found that certain types of information consumers were more likely to engage in incidental exposure to news. Survey data collected from four countries (Italy, Australia, UK, and US) showed that incidentally exposed individuals used significantly more online news sources than non-users. In addition, the effect of incidental news exposure was stronger for younger people and for people who had low interest in news. Certain platforms also facilitated incidental news exposure more than others — YouTube and Twitter users reported higher incidental news exposure than for Facebook users (Fletcher & Nielsen, 2018).

2.2. Factors influencing news and information engagement

While incidental news exposure is serendipitous, meaning that information consumers encounter news in unplanned or unintended ways, directed news consumption involves deliberate information-seeking on a specific topic or issue. An example of a deliberate act is clicking a link to a full news story or to related news stories (Antunovic et al., 2018). When it comes to people's decision-making on whether or not to follow up on a news or information source that they come across in their routine surveillance and incidental exposure, Boczkowski et al. (2018) found that cognitive, affective and pragmatic considerations played an important part.

Cognitive considerations take place on a mental ("thinking") level and they range from recency (timeliness), importance and personal relevance of the information, to whether the information has social utility (i.e., serves as a conversation topic) or provides a new perspective. On the other hand, affective considerations are made on an emotional ("feeling") level — the emotions the information evokes (e.g., bad or sad news, or feeling good). Pragmatic considerations such as potential disruption to an otherwise

smooth user experience, due to loading time or commercials when clicking videos, and the amount of data that the activity would involve, also influence people's decision to engage in deliberate news exposure (Kormelink & Meijer, 2018).

Research has also found another level of deliberateness or directed consumption — people make strategic and deliberate decisions when using different media platforms. This deliberateness is performed in people's decision to turn to different platforms to meets specific informational needs. For instance, college students used Wikipedia for getting background information on a subject matter and relied on media-sharing and Question-and-Answer sites like Yahoo! Answers for finding solutions to problems relating to their studies. When they wanted to get updates or news, they tended to use microblogs and social networking sites (Kim et al., 2018). This study and another by the Pew Research Center (Holcomb & Mitchell, 2013) highlight the role social networking sites play in people's news consumption.

2.3. Role of social networking sites and social networks

In addition to the abovementioned message and source attributes that serve as heuristics to guide people in their news and information consumption, research has also found that people's social networks, and whom they perceive to be opinion leaders, play an important part in their decision on what information or news to trust. The increasingly ubiquitous presence of news organisations' groups and pages on social networking sites enhances incidental news exposure among users. However, users' friends and family members, and the groups that they follow, also function as important sources of news (Bergström & Jervelycke Belfrage, 2018).

Besides being a source of news, one's social contacts also serve as "*trusted filters of news, adding an extra layer of editorial gatekeeping*" (Boczkowski et al., 2018, p. 3533). Anspach (2017) found that people who might normally ignore news about politics from traditional media sources might choose to read the same information on Facebook if they saw their friends discuss the article on their News Feeds. Friends and family members exert a strong personal influence in shaping people's news consumption, at times getting them to consume news that they otherwise would not, due to ideological incongruence.

Within social networks, opinion leaders are central to people's news and information consumption. This is because they highlight news that one may have missed, provide context to the subject matter, and interpret the information (Bergström & Jervelycke Belfrage, 2018). Opinion leaders thus play the role of "*vehicles and mediators of salient content*" (Bergström &

Jervelycke Belfrage, 2018, p. 592). Due to information overload, people rely on a trusted person's judgment pertaining to which stories are worth their time and attention (Boczkowski et al., 2018). Opinion leaders tend to be people who have high social media activity (e.g., comment and update often, post news and links to the original source) and are perceived to be well-read and have in-depth knowledge of certain topics, which conveys a sense of expertise (Bergström & Jervelycke Belfrage, 2018).

The ease of access to and engagement with news on social networking sites, together with the role of social contacts and opinion leaders in filtering news, contribute to the popularity of these platforms as news sources. The apps and notifications pushed out to users further entrench the predominance of social networking sites in people's information diet (Antunovic, 2018).

2.4. Indicators of trustworthiness and authentication practices

Given that information users are subject to information overload on a daily basis, they rely on various heuristics to help them assess the usefulness, value and trustworthiness of a piece of information. People's assessment takes place at the message level — where they consider if the reporting is fair and unbiased (Gaziano & McGrath, 1986; McCroskey et al., 1999) — and at the source level as well. Source credibility has been shown to be an important determinant of participants' perception of message credibility. While information consumers at times rely on cues such as recency and the number of related articles, source credibility has emerged to be a powerful cue that affects people's perceived trustworthiness of a message. A large body of work has shed light on the various types of cues that affect people's credibility assessment of a source. They include information about the authors (e.g., details about their backgrounds and qualification), name and URL of the site, and cues located either at the target sites (e.g., absence of advertisements, linking of sources) or at the sub-pages of these sites (e.g., terms and conditions pages relating to encryption and privacy) (Johnson & Wiedenbeck, 2009; Fogg et al.,2001; Metzger et al., 2003; Wathen & Burkell, 2002).

In general, high source credibility overrides people's considerations of recency and number of related articles when evaluating the credibility of a message (Sundar et al., 2007). When it comes to news, source credibility is connected to people's trust in the media — whether news items are reliable and have integrity (Tandoc et al., 2018). Despite the proliferation of social media, which facilitates information sharing among friends and family members, news organisations continue to enjoy high trust. A recent study by Tandoc (2019) found that news articles shared by news organisations on

social media were rated to be more credible than those shared by one's friends on a social networking site (e.g., Facebook).

Increasingly, people's trust in the source is shaped by the channel through which they obtain the information. Studies have shown that besides becoming the main information-foraging tool, search engines (e.g., Google Search) also influence people's trust in information sources. Regardless of their background, most people would begin their initial search on a topic using Google Search. In the case of respondents in a study on online health information search, Google Search served as the gateway to a wide array of health resources — Wikipedia, WebMD and specialised health sites (e.g., Diabetes Association) (Macias et al., 2018). Another study found that the main reason accounting for Google Search's popularity as an information search tool is its intuitive and simple user design (e.g., its auto-search suggestions), which affords positive user experience. The ranked order of search results was also found to influence people's choices in what sources to follow up on (Unkel & Haas, 2017).

The prevalence of misinformation and disinformation has led researchers to examine people's authentication practices, defined as how they determine the veracity of information. Tandoc et al.'s study (2018) involving 2,501 Singaporeans shed light on how they authenticate the information they encountered on social media. Essentially, the researchers found two main categories of authentication practices — internal and external. When people engage in internal practices, they rely on: (1) the self (i.e., their own wisdom, instinct, and insight); (2) the source (i.e., source of the news); and (3) the message (i.e., intrinsic tone and characteristics of the news item itself). People also take into consideration popularity cues, such as the number of likes, comments, or shares, when determining the authenticity of a piece of information. However, people turn to external sources when their internal practices fail to reach a conclusive determination. External authentication involves intentionally seeking information from social networks or institutional sources, which takes place either incidentally (i.e., when people rely passively on external sources for authentication) or intentionally (i.e., when people actively seek out external sources). The sources that people turn to when engaging in external authentication can be interpersonal (e.g., one's own network of social media friends) or institutional (e.g., formal hierarchies and organisations such as news outlets and Google).

2.5. Effectiveness of literacy interventions using different modalities

While substantial research has been conducted on assessing the efficacy of different literacy interventions delivered using different modalities, most

studies have been done in the areas of education, medicine, and health communications. In addition, participants for such studies have often been recruited from targeted segments of the population to meet specific research needs. Examples of such homogeneous samples include college students, low-income mothers, the elderly, or those with health conditions like diabetes or cancer where the examined modalities were designed for such health conditions.

Most studies have also focused on comparing the effectiveness of two modalities, predominantly "static" modalities (e.g., posters, written manuals, pamphlets) and "multimedia" modalities (i.e., a combination of textual, visual and audio information such as animations, video games and voiceover narrations). Few studies have examined the effectiveness of more than two modalities in a single study.

Existing studies have examined the effectiveness of a modality in various ways. In a study on the value of infographics in simplifying complex information, for instance, Elena-Gallagher et al. (2017) looked at four key outcomes: (1) retention or recall of the information presented; (2) comprehension or understanding of the infographic; (3) appeal or likeability of the visuals used in the infographic; and (4) application or transfer of knowledge gained from the infographic to similar situations. On top of these, studies have also looked at other aspects including perceived clarity (i.e., how clear a modality was to be), perceived usefulness of the information to themselves and others around them, and the degree to which the information provided would be used in the future (Limperos et al., 2015; Silk et al., 2018).

Such dimensions are measured at different levels. One example is the use of self-reporting measures, such as by asking respondents to rate their views about a modality (e.g., perceived usefulness, visual appeal) on a Likert scale (Armstrong et al., 2011; Kim & Utz, 2019). Other forms of measurement include designing questions that directly assess respondents' ability to perform a specific task. For example, outcomes such as one's ability to accurately recall information and level of knowledge gained are often measured by comparing pre- and post-test scores to multiple-choice quizzes to calculate the extent of knowledge increase (Elbert et al., 2016). Another method, known as the "transfer test", involves presenting respondents with scenarios or problems that require more than just information recall, but also their ability to apply the knowledge gained in other contexts to problem-solve (Mayer & Moreno, 2003). Finally, observable changes in behavioural or health outcomes (e.g., weight loss, higher intake of vegetables, increased frequency in high-intensity exercise) are often measured in studies that

examine the effectiveness of health literacy interventions (Walthouwer et al., 2015; Fitzpatrick et al., 2016).

Despite the paucity of studies that compare modality efficacy in the context of false information, similar studies in other areas provide valuable insights on the strengths and limitations of different modalities on desired outcomes, such as people's level of understanding, recall of information and self-efficacy, application of skills and knowledge in everyday life, as well as other behavioural changes.

2.6. Strengths of infographics as visual communication

An infographic is defined as the "*visual media that present data and concepts using visual imagery and aim to convey information in a clear, rapid and aesthetic manner*" (Elena-Gallagher, 2017, p. 130). Existing research on the effectiveness of infographics has suggested that they are particularly useful in simplifying complex topics as they condense information in a short and concise manner. Furthermore, infographics often lead to better engagement and learning outcomes by increasing audience enjoyment and satisfaction through the use of aesthetically pleasing designs.

Infographics have been increasingly used by educators as a way to introduce new topics and knowledge to students. In a study by Elena-Gallagher et al. (2017) comprising 1,900 students, the researchers found that almost 90 per cent of the students had a strong understanding of the infographics' content, with over 80 per cent of them saying that the infographics were useful in clarifying key concepts, helping them to remember key information, and summarising content. A thematic analysis of students' feedback also suggested that many students wanted to retain copies of the infographics for future use, with keywords like "print" and "download" being frequently mentioned in their feedback.

Similarly, another study found that infographics helped students better organise large volumes of information, which facilitated their comprehension and content recall. Infographics also led to a stronger motivation to research the topic further, suggesting higher engagement levels and a greater interest to continue learning (Cupita & Franco, 2019).

2.7. Strengths of multimedia modalities for deep learning

Compared with static modalities (e.g., printed text, posters, infographics), multimedia modalities such as videos and animations possess their own set of strengths. According to Mayer's Cognitive Theory of Multimedia Learning, deep, meaningful and comprehensive learning is promoted when

information is presented through multimedia modalities, such as through a combination of animations/graphics and text, when compared with static modalities (e.g., purely text). This is because the former prevents cognitive overload; when individuals receive an audio-visual information for instance, they process the information through separate sensory channels (i.e., both auditory and visual) to make meaningful interpretations and connections, rather than relying solely on one sensory channel to process the information (Mayer & Moreno, 2002).

In a study conducted by Mayer and Anderson, for example, respondents were asked to listen either to a narration on how bicycle pumps worked before watching an animation, or to listen to the same narration concurrently with the animation. The study found that those from the latter group were 50 per cent more likely to provide useful and creative solutions to problems scenarios, reiterating the usefulness of multimedia modalities for learning, understanding and transfer of knowledge and skills (Mayer & Anderson, 1991). These findings have been supported by other studies as well (Mayer & Gallini, 1990; Höffler & Leutner, 2007).

In addition to producing higher levels of understanding and recall, multimedia modalities have also been found to generate higher engagement and satisfaction among audiences. The visual and emotional appeal of multimedia modalities capture and sustain attention and interest for longer periods of time. This increased attention in turn stimulates the central route of persuasion (i.e., cognitive route), resulting in deeper engagement with the content presented (Cacioppo & Petty, 1984). For example, a study by Walthouwer et al. (2015) that compared two modalities (video versus text message) of an obesity prevention intervention found that respondents rated the video more positively on feelings of relatedness, usefulness and overall learning experience than the text message. The researchers argued that this stronger appreciation for the video was key to nudging behavioural changes (e.g., reduction of respondents' BMI and daily consumption of energy-dense foods) as it persuaded respondents to take the health messages more seriously.

Finally, studies have also shown that people generally prefer multimedia modalities to static ones even when both produce similar outcomes on understanding and recall. Hence, researchers recommend investing in multimedia modalities for content presentation for better long-term learning outcomes and behaviours (Veronikas & Maushak, 2005; Sachs, 2013).

2.8. Influence of demographic factors on modality effectiveness

Finally, existing studies have also suggested that the effectiveness of different modalities can also be influenced by demographic factors such as age, education level and socio-economic status.

Most studies in the field have examined the influence of age on the effectiveness of different modalities. Some researchers argue that information delivery through multimedia modalities may work better for the elderly. According to the Cognitive Aging Principle in Multimedia Learning, the neural and metabolic capability of the human brain declines with age, affecting reading, comprehension and recall abilities. Exposure to large and complex volumes of information exacerbates this cognitive strain. One way to alleviate this cognitive strain is to deliver information through multimedia modalities, which leads to information processing through separate sensory channels (e.g., visual, and auditory), thereby reducing the cognitive load otherwise experienced if information were processed through a single sensory channel (van Gerven, et al., 2006).

In a study by Rogers et al. (2001) for example, two groups of respondents — aged 17 to 24 years old and 65 to 74 years old — were presented with either a text-based or video-based blood glucose meter instruction manual, before being assessed on their knowledge gain, recall of key information, and confidence in operating the device. The study found that although the video-based manual was more effective than the text-based manual for both groups, older respondents who were presented with the video-based manual saw a greater increase in knowledge gain, retention of information, and confidence in operating the device than those who were presented with the text-based manual, compared with the younger respondents. This effect of age has also been observed in other similar studies (Sengpiel & Wandke, 2010). Furthermore, some studies have also suggested that the positive effects of multimedia modalities on older audiences can be augmented using a conversational style of communication (i.e., presenting the content through personal stories or testimonials) (Bol et al., 2015). Other studies have also highlighted that the effectiveness can be maximised by pacing the speed of information delivery to suit the needs of older audiences. Due to their weakening cognitive function, older persons may need more time to process the same amount of information than younger persons (Meppelink et al., 2015; Callahan et al., 2003).

Existing studies have also addressed the influence of other demographic factors like ethnicity, education level and socio-economic status on the effectiveness of different modalities. For example, a study by Greaney et al.

(2014) looking at the factors affecting individuals' preference for print or web-based health intervention materials found that white respondents and respondents from higher household financial statuses were more likely to prefer web-based interventions over print intervention materials. Another study that compared the effectiveness of a text-based versus video-based smoking cessation intervention found that the video-based intervention worked better than the text-based one, regardless of respondents' educational level (low, middle or high). This was contrary to the researchers' initial hypothesis that video-based interventions may only be more effective for individuals with higher education levels (Stanczyk et al., 2014).

Finally, apart from demographic factors, existing research has also looked at the influence of some non-demographic factors — such as people's pre-existing level of literacy (e.g., health literacy) (Polite et al., 2019; Meppelink et al., 2015) or comfort level with a particular medium (e.g., comfort with using the Internet) (Greaney et al., 2014) — to understand how that influences people's receptiveness to and the effectiveness of different modalities.

2.9. Gaps in the literature

This literature review highlights clear gaps pertaining to people's information authentication strategies in response to false information, and in understanding the efficacy of literacy interventions delivered using different modalities, which Phase 2 and Phase 3 of this study seek to fill, respectively.

First, there is a dearth of empirical research on false information done in the context of Singapore, with many existing studies being largely Western-centric. Furthermore, available research on the topic also tends to be quantitative in nature, with few studies taking a qualitative approach to understanding the problem of false information. As the Methodology section (Section 3) will explain in greater detail, qualitative approaches hold certain advantages over quantitative methods, especially when understanding people's information authentication strategies in response to false information. For example, qualitative approaches involving observations and interviews better capture people's online behaviours in response to encountering false information, and allow for deep dives to reveal what drives people's actions, underlying attitudes towards, and values and meanings attached to concepts such as "fake news", "credibility" and "trustworthiness". Such insights and nuances may not be captured by quantitative approaches like surveys.

When it comes to comparing the efficacy of literacy interventions delivered through different modalities, there is also a paucity of research on the topic. As mentioned earlier, existing studies on comparing modality efficacy used in interventions have largely been done in the fields of health literacy and education, but not in the context of false information. In other words, there is a knowledge gap pertaining to the strengths and weaknesses of existing strategies used in current literacy programmes that educate people about false information, and what needs to be improved to facilitate better learning and behavioural outcomes. Furthermore, existing research has largely been done on individuals from specific segments of the population (e.g., diabetic patients, college students). Hence, the findings from such studies might not be directly generalisable to the broader population.

Chapter 3

Methodology

CHAPTER 3: METHODOLOGY

In this section, we present the methodologies used in Phase 2 (people's news and information-seeking processes, and their verification strategies) and Phase 3 of the study (comparing the efficacy of different modalities for the National Library Board [NLB]'s S.U.R.E. framework). Section 3.1. focuses on self-confrontation interviews that were used for Phase 2, and Section 3.2. details the mixed method (survey and experiment) used for Phase 3.

3.1. Phase 2 — Self-confrontation interview

In Phase 2, we used the self-confrontation interview method to examine Singaporeans' immunity against false information, by understanding their online news consumption habits, and responses and strategies pertaining to false information.

Traditionally, the self-confrontation interview method has been used in psychology studies, for instance, to improve career counselling outcomes by understanding individuals' decision-making processes (Visser, 2016), and to assess the mental state and risk level of people who attempted suicide (Valach et al., 2002). In a typical self-confrontation interview, respondents are asked to perform the behaviour that is being analysed while their actions are video recorded. Subsequently, respondents are asked to view the video recording of their own actions. Researchers will pause the video recording at certain junctures to elicit responses from respondents, such as by asking them to recount their thoughts and emotions when they were performing those actions.

In the context of the Internet, this methodology has also been used to understand online shopping behavior (Lim, 2002). Given the complex nature of how both human factors and online affordances (e.g., user interface design, functionalities of a webpage) interact to shape individuals' actions online, the self-confrontation interview method provides researchers with a way to clearly chart online actions while understanding the cognitive and affective processes that guide those actions. Subsequently, the method has been used in other similar contexts such as to understand news exposure and news engagement on Facebook (Kümpel, 2019). However, the potential of the self-confrontation method remains under-tapped, largely due to the labour-intensive nature of the method.

While the qualitative data collected from self-confrontation interviews may not provide a representative picture of the population, this methodology holds certain advantages over quantitative approaches like surveys. First,

as mentioned earlier, the self-confrontation interview method has the unique advantage of allowing researchers to perform a within-method triangulation between observations and interview responses, and understand the mental factors that underpin people's decision-making processes and online behaviours. This complex nature of online behaviours — shaped by the interaction between human factors and the dynamic nature of the online space — is not something that can be fully understood by quantitative methods.

Second, the self-confrontation interview method uses a semi-structured interview guide to elicit responses from respondents, which provides researchers with the flexibility to probe deeper to uncover more nuanced responses pertaining to people's online behaviours. In addition, the self-introspection element that is embedded in the design of the method allows for more accurate retrieval of thoughts and emotions, as the video recording reminds respondents of their actions. As such, the time lapse between participants' action and recall is also minimal. Altogether, the self-confrontation interview method can effectively stimulate richer and more accurate responses from respondents.

Finally, given the paucity of existing research in the area of understanding strategies and responses to false information online in Singapore, qualitative methods like the self-confrontation interview method can contribute to the development of new research variables for future research (e.g. surveys).

3.1.1. Sample and interview design

Respondents for the Phase 2 self-confrontation interviews were recruited from the same pool of 2,011 respondents who had participated in Phase 1 of the study and had given their consent to be re-contacted to participate in subsequent phases of the study. Given the design of our study, we also ensured that the respondents who participated were generally comfortable with using a laptop by themselves or with minimal help. The self-confrontation interviews were carried out either in-person or virtually. Given that the fieldwork commenced after Phase 2 re-opening during COVID-19 pandemic, we provided the options to respondents to participate in the study in-person or virtually. Respondents were given a $50 NTUC voucher as a token of appreciation for participating in the study.

Prior to the actual study, eight pilot interviews were conducted to: (1) test the flow and design of the self-confrontation interview (from consent taking to completion of the interview); (2) gather feedback on design of the study and phrasing of interview questions; and (3) fine-tune operational procedures and logistics support. The fieldwork was conducted between 21 July 2020

and 26 October 2020. A total of 50 respondents were interviewed during Phase 2 of the study. While hard quotas were not set for the recruitment of these 50 respondents, steps were taken to ensure that there was a good mix of respondents in terms of age, gender, ethnicity, education, socio-economic status, and information user type.[4] Table 1 below shows a summary profile of the respondents who participated in Phase 2 of the study.

Table 1: Number of Phase 2 respondents by age, gender, ethnicity, education, housing type, information user type, and interview mode

Demographics		**Number of respondents**
Age	Youths (18-34 years old)	18
	Middle-aged (35-59 years old)	24
	Seniors (60 years old and above)	8
Gender	Male	26
	Female	24
Ethnicity	Chinese	37
	Malay	6
	Indian & Others	7
Education	Secondary and below	9
	Post-secondary (non-tertiary)	5
	Diploma and professional qualification	14
	University and above	22
Housing	HDB 1-3 Room Flat	12
	HDB 4-5 Room Flat	28
	Private housing (condominium, landed property)	10
Information user type	Disengaged	12
	Overconfident	13
	Diffident	13
	Savvy	12

[4] The typology comprising four information user types (Informationally Savvy, Informationally Disengaged, Informationally Diffident, and Informationally Overconfident) was generated from a cluster analysis conducted in Phase 1 of the study. For information on each information user type, refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 6.8.).

Interview mode	In-person	30
	Virtual	20

In-person self-confrontation interviews

In-person self-confrontation interviews were conducted either at the Institute of Policy Studies, or at a location of respondents' choice, and at a time that was convenient to them. Respondents were provided a laptop with an Internet connection for the interview. Each self-confrontation interview lasted between 60 and 90 minutes.

During the in-person self-confrontation interviews, interviewers first asked respondents to briefly describe their typical news information-seeking routine. Following which, respondents were asked to spend five minutes performing those described activities as they usually would in their everyday lives (on the laptop provided), while their on-screen activities were being video recorded using the Camtasia software with their knowledge. Respondents were told that they were free to visit any website or social media platform that came to mind, and were then left to browse independently, without interference by interviewers.

After five minutes, interviewers presented respondents with an article containing false information for them to read and to determine the veracity of the information. Respondents were given about 10 to 15 minutes to perform this task. Respondents were free to use the Internet in any way that they wished to facilitate their information verification process. Again, their on-screen activities were video recorded using the Camtasia software with their knowledge.

Subsequently, the video recordings were played back to the respondents, where interviewers paused at certain junctures of the video recordings to elicit comments from them about their on-screen activities at the time, guided by a semi-structured interview guide. Respondents were asked to recount any thoughts and feelings that might have guided their on-screen activities, and also to point out exactly what they were looking at on the screen when such information could not be gleaned from the video recordings.

At the end of the interview, interviewers debriefed respondents to inform them that the article that they had read as part of the study had been fact-checked by various established and reputable fact-checking organisations, such as Snopes and Full Fact, and contained unverified information and false claims.

Virtual self-confrontation interviews

For respondents who chose to participate in Phase 2 of the study virtually, interviewers conducted the interviews via Zoom, and at a time that was convenient to respondents. Similar to the in-person interviews, the virtual self-confrontation interviews lasted between 60 and 90 minutes each.

During the virtual interview, interviewers similarly asked respondents to describe their typical news information-seeking routine, before asking them to share their computer screen with interviewers via the "share screen" function on Zoom to perform the two activities described previously. Respondents' on-screen activities were video recorded using the Camtasia software, with their knowledge. Subsequently, interviewers played the video recordings back to respondents using the "share screen" function, where interviewers stopped at different junctures of the video recordings to elicit comments from the respondents about their on-screen activities at the time. At the end of the interview, interviewers similarly debriefed respondents to inform them that the article that they had read as part of the study had been fact-checked by various established and reputable fact-checking organisations and is false.

3.1.2. Data analysis

Upon completion of the fieldwork, the interviews were coded and analysed to identify emerging themes and uncover nuances that informed the data analysis as it progressed. We identified the following five meta-themes with multiple sub-themes under each meta-theme as presented in Table 2 below.

Table 2: Meta-themes and sub-themes identified in data analysis

No.	Meta-theme	Examples of sub-themes
1	Media use for news information	• Frequency and popularity of different information sources • Motivations for news information seeking and engagement • Attitudes towards different information sources
2	Information processing	• Signposts of credibility and trustworthiness • Informational, cognitive and emotional factors that shape information processing and verification

3	Information verification strategies	• Responses to false information • Internal and external authentication strategies
4	Views and attitudes towards fake news	• Definition of fake news • Concerns about the problem of fake news
5	Interpersonal and institutional interventions	• Reasons for being active or inactive in debunking false information • Views on policies and legislation pertaining to information and speech regulation

3.2. Phase 3 — Experiment and survey

Phase 3 of the study used a mixed methodology, comprising a survey and an experiment, to understand the effects of different modalities (i.e., PowerPoint, infographic, video) that were used to deliver the NLB's S.U.R.E. framework. The framework was launched in 2013 and promotes the importance of information searching and assessment to the general public. The acronym "S.U.R.E." stands for Source, Understand, Research, Evaluate — four steps and sets of practices that people should be mindful of when assessing the reliability of news.[5] Phase 3 also examined whether certain modalities produced better learning outcomes for certain demographics.

3.2.1. Sample and questionnaire design

Respondents for Phase 3 were recruited from the same pool of 2,011 respondents who had earlier participated in the Phase 1 survey and had given their consent to be re-contacted to participate in subsequent phases of the study. In addition to those who gave explicit consent to be re-contacted, we also recruited respondents who had completed the Phase 1 survey in English.[6]

We identified a total of 1,388 respondents (out of 2,011) who had given their consent to be re-contacted for subsequent phases of the study and had completed the Phase 1 survey in English. These respondents were then randomly split into three equal groups prior to recruitment. Each group was assigned a specific modality — PowerPoint, infographic or video — that

[5] More information on the S.U.R.E. framework is available at https://sure.nlb.gov.sg/
[6] In the Phase 1 survey, respondents were given the option to complete the survey in English, Mandarin or Malay. Only respondents who had completed our Phase 1 survey in English were considered for Phase 3 of the study because the S.U.R.E. framework materials were mostly available in English at the time of data collection.

delivered the S.U.R.E. framework (see Appendix 2 for screenshots of the three modalities). A total of 1,015 respondents took part in Phase 3. Tables 3 and 4 below show the breakdown of the respondents by the type of modality that they were exposed to, and by various demographic factors (e.g., age, gender, ethnicity).

Table 3: Distribution of Phase 3 respondents by type of modality

Type of modality	Number of respondents
PowerPoint	353
Infographic	339
Video	323
Total	1,015

Table 4: Percentage of respondents by citizenship, age, gender, ethnicity, education, housing type, and income

Demographics of respondents		Percentage (%) of respondents
Citizenship	Singapore Citizens	87.9
	Permanent Residents	12.1
Gender	Male	45.7
	Female	54.3
Age	18–20	6.9
	21–24	9.1
	25–29	9.6
	30–34	11.2
	35–39	11.4
	40–44	11.3
	45–49	7.6
	50–54	9.2
	55–59	8.7
	60–64	6.5
	65–69	4.6
	70–74	2.7
	75 & over	1.3
Ethnicity	Chinese	69.5
	Malay	15.3
	Indian/Others	15.3
Education	Below Secondary	5.4
	Secondary	20.4

	Post-Secondary (Non-Tertiary)	13.7
	Diploma and Professional Qualification	24.3
	University and above	36.2
Housing type	HDB 1- to 3-Room Flat	23.0
	HDB 4-Room Flat	35.7
	HDB 5-Room Flat / Executive Flat	24.0
	Private housing (condominium, landed property)	17.2
Monthly household income	No working person / Retiree household	8.1
	Below $1,000	2.8
	$1,000–$1,999	6.6
	$2,000–$2,999	9.4
	$3,000–$3,999	10.1
	$4,000–$4,999	9.7
	$5,000–$5,999	8.5
	$6,000–$6,999	7.4
	$7,000–$7,999	5.2
	$8,000–$8,999	7.4
	$9,000–$9,999	4.3
	$10,000 and above	20.7

After being given ample time to go through their assigned modality,[7] respondents were immediately asked to complete a survey questionnaire that collected data on the following:

1. Attitudes towards their assigned modality (e.g., visual attractiveness of the modality, how interesting it was);

2. Attitudes towards the S.U.R.E. framework (e.g., its perceived usefulness, clarity, helpfulness and applicability);

[7] Interviewers ensured that respondents viewed their assigned modality in its entirety by closely monitoring the time respondents took. For respondents who were presented with the PowerPoint and video, interviewers ensured that respondents viewed the content fully at least once. Respondents were also given as much time as they requested to revisit certain parts of the content or to view it multiple times before they started answering the questionnaire. For respondents presented with the infographic, interviewers encouraged respondents to read through the infographic fully and carefully before proceeding on to the survey.

3. Level of recall, knowledge, and understanding of the S.U.R.E. framework;

4. Self-efficacy in discerning online falsehoods and performing the S.U.R.E. steps.

To assess respondents' ability to put what they have learnt from the S.U.R.E. framework to practice, the survey also included a component that was designed to directly evaluate their ability to authenticate a piece of information. Respondents were presented with a news article that was published by a Singapore mass media. Respondents were asked to spend some time reading the news article and subsequently indicate whether they felt that the news article could be trusted.[8]

3.2.2. Data collection

IPS Social Lab was engaged for the data collection. Prior to the actual survey, a pilot survey was conducted to: (1) test the survey flow (from consent taking to completion of the survey); (2) gather feedback on the phrasing of survey questions and responses (e.g., in terms of length and clarity); and (3) fine-tune operational procedures and logistics support. A total of 20 pilot interviews were conducted on 10 November 2020, with respondents from different age groups.

Data collection for the actual survey was conducted between 30 November 2020 and 11 January 2021 via door-to-door household interviews using the computer-assisted data collected (CAPI) system. Prior to assigning interviewers to visit the selected households for interviews, invitation letters were mailed out two weeks in advance to inform respondents that they had been selected for the study.

IPS Social Lab conducted quality control checks via telephone call backs to ensure completeness, accuracy and consistency of the data collected — about 35 per cent of the data collected were validated via telephone call backs.

[8] Respondents were asked to indicate on a four-point Likert scale (from "untrustworthy" to "very trustworthy") the extent to which they trusted or distrusted the news article after reading it.

3.2.3. Data analysis

The IBM SPSS Statistics software (version 26) was used to analyse the survey data. The following data analyses were conducted and presented in this report:

1. Descriptive statistics to provide the top-line findings on each variable and to highlight emerging patterns in the data;

2. Independent t-tests, and one-way Analysis of Variance (ANOVA) and post-hoc tests[9] to determine if the mean scores in different groups (i.e., PowerPoint versus infographic versus video) differed significantly from each other;

3. Paired t-tests to determine if there were any changes in responses collected in Phases 1 and 3 of the study.[10] This allowed for a robust comparison of pre-intervention and post-intervention responses to determine the effects of the S.U.R.E. framework on respondents.

[9] Post-hoc tests were performed when one-way ANOVA revealed a statistically significant difference between groups (i.e., p-value < 0.05). For our analyses, the Tukey's HSD (Honest Significant Difference) post-hoc test was used when the data met the assumption of homogeneity of variances, whereas the Games-Howell post-hoc test was used when the data did not meet the assumption of homogeneity of variances.

[10] We repeated two questions in this survey that were asked in our Phase 1 survey: (1) "*I am confident that I can tell real information from false information*", and (2) "*I think I am better at spotting false information than the average person in Singapore*". Respondents were asked to indicate on a five-point Likert scale (from "strongly disagree" to "strongly agree") the extent to which they agreed or disagreed with the two statements.

Chapter 4

Main Findings for Phase 2

CHAPTER 4: MAIN FINDINGS FOR PHASE 2

This section presents the main findings of Phase 2 of the study. The findings are organised into four parts: (1) news-seeking habits, preferences and motivations (Section 4.1.); (2) trustworthy and credible sources (Section 4.2.); (3) information verification and fact-checking (Section 4.3.); and (4) "fake news" — what, how, whom? (Section 4.4.).

4.1. News-seeking habits, media preferences and motivations

4.1.1. Personalised consumption over and above dominance of topical issues

The self-confrontation interviews conducted with the 50 respondents during Phase 2 of the study shed light on Singaporeans' wide-ranging interests, options and preferences pertaining to news and information consumption. The topics ranged from politics (local and international) and education to business and health. As data collection for Phase 2 took place during the COVID-19 pandemic, topics relating to the coronavirus were naturally at the top of mind for many respondents. To keep themselves abreast of the rapidly developing situation, many respondents closely followed news pertaining to the spread and impact of the pandemic, the social-distancing measures that were rolled out by the government, and the various budget measures introduced to assist different segments of the population. Given the timing of the study, another topic that was followed closely by some respondents was then US President Donald Trump, particularly his handling of the pandemic in the country and his election bid.

Intentional news seeking: Interest and relevance

According to media theories such as the uses and gratifications theory by Katz et al., (1973) people seek information to fulfil specific needs. These needs include surveillance, entertainment, social and self-expression needs. Our interviews found that people's news and information-seeking behaviours were influenced by a wide range of motivations.

One key factor was relevance as respondents' personal interest drove their information seeking. Many respondents were often mindful of the time they spent reading news and information online. For example, a female respondent (55–59 years old) from the Informationally Savvy group said she did not like receiving or reading irrelevant information as it was a "*waste of time*".

> *"I don't like it when I receive information that is irrelevant to me. Jokes and stuff like that are fine, but information that is not relevant to me is a waste of time. But there are [relevant] information out there … someone drew a table to show what percentage of risk people carried with or without masks. I will look at those kinds of information."*
> ***— Respondent 1, female, 50–59 years old, Informationally Savvy group***

Respondents' information diet was also influenced by their occupations. Working professionals (e.g., in the IT, finance, education and health sectors) prioritised reading news and gathering information on topics relating to their work. For example, *The Financial Times*, *The Business Times*, and Bloomberg were sources that were popular among respondents who worked in the finance sector. A female respondent (35–39 years old) from the Informationally Savvy group who worked as a senior manager at a multi-national company followed US current affairs on a daily basis as her company's headquarters was based in the US. Another female respondent (40–44 years old) from the Informationally Diffident group who worked in a non-profit organisation followed news on socio-political developments in East Timor closely because she had to travel there regularly. Similarly, another male respondent (25–29 years old) from the Informationally Savvy group who worked in a bank regularly updated himself on the latest financial developments in the market because they were the primary "*conversation starter*" among his colleagues at work. Respondents who were not employed but who were full-time homemakers followed news on education closely as they had school-going children. For example, a female respondent (35–39 years old) from the Informationally Diffident group with two children regularly looked for information on the latest promotion deals and sales in addition to following news on education. She described this as something "*housewives and market aunties like to do*".

In general, across the sample of 50 respondents, there was an interest in "soft news", defined by respondents as "*gossip*", entertainment, and lifestyle news. In particular, "soft news" assumed a larger part of the diet of non-professional workers and those who were not employed. Respondents' motivations for reading "soft news" were entertainment-related — they read such news "*for fun*" and to relax. The need for diversion was particularly evident among respondents who were negatively affected by news on COVID-19 and the ramifications of the pandemic. News fatigue due to a perceived overwhelming volume of updates on the pandemic led to emotional fatigue. The negative news (e.g., the surge of cases around the world, number of fatalities, social-distancing measures) led to some respondents feeling "*depressed*" and intentionally "*switching off*" from the news. During the pandemic, especially in the initial months, the extensive

news coverage on the pandemic contributed to the rising anxiety felt by some respondents, who coped by not talking and reading about the pandemic. For example, a female respondent (35–39 years old) from the Informationally Diffident group said her frequency of news reading in general decreased as the pandemic worsened because she found the news to be "*very depressing*".

> *"Before COVID-19 I will go to the National Library to read newspapers. But because the news is very depressing these days, I've stopped reading it … the number [of COVID-19 cases and deaths] keeps increasing and the forecast of the economy is quite bad. From March and April [2020] onwards, I just let some of my friends filter some of the news to share with me … these days I stop trying to find out what is happening outside."* ***— Respondent 5, female, 35–39 years old, Informationally Diffident group***

A small number of respondents continued to closely monitor the latest developments because they wanted to keep up with the rapid changes (e.g., new social-distancing regulations) even though they found the news to be "overwhelming" at times. For example, a male respondent (25–29 years old) from the Informationally Overconfident group said he felt extremely worried over the increasing cost of living and prospects of his job security. However, he felt that the uncertainties were all the more a compelling reason for him to "*pay close attention*" to the news so he could be "*mentally prepared for the future*". Another male respondent (30–34 years old) from the Informationally Overconfident group shared a similar sentiment where he felt that it was important for him to stay updated on current affairs to "*better prepare for what was coming ahead*".

Incidental news exposure: Online and offline

In addition to respondents' personal interests, relevance to their lives, and currency of specific events, incidental exposure was another regular feature of respondents' news seeking (Niederdeppe et al., 2007; Antunovic et al., 2018). Their curiosity was often piqued by the novelty of the information when they engaged in news and information scanning. They then performed directed consumption by clicking on links and articles provided to find out more about the topic or event. Framing and presentation of an issue played an important part in attracting news consumers. News also served a social utility for some respondents. These respondents said they read up or read more about specific topics so that they could engage in conversations with their friends and family members. For example, a female respondent (21–24 years old) from the Informationally Diffident group said she and her friends would regularly share breaking news updates on Telegram with one

another and discuss them. Another female respondent (35–39 years old) from the Informationally Diffident group said she had nightly WhatsApp calls with her friends during the Circuit Breaker period where they shared the latest news on the Singapore General Elections and COVID-19. A handful of respondents with school-going children also read up on current affairs so that they could engage in discussions with their children. For example, a female respondent (40–44 years old) from the Informationally Overconfident group said she read up about the Beirut explosion because her daughter had previously brought up the topic. In other words, what came across from some respondents, especially the younger and middle-aged ones as well as working professionals, was an underlying desire to present themselves as informed and well-versed in current affairs.

4.1.2. Deliberate usage of different platforms

Turning to different sources for "heavy" and "light" news

Across the sample, digital sources formed the core of respondents' news and information diet, with respondents associating different types of news with different media. For instance, "heavy" or "serious" news was associated with *The Straits Times*, Channel NewsAsia and foreign media such as the BBC and *The Guardian*. Most respondents described these sources as being "*official*", "*formal*" and "*established*". These sources were perceived to present news in a purely factual manner that was supported by facts and figures. This was a primary reason why respondents relied on them for "*heavy*" and "*serious*" news. On the other hand, "*light*" news was associated with online-only news sites such as Mothership, STOMP and Must Share News. For example, a female respondent (35–39 years old) from the Informationally Overconfident group said she enjoyed reading Mothership because its articles were "*fun and interesting*". Another female respondent (35–39 years old) from the Informationally Diffident group described Mothership's news as a "*kaypoh*" (i.e., "busybody") news — "*news that may not be accurate, but just fun to read*". Besides using different news sites for different types of news, respondents also segregated media platforms based on the functions they served. For example, Google was used by most of the respondents for "hard news" (e.g., current affairs) and MSN for "soft news" (e.g., entertainment news).

Social media as a convenient "one-stop portal"

Social media was one of the most popular platforms used by respondents to follow news published by the above sources, with many of them citing Facebook and YouTube (for news from Channel NewsAsia and *The Straits Times*). Almost all young respondents relied on social media for news. A

significant number of the respondents said they followed legacy media such as *The Straits Times*, Channel NewsAsia and Mothership on Facebook, which provided a convenient way for them to receive alerts of breaking news. For example, a female respondent (35–39 years old) from the Informationally Diffident group said it was easy to get news and information from different sources on Facebook because all she had to do was to browse through her Facebook news feed and "*everything comes up*". She added that Facebook was useful for directing her to both verified and reliable news sources, and other topics of interest such as shopping, education, and celebrity gossips.

While Facebook and YouTube were ubiquitous across the different age groups, younger respondents were also likely to turn to Twitter and discussion forums such as Reddit for information and news. For example, a male respondent (25–29 years old) from the Informationally Overconfident group described Twitter as the "*best source of news updates*" because of the easy access to the "*most updated information*" from a variety of news sources, including *The Straits Times* and *The New York Times*, within a single platform. Similarly, a male respondent (30–34 years old) from the same group said that he liked the design of Twitter's feed where he could easily scroll through various local and international news from a variety of sources.

When it came to discussion forums like Reddit and Hardware Zone, respondents appreciated being able to read other people's opinions and views on a broad range of topics such as career and employment. For example, a male respondent (25–29 years old) from the Informationally Disengaged group, who had just graduated, felt that the comments posted on Reddit pertaining to career and employment sometimes provided useful advice to them.

> *"As a fresh graduate, I'm interested in people's career progression. The personal stories shared in the comments provide a different viewpoint. Sometimes the comments also provide advice on careers ... when it comes to news, people will also either share their own experiences or provide more factual information in the comments. That's why I find [discussion forums] beneficial."* **— *Respondent 26, male, 25–29 years old, Informationally Disengaged group***

Besides aggregating news from different news sources, social media was popular among respondents as they served as "one-stop portals" that served up a mix of serious news, entertainment and lifestyle news, and personal updates from friends, meeting both information and social needs. For

example, a female respondent (21–24 years old) from the Informationally Savvy group said this good mix of news on social media prevented her from being "*bombarded with too much of negativity*".

Search engines as a "go-to" for comprehensive news

Besides the abovementioned news sites and social media, Google's search engine was cited by many respondents as an important source of information. Many respondents across all four information user types said Google Search was their first port of call and their "*go-to*" when they wanted to scan and browse the latest news. Google Search was selected for several reasons. First, it was seen as an established and familiar brand, given that most of the users had a long history using the search engine and Gmail for their personal and professional use. Hence, using Google's services became an entrenched habit for many respondents. Many respondents felt naturally inclined to use Google Search as a starting base to conduct their news seeking and verification. Respondents who had been using Google Search also found its search results relevant because of Google's predictive algorithms, which encouraged them to continue using it as their main source of information. For example, a male respondent (18–20 years old) from the Informationally Savvy group shared that whenever he used Google's Chrome browser for information search, there would be a "drop-down menu" which recommended a list of interesting articles from various sources to him, based on his previous search patterns.

Second, Google Search served as a gateway to a broad range of topics and to different source types (e.g., news outlets, social media, discussion forums, websites, information portals and fact-checkers), making it a convenient and comprehensive information source. For example, a female respondent (40–44 years old) from the Informationally Savvy group said she frequently used Google News because it presented her with personalised and interesting news curated by Google's algorithms based on her past reading patterns. She would also browse Google News whenever she felt bored to discover new and interesting content. There was an element of serendipity given the higher level of unpredictability of what results would emerge from respondents' keyword searches. This echoes what was established by existing studies on Google Search facilitating incidental exposure.

Third, the user-friendly interface of both Google Search and Google News was cited by some respondents as a factor that encouraged their use. A female respondent (30–34 years old) from the Informationally Savvy group said she found Google Search to be very "*user-friendly*", which is why she did not need to explore using other search engines. The clean interface of

Google Search made it easy for users to navigate different news sites. There was a stark clamour for minimalism in a cluttered online environment.

4.1.3. Apps and social media driving mobile ubiquity

A "mobile first, digital first" news routine

Respondents' mobile devices assumed a central role in their news and information-seeking routines. Mobile devices, in particular the smartphone, provided a convenient channel for respondents to obtain the latest news and receive alerts on developments, facilitating "news consumption on-the-go". In addition to the portability of news made possible by mobile devices, the other reason that accounted for the prevalence of mobile consumption among the respondents was the simple and clean layout of news on mobile versions of news sites, which made for easy reading. Some users also appreciated reading the news on mobile devices as smaller screens meant processing less information at a time. This was in contrast to devices with larger screens (e.g., laptops) that required them to process more information at a given moment (see Images 1 and 2 for this comparison).

> *"The news on the desktop version is more spread out … you have to read through every headline before you decide which one to open … you need to read everything and choose which article is more important because of this [layout], as compared to the mobile version where you scroll through one headline at a time."* ***— Respondent 11, male, 18–20 years old, Informationally Savvy group***

Image 1: Layout of Channel NewsAsia's website on a mobile device

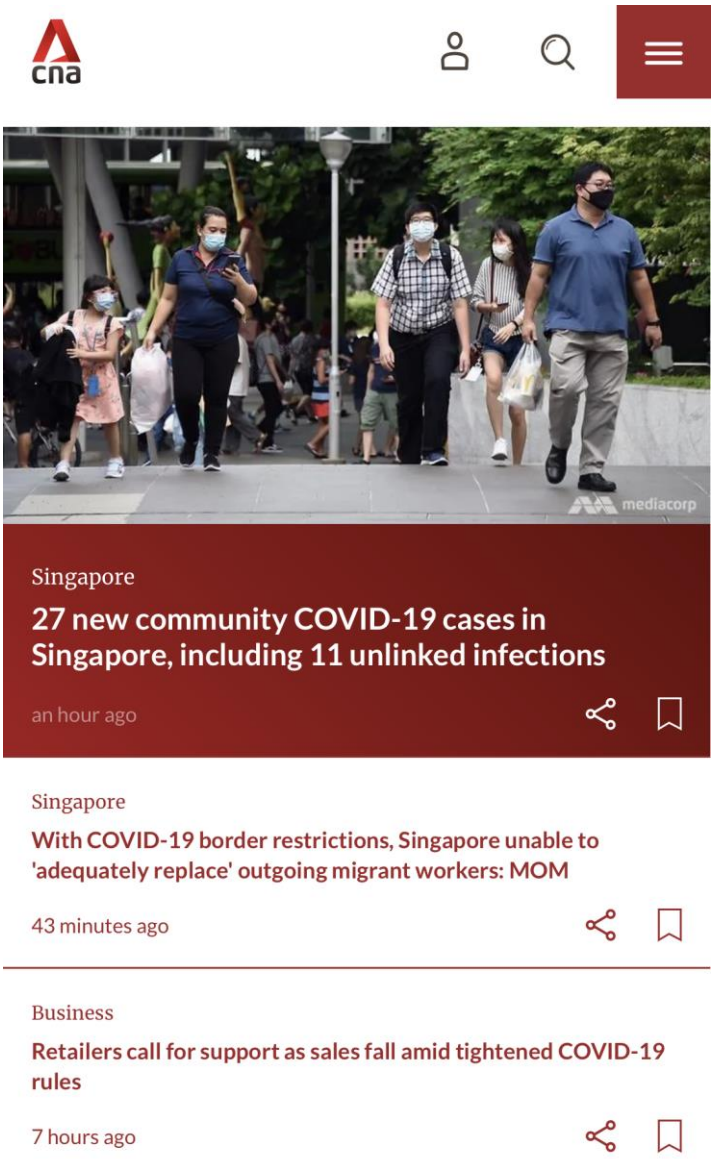
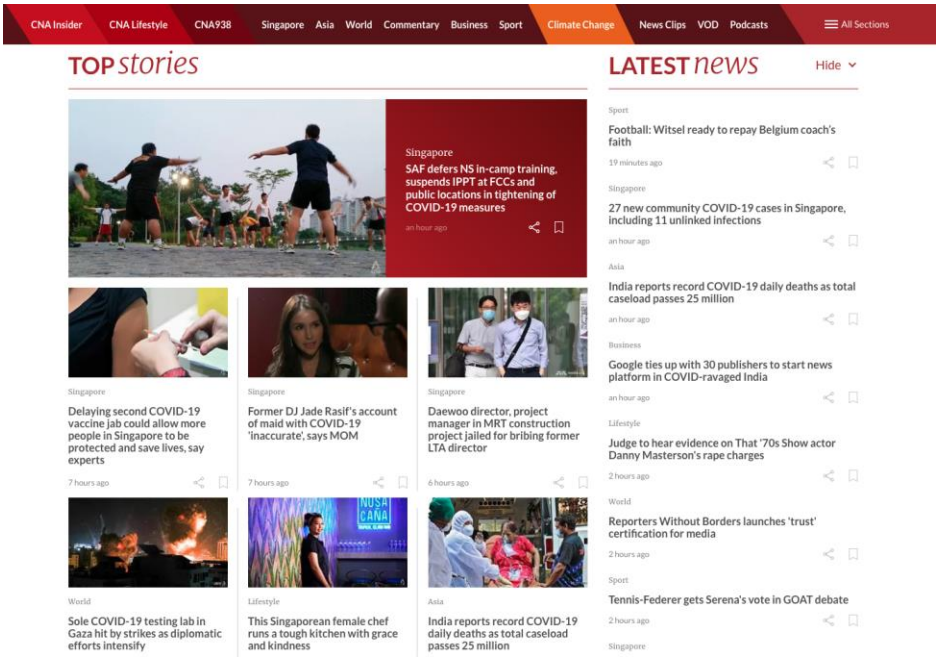


Image 2: Layout of Channel NewsAsia's website on a laptop



While most respondents relied on their mobile phones for news and information, a minority still relied on their laptops and desktops for information-seeking and reading of news. The latter group explained that they did so when carrying out "deeper reading" of news for school or work purposes or for conducting research on specific news topics where they might have to toggle between multiple webpages. Several respondents also explained that they could concentrate better due to the bigger screen and font size, and were also less distracted from the alerts and messages they received on their mobile devices.

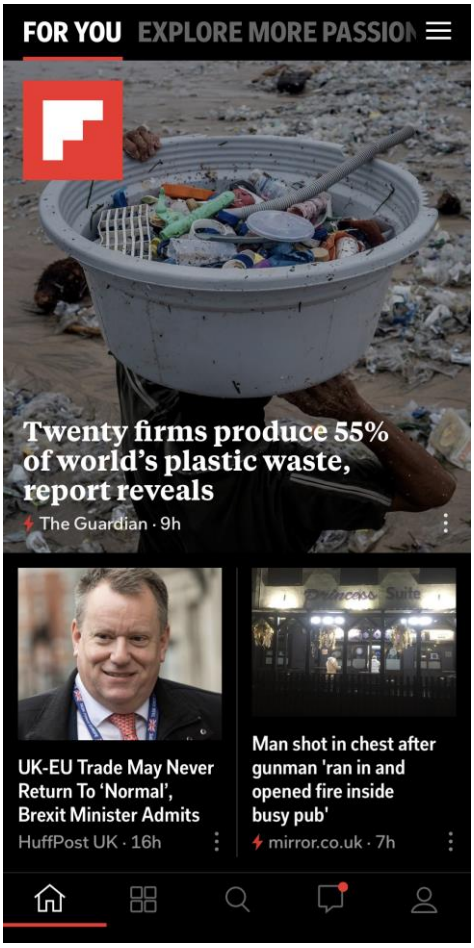
The majority of the respondents expressed a preference for digital news sources. This was because they perceived digital sources to provide timelier updates compared with traditional sources such as print newspapers, radio and television. Only a small handful of respondents, typically older respondents, still had the practice of buying print newspapers. While many respondents turned to digital versions of newspapers and television (e.g., Channel NewsAsia, *The Straits Times*, TODAY Online), none of the respondents in the sample tuned in to radio on the go. Nonetheless, television was still cited as a source of news by a small group of the respondents. Most of these respondents typically did so because their family members (e.g., their parents) were using the medium. For example, a male

respondent (80–84 years old) from the Informationally Disengaged group said he watched the news on Suria every night and that his family members would watch the news with him and explain what was happening to him. In other words, compared with other media types, television was a medium that facilitated family consumption. Some of these respondents also preferred television news because they had high trust in it. For example, a male respondent (60–64 years old) from the Informationally Disengaged group said he watched the news on Channel 8 daily because it was more "*reliable and factual*" compared with print newspapers. He explained that television news was more "*open and public*" and hence subject to stringent checks and controls by the government.

The third reason that accounted for the popularity of mobile devices for news and information consumption was the growing number of free apps available that users could download. A number of respondents said they read news from free e-newspapers made available by the National Library Board app. Other news apps that were used by some respondents included Flipboard[11] — an app that was pre-installed in some mobile phone models (see Image 3). For example, a female respondent (40–44 years old) from the Informationally Diffident group said, "*I can classify articles in Flipboard according to countries … because it is an American app, the initial pages they show are US based, but there are [also] different news pages that they share like The Guardian*, Forbes *and Reuters which I read*".

[11] Flipboard is an app that was developed in July 2010. It functions as a news aggregator and users are able to access content from social media and a range of websites.

Image 3: News aggregator app, Flipboard



Social sources of news: Platforms and people

As mentioned earlier, respondents were following developments surrounding the COVID-19 pandemic closely. The Gov.sg WhatsApp channel was cited by many respondents as an important information source that they used to keep track of the number of local cases and fatalities, social-distancing measures, and travel restrictions. However, for the small number of respondents who refrained from downloading apps to avoid cluttering their phones, social media played an important part as it was a "one-stop shop" that enabled them to keep abreast of the latest news (through alerts from the news sites that they followed and through friends' sharing) as well as to stay in touch with their friends and family members.

The Phase 1 survey showed that Instant Messaging platforms were the third most frequently used news and information source among the respondents.[12] This Phase 2 study shed light on respondents' usage and reasons. Respondents' engagement with news on Instant Messaging platforms took place in two main ways. First, about one third of the respondents in Phase 2 said they subscribed to Telegram channels for news. The Telegram channels that were popular among this group were *The Straits Times*, Channel NewsAsia and Mothership. Telegram channels played the same role as news and social media apps — they provided timely alerts on breaking news and important updates to respondents. However, using Telegram channels for news and information was a more popular practice among younger respondents, which was often introduced to them by their friends or colleagues. For example, a female respondent (21–24 years old) from the Informationally Diffident group who subscribed to *The Straits Times*' Telegram channel because of a friend's recommendation found the updates especially useful during key events such as the General Elections in 2020.

Second, most of the respondents were recipients of news and information that were forwarded to them by their family members and friends. A sizeable proportion of the respondents said they would read such news "*with a pinch of salt*". For example, a female respondent from the Informationally Disengaged group (25–29 years old) said content shared by family members and friends could be very "*opinionated*" and "*biased*" so "*people should do their own research*". Another male respondent (25–29 years old) from the Informationally Savvy group highlighted that many forwarded messages on WhatsApp tended to "*prey on*" current topics (e.g., remedies for COVID-19) and had to be read with caution.

> *"I don't really trust such forwarded messages as a lot of them like to leverage current topics like COVID-19 … [for example] a lot of them say 'this is how you can treat COVID-19'. I generally don't follow all of these … at most I read the header of the article [forwarded] or the video."* — ***Respondent 4, male, 25–29 years old, Informational Savvy group***

The Phase 1 survey also found that respondents' social networks (particularly their friends and family members) played an important role in

[12] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf(see Section 4.1.).

their information-seeking and were a trusted source of information.[13] The data collected from Phase 2 confirmed that friends and families were a trusted source of information, especially among respondents from the Informationally Diffident and younger respondents. Hence, respondents' social networks constituted a dominant part of their exposure to news and current affairs — the forwarding of news and videos was a frequent occurrence from their family members and friends in their daily communication. Their peers served as "curators" by surfacing important news and updates to them. This was seen to be helpful by respondents who felt overwhelmed by information clutter and that "*there was too much to read*". In so doing, friends played the role of cue givers who indicated for respondents what were pertinent issues of the day.

4.1.4. Strategies for news and information-seeking

While the Phase 1 survey provided insights into people's use and trust of different media sources, the self-confrontation interviews in Phase 2 elucidated the cognitive and emotional mechanisms that people relied on when they searched for news and processed information. The current media landscape exerted cognitive and emotional strain on respondents. As mentioned earlier, a number of respondents said the prevalence of negative news, exacerbated by the COVID-19 pandemic, exhausted them and either made them avoid specific topics, or discouraged them from reading the news altogether.

Coping with an information avalanche: Source, scanning and signposts

The other problem faced by respondents was information clutter and overload, a result of being exposed to a wide array of information from different sources (e.g., news sites and social media pages of news sites) and receiving updates via app alerts and social media. Respondents relied on several strategies to help them navigate the information clutter and overload.

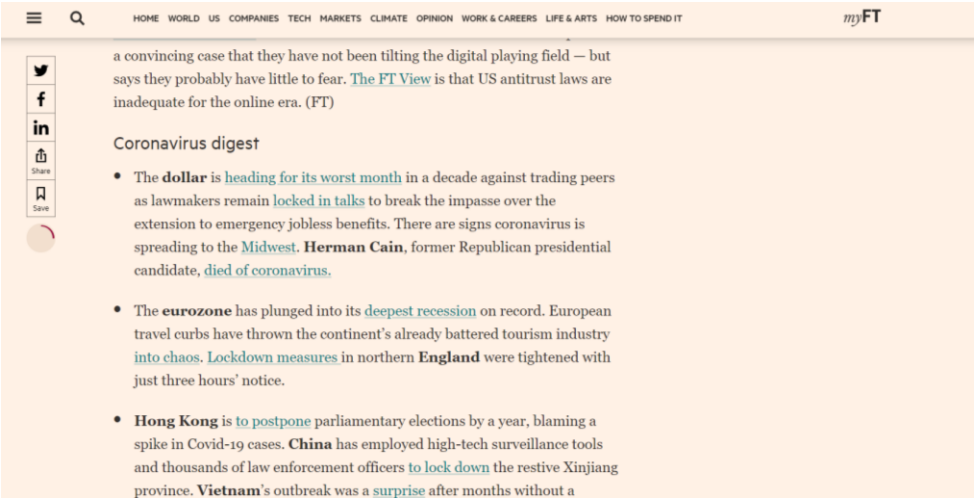
First, there was a clear dependence on the source. Certain news sources were seen to be more credible, including *The Straits Times*, Channel NewsAsia, Bloomberg, and *The Business Times*. A common reason cited by respondents for why *The Straits Times* and Channel NewsAsia were

[13] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 4.4.).

credible and trustworthy was their perceived affiliation with the government. Many respondents referred to these news sources as "*government-controlled*" and "*part of the government*". For example, a female respondent (21–24 years old) from the Informationally Savvy group said, *The Straits Times* and Channel NewsAsia "*are more established. I would think that they do internal checks instead of putting out news without fact-checking*." Similarly, another female respondent (25–29 years old) from the Informationally Overconfident group said she could afford to be "*less careful*" when reading news published by *The Straits Times* as compared with other sources because it "*would not publish any news without checking first.*" The high trust respondents had in the government spilled over to these local news sources. In addition, respondents assumed that there was a proper process of check and verification within these newsrooms.

A second commonly used strategy among respondents was to conduct a quick scan of headlines that were displayed in search results and social media feeds. Given the huge volume of information respondents were exposed to, most of them engaged in quick scans during their routine surveillance of news. The news-seeking exercise showed that most of the respondents perused news quickly. They were satisfied with a scan or cursory read that provided them with some surface indications of key developments, citing reasons such as lack of time and interest for their rapid surveillance. Many respondents felt that reading the headlines was "good enough" as it provided them with a good summary of the news and helped them decide whether or not to read further based on their interest, its relevance and appeal. For example, a male respondent (25–29 years old) from the Informationally Overconfident group said he usually only read the headlines because he felt they "*revealed the [entire] news story.*" When respondents performed an information scan, they skimmed headlines and looked out for keywords. They would proceed to read the articles only when certain headlines jumped out at them or if the content appeared relevant or interesting. In addition to headlines, respondents also oftentimes relied on snippets (i.e., text extracts) and text summaries that were displayed with the headlines in order to know the crux of an issue or event quickly. For example, a male respondent (25–29 years old) from the Informationally Savvy group said he liked reading news from The Financial Times because it featured "*bite-sized summaries*" on important topics (see Image 4).

Image 4: An example of The Financial Times' "bite-sized summary"



Finally, informational characteristics such as visuals played an important part in capturing readers' interest. Many respondents said attention-grabbing pictures or thumbnails that were featured next to the headlines were reasons why they zoomed in on specific news items. For example, a female respondent (35–39 years old) from the Informationally Savvy group said she enjoyed reading Mothership articles because they typically included many pictures in their articles. The images made their articles "*less wordy*" and "*more interesting*" to read. Similarly, a female respondent (21–24 years old) from the Informationally Diffident group said pictures were usually the first thing that caught her eye when reading the news and helped her decide whether or not she wanted to click on a news link or read an article further in depth.

Lead sentences in an article were also important as they helped users navigate articles and figure out what the article was about. The length of an article also had some influence on users. Articles and posts that were "*straight to the point*" and "*simple to read*" (e.g., focusing on facts and key happenings) were favoured over longer analytical pieces. Several respondents said they preferred articles that were succinct and concise, and were put off by "*wordy*" and "*lengthy*" articles, which they associated with certain news sources. For example, a male respondent (50–54 years old) from the Informationally Disengaged group said he found news published by *The Straits Times* to be "*too detailed*" as the journalists tended to "*write the whole story out*" in contrast to Channel NewsAsia, where the journalists usually summarised the news, making it "*easy to absorb*".

Discovering new information: Personalisation, prioritisation and price

Other respondents relied on personalised news feeds, which they found helpful in helping them discover news of interest and relevance to them. The personalisation took place at an intentional level (when respondents determined what types of news they wanted to receive) and at an unintentional level (i.e., algorithmic-determined personalisation). The personalisation of news feeds and search results (i.e., on Google News) fulfilled a utilitarian function — they saved respondents' time and surfaced topics of interest to them with minimal effort in information search on their end.

Social media was another commonly used tool by respondents to help them perform their routine surveillance. Facebook was cited by the majority of the respondents as a platform to obtain news from. They looked up news on social media to find out if they had missed out on news that may not have been covered by legacy media, for entertainment, and to find out what the "anti-government views" were. However, while they depended on Facebook, many of the respondents also expressed wariness and scepticism over what they read on social media, saying that many of the posts and commentaries were emotional and biased. For example, a female respondent (25 –29 years old) from the Informationally Disengaged group said even though she enjoyed being able to "*see what people are up to and read the latest stories at the same time*" on Facebook, she recognised that some news may be "*biased*" because "*people tend to get too emotional*" when sharing news. Another male respondent (40–44 years old) from the Informationally Diffident group felt that some who shared or commented on news articles were likely to have a certain agenda. Thus, while people turned to social media frequently for news and information due to its convenience, they were generally distrustful of what they read on social media.

> *"The news can be created by people. The source may be reliable, but it may also be a scam or created for fun. So, I don't rely on what I see on Facebook."* — ***Respondent 40, male, 40–44 years old, Informationally Diffident group***

This supported the findings from the Phase 1 survey, which showed that despite ranking second and third in terms of people's usage frequency, social networking sites and Instant Messaging platforms were ranked 10th and 11th out of 12 media types (i.e., among the last three) in terms of

people's trust in these platforms.[14] Only a small number of respondents did not express any doubts pertaining to the content they came across on social media. The qualitative data from Phase 2 suggests that people who were sceptical were more likely to be those from the Informationally Savvy group of information users.

The price of news was another important factor that influenced respondents' news seeking. The majority of respondents did not pay for news in digital formats. A few would purchase print newspapers (e.g., *The Straits Times*, *Lianhe Zaobao* and *Shin Min Daily News*) but infrequently. The lack of willingness to pay for news stemmed from the availability of a wide array of free sources. The respondents did not feel there was a justification or a compelling reason for them to pay for news. This explains why Channel NewsAsia was most frequently cited as a news source among local news sources, with a smaller number of respondents citing TODAY Online. *The Straits Times* was also a frequently consumed news source, but respondents' consumption of news was limited to only the free articles available. Some expressed frustration with the paywall, which was a reason why they did not use the app frequently. A small number of respondents however did not feel that the paywall affected them as they could simply find the same information in another source. For example, a male respondent (30–34 years old) from the Informationally Overconfident group said, "*sometimes I get frustrated (at the paywall), but I understand [The Straits Times needs] to make money.*" Hence, he would either purchase a hardcopy or visit other news sources that were free.

4.2. Trustworthy and credible sources

In the current information landscape, information users must contend with false information that exists in different forms and originate from myriad actors, and is circulated on a multitude of platforms or channels. Our study examined what respondents considered were trustworthy and credible sources, and the signposts or decision markers they used when deciding whether or not they should trust and heed a particular source. The terms "*credible*" and "*trustworthy*" were used interchangeably by the respondents. Younger respondents also used the word "*legit*" (short for "legitimate") to describe a credible source.

[14] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 4.3.).

4.2.1. Source, style, balance and currency

Source

As mentioned in the preceding section, news sources that were affiliated or perceived to be affiliated with the government were seen by most of the respondents as trustworthy. For instance, *The Straits Times* was referred to as a "*Singapore media*" and being "*government-controlled*". There was an expectation among respondents that information published by *The Straits Times* was "*official information*" and would be accurate, as the government would not deliberately mislead citizens. The transfer of credibility from the government to legacy media accounted for respondents' high trust in the media. In general, foreign news media such as BBC, CNN and CNBC were also seen as credible although a small number of respondents labelled them as "*Western*" and "*liberal*" in their coverage and analysis.

There was a perceptible difference in how respondents viewed "mainstream" and "alternative" local news sources, with the latter being seen as a check and balance of mainstream media and providing a different perspective of an issue (i.e., "*the other side of the story*"). While respondents trusted alternative sources less, they still read these sources to learn about the different viewpoints and perspectives of an issue. As presented earlier (Section 4.1.2.), Google's search engine and Google news were popular channels of news and information among respondents because they were familiar with them and found them easy to use. Many of the respondents trusted Google as a search engine that helped them verify false information. "*I did a Google search*" was a common refrain among respondents when asked why they felt that the claims made in certain reports were correct. These sentiments explained why using search engines was the second most commonly used verification method among the 2,011 survey respondents in Phase 1 of the study.[15]

Style

Another commonly cited signpost for credibility was the language used for reporting. The style of reporting and writing played a critical part in helping respondents form impressions of the seriousness and gravitas of the news source. For instance, *The Straits Times*' formal language was often contrasted with the use of Singlish by Mothership, which made the latter

[15] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 6.6.).

come across as less serious. For example, a female respondent (25–29 years) old from the Informationally Disengaged group said, "*I think that The Straits Times is more professional while Mothership shares more questionable stuff … sometimes they (Mothership) use Singlish which you won't see in The Straits Times*". Thus, the use of Singlish had both plus and minus points. While the information presented in Singlish might be more relatable to readers, it also led to some respondents viewing the news site as unprofessional. For example, a male respondent (50–54 years old) from the Informationally Disengaged group said Mothership was an untrustworthy website as it did not have a "*proper*" journalistic style of writing. He added that their articles tended to be "*copy and paste*" bits and pieces of information from other sources, and thus he did not consider news from Mothership as "*real*". Some respondents also used the word "*sensational*" and "*clickbaity*" to describe the articles they read on Mothership, which usually focused on "*the silly things that people do*".

Balance

Many respondents also associated balanced reporting and neutrality with trustworthiness — they appreciated reports and articles that provided them with different sides of the argument and different perspectives of an issue. A female respondent (35–39 years old) from the Informationally Diffident group said she trusted news sources like *The Straits Times* and *Lianhe Zaobao* because they used a more "*informative*" and "*neutral*" tone as compared with other sources like *Lianhe Wanbao* and *Shin Min Daily News*, which she felt was more focused on providing entertainment news.

> *"My mum used to buy Xinmin Ribao [Shin Min Daily News] but I don't like to read it … I feel it is a waste of money because the news tends to be a bit more suited for 'aunties'. Sometimes I am also not sure if the information can be trust[ed] or not. So, I rely more on Straits Times or Zaobao because I think the way they write is more neutral. Their news focuses on current affairs … they don't write in a 'gossipy' way. They also use many statistics to support their stories and the way they write suggest they want to inform people rather than entertain them."* ***— Respondent 5, female, 35–39 years old, Informationally Diffident group***

Another male respondent (40–44 years old) from the Informationally Overconfident group, who was previously a Hong Kong citizen, said as compared with foreign media sources like Taiwan's *Liberty Times*, *The Straits Times* presented factual and objective information as much as possible. He also highlighted that the only time journalists included their

personal opinions in the paper was under the commentary section, which was clearly labelled.

> *"The Straits Times is more balanced … I think they try to focus on the facts about the issue. They try not to put their own or personal comments in the news … [instead] they put it in the commentaries. The commentaries talk about the news from different angles, and I will read them."* ***— Respondent 12, male, 40–44 years old, Informationally Overconfident group***

This also explained why some respondents felt that commentaries or opinion pieces were less trustworthy than news reports that focused on facts and statistics. Balanced reporting and analysis were proxies for credibility — in addition to being "easier to read" and objective, a straightforward (as in not embellished with critique and analysis) nature of writing made factual pieces more believable. The association of balance with credibility explained why many of the respondents expressed scepticism over what they read on social media. They felt that social media was rife with personal opinions that tended to be biased. A few of the respondents said the polarisation of views on social media was the reason why they stopped turning to social media such as Twitter and Facebook for news — people were taking sides and advocating for what they believed in, without listening to others. Consequently, this turned social media into a toxic place for some.

> *"I think earlier this year, someone living in a condominium had a quarrel with a security guard. There was a big hoo-ha and people shamed him for bullying the security guard. Yes, what he did wasn't right, but it spiralled out of control to the point where I think he was emotionally traumatised. I think there has to be a balance. He was absolutely wrong in what he did … but there is a point where it needs to stop, and Singaporeans don't know where to stop."* ***— Respondent 13, female, 40–44 years old, Informationally Diffident group***

Currency

Another proxy for credibility was the timeliness and currency of the news reports. The frequency at which news was published and their timeliness (e.g., how soon the news was reported after the event took place) was an informational characteristic that many respondents looked out for. The date of publication of an article provided respondents with an indication of both its accuracy (updated as opposed to outdated facts and developments) and professionalism of the organisation behind the news source. For example, a female respondent (35–39 years old) from the Informationally Diffident group

said she considered Nestia (a lifestyle news app) a trustworthy source of information because its articles had clear date and time labels. Others who subscribed to alerts from well-known news media like Channel NewsAsia and *The Straits Times* similarly cited timeliness as a key factor that made them reliant and trusting of such sources.

4.2.2. Strategies and heuristics for different groups

We observed some similarities and differences among different types of information users. Across all four information user types, familiarity with a news source usually enhanced respondents' perception of its trustworthiness. This partly explained why legacy media, which occupied a larger mindshare among respondents, was seen to be more trustworthy and credible. While this was a common belief across all four groups of users, those from the Informationally Diffident and Informationally Disengaged groups were most likely to feel this way. In addition to familiarity, balance in reporting and analysis was also a critical factor. Writing style and tone were thus key, and a balanced writing style in a neutral tone was a proxy for trustworthiness for many of the respondents.

Those with stronger immunity against false information (e.g., those who were Informationally Savvy) were more likely to practise greater circumspection and introspection when evaluating the credibility and authenticity of a news source. They had a more diverse media diet and were more thoughtful of what was credible and what could be trusted, and whom they could trust. For instance, more respondents from this group made the differentiation between official news sources and their friends and family members. Hence this group was also more likely to distrust Instant Messaging platforms such as WhatsApp as a source of news. They were also more cognisant of informational characteristics, looking out for "sponsored articles", data and statistics. To this group, there was a clear difference between a news report and a commentary. Respondents who were Informationally Savvy were also more likely to engage in purposeful information-seeking as opposed to serendipitous encounters with news. Compared with those who were Informationally Overconfident, Informationally Diffident and Informational Disengaged, they were also more likely to practise strategic use of their social networks for verification — turning to different social contacts that they perceived to be "experts" and key opinion leaders in specific domains (e.g., a friend who worked in human resource on employment-related news).

On the other hand, those with weaker immunity against false information (e.g., those who were Informationally Diffident and Informationally Disengaged) tended to rely more on their interpersonal networks for news

and information, especially their friends. They also paid less attention to informational details like the publication date, and preferred easy and simple to read articles that did not require too much cognitive effort on their part. The perspective of the majority was a proxy for truth for these respondents. Even the young and middle-aged people from these two groups tended to rely more on social media and friends as a source of news and information. For example, a female respondent (25–29 years old) from the Informationally Disengaged group said she relied heavily on her social media and Instant Messaging platforms like Facebook, Instagram and Telegram to get her latest updates on the news. This was because the updates she received on these platforms were entertaining, given that they were oftentimes "*sensational*" and "*ridiculous*". Similarly, another female respondent (35–39 years old) from the Informationally Diffident group said she depended on what her friends on Facebook shared for information and updates on topics such as education, shopping and promotions, and current affairs.

> *"News always appear in my feed. I'll scroll and will click on something when it interests me … usually after work, I will check what the updates on Telegram are and share the news with my friends … I will also share with my friends certain ridiculous stories (e.g., Singaporeans doing stupid things) and discuss with them."* **— *Respondent 10, female, 25–29 years old, Informationally Disengaged group***

In contrast, respondents from the Informationally Savvy group were more discerning of the information they received on social media. For example, a male respondent (25–29 years old) from the Informationally Savvy group said while he was active on a variety of social media platforms such as Facebook, Twitter, Tik Tok and Instagram, he only used them for entertainment-related news. He added that he was "*wary*" of social media platforms like Facebook because of the misleading information that he came across.

> *"I'm very wary especially of Facebook. Many posts are older news that have been amended. They are usually shared by the older 'boomer' generation who like to forward messages on Facebook.*" — ***Respondent 4, male, 25–29 years old, Informationally Savvy group***

Finally, respondents from the Informationally Diffident and Informationally Disengaged groups were more contented with cursory scans of important events and news, as opposed to reading in greater depth for details. It was also interesting to note that some respondents from the Informationally

Disengaged group cited comments in discussion forums and those for YouTube videos as a source of information. Comments posted by others in discussion forums and YouTube helped them form impressions of the topic discussed. Some of them explained that such comments were "*light*", "*entertaining*" and "*funny*", which made information-seeking more pleasurable. For example, a male respondent (30–34 years old) from the Informationally Diffident group said he enjoyed reading comments of YouTube videos because it felt like he was "*watching the videos together with a friend*".

4.3. Information verification and fact-checking

In addition to interviewing respondents on their information and news-seeking habits, Phase 2 also involved getting respondents to read an article containing 5G misinformation from the website, Health Nut News (HNN), and carry out a verification exercise. This section presents findings from the self-confrontation interviews, which required respondents to explain the actions they took when verifying the claims made in the article (also see Section 3.1.). Majority of the respondents felt that the HNN article was not trustworthy. While several of the respondents relied on their "gut feel", most of the respondents arrived at this conclusion after performing different extents of fact-checking online. Respondents took an average of 10 minutes for the verification exercise, with the longest duration being slightly over 15 minutes. A small minority of respondents chose not to perform any form of verification at all.

4.3.1. Internal validation

Images as a warning for inauthenticity

Images such as photographs were an important information characteristic. In an earlier section (Section 4.1.4.), we presented findings pertaining to the role of images (e.g., thumbnails) in attracting people's attention to a news source and encouraging them to read more. Similarly, when verifying information, images played an important role in people's decision-making pertaining to whether or not to trust the news or information they were presented with.

Among the small group of respondents who felt that the article was not trustworthy at first glance cited images as a warning for inauthenticity. For example, a few of them said the picture of the dead birds looked fake or manipulated (see Image 5). One respondent said the birds looked like they were laid out deliberately by someone to be photographed. Another respondent said the picture looked "*too big*". The respondent could have

meant that the picture looked disproportionately large compared with the rest of the article, which could have made him feel that the author of the article wanted to arouse fear among readers.

> *"I was a bit doubtful [about] why the author wrote this article [and why] she would collect all the birds home just to take a photo to show everybody that this bad thing happened to the birds. I don't know what is her intention [for doing so] … why collect all the birds, put [them] on [a piece of] newspaper and take a photo just to show that the bird died because of 5G?" —**Respondent 45, male, 40–44 years old, Informationally Diffident group***

In addition, a few respondents felt that it was neither possible nor realistic that so many birds "dropped dead from the sky".

> *"I have not heard of birds falling from the sky and dying because of 5G …" — **Respondent 17, male, 65–69 years old, Informationally Overconfident group***

> *"I don't think it is real because birds do not just drop dead unless they are poisoned … if birds can be killed by microwaves in the air, then humans would be killed too." — **Respondent 46, female, 55–59 years old, Informationally Overconfident group***

Image 5: Picture of dead bird in the Health Nut News article

A website that mimics legacy media

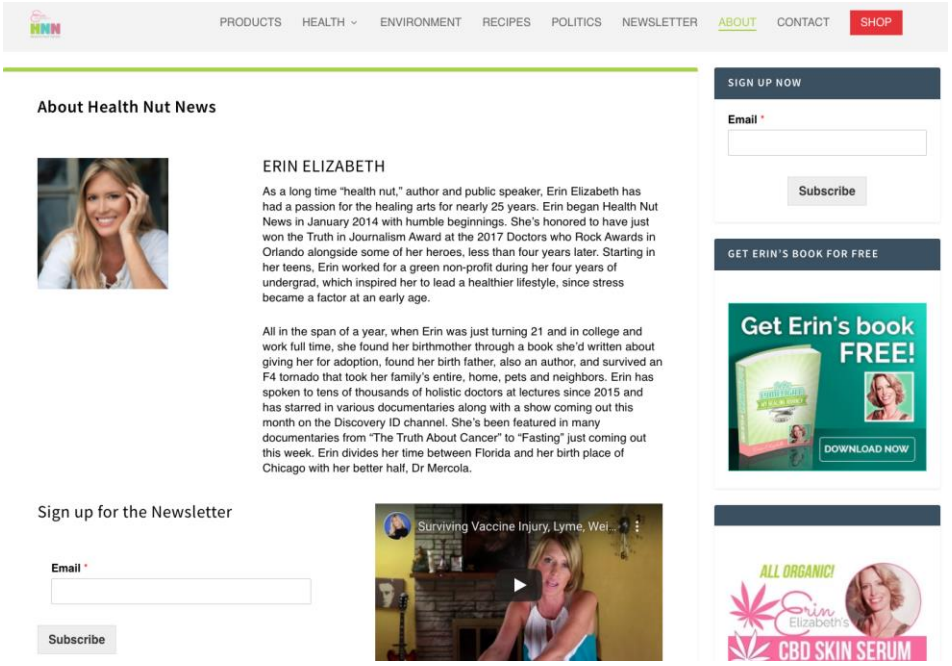
Another reason why respondents felt that the HNN article was not trustworthy at first glance was the name of the website — they felt that "Health Nut News" was not an appropriate name for a professional website. For example, one respondent remarked that "Health Nut News" was "*a strange name for a serious website*" and another said, "*no serious website would have such a name*". A few respondents also said the publisher was mimicking legacy news site CNN. In short, the parts of the article that were unconvincing to the naked eye were the pictures of the dead birds and the name of the website. While these may be natural reactions, they should not be the sole signposts for authenticity.

> *"The first thing I noticed that was weird was the logo of the website, HNN, because I thought it was trying to mimic CNN … the site was trying to look a bit professional."* — ***Respondent 27, male, 25–29 years old, Informationally Disengaged group***

Source that lacked credibility

In addition to signposts such as images and website names, the source behind the news, which could be a person or an organisation, was also an important consideration for respondents as a signpost for credibility. When it came to the HNN website, many respondents observed that the website was managed by an individual (i.e., Erin Elizabeth), and not an organisation. An organisation as source seemed to carry more weight than an individual as source. For instance, several respondents made references to established international news sites such as CNN, MSNBC and *The New York Times* as credible sources. Respondents who made the effort to learn more about the author of the Health Nut News article did so either by going to the "About" page (see Image 6) (where they noted little information was available) or by conducting a search on Google. Several respondents who conducted searches on Google to learn more about the author had the impression that she was not an expert in the field. Based on their search, they concluded that the author did not have the relevant expertise or background — she was neither a certified healthcare practitioner nor had professional credentials. Thus, most of the respondents felt that she was not qualified to make the claims that she did in the article, which added to their doubts regarding the veracity of the information presented.

Image 6: "About" page of the Health Nut News website



Inappropriate language and "charged" tone

Regardless of the varying amount of effort made by respondents to verify the article, there were a few informational characteristics or message attributes that stood out to respondents. One message attribute was the tone of the article. Respondents felt that the author employed an informal tone, one that would not be used by professionals from the journalism and healthcare sectors. None of the respondents rationalised the use of the informal tone as a way to make the article more accessible or relatable to readers. This could be due to the subject matter that was a serious one (i.e., the harms of 5G and allegations that 5G could cause deaths), for which an informal and casual tone was unbefitting. In addition, many of the respondents felt that the author's tone was dramatic and smacked of fear-mongering. The author's "*charged*" tone and choice of language also aroused their suspicion on her motive and agenda for publishing the article. Some respondents thought she could be a member of or advocate for the anti-5G movement. The language she used was seen by respondents to be "*provocative*", for instance her use of words and phrases such as "*stupid*" and "*am not kidding here*". Others also felt that the author was "*trying too hard*" to convince readers into believing that 5G was harmful by over-emphasising that the information presented was true.

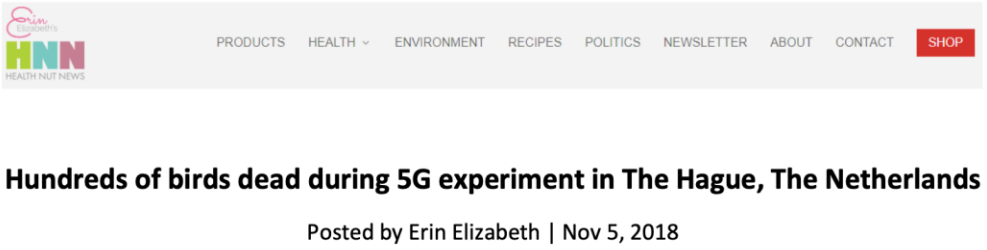
> *"The tone of the article was also a bit weird, so were certain phrases, like the part, 'whether no harmful equipment would occur on and around the station'. There was also some charged language here … the article might be directly quoting interview sources, but the charged tone was off-putting. Like the part, 'and be ready to be shocked how stupid most sheeple really are believing blindly the so-called experts and authorities' … that's what I found weird about this."* ***— Respondent 26, male, 25–29 years old, Informationally Disengaged group***

> *"The language was a bit strange…you don't have to write 'am not kidding here' … you don't have to explain that you are not kidding. If someone was telling you the facts and they said, 'I'm not lying you know, I'm being honest with you', I will be more wary."* ***— Respondent 28, male, 45–49 years old, Informationally Disengaged group***

Lack of neutrality

As mentioned earlier (see Section 4.2.1.), one of the signposts that respondents relied on when assessing the credibility of a news source was how balanced or neutral it was. The same signpost was used by respondents when they considered the trustworthiness of the HNN article. Most of the respondents felt that the article was not balanced, which they defined to be providing two sides of an argument. In the case of the HNN article, being "*balanced*", as suggested by several respondents, would entail the author presenting the pros and cons of 5G, or acknowledging other possible causes for the death of the birds. As mentioned earlier, headlines played an important role in attracting people's attention to a news source. Many respondents felt that the headline of the HNN article was sensational, written to shock and attract attention (see Image 7).

Image 7: Headline of the Health Nut News article



Other message attributes

Several other message attributes also played an important role in helping respondents evaluate the veracity of the HNN article. One of them was the lack of evidence in the form of facts and figures. Another was the date of publication (5 November 2018), which was noted by many of the respondents to be more than two years old. This echoes what respondents had said when they performed the news-seeking exercise on the timeliness of publication to be an important indicator of credibility. Some respondents also drew the natural conclusion that given the date of publication, the information presented in the article might be outdated. While most of the respondents took some time to read through the HNN article, a small group of the respondents relied on their pre-existing knowledge of the 5G technology (e.g., Respondent 29, who was a software engineer) when evaluating the trustworthiness of the article and did not peruse the article in detail or perform many checks.

> *"5G is a topic that relates to my studies and my work because I am an IT graduate. I am interested in the news for two reasons, first, the topic of 5G and second, because I am also interested in birds. So obviously something was fishy about the news [because] why would 5G affect birds? If [5G] was going to affect birds, then no birds would be left since [the experiment]."* — ***Respondent 29, male, 50–54 years old, Informationally Disengaged group***

4.3.2. External validation

Authoritative sources that debunked the article

Apart from performing internal modes of validation, respondents also engaged in external validation. One of the most common forms of external validation performed by respondents was conducting keyword searches using a search engine (e.g., "5G network effect on birds", "birds dead during 5G experiment", "Erin Elizabeth Health Nut News", "Health Nut News legitimacy"). We observed what were perceived as authoritative sources by respondents based on the search results that they clicked on and their reasons they gave during the interviews. One group of search results that the majority of respondents clicked on were articles and reports published by legacy media. News media outlets such as Reuters, *The New York Times*, CNN and BBC were information sources that came up in respondents' keyword searches.

Respondents largely trusted the information published on these news sites, which challenged the claims presented in the HNN article. Comparisons

were made between these news sites "*which have been around for a long time*" and the websites (e.g., Stop5G.net) mentioned in the HNN article. In particular, the Facebook page of John Kuhles that was cited in the HNN article raised the red flag for many of the respondents who took the time to read the article carefully. Legacy media emerged to be important references in respondents' verification exercise.

In addition to legacy media, government and academic sources such as the Federal Communication Commission (FCC) (https://www.fcc.gov/) in the US, Science Direct (a website that publishes academic papers at https://www.sciencedirect.com/), John Hopkins Medicine (https://www.hopkinsmedicine.org/), and WebMD (a US-based website that publishes information on health and medicine related topics at https://www.webmd.com/), were familiar to many respondents. These sites were seen to be "*official*" and thus more reliable, compared to the groups that were referenced to in the HNN article. The "Stop 5G" Facebook group mentioned, which respondents had not heard of, was perceived to be an "interest group" driven by a specific agenda (e.g., to stoke fears of 5G).

> *"I searched for '5G network FCC' because FCC is the regulator for all electronic products … everything will have to go through [it] for approval as it is the authority for all electronic devices. So, I knew where to go to for information on [the] protocols and specifications for 5G networks." —* ***Respondent 27, male, 25–29 years old, Informationally Disengaged group***

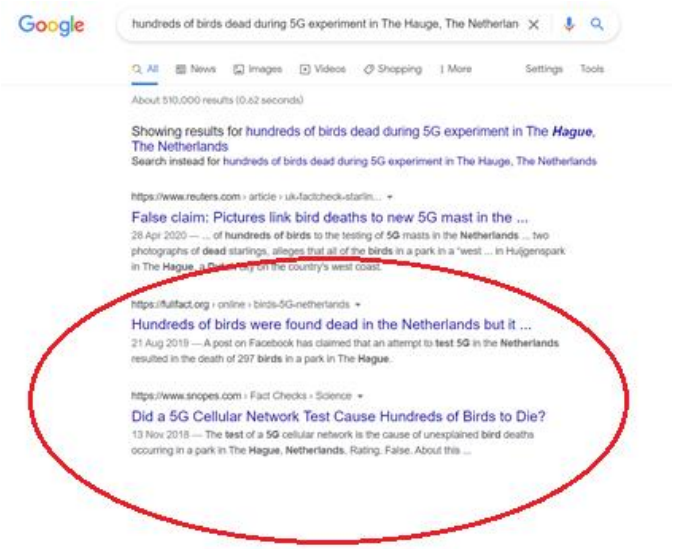
Trust in government a key factor

Our observation that respondents perceived government information sources as credible and trustworthy was corroborated by how their confidence in the government and trust in authority also strongly influenced their evaluation of the trustworthiness of the HNN article. Many felt certain that the claim (i.e., 5G was the cause of the death of birds) could not be true as the 5G technology had been approved by the Singapore government and other governments. For example, a male respondent (40–44 years old) from the Informationally Diffident group questioned, "*why would the government want to harm its own people?*" In other words, respondents thought that if 5G were indeed harmful, the government would have prohibited the use of the technology and would not have invested in building the 5G infrastructure in Singapore. Since 5G was government-approved and FCC-approved, respondents felt that 5G was safe and was unlikely to be the cause of the birds' deaths. Thus, the legitimacy of the government was transferred to the legitimacy of 5G as a technology that had minimal harm.

Lack of familiarity with fact-checking websites

Fact-checking websites such as Snopes and Full Fact came up in the top few results of many respondents' keyword searches (see Image 8). It is interesting to note that almost all of the respondents had not heard of these international fact-checking sites. As the findings from the Phase 1 survey indicated, fact-checking websites were least frequently used by respondents as a verification method — only 22.7 per cent of respondents used fact-checking websites to verify information that they encountered online.[16] Some of the respondents did not click on the results that featured fact-checkers as they were not familiar with them and thought they might be suspicious sites.

Image 8: Full Fact and Snopes appearing in the top results on Google Search



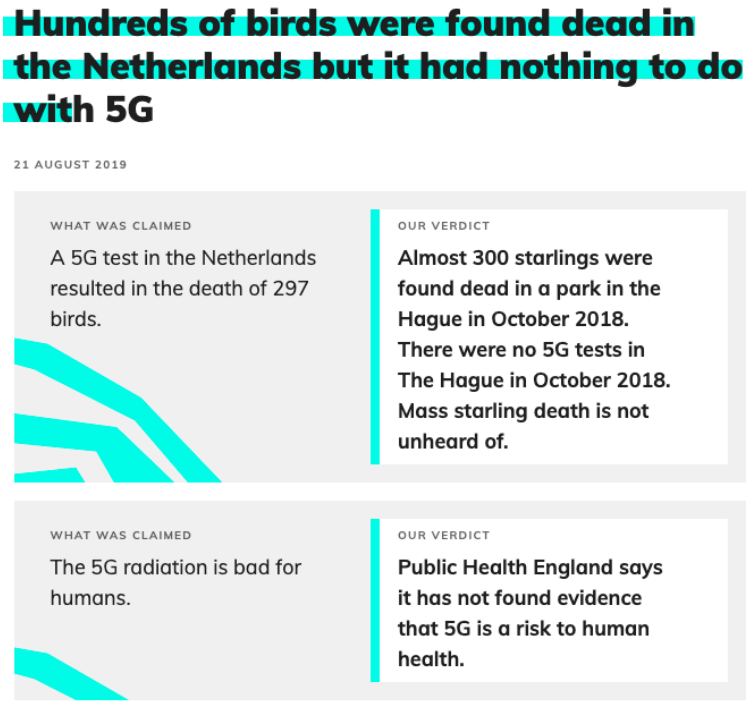
However, many of the respondents clicked on those search results as they were drawn to labels such as "False Claim" and "Fact-Check" (see Image 9). When they visited the fact-checking websites, they felt that the information presented looked official and trustworthy. The conciseness of the fact-

[16] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 6.6.).

checks that presented the false claims and corrective information (e.g., summary boxes or structured point-by-point debunking) helped as respondents generally were put off by lengthy texts (see Image 10).

Image 9: Example of "fact-check" label in Google Search result

Image 10: Example of concise information presentation by fact-checking websites



4.3.3. Responses of different groups of information users

Non-informational factors such as the respondents' background knowledge (e.g., educational and professional background) and the relevance of the topic (e.g., whether respondents felt that the topic would directly affect their lives) influenced how they engaged with the HNN article. For instance, several respondents who worked in the engineering and computing industries were more familiar with technology in general and the workings of 5G. This group was quite certain that the claims made in the article were fallacious.

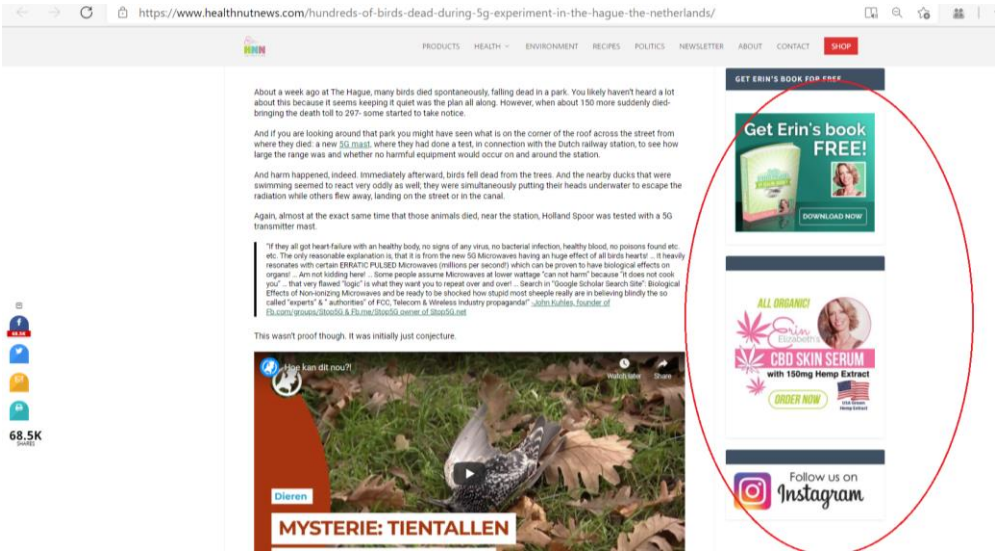
Across the four groups of information users, respondents from the Informationally Savvy and Informationally Diffident groups were more sceptical of the HNN article. They felt that the author "*tried too hard to persuade*" and came across as someone who was assuming the identity of an influencer sharing her views on the 5G technology. Several respondents also pointed out that the article resembled more like a blog post than a professional news article. While respondents from all four groups noticed similar informational characteristics, those from the Informationally Savvy and Informationally Diffident groups, especially the former with stronger immunity against false information, could better detect nuance within the same signpost and better articulate why they concluded that the article was not trustworthy. They were also more aware about the search engine optimisation practice (e.g., top search results are likely to be more relevant or accessed more frequently by other users) and more knowledgeable in performing reverse image search. The following two quotes highlight the differences in how respondents from the Informationally Overconfident and Informationally Savvy groups assessed the "look" of the HNN article. Respondents from the Informationally Overconfident groups tended to merely assess the observable characteristics of a website (e.g., font, layout, advertisements), whereas those from the Informationally Savvy groups read beyond such manifest characteristics and considered the underlying intentions (e.g., financial motives) of the website as well (see Image 11).

> *"The website looked legitimate because of its font and layout … it has the typical format of a news report. The tabs on the website also seem quite organised and there aren't any pop-ups as well."* — ***Respondent 14, female, 25–29 years old, Informationally Overconfident group***

> *"The website felt less like a news website but more of a blog because it had advertisements everywhere … the product advertisements gave me the impression that this person was writing articles for*

monetary gains." — ***Respondent 11, male, 18–20 years old, Informationally Savvy group***

Image 11: Examples of advertisements on the HNN website



Those with stronger immunity against false information were also more aware of fact-checkers and what various signposts (e.g., verified ticks or advertisement labels that appeared beside search results) meant. Respondents from the Informationally Savvy group either relied on their domain knowledge on 5G and conspiracy theories surrounding 5G, or used a combination of vertical and lateral reading techniques if they were not domain experts. Respondents from the Informationally Savvy group were also less likely to question the need to verify the claims presented in the HNN article. This could be due to them not relying on their "gut feel". They were more engaged with the verification process once they started on it and spent more time cross-checking with other sources.

On the other hand, the respondents from the other three groups depended more on their personal experience (e.g., they did not encounter any problems with 4G and hence felt they were unlikely to experience the dire effects of 5G alluded to in the HNN article) and "gut feel" (e.g., drawing parallels with the mobile phone technology). Motivated reasoning was at work as respondents' acceptance of and sense of safety from harmful effects from their mobile device influenced their acceptance of the 5G technology, a "related technology". The interest to verify and fact-check among respondents from these three groups also varied. The effort and time they

spent on the verification exercise depended on their interest in the topic and their reliance on their "gut feel". The more they relied on their "gut feel", the less useful they thought fact-checking was. For instance, a large proportion of respondents from the Informationally Disengaged group depended on heuristics such as the look and feel of the article, and the presence of graphics.

Those with weaker immunity against false information also tended to rely on vertical reading, which meant that they focused more on the HNN article and website itself, instead of conducting lateral reading, looking up other information sources and cross-checking the claims made in the article. These respondents felt that certain informational characteristics (e.g., the formatting of the article) looked odd but they were unable to articulate why. They also focused on informational characteristics that were more visibly questionable, such as the sensational headline and the one-sided nature of the article, and were also more likely to ask their friends when they were unsure of something they came across online. Respondents who were not from the Informationally Savvy group were also more likely to react emotionally to the article (e.g., felt disgusted and sad) than respondents from the Informationally Savvy group who responded more to the evidence (or lack thereof) presented in the article.

4.4. "Fake news" — What, how, whom?

During Phase 2 of the study, we also examined people's attitudes and perceptions pertaining to the problem of fake news and false information. The 50 interviews shed light on how people defined "fake news", the impact people thought fake news would have on themselves and those around them, how they generally responded to fake news, and whom they felt should be responsible for solving the problem. We found some differences among the four groups of information users, particularly in the practice of critical thinking and sense of agency in their response to fake news as a problem that plagues the information landscape.

4.4.1. Content, communicator's intent and consequences

Signposts of false information

We observed different interpretations of what constituted "fake news" among the respondents. A common interpretation was based on the presentation of information and the presence of certain informational characteristics. A significant number of respondents said fake news was information that was falsified to achieve a specific impact. These respondents identified fake news with a specific genre — false information created to cause panic and

anxiety. Examples included rumours of Deputy Prime Minister Heng Swee Keat stepping down from office (back in 2020).

> *"For example, the news that DPM [Heng Swee Keat] is stepping down is one of the biggest fake news I have ever heard … such news cause panic among people, mislead people, or even scam people … these are all fake news."* — ***Respondent 5, female, 35–39 years old, Informationally Diffident group***

> *"Fake news is either something that is fabricated out of nothing or is exaggerated by 'adding ingredients'. One example is the number of reported COVID-19 cases in some countries, which do not seem accurate … it cannot be that the pandemic has affected so many countries, but some countries still have no cases. It is impossible that the whole world is affected but you (some countries) are still unaffected, especially when you are a developing country."* ***— Respondent 21, male, 60–64 years old, Informationally Disengaged group***

A good number of respondents said fake news did not contain any "facts". By "facts", respondents generally meant evidence, specifically in the form of statistics and numbers. To these respondents, the absence of such "facts" was a warning sign that a report or an article should not be trusted. However, within this group of respondents, several recognised the possibility that numbers and statistics could also be doctored to mislead readers.

> *"It is very hard to put a finger on [what fake news is], but if it is not based on data, it is just an opinion. I want to see hard data … an opinion is for example, some people might say that the US economy is doing better. But data are things like 14 million people are still unemployed in the US, the number of bankruptcies is increasing and the number of people on state welfare is not going down …"* — ***Respondent 4, male, 25–29 years old, Informationally Savvy group***

> *"Things that are blatantly untrue would be fake news … the 5G [killing] birds example is fake news because there is no evidence that the birds were killed by 5G. From my experience, the fake news that I have come across tend to be 'health advice' forwarded from people … drink hot water and it will kill the [corona]virus … but they are all not fact-checked. At the end of the day, fake news is news without facts or evidence."* ***— Respondent 9, female, 40–44 years old, Informationally Savvy group***

Informational characteristics served as indicators of veracity and truth for respondents who had a basic interpretation of the problem. The common signposts cited by this group of respondents were logos that "*looked strange*", certain phrasings of words and poor grammar, and news that "*tried to attract people's attention*" or "*mislead*" people.

> *"Sometimes you notice that the logo is a bit different … or the phrasing and the grammar is not right … you can tell the difference."* — ***Respondent 45, male, 40–44 years old, Informationally Diffident group***

> *"The article felt like a conspiracy theory … the title and language were 'non-standard'. For example, the article starts [with] 'about a week ago'… most articles don't really start like this. It makes me suspicious. The article also sounds quite speculative … for example the sentence, 'it seems keeping quiet was the plan all along'."* — ***Respondent 36, male, 18–20 years old, Informationally Overconfident group***

Other signposts included features like not having a "*proper URL*", "*when the headline does not match the content*", or having pictures that were not related to the subject matter. One example cited by a respondent was an alleged video of a wildlife market in China when the original video was actually that of a market in Indonesia, which the respondent noticed after spotting signboards in the video that were written in Bahasa Indonesia instead of Mandarin. Another example cited by a respondent was a Facebook post that alleged that the entire leadership of the DBS Bank was made up of foreigners. The post had included a picture that was originally taken of PMETs in an office in a South Asian country.

> *"Fake news is when the URL does not have .com or .sg … or if the content does not make sense or the headline does not match what the content says …"* — ***Respondent 47, female, 21–24 years old, Informationally Diffident group***

> *"Fake news is something that misleads people into believing something that is not real. The picture about the leadership of DBS being made up of all foreigners was obviously fake news because the purpose was to make people feel angry about foreigners."* — ***Respondent 48, female, 35–39 years old, Informationally Overconfident group***

Several respondents with weaker immunity against false information, particularly those from the Informationally Diffident and Informationally

Overconfident groups, were unable to identify or recall specific signposts and problems that they would typically associate with fake news. Instead, these respondents depended on their "gut feel" and "sixth sense". For example, a female respondent (60–64 years old) who was from the Informationally Diffident group said, "*sometimes I get the feeling whether it is true or not true, based on my experience.*" Another male respondent (30–34 years old) who was also from the Informationally Diffident group said, "*for me, I just go by my gut … who benefits when this fake news spreads?*" For some respondents, news that seemed "*dramatic*" or "*just doesn't seem right*" aroused their suspicions of the veracity of the content — a female respondent (45–49 years old) who was from the Informationally Overconfident group said, "*I think if the news is too dramatic … like the presentation is too aggressive or trying too hard to sell, then it does not seem right.*"

Some respondents who demonstrated a more simplistic level of understanding of fake news drew a dichotomy between fact and opinion. A small number of respondents said any content that was opinion-based was fake because news should be based on facts. For example, a female respondent (25–29 years old) who was from the Informationally Disengaged group said categorically that fake news was personal opinion. These respondents failed to consider that facts could be used as evidence to support an argument in opinion pieces. In other words, they had a black and white interpretation of what was fake and what was not.

> *"Fake news is when people spread news that is based on their own opinions. For example, they take a picture [of an event] and then they send it to others. Hence, the news becomes 'distorted'… like if I hear a story from a friend, when I pass it on, I may exaggerate certain things and the whole story becomes distorted."* — ***Respondent 10, female, 25–29 years old, Informationally Disengaged group***

Communicator's perceived intent is key

Another common interpretation of what constituted "fake news" was premised on the communicator's intent and objective. News that appeared to be written with an agenda was seen as fake or untrustworthy. The agenda in question might not be a motive to deceive but one that was manipulative — influencing people to think about an issue in a specific way or advocating a certain opinion.

> *"Fake news is about a group of people trying to push out certain information. They have their own opinion, they have their own biases … it is impossible to really understand the full perspective.*

> *People have their own agenda they want to promote, so sometimes when I read the news, I question what are their motivations. For example, you can expect reliable information from a government but at the end of the day, it is all about what they (the government) want to tell the masses, what information they want their people to accept."* — ***Respondent 22, male, 30–34 years old, Informationally Diffident group***

Another interpretation of what constituted "fake news" demonstrated a more nuanced and critical understanding among a small number of respondents. These respondents acknowledged that there were many different interpretations of information and shades of truth. The subjectivity involved in people's interpretation of information made it hard for them to specify exactly what fake news was. For example, a female respondent (55–59 years old) from the Informationally Savvy group said debate and discussions were important because there could be many interpretations of a fact. Falsity is thus dependent on one's perspective and in order to arrive at a consensus, discussions to uncover the complexities and nuances present in the issue need to take place.

> *"To me, fake news is inaccurate news. But 'inaccurate' depends on an individual's definition of what is 'inaccurate'. Sometimes, when politicians bring up something, they can change the context or put in more context … to me, that is incorrect. Many people do not treat that as false news, but I do … sometimes, it is also not a straightforward matter of true or false … you need a discussion and debate."* — ***Respondent 1, female, 55–59 years old, Informationally Savvy group***

> *"What is 'fake news' is very grey because now the news might be genuine, but not later when there is new information. Like COVID-19, we found new information [about the virus] at every stage … but you cannot go back and say 'you said [the virus] won't spread in the community, that was fake news', because at that point, that was the only information we had. So, it really is very grey."* — ***Respondent 49, female, 45–49 years old, Informationally Savvy group***

Other respondents from the Informationally Savvy group also said some information might be false because it was "misrepresented" or framed in a certain way. These respondents were sceptical of information that was presented in a certain way that obviously suggested that the communicator intended to sway readers' opinion of an issue.

> *"The word 'false' implies 'either true or false' or 'either yes or no'. But most of the time, the information presented to us is not simply true or false … it is inaccurate, it is interpretation, it is misrepresentation. In fact, I would say that 'misrepresentation' is the key word here … when people misrepresent, is it false in a specific context?"* — ***Respondent 1, female, 55–59 years old, Informationally Savvy group***

> *"I suppose fake news also means how you frame the news … you can take something that has happened, and you can manipulate it in a way such that certain ideas come across as true."* — ***Respondent 9, female, 40–44 years old, Informationally Savvy group***

Impact of fake news

Respondents' concerns about the impact of fake news occupied a wide spectrum from indifference to fears about its adverse impact on society. One common reaction was that fake news was not a problem in Singapore, despite existing discourse on and initiatives targeted at false information. Several reasons accounted for this sense of assurance and security. First, the context in which the problem played out was an important factor. These respondents felt that fake news posed a bigger problem for countries such as the US and the Philippines where politics and society were polarised. Given the stability of Singapore's political system, respondents felt that they would not experience similar dire effects. Second, respondents believed that most people turned to verified sources when they consumed information.

> *"I think it is not so much of an issue in Singapore because the people I talk to will usually verify information with websites like The Straits Times or subscribe to the hardcopy of the newspaper. On social media like Instagram or Twitter … even if a piece of fake news springs up, some people would point out that it is fake, so I think people are quite responsible on social media as well."* — ***Respondent 8, female, 21–24 years old, Informationally Diffident group***

The third and most commonly cited reason was the Singapore government's efficiency in debunking fake news. A male respondent (30–34 years old) from the Informationally Overconfident group said the government played a very active role in acting against false information. Citing the Protection from Online Falsehoods and Manipulation Act (POFMA) as an example, the respondent said he was "*not too concerned about fake news in Singapore because the government controls a lot of these [fake] news*". Another respondent who was originally from India compared the two governments'

approaches and said the Singapore government provided a safe and secure environment for its citizens.

Finally, some respondents' indifference to the problem could be due to apathy that was brought about by a feeling of helplessness. For instance, a female respondent (45–49 years old) from the Informationally Overconfident group said there were simply too many people posting false information and there was not much she could do about it.

> *"There are many people posting untruths [on social media platforms], so what can you do? You can block [them] but you can't stop them from posting. So, I will just read and let it pass … I won't take any action."* — ***Respondent 23, female, 45–49 years old, Informationally Overconfident group***

While a subset of respondents felt indifferent to the problem of fake news due to the abovementioned reasons, others expressed worry about the impact fake news might have on individuals and the society. Respondents who associated fake news with scams saw harm in the form of financial losses incurred by victims.

> *"For me, I am more concerned about scam calls, especially for the elderly because they will be cheated. I think the extent of harm of scam calls is higher because they make you lose money."* — ***Respondent 41, male, 40–44 years old, Informationally Overconfident group***

At the societal level, fake news could have a divisive effect, and generate chaos and anarchy. Respondents were concerned with fake news that would affect social harmony, such as those pertaining to race, which could be especially "*dangerous*" in Singapore's multi-cultural and multi-religious landscape.

> *"I would feel angry and disappointed when people share stuff that affects social harmony or potentially have negative consequences on society… for example, during the Circuit Breaker, people rushed to the supermarkets and queued to buy things. This could have caused more infections to spread."* — ***Respondent 10, female, 25–29 years old, Informationally Disengaged group***

> *"Yes, I am very worried (about the problem of fake news). It can have a huge impact in a multiracial country like Singapore especially if someone spreads fake news about race … this is no joking matter…"*

— Respondent 21, male, 60–64 years old, Informationally Disengaged group

"The problem [of fake news] can be very dangerous … in a multi-cultural and multi-religious country like Singapore, it is very important to get the right information." ***— Respondent 22, male, 30–34 years old, Informationally Diffident group***

4.4.2. Vulnerable communities

When respondents reflected on the consequences of fake news, they were also aware that the problem could be more challenging for specific segments of the community. One of the vulnerable segments identified were the youths, given that they spent a large part of their time online. To many of the middle-aged and elderly respondents, exposure to the online space was linked to susceptibility, and the more time one spent online, the more vulnerable one would be to fake news. However, such a perspective failed to take into consideration the nature of activities that youths engaged in online and how they might be processing the information they came across.

There was also a perception among middle-aged and elderly respondents that youths lacked critical skills to determine what was real or fake. For example, a female respondent (35–39 years old) from the Informationally Diffident group said she was more concerned about the youths because they often "*easily buy into*" what they read online and "*create a ruckus without knowing the facts*".

Such a perception could be due to two reasons — (1) their personal experiences (e.g., parents whose children did not have the habit of talking to them about their experiences and activities online) and (2) youths' greater propensity to express themselves and denounce what they felt was not right. These older respondents felt that while youths lacked the historical or background knowledge, they were unwilling to speak with their teachers and parents when they were in doubt. Their sense of rebelliousness against authorities, coupled with their lack of historical knowledge, meant that they could be more easily persuaded by "*alternative narratives*". Parents and teachers were unable to intervene because they were unaware of their children and students' experiences and doubts.

"The world is very different now. During my time [and] my parents' time, we trusted what the politicians or government said because we were not educated … the government knew it all because they were educated. So, we didn't really question things. We also didn't have all these [Internet] things to change or cloud our mind … but now the

> *new generation looks at things differently … like even Raeesah Khan's comments … I didn't like it but it's not [harmful] to the new generation" —* ***Respondent 1, female, 55–59 years old, Informationally Savvy group***

> *"Now every child has a phone. Sometimes their friends will send them news or whatever … they won't know if the information is true or false but they will take it as true and won't ask around." —* ***Respondent 6, female, 35–39 years old, Informationally Diffident group***

Another group whom respondents felt were susceptible to fake news were the seniors. There was a general perception, especially among the younger and middle-aged respondents, that seniors did not understand how social media worked. Their lack of understanding of how social media worked made them vulnerable as they navigated a space that they were unaccustomed to. Several respondents noted that while seniors were taught how to use devices via different programmes (e.g., programmes rolled out at community centres), they were unfamiliar with the Internet and the ease with which false information could be produced and spread. This problem was compounded by their lack of knowledge on how to verify information. As a result, they became victims of fake news, e.g., scams and health misinformation.

> *"I personally feel that youths in general would be less vulnerable [to fake news] … my main concern is for the elderly who are not used to such platforms and media. It is harder for them to verify news sources because they are not familiar with the Internet." —* ***Respondent 26, male, 25–29 years old, Informationally Disengaged group***

Seniors were also seen to be more "*kiasu*" (i.e., did not want to lose out on good deals) which increased their susceptibility to scams. Their unfamiliarity and excitement in their foray into the online space further heightened a sense of novelty when they come across sensational content.

> *"I think the older generation does not know how to discern fake news from real news and they 'take everything as they are' … maybe it is because they are 'kiasu' and don't have access to the Internet, so they just buy into whatever that is fed to them." —* ***Respondent 10, female, 25–29 years old, Informationally Disengaged group***

Another important reason why some respondents felt that seniors were more vulnerable was because of a "network effect". The network effect took place

when seniors turned to their peers, who were other seniors who might be equally susceptible, when they wanted to verify information.

Respondents also highlighted several other groups that cut across different age groups who might be vulnerable to false information. These included people who were members of interest groups on Facebook and WhatsApp, due to the echo chamber effect. This is because members of closed groups were more likely to share information that was biased and skewed to the group's interests and position on issues, and were less exposed to alternative viewpoints and information. For example, a male respondent (45–49 years old) from the Informationally Disengaged group said, "*some people who are not well-read may be easily influenced to take the news that they see at face value.*"

In general, optimism bias among respondents led to them feeling that "others" were more vulnerable to fake news. For instance, young respondents such as those in their twenties and thirties said they had the necessary skills and ability to discern real from fake news, which they learnt in school, and were confident in navigating the online space safely. Older respondents tended to think that youths were more vulnerable, and younger respondents tended to think that seniors were more vulnerable. Middle-aged respondents identified seniors and youths as vulnerable segments. However, no one said they themselves were susceptible to false information.

4.4.3. Responses to fake news

Respondents' reactions to fake news fell mainly into two categories — those who ignored the false information and those who took action against it.

A significant number of respondents said they would ignore fake news that were sent to them by people in their social networks. One reason was the perceived little or no impact that the fake news would have, either on them or on others. For example, a female respondent (35–39 years old) from the Informationally Diffident group mentioned that fake news was something that did not directly affect her and her family members, so she did not see any need to react or respond to it. Another male respondent (40–44 years old) from the Informationally Diffident group said he usually ignored the fake news that he received because his friends often shared them with him for fun and entertainment. The other reasons included a sense of futility and an attribution of responsibility to others. Several respondents did not see the point of blocking people who forwarded them false information as that would not prevent those people from posting and sharing false information again (as mentioned earlier in Section 4.4.1.). Others chose not to take any action because they felt that fake news was debunked very quickly in Singapore

and there would always be someone who would alert others about the fake news.

> *"When I see fake news online, I will just ignore it, because once you share on Facebook, others will comment whether this is not true or this is not in Singapore ... So, I will just ignore all these because people will tell them … Singapore is very fast in telling it is fake … no need for me to go and tell others."* ***— Respondent 6, female, 35–39 years old, Informationally Diffident group***

Besides the above reasons, a common reason cited by respondents for not taking any action when they received false information from others was their fear and concerns with being misunderstood by their social contacts. A female respondent (30–34 years old) from the Informationally Savvy group said she would not correct others, as she did not want to be seen as "*defensive*" and "*demeaning*". Some respondents were concerned if they would come across as disrespectful, especially towards their seniors. Some others also feared that correcting others would strain personal relationships and lead to them being left out from information sharing in the future. There was a social cost attached to intervention and debunking false information.

> *"I realised that people don't like hearing what they have sent is fake. Sometimes people get defensive … I used to send my close friends a whole bunch of links on how something is fake and it did not go well with them... sometimes when I send them links to show what they sent is fake, they don't reply to me."* ***— Respondent 9, female, 40–44 years old, Informationally Savvy group***

Another reason why respondents did not take any action when they came across false information is due to the complexity of "fake news". A few said they would not correct others unless they could be sure that the information was "*100 per cent fake news*", which was oftentimes either impossible to do so or would have required too much time and effort.

> *"I usually ignore the messages unless I am 100 per cent sure that it is fake news or if I come across a credible article to counter that. If I cannot confirm that the news is 100 per cent fake news, it is hard for me to convince people, especially if they are more senior than me. I would come across as being defensive or demeaning [to them]."* ***— Respondent 2, female, 30–34 years old, Informationally Savvy group***

As for the respondents who took action when they came across false information, their intervention was generally limited to close family members,

friends and for a small handful, colleagues. Their familiarity with close contacts meant they were less likely to be embroiled in confrontations and misunderstandings. For example, a female respondent (55–59 years old) from the Informationally Savvy group said she would "*warn*" her parents and siblings if she saw them sharing false or even sensitive information which may not be false. However, she was less willing to do the same for friends, as she did not want to get into "*unnecessary debates*" with them.

Respondents also felt that they could be more direct and open with their family members and friends, who were less likely to be offended when called out. For example, a female respondent (40–44 years old) from the Informationally Savvy group said she "*nagged at her mother to stop spreading fake news*" whenever she sent her false information. She felt that her actions were effective as she noticed that her mother began to include disclaimers (e.g., "*I'm not sure if this is fake news*") when forwarding messages. Another respondent (35–39 years old) from the Informationally Diffident group said she was more willing to inform her close colleagues that they had shared false or suspicious news on social media and Instant Messaging platforms.

> *"If I open [a news] and see that it is fake news then I will just tell them off, saying, 'eh this is fake news!' … I think this is a concern for me because the same fake news affects my mom and all the elderly who will get panic attacks."* ***— Respondent 25, female, 35–39 years old, Informationally Diffident group.***

When debunking false information and correcting their close contacts, respondents were conscious of how they conveyed their messages. For example, a female respondent (35–39 years old) from the Informationally Savvy group said she had to be very "*respectful*" and "*careful*" with her words when letting people know that they might have shared potentially false information. In addition, they would typically communicate via personal messages either on Instant Messaging platforms or social networking sites. Respondents made considered and deliberate attempts to get their message through without offending their family members and friends.

Respondents relied on a few strategies to debunk the false information they received from their social contacts. One common method is to visit authoritative sources such as government websites, legacy media and fact-checking websites, where the false information has already been debunked, and forward the information or link to their contacts. For example, a male respondent (25–29 years old) from the Informationally Savvy group said he would use Google Search to look for credible sources that have already debunked the information and forward them to his friends whenever they

sent him false information. Another male respondent (40–44 years old) from the Informationally Diffident group who had high trust in the government said, "*the best way to verify is to turn on the TV or go to the government's WhatsApp channels because the information has already been verified by the government.*" Others would verify the information using Google Search and share the relevant links with their family members and friends.

A minority of the respondents adopted a more proactive approach. For instance, a female respondent (55–59 years old) from the Informationally Overconfident group, who was the group administrator for a few WhatsApp chat groups, played an active role in stemming the spread of false information among her social contacts. As group administrator, she set ground rules that discouraged members from sharing unverified information and debunked false information. For example, she shared that her friend had sent a video of an elderly man spitting on a train, which led to much concern given the ongoing pandemic. Upon verifying however, she discovered that it was an old YouTube video that had been re-circulated. She immediately informed her WhatsApp group members and urged them not to share the video any further. In addition, the respondent would often send reminder messages such as "*please do not forward this to anyone because this has yet to be confirmed by the government*", or "*please check the media*" in response to unverified information shared in the WhatsApp group. However, such respondents were the outliers as most respondents either adopted a reactionary approach or ignored the false information.

4.4.4. Responses of the savvy and less savvy

In general, people's definitions of fake news were wide-ranging and, in many cases, they conflated opinions with falsehoods. However, those with stronger immunity against false information such as respondents from the Informationally Savvy group, were more sensitive to nuances of what was considered true or fake. They were also aware of how people's personal experiences and opinions influenced their interpretation of the news. They saw a thin line between what was fact and fiction, and that while some information may not be false, they could be framed and curated in a way by the communicator to achieve a specific objective. Respondents from the Informationally Savvy group could also better articulate what fake news was and the intentions behind those who spread fake news (e.g., to spread panic and to de-stabilise racial harmony in society).

On the other hand, those with weaker immunity against false information such as respondents from the Informationally Diffident group, demonstrated a more superficial understanding of the problem — fake news was defined as "news that was not true" or news without facts (which they equated with

numbers and statistics). They tended to associate fake news with scams that were manifestly false. They were also less able to articulate why they deemed certain information as fake and felt that verification required too much work, and hence relied more on heuristics such as the overall look and feel of a message rather than its actual content. For example, a female respondent (40–44 years old) from the Informationally Diffident group concluded that the HNN article was false because its layout resembled that of a personal blog and its domain name "*doesn't sound official*". She added that these two factors alone sufficed and that she did not see a need for further verification, if not for the interview exercise.

Those with weaker immunity against false information were also more likely to rely on their "gut feel" and instinct to tell if something was true or false. For example, during the verification exercise, many respondents from the Informationally Diffident group chose to click on sources like Snopes or Reuters not because they were familiar or convinced by the sources, but because of their "gut feel". Hence, many of them could not really explain why they clicked on certain sources or chose to perform certain actions (e.g., performed a keyword search but not click on any of the search results). For some respondents, their "gut feel" gave them the confidence to navigate the online space. For example, a female respondent (21–24 years old) from the Informationally Diffident group said her past experience working with various groups people in different work environments (i.e., business and service sectors) taught her how to read people's body language, which made her confident that she was skilled enough to know if someone were lying.

4.4.5. What needs to be done to manage this problem?

Most of the respondents felt that fake news was a complex problem that required interventions at various levels and on different fronts, and was a problem that cannot be eradicated completely but only mediated. The interventions that respondents felt were important to help counter the problems caused by false information fell under two main categories — individual measures and institutional measures. The majority of the respondents felt that individuals as end users were ultimately the ones who were responsible for stemming the spread of false information. This is because the online space was too expansive for any one person or organisation to control what gets published and shared. Most respondents felt that citizens have to stay alert, be vigilant and cautious as the problem of false information will not be eradicated completely. For example, a female respondent (35–39 years old) from the Informationally Diffident group said, "*there is nothing others can do … with technology, we will always have access to all sorts of information, so it is up to us on how vigilant we need to be.*"

Individual responses

When it came to what citizens could do, respondents felt that everyone could take simple steps to help solve the problem, or at the minimum, not make it worse. For one, people should stop forwarding messages just because the messages appear interesting or novel, but they should read up and do "*a simple fact-check*". For example, a male respondent (25–29 years old) from the Informationally Savvy group said people "*should not take things as they are*" as there are available sources that people could check with. He felt that people in Singapore were fortunate as they could easily access statistics and figures in government websites. Thus, they could conduct a simple fact-check by looking up these sources.

> *"People just forward news without checking … I'm not saying they need to do detailed research … but if you do a simple fact-check, you can find whether or not there is a basis to that news. You shouldn't take things the way they are. This is everyone's responsibility. In Singapore, we are fortunate that the data is easily obtainable. A lot of statistics are readily shared on the government sites. So, I think if people do a simple check, they can tell what is false and what is not."*
> ***— Respondent 4, male, 25–29 years old, Informationally Savvy***

Respondents also felt that while people had good intentions when sharing articles and videos most of the time, they should not assume that the people with whom they were sharing information with would be able to discern false information from real information. For example, a female respondent (35–39 years old) from the Informationally Diffident group said she often encountered people who shared information they have not read yet, causing confusion among those who later received it. Another male respondent (25–29 years old) from the Informationally Overconfident group felt that people should not "*just anyhow post*" without knowing the full context of the news as it could "*mislead*" people into believing false information.

Some respondents felt that besides having the agency to decide what action to take with the information one received, individuals could adopt a more pro-active approach — they should help and teach one another on how to determine what is real, what is opinion, and what is fake. For example, a female respondent (35–39 years old) from the Informationally Overconfident group stressed that managing false information is not solely a "*one-person job*" or the government's responsibility alone.

> *"Everybody must help everybody in teaching what is fake news. It is not just a one-person job or the government's job. Many are opinion pieces and they are not exactly fake. So how do you discern? It*

> *depends on your own principles and opinions as well. If it is totally fake, everyone has to have the awareness to know that it is fake. Everybody needs to work together.”* ***— Respondent 48, female, 35–39 years old, Informationally Overconfident group***

A female respondent (21–24 years old) from the Informationally Diffident group added that “*teaching*” meant that people who could recognise false information should play a more active role in informing those in their social networks, especially for those who did not mind “*being scolded for calling out fake news*”. Individuals who were influencers in their social networks and in general, should step up and play a greater role in debunking and calling out false information. Influencers took different meanings for different respondents. For some, influencers were opinion leaders who were domain experts or subject matter experts (e.g., a healthcare provider), for others, they were family members whom they trusted. Among younger respondents, their peers were opinion leaders, given their similar age and social media diet.

Institutional responses

Among institutional actors who were seen to be responsible for combatting false information, the government was the most commonly named stakeholder. This was especially so among respondents from the non-Informationally Savvy groups. These respondents felt that the government was in the best position to lead the fight against false information because it had the levers to do so, for instance, through law. On the other hand, they felt that citizens were less able to take action against those who contribute to the problem as they might land themselves in trouble (e.g., ugly confrontations with people in their social networks). A male respondent (50–54 years old) from the Informationally Disengaged group felt that the government was elected by the people to solve problems and had the resources to do so.

> “*The government has already been appointed to take care of me… [taking action against fake news] is none of my business … I rely on the team that has already been elected*.” — **Respondent 29, male, 50–54 years old, Informationally Disengaged group**

Another a male respondent (60–64 years old) from the same group drew an analogy between the head of state and the head of a family. He drew on Chinese philosophy and said the government is the “*father and mother of the nation*”. As “*head of the family*”, it has a big role to play in solving the problem.

Respondents felt there was an array of strategies that could be used by the government to address the problem of false information. A commonly named strategy was to use legislative levers such as the Protection from Online Falsehoods and Manipulation Act (POFMA) to act against fake news and false information. For example, a female respondent (21–24 years old) from the Informationally Diffident group believed that POFMA acted as a deterrent and was one reason why the spread of false information "*has been better*" as it made people more cautious about what they shared online. Another female respondent (35–39 years old) from the Informationally Diffident group said she tried not to forward too much information, especially information she was unsure of, because she feared the consequences of POFMA and did not want to "*get into any trouble with the law*". A male respondent (50–54 years old) from the Informationally Disengaged group said the government had already been doing a reasonable job in trying to manage this problem. However, he suggested that it should "*step up*" by introducing further punishments such as fines for perpetrators of fake news.

However, a small number of respondents felt that POFMA was not necessary as there were existing laws in Singapore to combat problematic speech (e.g., slander, defamation and sedition). Respondents who were less trusting of the government felt that POFMA was motivated by a political agenda. For example, a male respondent (25–29 years old) from the Informationally Savvy group said he did not support POFMA as it stifled people's freedom of expression. Another female respondent (50–55 years old) from the Informationally Overconfident group said POFMA served as a tool for the government to consolidate its power and stifle the spread of alternative views.

The other measures that respondents felt the government could take include raising awareness of the problem among people (like how the government takes the lead in educating the public in other domains such as recycling), focusing on vulnerable segments that include children and the elderly. While some outreach to senior citizens is being conducted at community centres, they focused on teaching seniors how to use devices but not how social media works. Although various agencies have been conducting outreach targeted at different segments (e.g., efforts by the National Library Board and Media Literacy Council), some pockets of the population, especially the middle-aged group, could have fallen through the gaps.

> *"They should educate the public about the process of recognising fake news … what elements to look out for? This [can be done] for different groups of people like the children, adults and the elderly. If you ask me what is the proper channel to use to identify if a piece of news is fake or not … I don't know. There should be more publicity*

> *on this area … like NEA, they are trying to teach us to reduce plastic bags. But for [identifying fake news], I don't see it."* ***— Respondent 41, male, 40–44 years old, Informationally Overconfident group***

Although many respondents looked to the government as the main actor for tackling false information in Singapore, many others, especially those from the Informationally Savvy group, also felt that there were limitations to the government's efficacy. This was because it is not possible for the government to "police the internet" at all times and in all places. A female respondent (40–44 years old) from the Informationally Savvy group gave the example of private Telegram groups as avenues that were not accessible to the government. The fact that some fake news originated from overseas also limits the government's ability to take effective action. Some recognised that the government's efforts were limited by the global nature of this problem. For example, a female respondent (35–39 years old) from the Informationally Diffident group said, "*the government should do something about [the spread of false information] … but it is a bit hard because this is the whole world's problem, not just Singapore's problem, so it is very hard [to solve].*"

Moving forward, respondents felt that the government should adopt more proactive and holistic measures to combat the problem. For instance, the government could proactively disseminate accurate information to the public, thereby inoculating them from potential false information. A male respondent (30–34 years old) from the Informationally Diffident group also felt that the government has been making commendable efforts in strengthening relationships between different communities, which were important and should continue. He said, "*the government has been trying very hard to build a good relationship among different races and religions so that even if [there are] any news that harms society, people can fall back on their strong relationships with one another.*" Maintaining strong social ties and relations in society was perceived to be a critical strategy to cushion the negative impacts of false information.

Besides the government, respondents felt that other institutional players such as social media companies and owners of online websites should assume responsibility to counter false information. A male respondent (50–54 years old) from the Informationally Disengaged group said, unlike news organisations, social media platforms like Facebook allowed everyone to post content "*without having to undergo any checks*". This results in people "*coming up with their own facts on Facebook*" and there was not much that individuals who recognised the problem could do. Thus, some respondents felt that social media platforms have the "*ethical duty*" and "*social responsibility*" to do the needful to stem the spread of false information. For

example, a female respondent (45–49 years old) from the Informationally Overconfident group said social media companies such as Facebook have the oversight of content published on their platforms and should do more to "*scan through posts to verify what they (people) are posting.*" Another female respondent (35–39 years old) from the Informationally Diffident group recognised that while Facebook and Instagram were doing their part to mitigate this problem, more needs to be done to address other problems like inauthentic accounts and spam messages. However, respondents also acknowledged that it is difficult for platforms to conduct the required checks.

Similarly, online news sites such as Mothership and The Online Citizen have the responsibility to practise "*good corporate governance*" and fact-check before publishing. Only a small number of respondents attributed responsibility to news organisations and journalists who report news — news organisations should perform internal checks to confirm the authenticity of videos before publishing.

The final institutional player was schools. Several respondents said the Social Studies curriculum, which they felt was currently too narrow in scope, could be expanded to incorporate content to develop critical thinking. A male respondent (40–44 years old) from the Informationally Overconfident group who was a teacher in a junior college said the current cyber-wellness curriculum largely focused on cybersecurity and cyberbullying, and could be expanded to equip students with more digital literacy skills, especially with regard to knowing how to identify false information online. A female respondent (40–44 years old) from the Informationally Diffident group felt that it was important to impart such knowledge to students as early as possible (e.g., primary six) so that there is enough time for them to learn how to navigate the online ecosystem.

While there were no distinct differences among the four groups of information users when it came to who should be responsible to counter false information, those who had stronger immunity against false information (e.g., from the Informationally Savvy group) generally assumed greater agency. They were more likely to advocate personal responsibility and to call for more active or effortful practices (e.g., fact-checking). Almost none from the Informationally Savvy group mentioned the government as the main actor as they felt that the government has its limitations and that ultimately, citizens who were the consumers of information were most responsible.

On the other hand, those with weaker immunity against false information, such as respondents from the Informationally Diffident and Informationally Disengaged groups, were more likely to be more comfortable and welcoming of government intervention, be it through legislation, enforcement or

education. When they spoke about what individuals could do, they tended to focus on passive practices, such as being more mindful of fake news and "waiting for official sources" to provide further information before sharing the information. In addition, older respondents were less likely to say that social media platforms should be responsible for the problem, and this could be due to their lack of knowledge of how social media worked.

Chapter 5

Main Findings for Phase 3

CHAPTER 5: MAIN FINDINGS FOR PHASE 3

This section presents the main findings of Phase 3 of the study. The findings are organised into three parts: (1) evaluation of the three modalities and the S.U.R.E. framework (Section 5.1.); (2) impact of the S.U.R.E. framework (Section 5.2.); and (3) whether certain modalities produce better outcomes for certain demographics (Section 5.3.). We also conducted one-way ANOVA analyses to compare the three modalities.[17]

5.1. Evaluation of modalities and S.U.R.E. framework

As mentioned in our literature review (Section 2.5.), existing studies have examined the efficacy of a modality by measuring outcomes as such the degree of recall of information presented, visual appeal, and perceived usefulness of a modality etc. In Phase 3, we evaluated the three modalities on the following the dimensions: (1) how clear they were; (2) how interesting they were; (3) how visually attractive they were; (4) how useful they were; and (5) whether respondents gained new knowledge from the modalities. In addition, we also evaluated the S.U.R.E. framework on the following aspects: (1) usefulness; (2) clarity; (3) helpfulness; and (4) applicability of the framework.

5.1.1. Evaluation of modalities

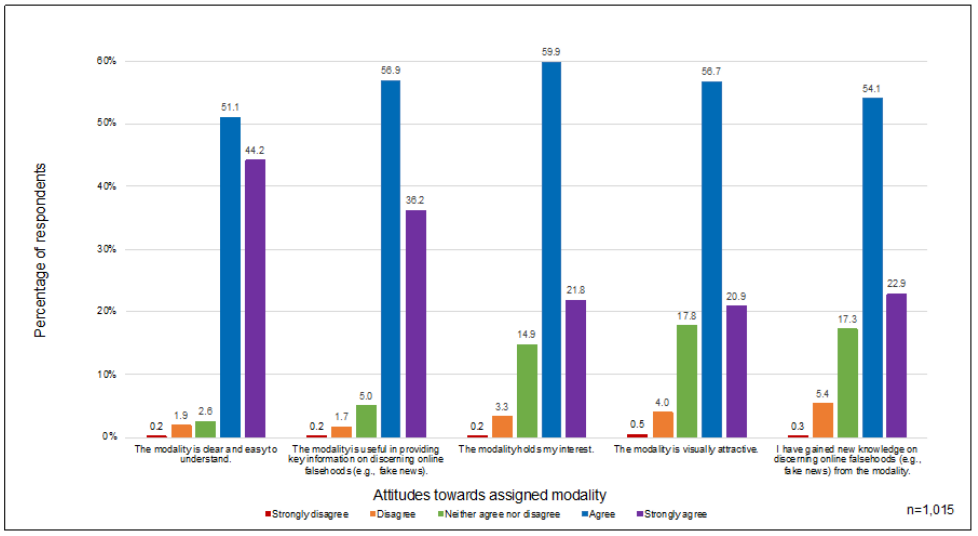
As seen in Figure 1, respondents from all three modality groups found their assigned modality clear and easy to understand, useful, and interesting.[18] The key strengths of the S.U.R.E. framework were its clarity and usefulness. Of the 1,015 respondents, more than 90 per cent of them (95.3 per cent) agreed or strongly agreed that their assigned modality was clear and easy to understand. About nine out of 10 of them (93.1 per cent) agreed or strongly agreed that their assigned modality was useful in providing key information on discerning online falsehoods. About 80 per cent of them (81.7 per cent) agreed or strongly agreed that their assigned modality was

[17] In figures that compare the three modalities, the horizontal brackets indicate where the between group significant mean differences lie. * indicates that mean difference is statistically significant at p-value < 0.05. ** indicates that mean difference is statistically significant at p-value < 0.01. *** indicates that mean difference is statistically significant at p-value < 0.001.

[18] Respondents were asked to indicate on a five-point Likert scale (from "strongly disagree" to "strongly agree") the extent to which they agreed or disagreed with the following five statements: (1) "*the presentation/infographic/video was clear and easy to understand*"; (2) "*the presentation/infographic/video holds my interest*"; (3) "*the presentation/infographic/video is visually attractive*"; (4) "*the presentation/infographic/video is useful in providing key information on discerning online falsehoods (e.g., fake news)*"; (5) "*I have gained new knowledge on discerning online falsehoods (e.g., fake news) from the presentation/infographic/video*".

interesting. In comparison, the S.U.R.E. framework performed less well in terms of its visual appeal and in terms of helping respondents gain new knowledge. Slightly over three-quarters of the respondents agreed or strongly agreed that their assigned modality was visually attractive and that they had gained new knowledge on discerning online falsehoods from their assigned modality (77.6 per cent and 77 per cent said so respectively).

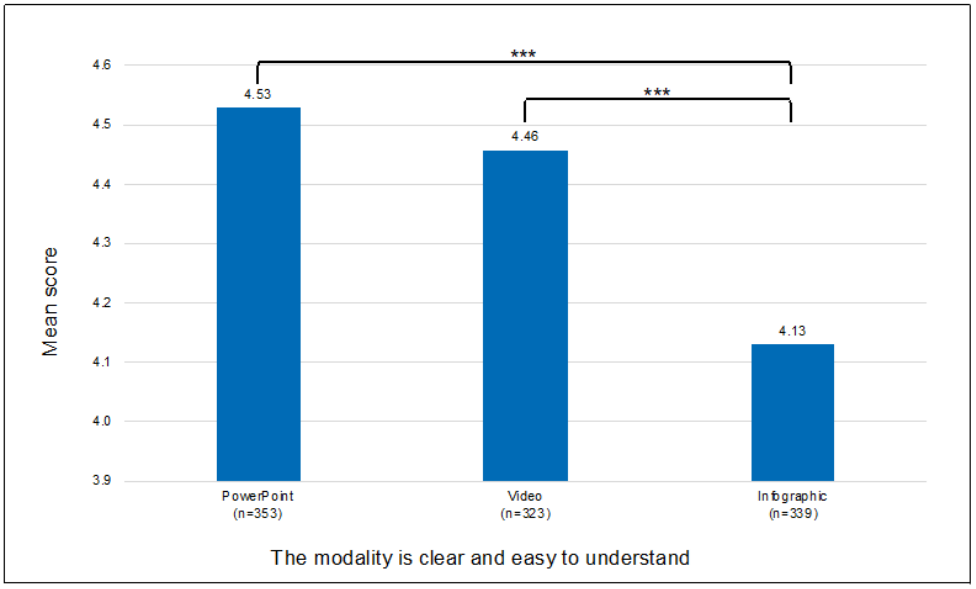
Figure 1: Respondents' attitudes towards their assigned modality



Further analyses also revealed significant differences in respondents' attitudes towards the three different modalities. When it came to perceived clarity of their assigned modality, the one way-ANOVA analysis and post-hoc tests found statistically significant differences between respondents presented with the PowerPoint and those presented with the infographic, and between respondents presented with the video and those presented with the infographic. The study found that the PowerPoint ($\bar{x}$ = 4.53) was significantly clearer than the infographic ($\bar{x}$ = 4.13), Similarly, between the video and the infographic, the video scored higher in clarity ($\bar{x}$ = 4.46) than the infographic.[19] See Figure 2.

[19] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), and between "video" and "infographic" group means (p-value = .000).

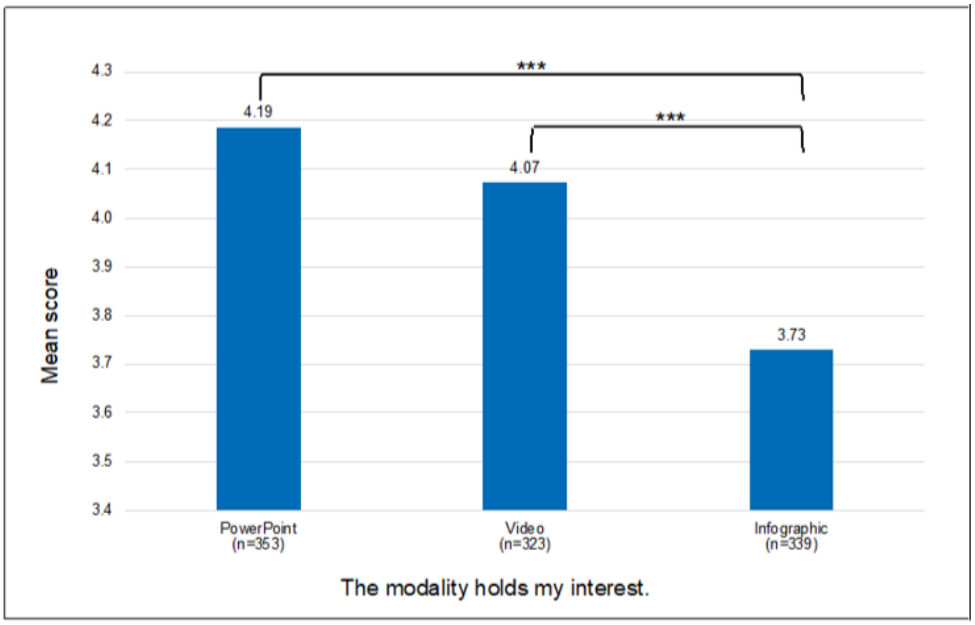
Figure 2: Mean differences in perceived clarity of assigned modality



The same trend was observed when it came to how interesting respondents perceived their assigned modality to be. The study found that the PowerPoint ($\bar{x}$ = 4.19) was significantly more interesting than the infographic ($\bar{x}$ = 3.73). Similarly, the video ($\bar{x}$ = 4.07) was also found to be significantly more interesting than the infographic.[20] See Figure 3.

[20] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), and between "video" and "infographic" group means (p-value = .000).

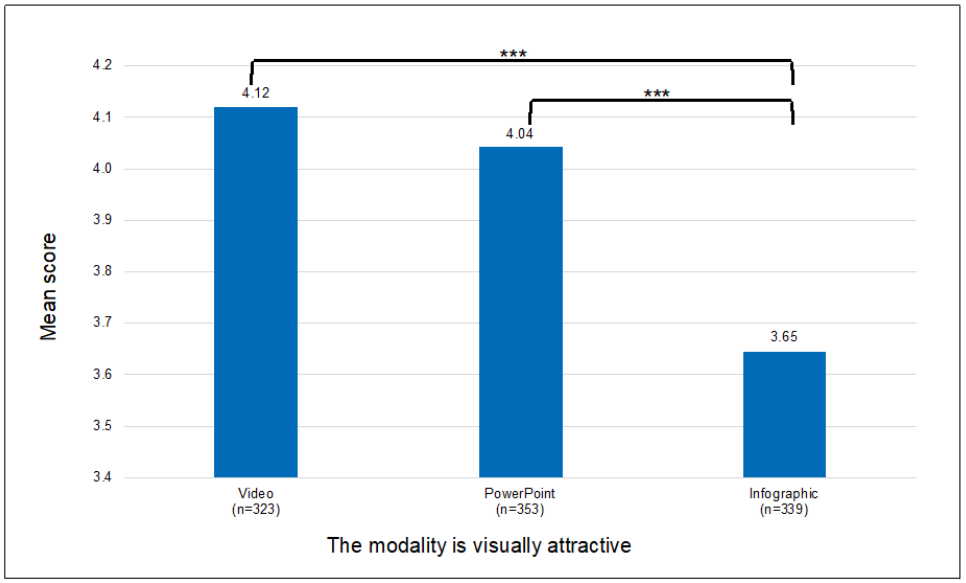
Figure 3: Mean differences in how interesting the assigned modality was perceived to be



The one-way ANOVA analysis and post-hoc tests also found significant differences in mean scores when it came to respondents' perceived visual attractiveness of their assigned modality. The study found that both the video ($\bar{x}$ = 4.12) and the PowerPoint ($\bar{x}$ = 4.04) were perceived to be more visually attractive than the infographic ($\bar{x}$ = 3.65).[21] See Figure 4.

[21] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "video" and "infographic" group means (p-value = .000), and between "PowerPoint" and "infographic" group means (p-value = .000).

Figure 4: Mean differences in perceived visual attractiveness of assigned modality



When it came to perceived usefulness of the assigned modality in providing key information on discerning online falsehoods and gaining new knowledge on discerning online falsehoods from the assigned modality, the one-way ANOVA analysis and post-hoc tests revealed statistically significant differences across all three modalities. The PowerPoint scored the highest for perceived usefulness ($\bar{x}$ = 4.44), followed by the video ($\bar{x}$ = 4.32) and the infographic ($\bar{x}$ = 4.05).[22] When it came to gaining new knowledge about discerning online falsehoods, the PowerPoint modality was most effective ($\bar{x}$ = 4.11), followed by the video ($\bar{x}$ = 3.94), and the infographic ($\bar{x}$ = 3.76).[23] See Figures 5 and 6.

[22] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), between "PowerPoint" and "video" group means (p-value = .019), and between "video" and "infographic" group means (p-value = .000).
[23] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), between "PowerPoint" and "video" group means (p-value = .015), and between "video" and "infographic" group means (p-value = .007).

Figure 5: Mean differences in perceived usefulness of assigned modality

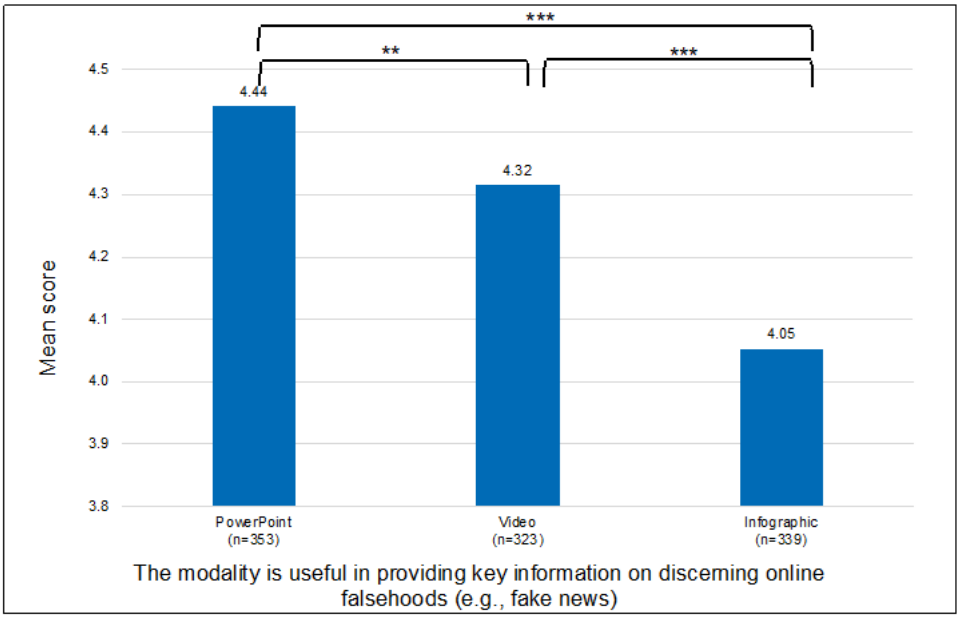
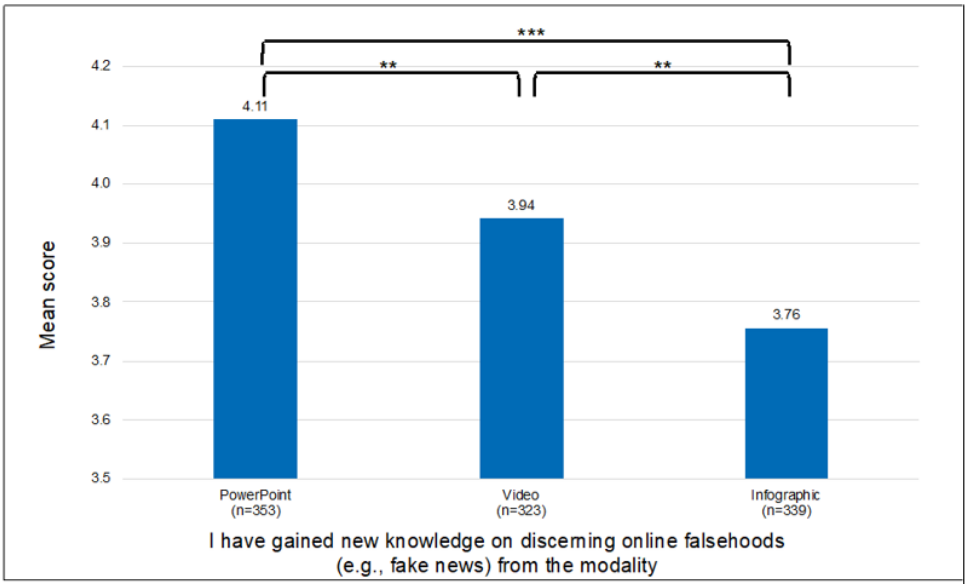


Figure 6: Mean differences in gaining new knowledge from assigned modality



In summary, all three modalities were clear, useful, and interesting. However, the one-way ANOVA analysis and post-hoc tests found that the PowerPoint was consistently more effective than the video and infographic across four dimensions — perceived clarity, perceived usefulness, how interesting respondents felt their assigned modality was, and whether they had gained new knowledge from their assigned modality. The only exception was in terms of visual attractiveness, where video was perceived to be most visually attractive. This could be due to the animation and music that enhanced the aesthetics of the video. It is interesting to note that the PowerPoint generally outperformed the video in most aspects, even though both the PowerPoint and video were equally media-rich modalities. One possible reason for this is the "talking-head"[24] element in the PowerPoint that provided a more personal and conversational style of information delivery when compared with the video. The instructor embedded in the video as the "talking head" could have enhanced the relatability of the S.U.R.E. framework. Indeed, as seen from sentiments collected via open-end responses in Section 5.1.2., several respondents who were presented with the PowerPoint highlighted that the explanations provided by the "talking-head" were especially clear, engaging, and easy to understand. Table 5 below summarises the findings presented in Section 5.1.1.

Table 5: Summary table of how different modalities fared[25]

No.	Dimensions	PowerPoint	Infographic	Video
1	Clarity	1st	3rd	2nd
2	Interesting	1st	3rd	2nd
3	Visual attractiveness	2nd	3rd	1st
4	Usefulness	1st	3rd	2nd
5	Gaining new knowledge	1st	3rd	2nd

5.1.2. Open-ended responses

In addition to capturing respondents' attitudes towards their assigned modality using a five-point Likert scale (as seen in Section 5.1.1.), we also included two open-ended questions that captured qualitative responses to get a better picture of why respondents felt a certain way and the reasons behind their attitudes towards their assigned modality and the S.U.R.E.

[24] "Talking head" refers to the image of the instructor that appears at the bottom left-hand corner of the PowerPoint, who verbally explains the content in the slides to the audience.
[25] The rankings in this summary table are based on the mean scores of each modality for the various dimensions. Refer to the Figures 2–6 for details on the statistically significant differences among the modalities.

framework.[26] The following sections present respondents' feedback and suggestions relating to the usefulness of their assigned modality and the S.U.R.E. framework, and increasing knowledge among readers and viewers.

Reasons for finding assigned modality useful or not useful

In general, most respondents found their assigned modality useful. Furthermore, respondents presented with the different modalities largely shared similar reasons for why they found their assigned modality and the S.U.R.E. framework useful. As seen in Table 6, the top 10 most frequently recurring words from the responses of each modality group shared common words such as "easy", "clear", "understand", "identify", and "differentiate". Figure 7 shows the word clouds that were generated based on the responses from each modality group.[27]

Table 6: Top 10 words relating to reasons for finding assigned modality useful[28]

No.	PowerPoint	Infographic	Video
1	Real (46)	Understand (61)	Understand (48)
2	Understand (41)	Easy (48)	Easy (41)
3	Know (37)	Steps (45)	Identify (41)
4	Easy (33)	Real (36)	Real (32)
5	Clear (32)	Clear (36)	Steps (31)
6	Identify (30)	Identify (31)	Know (30)
7	Online (28)	Check (28)	Online (20)
8	Differentiate (27)	Know (25)	Check (20)
9	Steps (21)	Differentiate (23)	Clear (19)
10	Look (21)	True (18)	Helps (18)

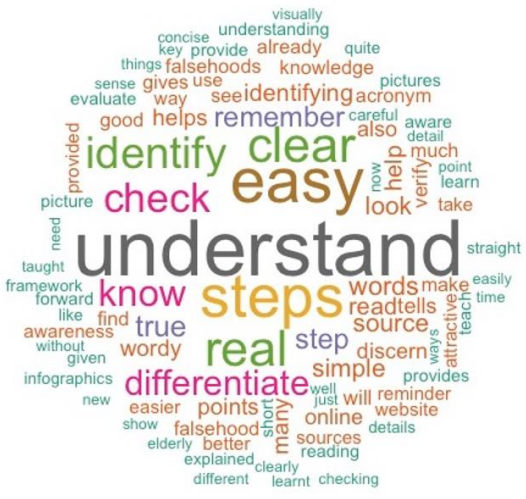
[26] Respondents were asked the following open-ended questions: (1) "*Why did you find the modality useful? If it was not useful, why not?*", and (2) "*What new knowledge did you gain from the modality? If you did not gain any new knowledge from the modality, why not?*"

[27] Word clouds were generated using R packages "wordcloud" and "tm". The minimum frequency for a word to appear in the word cloud was set at five. Stop words — i.e., words that do not add much meaning to a sentence — such as "the", "and", "you", "I", "are" were also removed from the analysis. We also included additional stop words — e.g., "PowerPoint", "infographic", "video", "useful", "knowledge" — that were context-specific to make the word clouds generated more meaningful.

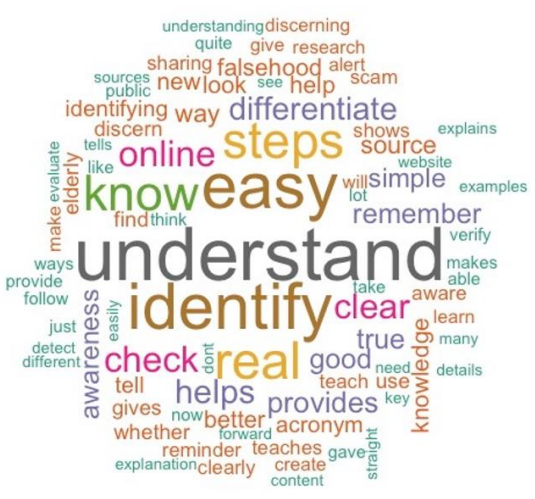
[28] The number within the parentheses indicates the number of times that specific word appeared in the open-ended responses.

Figure 7: Word clouds generated based on open-ended responses relating to whether assigned modality was useful or not useful

PowerPoint



Infographic



Video

A common reason cited by respondents for why their assigned modality and the S.U.R.E. framework were useful was because these were clear, concise, and easy to understand. For example, respondents who were presented with the PowerPoint found it useful because the verbal explanations given by the "talking head" were clear, and the step-by-step approach of the S.U.R.E. framework was systematic and easily understandable. Similarly, many respondents who were presented with the infographic also said the four distinct S.U.R.E. steps were simple and easy to understand. Respondents who were presented with the video echoed these sentiments and highlighted that the format of the video and the language used also made it especially easy to understand the S.U.R.E framework. They added that the video animations were attractive and interesting, and sustained their attention. Table 7 below lists some sample quotes (edited for clarity) taken from respondents who found their assigned modality and the S.U.R.E. framework useful because they were clear and easy to understand.

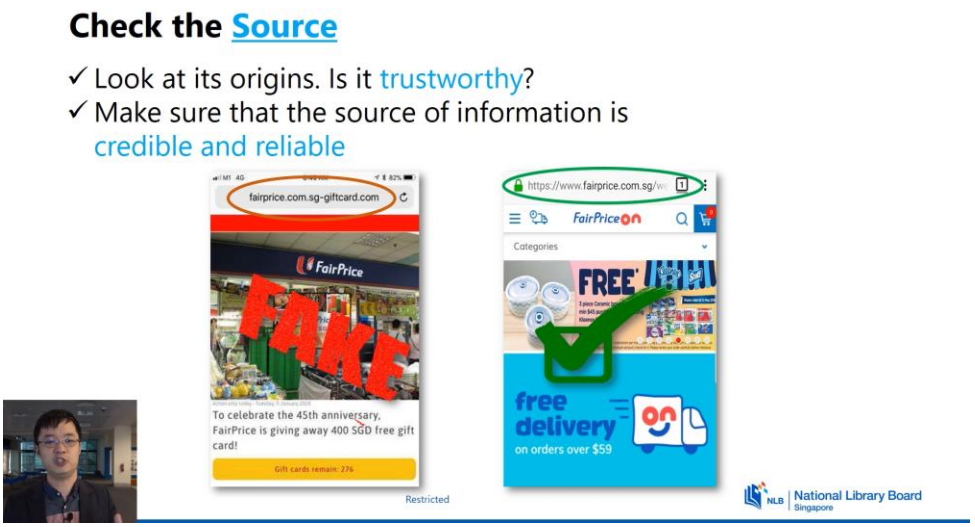
Table 7: Sample quotes on the assigned modality and S.U.R.E. framework being clear and easy to understand

Type of modality	Sample quotes
PowerPoint	• *"It is well structured and the acronym is easy to remember."* • *"The information is clearly and logically presented in a way easy for most people to understand."* • *"This is well created and made it easy for me to understand as it shows the different ways for me to spot different information online."* • *"S.U.R.E. is clear and straightforward. The presenter articulates the four steps very clearly."* • *"The side-by-side display of the presenter and the graphics in the PowerPoint is very useful in giving a clear message on online falsehoods."*
Infographic	• *"It is informative and straight to the point."* • *"It is useful because it is informative and easy to understand. I can apply the information to my daily life."*

	• *"The information is well-categorised and the descriptions are clear."* • *"It is useful as the S.U.R.E. steps are very easy to remember and I can apply it in real life. The information has been simplified and kept very straightforward."* • *"The steps provided are very clear that it made me understand it easier."*
Video	• *"The information and illustrations are very clear and it shows the steps required to make sure we are not reading fake news."* • *"The acronym is easy to remember and the explanation is clear."* • *"Presents information in clear and succinct manner, giving examples in each point."* • *"Clear steps to approach topic of identifying falsehoods. S.U.R.E. framework makes it easy to learn steps."* • *"The explanation is very clear in the video and I can use this when I read something online."* • *"It is concise and fairly simple to understand. Animation is interactive."* • *"The video is simple and easy to understand, like an advertisement."*

Another common reason cited by respondents for why their assigned modality and the S.U.R.E. framework were useful was because they provided well-substantiated information on identifying falsehoods and on differentiating real information from false information. For example, respondents who were presented with the PowerPoint found it particularly useful because the real-life examples and case studies used (e.g., how to distinguish between an authentic and fake NTUC FairPrice website URL) made them more aware of similar scams (see Image 12).

Image 12: Screenshot of PowerPoint explaining the difference between authentic and fake NTUC FairPrice website URL



Respondents who were presented with the video similarly cited the good use of examples and illustrations in the video to help them better understand the topic of online falsehoods. Many of the respondents who were presented with the infographic also found it useful as it provided thorough explanations on how to spot false information. However, some of them also caveated that the usefulness of the infographic was limited by the lack of concrete examples provided to illustrate the points made. Table 8 below lists some sample quotes taken from respondents who found their assigned modality and the S.U.R.E. framework useful because they provided information on discerning falsehoods.

Table 8: Sample quotes on the assigned modality and S.U.R.E. framework providing well-substantiated information

Type of modality	Sample quotes
PowerPoint	• *"I have a better understanding about fake URLs, like 'fairprice.com.sg-gift card'."* • *"The example of the URL is useful and helps improve information literacy for those who do not know how to identify falsehoods."* • *"Useful as it explains the different kinds of false information that one may experience when browsing online or when going through their social media."* • *"The examples given were clear and helpful."*
Infographic	• *"Clear information and guides people on how to differentiate what is false information and how to use the steps to determine if the information is false."* • *"Very informative. The S.U.R.E. framework is explained in detail and this is the first time I see it. I can use this to differentiate news from now on."* • *"It is only useful to a certain extent … there aren't any examples for people to know what are credible and not credible sources."* • *"The infographic gave examples but I couldn't visualise the examples like 'checking the sources online'; I don't understand the meaning of 'website extensions'."*
Video	• *"Useful. Because the photos, explanations in the video, make us have second thoughts before sharing information and be more vigilant."* • *"Video provides concrete examples on how to discern authenticity of source and tips on how to do research."*

	• *"This video has taught me to differentiate fake news. There are a lot of fake news nowadays that makes me worry what are actual news and what are fake news."* • *"Yes. The information on fake news and discerning fake news is well illustrated so we can understand better [how to discern fake news]."*

A small minority of the respondents (about four per cent) said they did not find their assigned modality or the S.U.R.E. framework useful. The main reason cited by this group of respondents was that the information provided in the S.U.R.E. framework was too basic and that they were either already aware of it or were already practising the S.U.R.E. steps in their everyday lives. Respondents who were presented with the infographic said the infographic was not helpful because it was too wordy. One respondent, who identified himself as a senior, suggested that an image-based format, such as cartoon strips, might appeal more to seniors. Table 9 below lists some sample quotes taken from respondents who did not find their assigned modality or the S.U.R.E. framework useful.

Table 9: Sample quotes on the assigned modality and S.U.R.E. framework being not useful

Type of modality	Sample quotes
PowerPoint	• *"Not useful, presentation not clear enough."* • *"Not useful as I already know all these."* • *"Not useful as I already know about ascertaining reliability of sources."* • *"Not useful as have been doing such steps to identify falsehoods."* • *"Not useful for me as I already know all this information."*
Infographic	• *"Not useful, already have prior knowledge."* • *"Not useful because I already know how, through radio, TV and other channels."*

	• *"Not useful because I already know beforehand. I learnt before."* • *"No. It wasn't useful. The infographic is too wordy and I have to read two to three times to understand what the sentence means. It may be difficult for those who are not good in English. It felt a bit troublesome to read so many words and heavy sentences."* • *"Not useful, too wordy to facilitate understanding and to hold interest."* • *"Not useful because too many words. Cartoon strips, images, pictures and photos will be better for people of my age [70 years old]."*
Video	• *"No, because I already take these steps. But it seems like a good primer for the general public."* • *"Not useful to me because I think it is common sense."* • *"Not useful as youngsters like me are more tech savvy."* • *"Not useful because it was too fast. The information was not clear."*

Suggestions for improving modalities

Several respondents suggested specific ways to improve the different modalities. As mentioned earlier, several respondents who were presented with the infographic felt that the infographic was too wordy, which affected their ability to pay close attention and process the content. Some respondents specifically pointed out that its text-heaviness made it less suitable for seniors (also see Section 5.3.1., where we explore whether certain modalities work better for certain demographics).

When it came to the video, a handful of respondents shared that the duration of the video was too long, and that they found it difficult to pay full attention

to it and to watch it in its entirety. Some also highlighted that the speed of information delivery should be slowed down, especially for the benefit of seniors. It is interesting to note that although the PowerPoint was longer in duration (4 minutes 6 seconds) than the video (3 minutes 30 seconds), none of the respondents who were presented with the PowerPoint gave negative feedback about the length of the presentation. This may suggest the strength of incorporating a more narrative and conversational style of information delivery (e.g., via the "talking head") to engage audiences and better hold their attention.

Finally, several respondents suggested reproducing the different modalities in vernacular languages, in order to reach out to audiences from different age groups.[29] Table 10 below lists some sample quotes taken from respondents who gave specific feedback to improve the modalities.

Table 10: Sample quotes on feedback to improve assigned modality

Type of modality	Sample quotes
PowerPoint	• *"It is useful, it teaches me how to know which is fake news. The four steps, S, U, R and E are very helpful. Better to have it other languages, for different races — Chinese, Indian, Malay. Should increase awareness among the public and reach out to different age groups."*
Infographic	• *"Not useful, too wordy to facilitate understanding and to hold interest."* • *"It contains the necessary information, but it is too wordy."* • *"Yes, the infographic is visually enticing and attractive to catch attention, but the pointers are too long and hard to understand for the elderly."* • *"Useful, but too wordy and not suitable for the elderly. More pictures, graphics, photos or cartoons would make it easy for the elderly to understand."*

[29] Interviewers debriefed respondents and told them where to get resources from NLB's website. At the time of the study, the video was the only modality that was available in vernacular languages.

	• *"Too much information. Not sure how it applies in the real world. Perhaps better if there are pictures to show difference between real and fake news."*
Video	• *"The short form S.U.R.E. is useful especially for elderly. In order for the message to be more effective (for the elderly), the video should be made available in other languages."* • *"Not useful to me because I think it is common sense. The video is too long and too wordy, so I switch off after a while. Any video longer than two minutes is too long."* • *"The video should be slightly shorter so it will be easier for the elderly to focus. It is boring and people lose their attention if it is too long."* • *"Useful. The details are very clear. But need easy words, more photos and bigger photos so that the elderly can understand. The speed of delivery must be slower for the elderly."* • *"Regarding 'Research', I think it was useful to inform viewers that they should check the article against additional sources. However, the 'no results found' might be a little misleading because Google Searches rarely return no result found."*

Gaining new knowledge from assigned modality

Most respondents agreed that they had gained new knowledge from watching the video, the PowerPoint or by reading the infographic. They also shared common types of knowledge gain regardless of the modality they were presented with. This can be seen from words relating to the S.U.R.E. framework (e.g., "source", "research", "evaluate") and the steps on checking online information, that commonly recurred in their responses (see Table 11). Figure 8 shows the word clouds that were generated based on the responses from each modality group.[30]

[30] Examples of stop words are "fake news", "useful", "PowerPoint presentation", "video", "infographic", "can", "people", "yes", "false information" and "sure".

Table 11: Top 10 words relating to gaining new knowledge from assigned modality[31]

No.	PowerPoint	Infographic	Video
1	Already (40)	Already (51)	Know (48)
2	Know (40)	Know (45)	Check (47)
3	Website (31)	Check (44)	Already (41)
4	Real (31)	Source (35)	Source (34)
5	Check (29)	Learn (30)	Steps (31)
6	Differentiate (28)	Steps (27)	Website (30)
7	Steps (27)	Real (25)	Gain (21)
8	Learn (26)	Evaluate (24)	Learnt (21)
9	Gain (24)	Online (23)	Real (21)
10	Picture (24)	Gain (22)	Research (18)

[31] The number within the parentheses indicates the number of times that specific word appeared in the open-ended responses.

Figure 8: Word clouds generated based on open-ended responses relating to whether respondents gained new knowledge from their assigned modality

PowerPoint

Infographic

Video

The most common type of knowledge gained by respondents was the S.U.R.E. framework itself, as it provided an easy-to-remember and systematic step-by-step approach for protecting themselves from online falsehoods moving forward. Among the four S.U.R.E. steps, the "S", "R" and "E" steps seem to have left the strongest impression on respondents. For example, many respondents mentioned that they appreciated the real-life example of how to assess the credibility of a source by examining if the URL of a webpage contained suspicious extensions, as this was something that they were previously unaware of. Through these examples, the framework heightened their alertness to websites and scams they might encounter in future. Many respondents also highlighted that they had gained a deeper appreciation of the importance of conducting further research (e.g., cross-validating with at least two sources) and evaluating a piece of information thoroughly before sharing it. Table 12 lists some sample quotes from respondents who elaborated on the knowledge they had gained from the S.U.R.E. framework.

Table 12: Sample quotes on gaining new knowledge from the S.U.R.E. framework

Type of modality	Sample quotes
PowerPoint	• *"I learnt how to tell if a picture is Photoshopped or manipulated as shown in the video on the MRT. Most of us just look at the surface and do not dive deeper into the actual context of the video, hence we misunderstand the information."* • *"Able to differentiate between real and fake news from the URL / website. Lately, there have been many fake news on NTUC / Sheng Siong giving out vouchers and many people believed them."* • *"Yes, the example showing different NTUC website domains is new information to me."* • *"A fake URL has an added extension. The S.U.R.E. framework is helpful."* • *"Definitely, I learnt from the presentation "S.U.R.E.", what it means and how to use it to validate the authenticity of news etc."* • *"I understand that we should always look at the big picture, evaluate the source and do research to determine credibility."* • *"The S.U.R.E. framework and its step-by-step method to check and differentiate news."*
Infographic	• *"Checking to ensure there are at least two other sources that confirm the information."* • *"Evaluate — gives me a different dimension / perspective, that I should share news only after establishing if the information is legitimate. It also makes me question if there's really a need to share."* • *"I learnt about fake web addresses and not to respond to any web link which may expose me to data leak."*

	• *"The acronym S.U.R.E. is easy to remember. The sequence is systematic. It strengthens my skills to identify false news."* • *"The infographic teaches me how to differentiate real and false news easily."* • *"I can use the steps in S.U.R.E. to verify the authenticity of news or information I receive."* • *"Identify the source of website link by checking if there is an extension behind."* • *"I gained new knowledge on the four steps of S.U.R.E. and how to use it when looking for information in future."* • *"Evaluate the information before sending to other people."*
Video	• *"Yes, I gained new knowledge. Must check whether website is legitimate, if the source is credible and understand the purpose of the article."* • *"Video said something about if the research result not found, may be fake. Look out for the date in the article. Take note web address the extension."* • *"I know that Source, Research and Evaluate is important but I did not know the Understand part. Good to know."* • *"The S.U.R.E. framework is short and simple to remember and it contains information on how to evaluate and check false information."* • *"Searching and evaluate from at least two sources to confirm if the information is correct."* • *"Mindful of website extension which I normally do not take notice."* • *"I understand that confirming the credibility of news takes more than just reading, one has to do further research."* • *"Yes, I learnt about cross referencing sources and verifying links to discern fake news."* • *"Although we tell ourselves to be careful, this framework provides a structured approach to help us identify falsehoods."* • *"Check for the date, time and place, and do multiple online searches to cross-check against news outlet for information credibility."* • *"Yes, before this, I did not know how to tell whether a source is correct. Now, I know how to look up the URL, Google it, check if the information is published on an official website etc."*

Suggestions for improving modalities

Similar to the feedback on the usefulness of the modalities and the S.U.R.E. framework, a minority of the respondents felt that they did not gain new knowledge — about 12 per cent of respondents who were presented with the PowerPoint said so, and about one in five respondents who were presented with either the infographic (20 per cent) or the video (17 per cent) said so. The most commonly cited reason by this group of respondents was that they were already familiar with what they should do and they were already practising the S.U.R.E. steps in their everyday lives. That said, several respondents who felt that they did not gain any new knowledge still felt that the S.U.R.E. framework served as a good reminder or refresher of what they already knew. This suggests the potential for benefits to be reaped even by those may be already aware of what they should do to verify the accuracy of a source. Table 13 lists some sample quotes from respondents who did not gain new knowledge from their assigned modality.

Table 13: Sample quotes on not gaining new knowledge from the S.U.R.E. framework

Type of modality	Sample quotes
PowerPoint	• *"No, because I already knew the steps. I am aware of how to spot false news."* • *"I already have that knowledge on how to tell if the news is true or not."* • *"I know already but good recap."* • *"I already know and I have been practising the SURE steps."* • *"Not really, I kind of knew most of the steps as I have come across this information elsewhere."*
Infographic	• *"No. Those are things I already know."* • *"I did not gain any new knowledge because I already know how to differentiate fake and real news So there is nothing new to me."* • *"More of a reminder, a refresher document."* • *"Not much gain of new knowledge, the information is common sense."* • *"I already know how to differentiate them before trusting its source."*
Video	• *"I did not gain any new knowledge as I am already aware of these steps and know how to check."* • *"Nothing new because it feels like common sense."* • *"No knowledge gain — this is common knowledge, we have been taught how to cross reference sources since we were in secondary school."*

	• *"No new knowledge is gained, but it is a reminder to be aware of fake news."* • *"Did not gain any knowledge as I am already practising it in my daily life."*

In summary, most respondents found their assigned modality and the S.U.R.E. framework useful and had gained new knowledge from it. Most found it useful because it was clear, simple, and easy to understand, while providing comprehensive and well-substantiated information on how to identify online falsehoods. Many also felt that the systematic and step-by-step approach of the S.U.R.E. framework would come in handy in future. A small minority of the respondents did not find the S.U.R.E. framework useful and did not gain any new knowledge from it, mainly because they were already familiar with the information provided. Respondents also shared some ways to improve the various modalities — for one, several respondents pointed out that the infographic was too wordy and hard to follow closely as a result. Respondents also felt that the video could be shortened and slowed down for better retention of the information. Finally, respondents shared that the various modalities should come in vernacular languages to benefit more segments of the public. Table 14 below summarises the key findings from the open-end responses.

Table 14: Summary of strengths and areas for improvement for the modalities and the S.U.R.E. framework

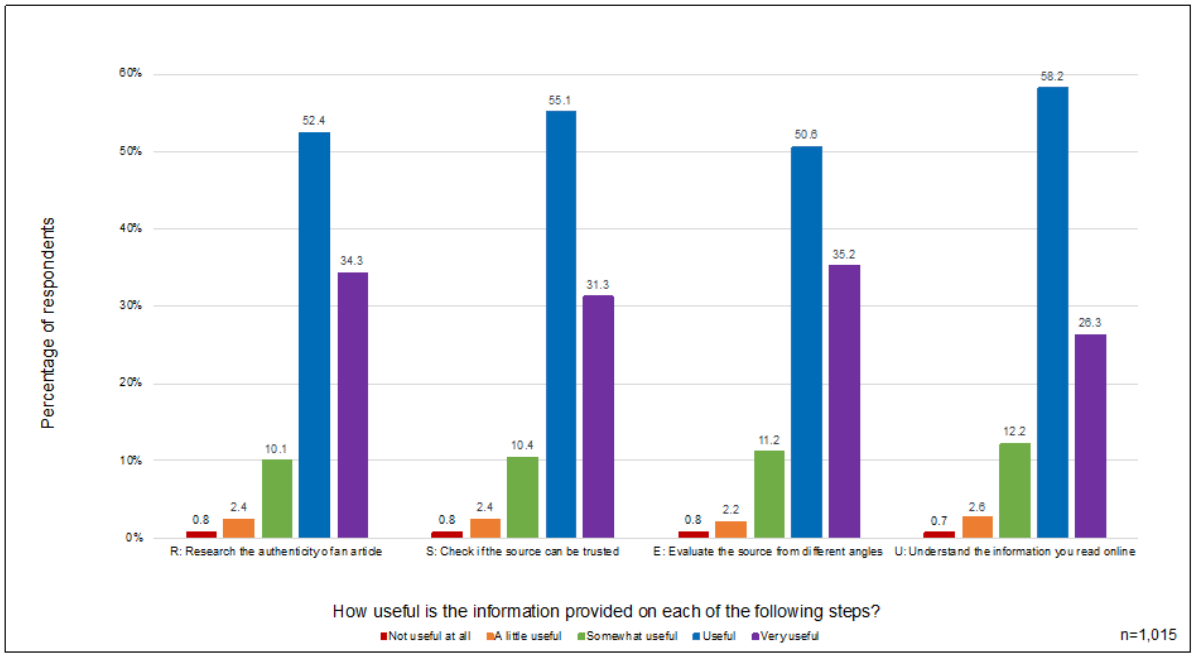
Strengths	Areas for improvement and suggestions
• Clear, concise, and easy to understand. • Provided well-substantiated information on identifying falsehoods and on differentiating real information from false information. • Provided an easy-to-remember and systematic step-by-step approach for recognising online falsehoods. • Provided real-life examples of how to examine the credibility of a URL, which would reduce chances of falling prey to imposter websites and scams in future. • Helped gain deeper appreciation of the importance of conducting further research (e.g., cross-validating with at least two sources) and evaluating a piece of information thoroughly before sharing it.	• Information provided in S.U.R.E. framework was too basic for some respondents. • Infographic lacked concrete examples to illustrate the points made. • Infographic was too wordy, making it difficult to fully digest its content. Being too wordy also made it less suitable for seniors. • Video was too long, making it difficult to pay full attention to the video in its entirety. • Speed of information delivery in the video should be slowed down, especially for the benefit of seniors. • Modalities should be made available in vernacular languages.

5.1.3. Evaluation of S.U.R.E. framework — perceived usefulness

In addition to examining respondents' attitudes towards their assigned modality (as presented in Section 5.1.1.), we also measured respondents' attitudes towards the S.U.R.E. framework itself.

First, we examined how useful respondents found the information provided in each of the four steps — "S", "U", "R", and "E" — of the S.U.R.E. framework was.[32] In general, the majority of the respondents agreed or strongly agreed that the information provided in all four steps of the S.U.R.E. framework was useful, with more than 80 per cent of them who said so. Among the four steps, respondents found the "R" step most useful — 86.7 per cent of respondents agreed or strongly agreed that the information provided in the "R" step of the S.U.R.E. framework was useful. This was closely followed by the "S" step, with 86.4 per cent of respondents who agreed or strongly agreed that the information provided in the "S" step of the S.U.R.E. framework was useful. In comparison, the "U" step of the S.U.R.E. framework saw the lowest proportion of respondents who agreed or strongly agreed that the information provided was useful (84.5 per cent). See Figure 9.

Figure 9: Perceived usefulness of the S.U.R.E. framework

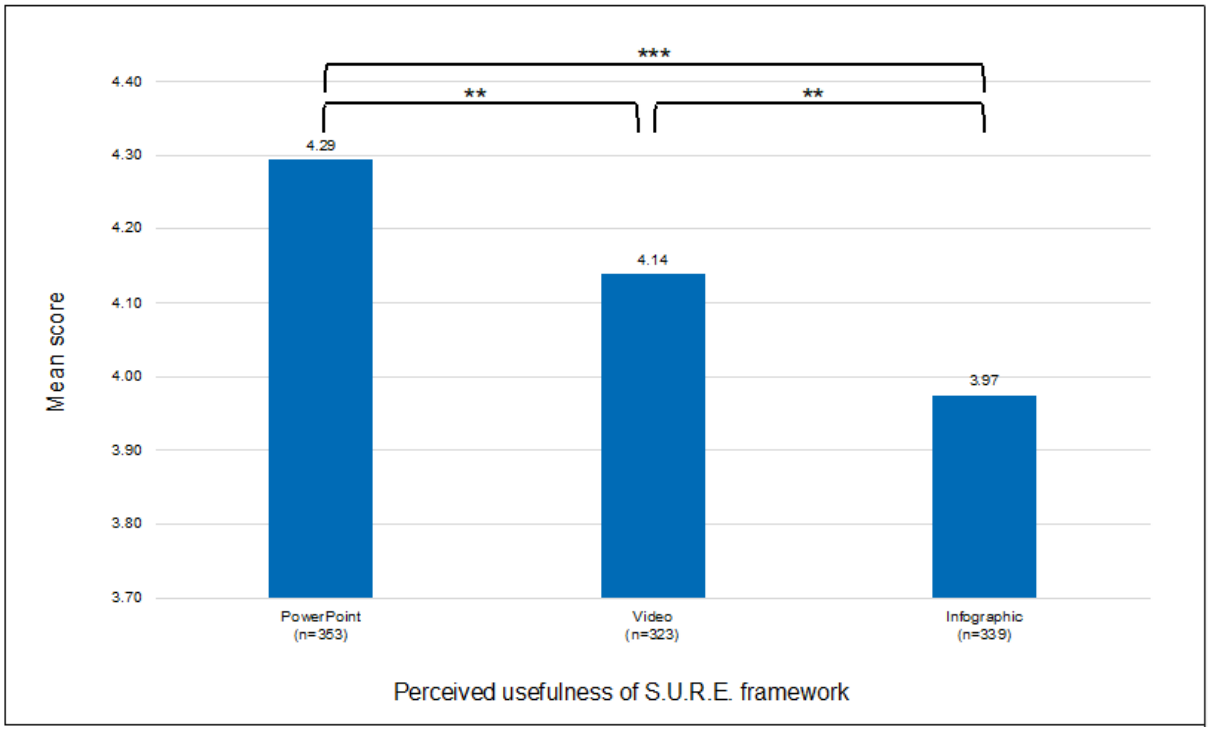


The one-way ANOVA analysis and post-hoc tests also revealed statistically significant mean differences across all three modalities. In line with earlier findings, the PowerPoint was perceived to be most useful ($\bar{x}$ = 4.29), followed by the video ($\bar{x}$ = 4.14) and infographic ($\bar{x}$ = 3.97).[33] See Figure 10.

[32] Respondents were asked to indicate on a five-point Likert scale (from "not useful at all" to "very useful") how useful they thought the information provided in each of the following S.U.R.E. steps were: (1) "*S: Check if the source can be trusted*"; (2) "*U: Understand the information you read online*"; (3) "*R: Research the authenticity of an article*"; and (4) "*E: Evaluate the source from different angles*".

[33] One-way ANOVA analysis and post-hoc tests were conducted using a single mean score for perceived usefulness of the S.U.R.E. framework, which was calculated by averaging the individual mean scores of each of the "S", "U", "R", and "E" steps. One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), between "PowerPoint" and "video" group means (p-value = .003), and between "video" and "infographic" group means (p-value = .002).

Figure 10: Mean differences in perceived usefulness of the S.U.R.E. framework



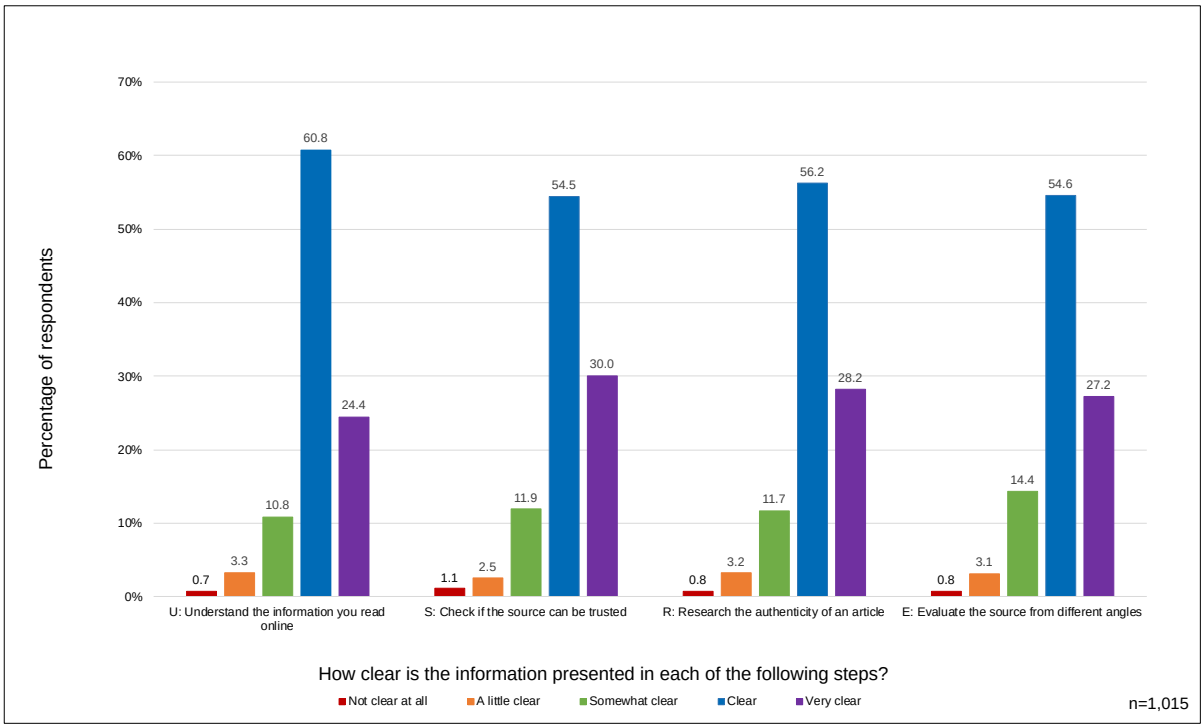
5.1.4. Evaluation of S.U.R.E. framework — perceived clarity

Next, we also asked respondents how clear they found the information provided in each of the four steps of the S.U.R.E. framework.[34]

Similar to earlier findings, the majority of the respondents agreed or strongly agreed that the information provided in all four steps of the S.U.R.E. framework was clear, with more than 80 per cent of them who said so. As seen in Figure 11, respondents found the "U" step of the S.U.R.E. framework to be clearest — 85.2 per cent of respondents agreed or strongly agreed that the information provided in the "U" step of the S.U.R.E. framework was clear. This was closely followed by the "S" step, with 84.5 per cent of respondents who agreed or strongly agreed that the information provided in the "S" step of the S.U.R.E. framework was clear. In comparison, the "E" step of the S.U.R.E. framework saw the lowest proportion of respondents who agreed or strongly agreed that the information provided was clear (81.8 per cent).
These two findings — the "U" step of the S.U.R.E. framework perceived to be least useful yet clearest — suggest that respondents likely had a pre-existing knowledge of the information provided in this particular step of the S.U.R.E. framework.

[34] Respondents were asked to indicate on a five-point Likert scale (from "not clear at all" to "very clear") how clear they thought the information provided in each of the following S.U.R.E. steps were: (1) "*S: Check if the source can be trusted*"; (2) "*U: Understand the information you read online*"; (3) "*R: Research the authenticity of an article*"; and (4) "*E: Evaluate the source from different angles*".

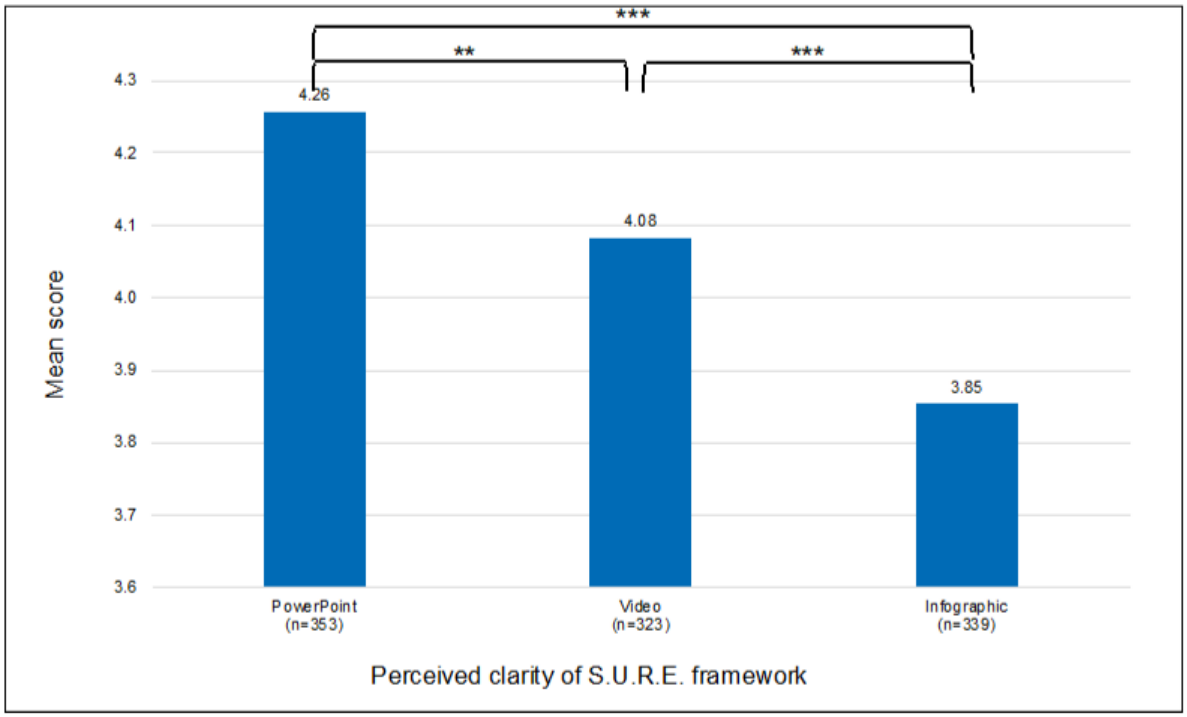
Figure 11: Perceived clarity of the S.U.R.E. framework



Similarly, the one-way ANOVA analysis and post-hoc tests revealed statistically significant mean differences across all three modalities.[35] The PowerPoint was perceived to be clearest in terms of the information provided in the S.U.R.E. framework ($\bar{x}$ = 4.26), followed by the video ($\bar{x}$ = 4.08) and the infographic ($\bar{x}$ = 3.85). See Figure 12.

[35] One-way ANOVA analysis and post-hoc tests were conducted using a single mean score for perceived clarity of the S.U.R.E. framework, which was calculated by averaging the individual mean scores of each of the "S", "U", "R", and "E" steps. One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000), between "PowerPoint" and "video" group means (p-value = .001), and between "video" and "infographic" group means (p-value = .000).

Figure 12: Mean differences in perceived clarity of the S.U.R.E. framework

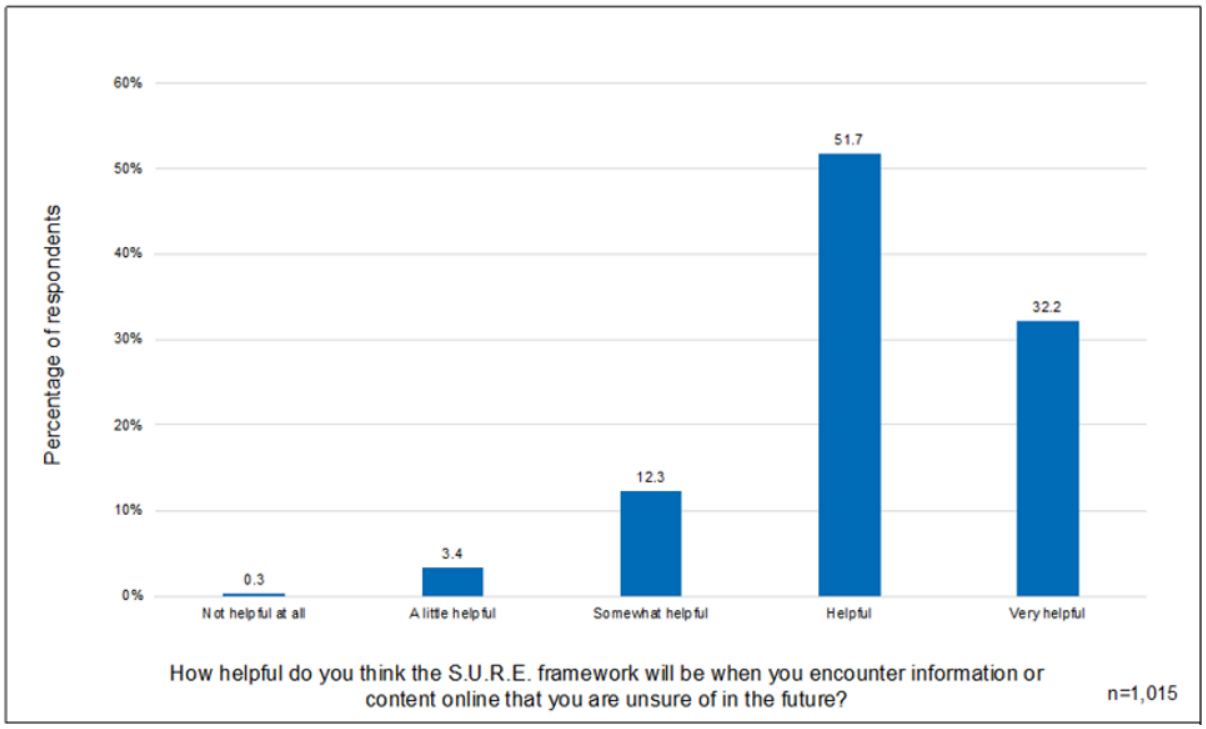


5.1.5. Evaluation of S.U.R.E. framework — perceived helpfulness

Our study also measured respondents' perceived helpfulness of the S.U.R.E. framework.[36] As seen in Figure 13, more than 80 per cent (83.9 per cent) of the respondents said the S.U.R.E. framework was helpful or very helpful. Slightly over 10 per cent of the respondents (12.3 per cent) said that the S.U.R.E. framework was somewhat helpful, and only less than five per cent (3.7 per cent) of them said that the S.U.R.E. framework was a little helpful or not helpful at all.

[36] Respondents were asked to indicate on a five-point Likert scale (from "not helpful at all" to "very helpful") how helpful they thought the S.U.R.E. framework will be when they encounter information or content online that they are unsure of in the future.

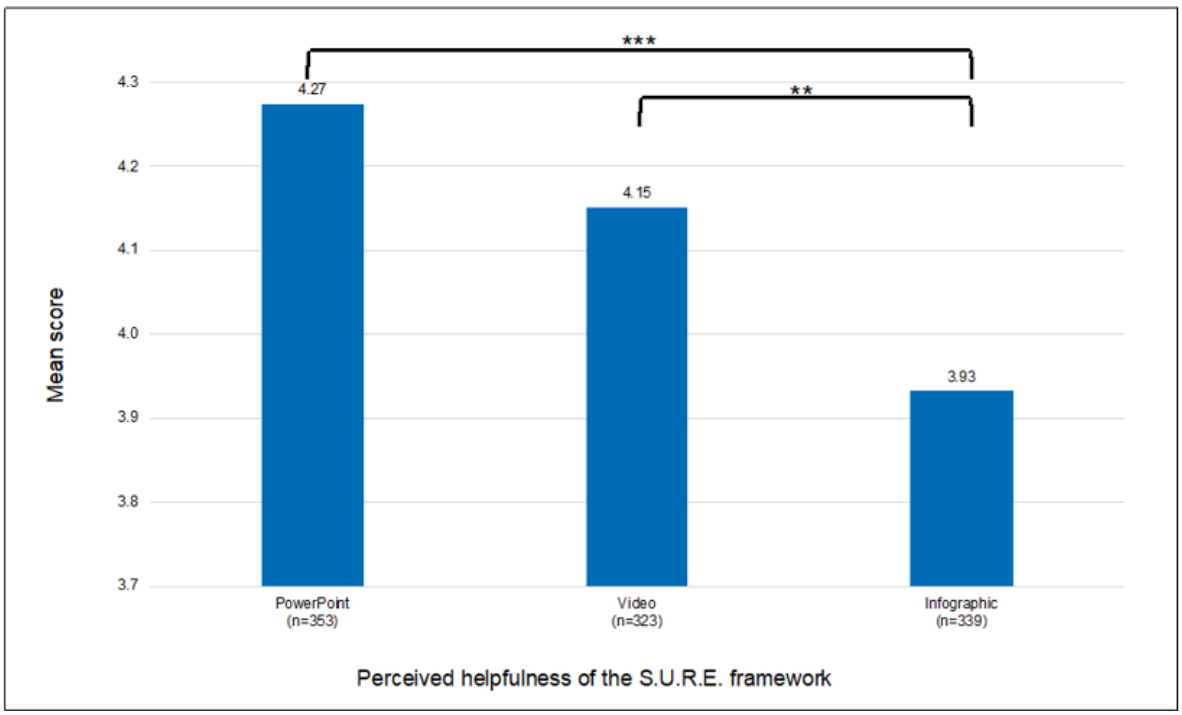
Figure 13: Perceived helpfulness of the S.U.R.E. framework



When it came to perceived helpfulness of the S.U.R.E. framework, the one-way ANOVA analysis and post-hoc tests revealed statistically significant differences between the PowerPoint and the infographic, as well as between the video and the infographic. The PowerPoint was perceived to be more helpful ($\bar{x}$ = 4.27) than the infographic ($\bar{x}$ = 3.93). Similarly, the video was perceived to be more helpful ($\bar{x}$ = 4.15) than the infographic.[37] See Figure 14.

[37] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000) and between "video" and "infographic" group means (p-value = .001).

Figure 14: Mean differences in perceived helpfulness of the S.U.R.E. framework



5.1.6. Evaluation of S.U.R.E. framework — perceived applicability

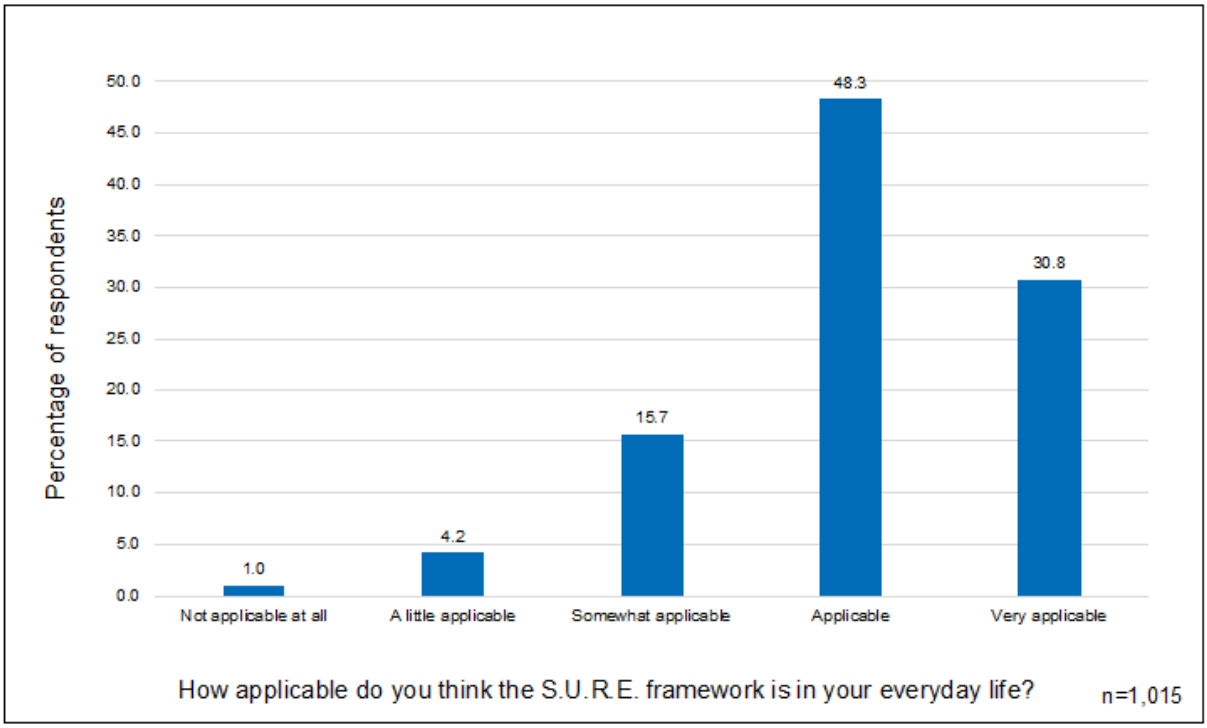
Finally, we also asked respondents how applicable the S.U.R.E. framework was, both to themselves and to others.[38,39]

In terms of the applicability of the S.U.R.E. framework to themselves, almost eight in 10 of the respondents (79.1 per cent) said the S.U.R.E. framework was applicable or very applicable to their everyday lives. About 15 per cent of the respondents (15.7 per cent) said the S.U.R.E. framework was somewhat applicable to their everyday lives, and about five per cent (5.2 per cent) of them said the S.U.R.E. framework was a little applicable or not applicable at all to their everyday lives. See Figure 15.

[38] In terms of the applicability of the S.U.R.E. framework to themselves, respondents were asked to indicate on a five-point Likert scale (from "not applicable at all" to "very applicable") how applicable the S.U.R.E. framework was in their everyday lives.

[39] In terms of the applicability of the S.U.R.E. framework to others, respondents were asked to indicate on a five-point Likert scale (from "strongly disagree" to "strongly agree") the extent to which they agreed or disagreed with the following statements: (1) "*I believe the S.U.R.E. framework should be used a guide by others when they are unsure of any information or content online*"; and (2) "*I will refer others to the S.U.R.E. framework as a guide they could use when they are unsure of any information or content online*".

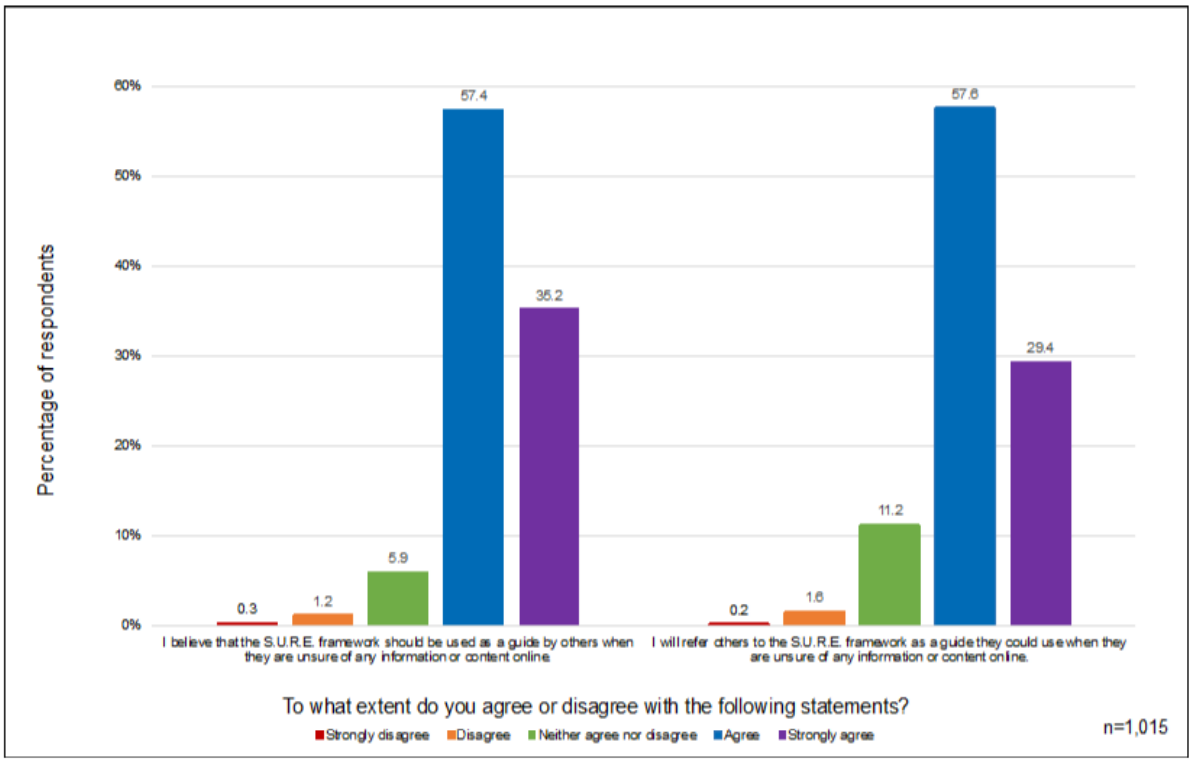
Figure 15: Perceived applicability of the S.U.R.E. framework to self



A similar trend was observed when it came to respondents' perceived applicability of the S.U.R.E. framework to others. Over 90 per cent (92.6 per cent) of the respondents agreed or strongly agreed that the S.U.R.E. framework should be used as a guide by others when they are unsure of any information or content online. Close to 90 per cent (87 per cent) of the respondents also agreed or strongly agreed that they would refer others to S.U.R.E. framework as a guide that they could use when they are unsure of any information or content online. See Figure 16.

The high applicability of the S.U.R.E. framework is likely due to its clarity, usefulness and helpfulness. Respondents were confident of their ability to apply what they learnt to their day-to-day practice because they understood the practices and habits promoted by the framework. Not only did they find the framework useful to them, they were also hopeful that others would reap similar benefits from the framework.

Figure 16: Perceived applicability of the S.U.R.E. framework to others



We also conducted a one-way ANOVA analysis and post-hoc tests to check if there were statistically significant mean differences across the three modalities. When it came to respondents' perceived applicability of the S.U.R.E. framework to themselves, we found that the PowerPoint was perceived to more applicable ($\bar{x}$ = 4.23), in terms of the information presented on the S.U.R.E. framework, than the video ($\bar{x}$ = 4.01) and the infographic ($\bar{x}$ = 3.86).[40] When it came to respondents' perceived applicability of the S.U.R.E. framework to others, the PowerPoint ($\bar{x}$ = 4.31) and video ($\bar{x}$ = 4.21) scored higher than the infographic ($\bar{x}$ = 4.08)[41] See Figures 17 and 18.

[40] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000) and between "PowerPoint" and "video" group means (p-value = .001).

[41] One-way ANOVA analysis and post-hoc tests were conducted using a single mean score for perceived applicability of the S.U.R.E. framework to others, which was calculated by averaging the individual mean scores of Q10 R1 and Q10 R2. One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000) and between "video" and "infographic" group means (p-value = .013).

Figure 17: Mean differences in perceived applicability of the S.U.R.E. framework to self

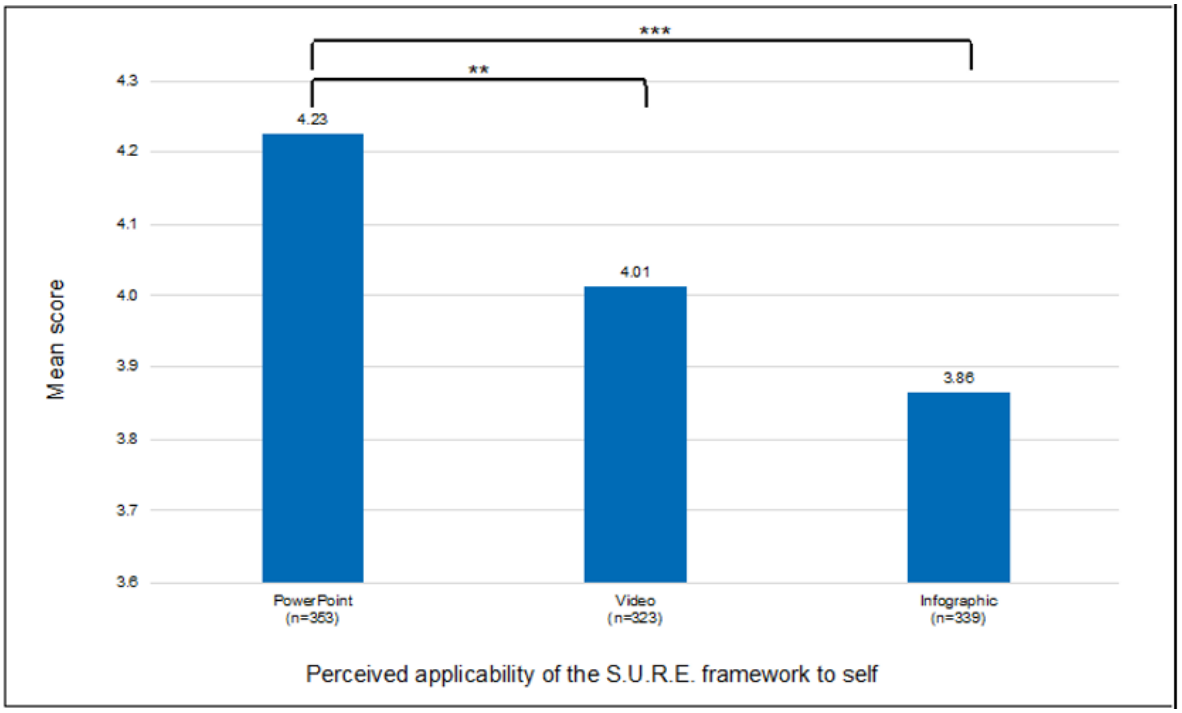
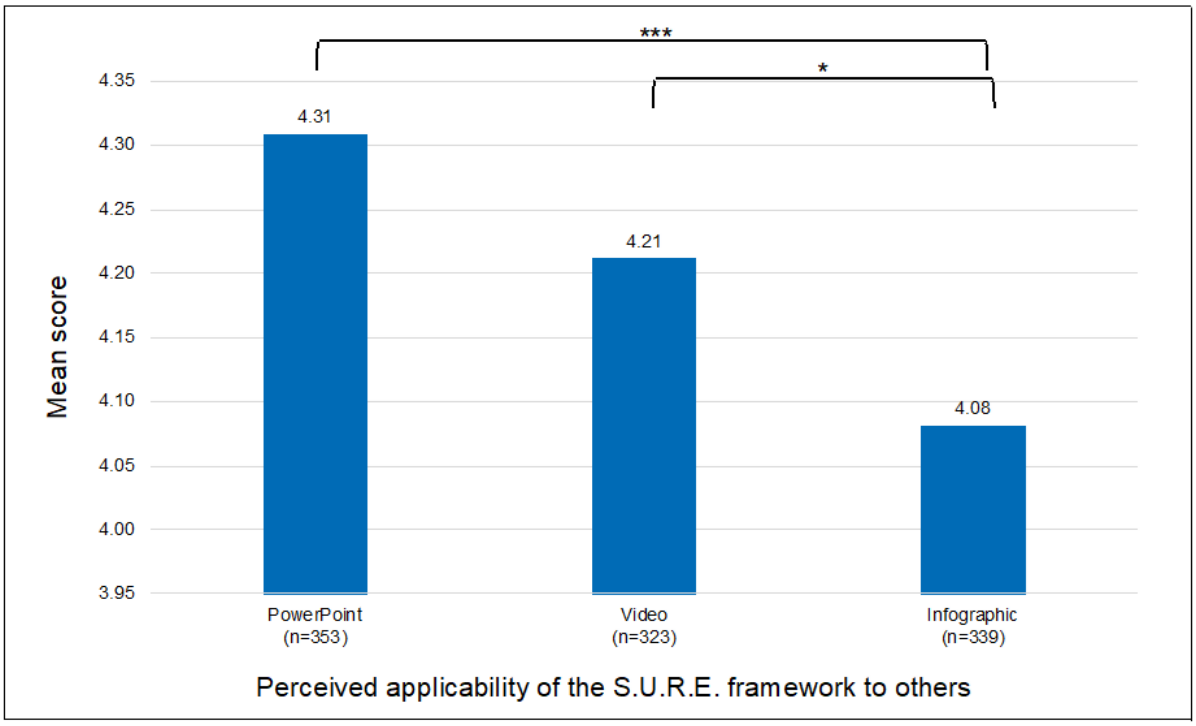


Figure 18: Mean differences in perceived applicability of the S.U.R.E. framework to others



In short, our findings showed that in general, the PowerPoint generated more positive perceptions about the S.U.R.E. framework (in terms of its perceived usefulness, clarity, helpfulness and applicability) than the video and infographic. This corroborates earlier findings (in Section 5.1.1.) that showed more positive perceptions towards the PowerPoint modality as well. Table 15 below provides a summary of the findings from the framework evaluation.

Table 15: Summary table on evaluation of the S.U.R.E. framework

- Respondents found the "R" ("Research") step most useful, but found the "U" ("Understand") step least useful.
- Respondents found the "U" ("Understand") step clearest, but found the "E" ("Evaluate") step least clear.
- More than 80 per cent of the respondents found the S.U.R.E. framework helpful or very helpful.
- Almost 80 per cent of the respondents found the S.U.R.E. framework applicable or very applicable to their everyday lives. About 90 per cent of them agreed or strongly agreed that the framework should be used by others and that they would refer others to it.
- Among the three modalities, the PowerPoint performed best across all dimensions (i.e., usefulness, clarity, helpfulness, applicability).

5.2. Impact of the S.U.R.E. framework

In addition to understanding respondents' perception and reception of the S.U.R.E. framework and the modality through which it was delivered, Phase 3 of the study also examined the impact of the S.U.R.E. framework. For impact assessment, we measured respondents' (1) ability to recall information about the S.U.R.E. framework; (2) level of knowledge of the S.U.R.E. framework; (3) level of understanding of the S.U.R.E. framework; (4) level of self-efficacy in discerning real from false information and performing the S.U.R.E. steps; and (5) their ability to authenticate a piece of information. Similar to earlier sections, we also examined if there were modality differences for each of these five dimensions.

5.2.1. Recall of information about the S.U.R.E. framework

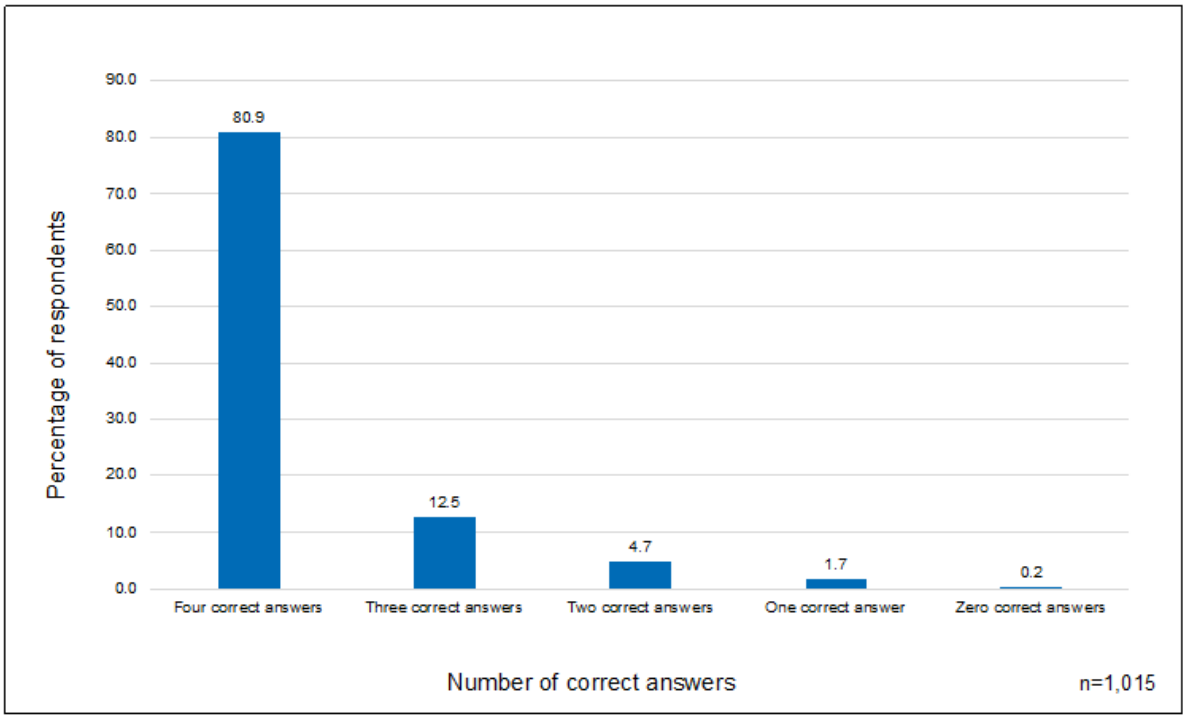
We measured respondents' ability to accurately recall information about S.U.R.E. framework by asking them what "S", "U", "R', and "E' respectively stands for. Table 16 presents the proportion of respondents who answered each question correctly or incorrectly.

As seen in Table 16, the majority of the respondents were able to accurately recall what "S.U.R.E." stood for. Over 90 per cent of the respondents were able to answer each recall question correctly. Using respondents' score for each question, we also totalled their overall performance on recalling information about the S.U.R.E framework into a score out of four — about eight in 10 respondents (80.9 per cent) answered all four recall questions correctly. Slightly over 10 per cent of the respondents (12.5 per cent) answered three out of four questions correctly, and 6.6 per cent of them gave two or less correct answers. See Figure 19.

Table 16: Responses to recall questions about the S.U.R.E. framework

No.	Questions	Responses	Percentage (%) of respondents
1	What does the letter "S" in the S.U.R.E. framework stand for?[42]	Chose correct answer	92.1
		Chose incorrect answers	7.8
2	What does the letter "U" in the S.U.R.E. framework stand for?[43]	Chose correct answer	95.1
		Chose incorrect answers	5.0
3	What does the letter "R" in the S.U.R.E. framework stand for?[44]	Chose correct answer	94.8
		Chose incorrect answers	5.2
4	What does the letter "E" in the S.U.R.E. framework stand for?[45]	Chose correct answer	90.2
		Chose incorrect answers	9.8

Figure 19: Level of recall of the S.U.R.E. framework



A one-way ANOVA analysis was performed to check if there were significant differences in respondents' ability to accurately recall information about the S.U.R.E. framework when presented with different modalities. However, no statistically significant difference in mean scores was found.

5.2.2. Knowledge about the S.U.R.E. framework

In addition to measuring respondents' ability to accurately recall information about the S.U.R.E. framework, we measured respondents' knowledge of the S.U.R.E. framework by listing six statements relating to the S.U.R.E. framework, where respondents had to select either "true", or "false" for each statement. Respondents were also given the "don't know" option.

[42] Options given were: (1) Source (correct answer); (2) Sharing; (3) Sure; (4) Spelling.
[43] Options given were: (1) Use; (2) Utilise; (3) Understand (correct answer); (4) Unfair.
[44] Options given were: (1) Rational; (2) Research (correct answer); (3) Repeat; (4) Reuse.
[45] Options given were: (1) Easy; (2) Educate; (3) Error; (4) Evaluate (correct answer).

As seen in Table 17, the majority of the respondents answered each of the six questions correctly. The question that most respondents answered correctly was, "*Before choosing to share or forward any information, it is necessary to check if the headline or media may be manipulated*", where close to 95 per cent of the respondents answered this question correctly. The question that fewest respondents answered correctly was, "*A web/website address that has an extension added to it indicates that the source is not credible*" — 78.1 per cent of the respondents answered this question correctly. This suggests that respondents were least clear about discerning the credibility of a source by assessing the URL of a webpage, which also resonates with findings from the open-ended responses earlier (Section 5.1.2.) — several respondents had highlighted that the fake URL example mentioned in the S.U.R.E. framework was a new and novel piece of information to them.

Table 17: Responses to knowledge questions about the S.U.R.E. framework

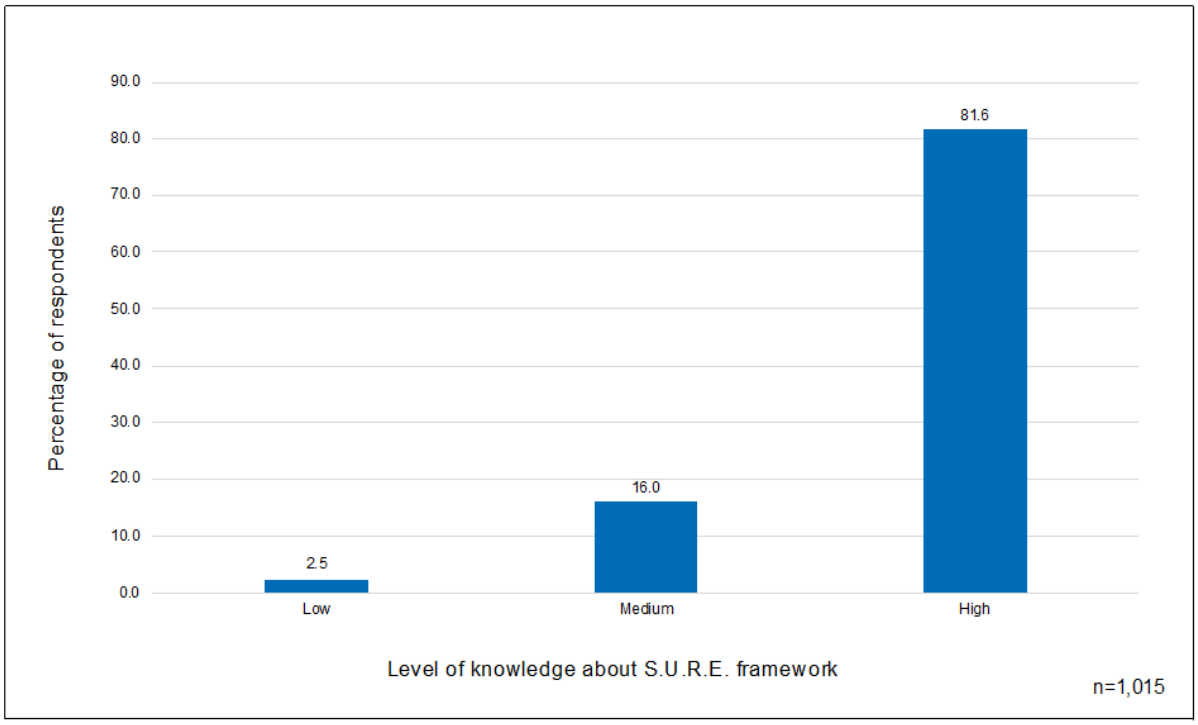
No.	Questions	Responses	Percentage (%) of respondents
1	A web/website address that has an extension added to it indicates that the source is not credible (e.g., the official website of the Ministry of Manpower is www.mom.gov.sg but you see an extension at the end of the web address, like www.mom.gov-sg.com).	True *(correct answer)*	78.1
		False	14.7
		Don't know	7.2
2	Factual sources contain information such as the name of the author, date published, and links to other official sources supporting the information.	True *(correct answer)*	86.3
		False	7.8
		Don't know	5.9
3	Personal opinions and expressions on social media can potentially be a source of misinformation.	True *(correct answer)*	87.6
		False	9.6
		Don't know	2.9
4	It is safe to share a piece of information if it is one-sided (i.e., tells only one side of the story).	True	8.7
		False *(correct answer)*	85.8
		Don't know	5.5
5	There should at least be two or more sources to confirm if the information in a source is real.	True *(correct answer)*	92.8
		False	4.0
		Don't know	3.2
6	Before choosing to share or forward any information, it is necessary to check if the headline or media (e.g., image, video) may be manipulated (i.e., replaced or Photoshopped).	True *(correct answer)*	94.9
		False	2.5
		Don't know	2.7

The findings also suggest that respondents had a better knowledge of the practices they should adopt for information verification, compared with their knowledge of the informational or message attributes associated with false information. More than 90 per cent of them said there should at least be two or more sources to confirm if the information in a source is real, and that it is necessary to check if the headline or media (e.g., image, video) may be manipulated (i.e., replaced or Photoshopped) before choosing to share or forward any information. Comparatively, fewer knew what makes for a false URL, the informational features of factual sources, and that personal opinions and expressions on social media could

potentially be a source of misinformation. The last finding corroborates the findings from Phase 2 of the study, which pointed to people attributing subjectivity to what is perceived to be "true" or "false".

We also grouped respondents according to three levels of knowledge of the S.U.R.E. framework by combining their scores for these six questions.[46] The majority of the respondents (81.6 per cent) had a high level of knowledge about the S.U.R.E. framework. Less than 20 per cent (16 per cent) of the respondents had a medium level of knowledge of the S.U.R.E. framework, and only 2.5 per cent of them had a low level of knowledge. See Figure 20.

Figure 20: Level of knowledge about the S.U.R.E. framework



A one-way ANOVA analysis confirmed that there was no statistically significant difference in in respondents' level of knowledge about the S.U.R.E. framework when presented with different modalities.

5.2.3. Level of understanding of the S.U.R.E. framework

To measure respondents' level of understanding of the S.U.R.E. framework, we asked respondents four questions, each relating to one of the "S", "U", "R", and "E" steps of the S.U.R.E. framework.[47]

As seen in Table 18, more than 80 per cent of the respondents answered questions relating to the "S", "U", and "R" steps correctly, suggesting a generally good level of understanding of the information presented in these steps. The question about the "U" step of the S.U.R.E. framework saw the highest proportion of respondents who answered it correctly (84.4 per

[46] Respondents were grouped into three categories, those with (1) low (gave zero to two correct answers), (2) medium (gave three to four correct answers), and (3) high (gave five to six correct answers) levels of knowledge about the S.U.R.E. framework.
[47] For each of the four questions, respondents were asked to select the option that they thought was the correct answer to the question.

cent), followed by the question about the "R" step (82.6 per cent), and the question about "S" step (80.4 per cent).

In comparison however, only about half of the respondents (51.7 per cent) answered the question about the "E" step of the S.U.R.E. framework correctly, suggesting that respondents demonstrated weakest understanding about how to evaluate a piece of information (e.g., evaluating information from different angles, exercising fair judgment, considering if the headline or media may be manipulated before deciding whether to share or forward it).

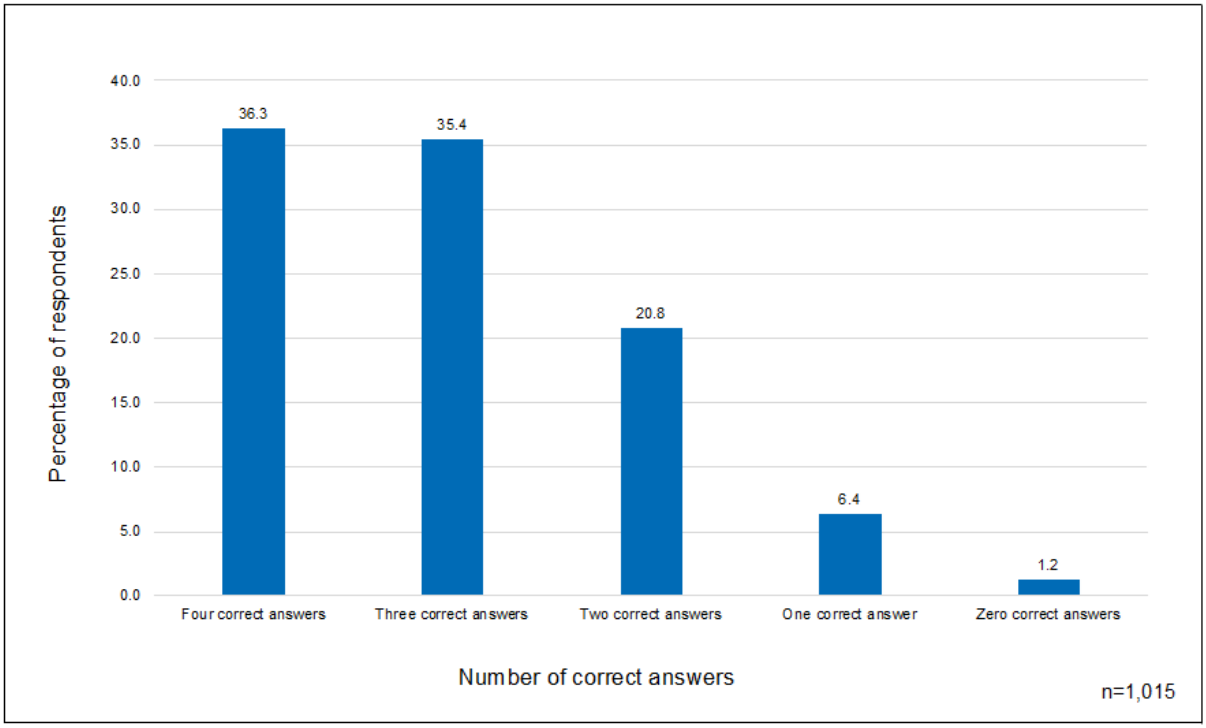
Table 18: Responses to questions that assessed their understanding of the S.U.R.E. framework

No.	Questions	Responses	Percentage (%) of respondents
1	Which of the following might be an example of an official source in the Singapore context?[48]	Chose correct answer	80.4
		Chose incorrect answers	19.6
2	A factual piece of information will not contain _____?[49]	Chose correct answer	84.4
		Chose incorrect answers	15.6
3	Which of the following methods can one use to check if a source (e.g., article, message) is authentic?[50]	Chose correct answer	82.6
		Chose incorrect answers	17.5
4	Which of the following should you do before you decide to forward or share an article?[51]	Chose correct answer	51.7
		Chose incorrect answers	48.3

Using respondents' score for each question, we totalled their overall performance on understanding the S.U.R.E framework into a score out of four. As seen in Figure 21, about a third of the respondents (36.3 per cent) answered all four questions correctly, with another third of them (35.4 per cent) who answered three out of four questions correctly. About one-fifth of the respondents (20.8 per cent) answered two out of the four questions correctly, and less than 10 per cent (7.6 per cent) gave either one or zero correct answers.

[48] This question measures respondents' understanding of the "S" step of the S.U.R.E. framework. Options given were: (1) www.gov.sg.com; (2) www.gov.sg (correct answer); (3) www.gov.com.edu; (4) www.gov.sg-gov.com.
[49] This question measures respondents' understanding of the "U" step of the S.U.R.E. framework. Options given were: (1) personal opinions (correct answer); (2) links to other official sources; (3) details on dates; (4) details on time.
[50] This question measures respondents' understanding of the "R" step of the S.U.R.E. framework. Options given were: (1) check for at least two sources (e.g., article, message) to confirm if the information is real (correct answer); (2) check if the source (e.g., article, message) is sent by a trusted friend or family member; (3) check if the source (article, message) contains images; (4) none of the above.
[51] This question measures respondents' understanding of the "E" step of the S.U.R.E. framework. Options given were: (1) check if the article supports your views (e.g., what you believe in or think is correct); (2) check if the article looks professional (e.g., looks like it was produced by a news organisation/media professional); (3) consider if the headline or media (e.g., image, video) in the article may be manipulated (i.e., replaced or photoshopped); (4) none of the above.

Figure 21: Level of understanding of the S.U.R.E. framework

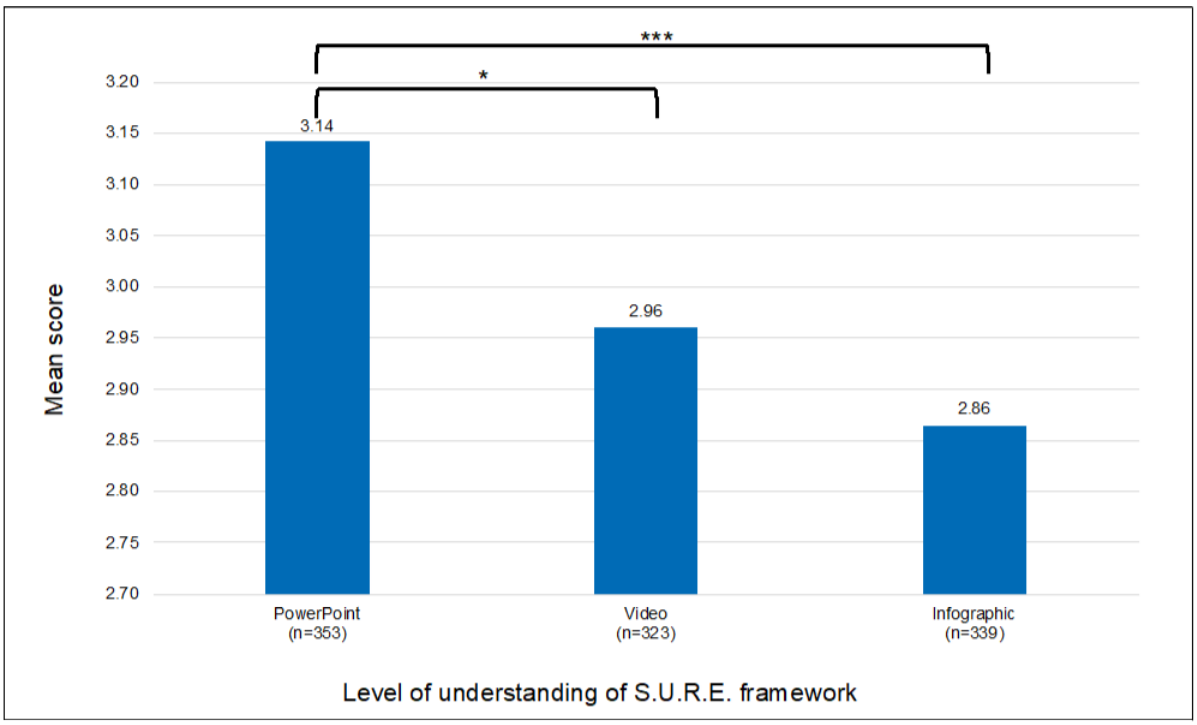


Taken together with earlier observations where about 80 per cent of the respondents answered all four questions on recall correctly (see Section 5.2.1.) and had a high level of knowledge about the S.U.R.E. framework (see Section 5.2.2.), the current finding that only one-third of the respondents (36.3 per cent) answered all four questions that measured respondents' level of understanding suggests that while the catchy nature of the S.U.R.E. acronym aids audiences in recalling what the "S", "U", "R", and "E" in the framework stand for, people may require more time for practice and internalisation to go beyond mere recall of information and having knowledge about the S.U.R.E. framework, in order to gain a solid understanding of each of the steps. This has implications on digital literacy programmes that are planned ahead, where aspects of longer exposure and repeated interventions should be incorporated into the design of such programmes to enhance their effectiveness.

The one-way ANOVA analysis and post-hoc tests also found significant differences in respondents' level of understanding of the S.U.R.E. framework. The PowerPoint contributed to significantly higher understanding of the framework ($\bar{x}$ = 3.14) than the video ($\bar{x}$ = 2.96) and the infographic ($\bar{x}$ = 2.86).[52] See Figure 22.

[52] One-way ANOVA analysis was conducted using respondents' overall score (out of four) for understanding of the S.U.R.E. framework. One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .001). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000) and between "PowerPoint" and "video" group means (p-value = .037).

Figure 22: Mean differences in level of understanding of the S.U.R.E. framework



5.2.4. Level of self-efficacy in the S.U.R.E. steps

In addition to measuring respondents' level of recall, knowledge, and understanding of the S.U.R.E. framework, we also measured their self-efficacy as part of examining the impact of the S.U.R.E. framework. We measured respondents' self-efficacy in two ways: (1) their self-efficacy in discerning real from false information in general[53], and (2) their self-efficacy in performing each specific step of the S.U.R.E. framework.[54]

Respondents' self-efficacy in discerning real and false information in general

Earlier in Phase 1, we found that respondents' perceived self-efficacy in discerning what was real or false was low. Less than half of the respondents were confident that they could tell real information from false information — 47.1 per cent of them agreed or strongly agreed with this statement. Most of the respondents were either not confident (17.5 per cent strongly disagreed or disagreed with the statement) or were ambivalent about their ability to do so (35.4 per cent neither agreed nor disagreed). Moreover, only a small group, 26.4 per cent of the respondents felt that they were better than the average person in Singapore at identifying false information.[55]

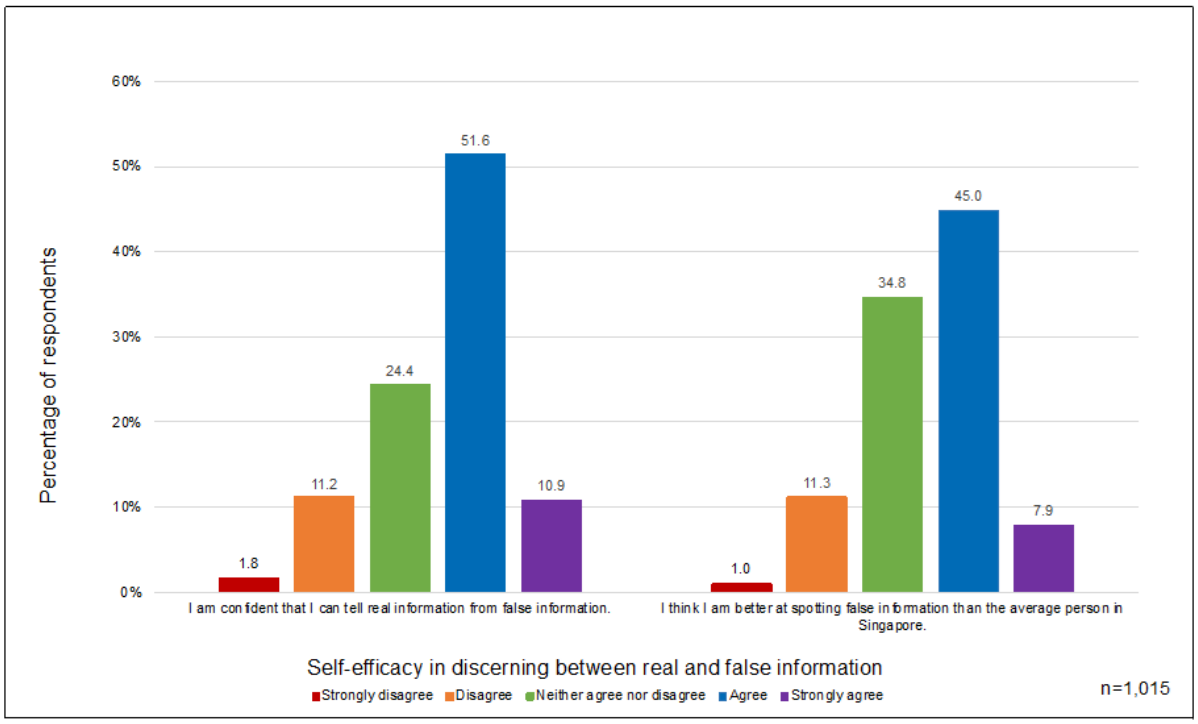
[53] Respondents were asked to indicate on a five-point Likert scale (from "strongly disagree" to "strongly agree") the extent to which they agreed or disagreed with the following two statements:(1) "*I am confident that I can tell real information from false information*", and (2) "*I think I am better at spotting false information than the average person in Singapore*". These two questions were also asked in the Phase 1 survey questionnaire.

[54] Respondents were asked to indicate on a five-point Likert scale (from "strongly disagree" to "strongly agree") the extent to which they agreed or disagreed with the following four statements: (1) "*I am confident in knowing how to verify the credibility of a source*"; (2) "*I know the steps to check the authenticity of a source*"; (3) "*I know how to exercise fair judgment when evaluating a source*"; and (4) "*I can discern between a fact and an opinion*".

[55] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 5.2.2.).

In Phase 3, however, most respondents expressed confidence in discerning between real and false information. Close to two-thirds of the respondents (62.5 per cent) agreed or strongly agreed they were confident that they could tell real information from false information. About a quarter of the respondents (24.4 per cent) were ambivalent about their ability and 13 per cent of them disagreed or strongly disagreed that they were confident about discerning real information from false information. Furthermore, slightly over half of the respondents (52.9 per cent) agreed or strongly agreed that they were better at spotting false information than the average person in Singapore. See Figure 23.

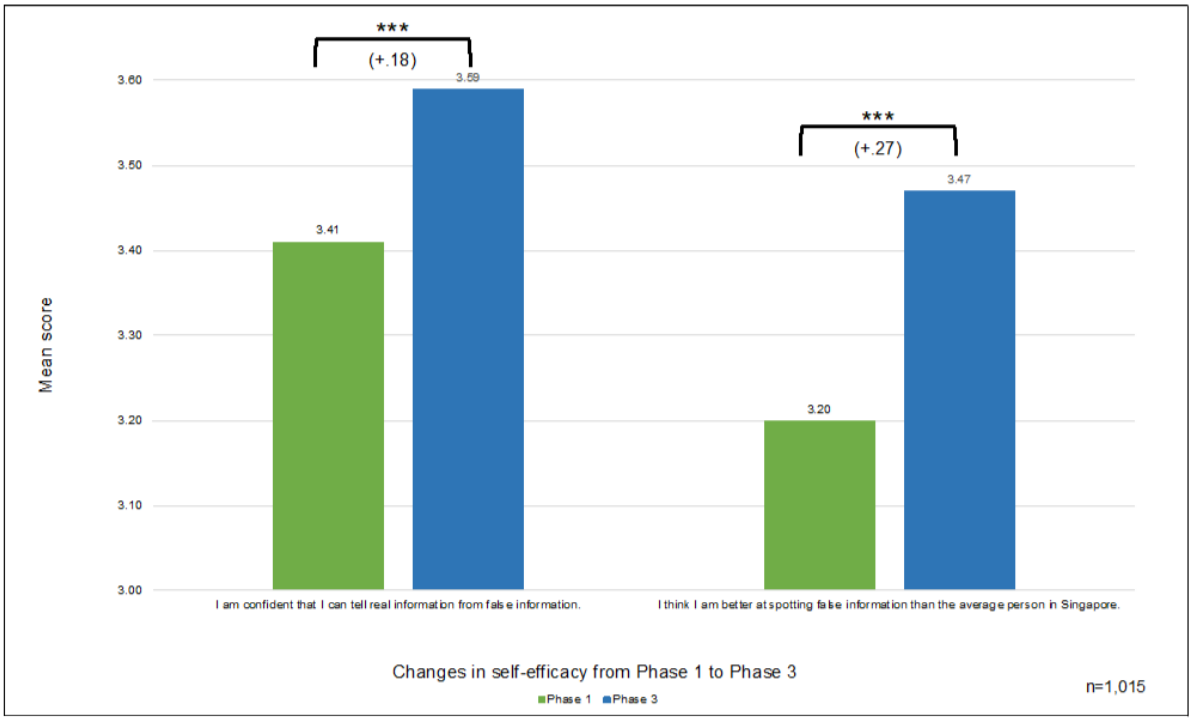
Figure 23: Self-efficacy in discerning real and false information in general



To determine whether this increase in self-efficacy from Phase 1 to Phase 3 was statistically significant, we performed a paired t-test to compare the responses to these same two questions that were also asked in the Phase 1 survey. The results showed that respondents' confidence in telling real information from false information increased significantly, from Phase 1 ($\bar{x}$ = 3.41) to Phase 3 ($\bar{x}$ = 3.59).[56] Similarly, there was a statistically significant increase in respondents' confidence in being better at spotting false information than the average Singaporean, from Phase 1 ($\bar{x}$ = 3.20) to Phase 3 ($\bar{x}$ = 3.47).[57] See Figure 24.

[56] The p-value recorded for this paired t-test was .000.
[57] The p-value recorded for this paired t-test was .000.

Figure 24: Changes in self-efficacy from Phase 1 to Phase 3



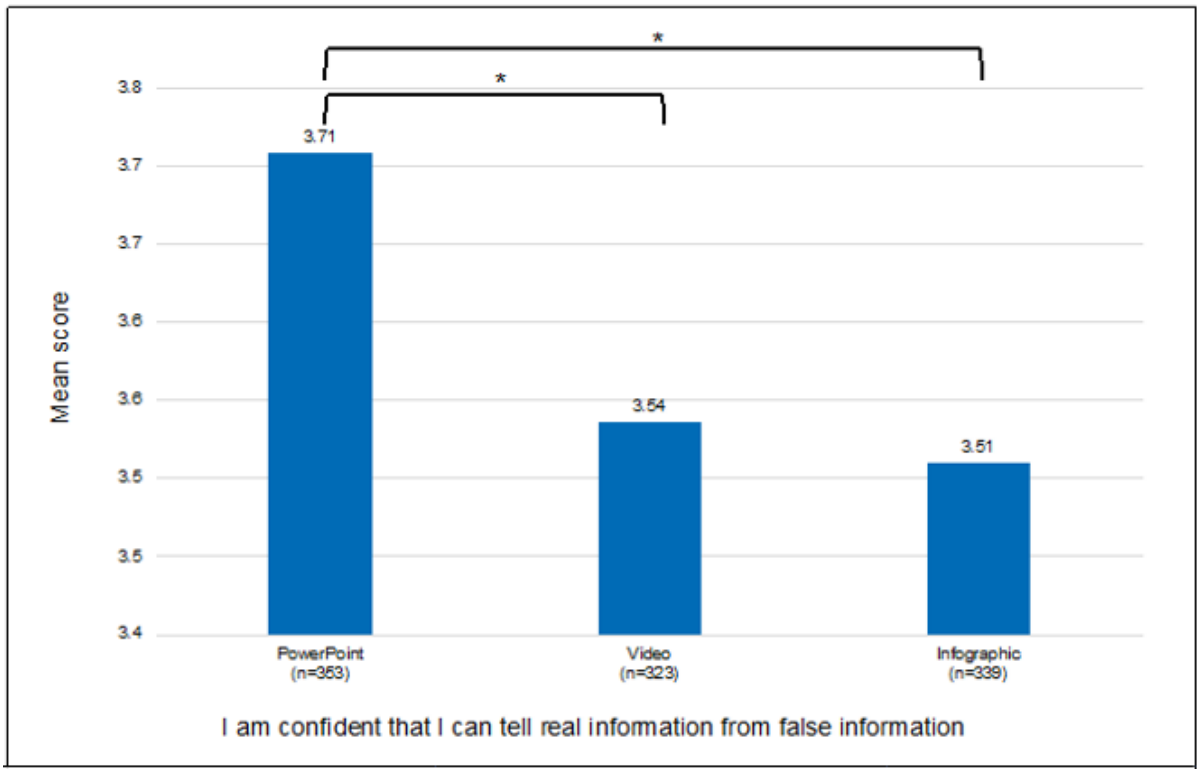
This finding suggests that exposure to literacy programmes and interventions (in this case, exposure to the S.U.R.E. framework) is effective at increasing people's self-efficacy and self-confidence in discerning between real and false information. Taken together with another finding from the Phase 1 survey — where regression analyses found that people with higher self-efficacy in discerning between real and false information also tended to be less susceptible to false information[58] — this also suggests potential benefits to be reaped by ramping up similar interventions for different segments of the public.

In addition to performing the paired t-tests, we also performed a one-way ANOVA analysis and post-hoc tests to check if there were differences in respondents' self-efficacy in discerning real and false information in general when presented with different modalities. As seen in Figure 25, respondents who were presented with the PowerPoint were most confident in discerning real information from false information ($\bar{x}$ = 3.71) than those who were presented with the video ($\bar{x}$ = 3.54) and those who were presented with the infographic ($\bar{x}$ = 3.51).[59] When it came to being better at spotting false information than the average Singaporean however, the one-way ANOVA analysis did not reveal a statistically significant difference in mean scores.

[58] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 6.7.2.).

[59] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .005). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .010) and between "PowerPoint" and "video" group means (p-value = .028).

Figure 25: Mean differences in confidence in telling real information from false information

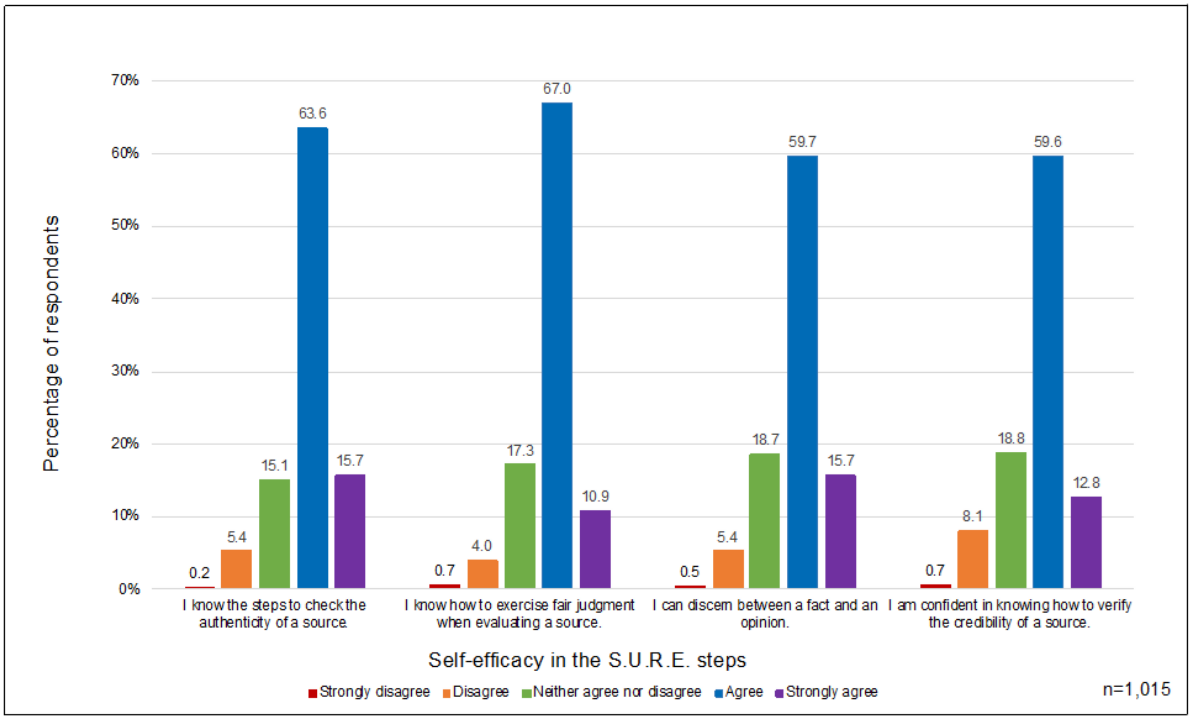


Respondents' self-efficacy in performing specific steps of the S.U.R.E. framework

As mentioned, in addition to measuring respondents' self-efficacy in discerning real and false information in general, we also measured respondents' self-efficacy in performing each specific step — "S", "U", "R" and "E" — of the S.U.R.E. framework.

As seen in Figure 26, 79.3 per cent of the respondents agreed or strongly agreed that they knew the steps to check the authenticity of a source ("R" step of the S.U.R.E. framework). This was closely followed by 77.9 per cent of the respondents who agreed or strongly agreed that they knew how to exercise fair judgment when evaluating a source ("E" step of the S.U.R.E. framework). About three-quarters of the respondents (75.4 per cent) of the respondents agreed or strongly agreed that they could discern between a fact and an opinion ("U" step of the S.U.R.E. framework), and 72.4 per cent of them agreed or strongly agreed that they were confident in knowing how to verify the credibility of a source ("S" step of the S.U.R.E. framework).

Figure 26: Self-efficacy in performing the S.U.R.E. steps



The findings suggest that respondents seem to be least confident about being able to perform the "S" step of the S.U.R.E. framework (i.e., knowing how to verify the credibility of a source), which corroborates the earlier finding in Section 5.2.2. where the highest proportion of respondents failed to correctly answer a knowledge question about the "S" step of the S.U.R.E. framework (i.e., whether having an extension to a web address suggests a credible source or not).

We also performed a one-way ANOVA analysis and post-hoc tests to examine if there were differences in respondents' self-efficacy in performing each of the S.U.R.E. steps when presented with different modalities. We found that the PowerPoint consistently recorded a statistically significant higher mean score than the video or the infographic.

For example, when it came to self-efficacy in performing both the "S" and "U" steps of the S.U.R.E. framework, respondents who were presented with the PowerPoint were most confident of the "S" and "U" steps (with respective mean scores of 3.88 and 3.92), than those presented with the video (3.76 and 3.85 for "S" and "U", respectively) and those presented with the infographic (3.62 and 3.77 for "S" and "U" respectively). [60,61] When it came to self-efficacy in performing the "R" step of the S.U.R.E. framework, respondents who were presented with the PowerPoint were more confident ($\bar{x}$ = 4.01) than respondents who were presented with the video ($\bar{x}$ = 3.88) and those presented with the infographic ($\bar{x}$ = 3.78).[62] Finally, when it came to self-efficacy in performing the "E" step of the S.U.R.E. framework, we found that both the PowerPoint and the video recorded significantly higher mean scores than

[60] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000).
[61] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .050). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .042).
[62] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .000) and between "PowerPoint" and "video" group means (p-value = .044)

the infographic — respondents presented with the PowerPoint recorded a mean score of 3.92 and those presented with the video recorded a mean score of 3.86, whereas respondents who were presented with the infographic recorded a mean score of 3.72.[63] See Figures 27, 28, 29 and 30.

Figure 27: Mean differences in self-efficacy in performing the "S" step of S.U.R.E.

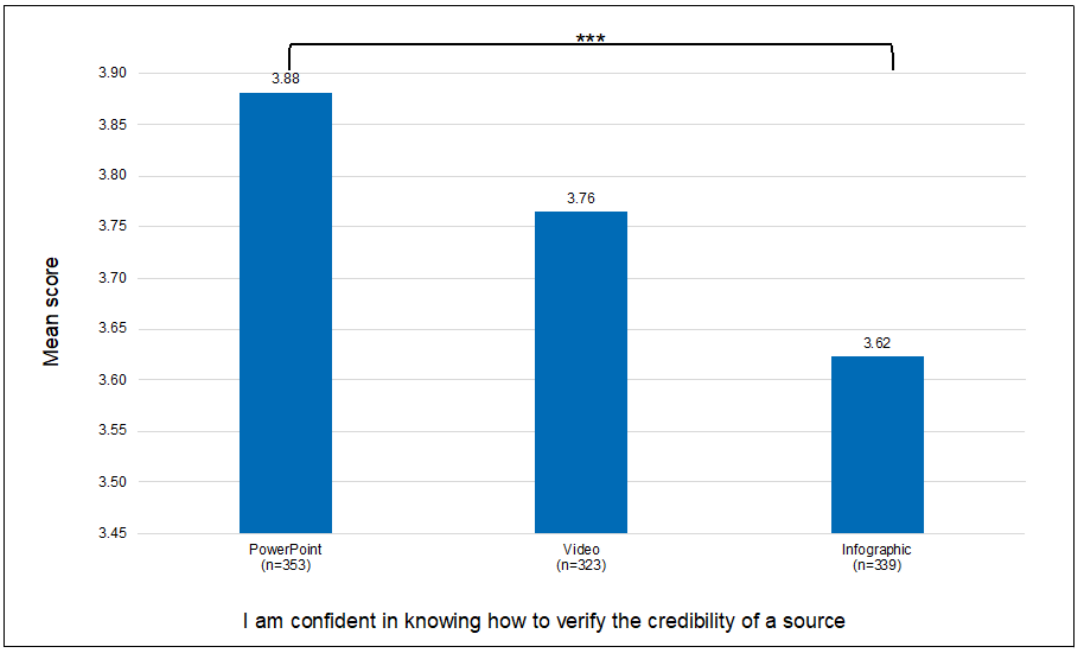
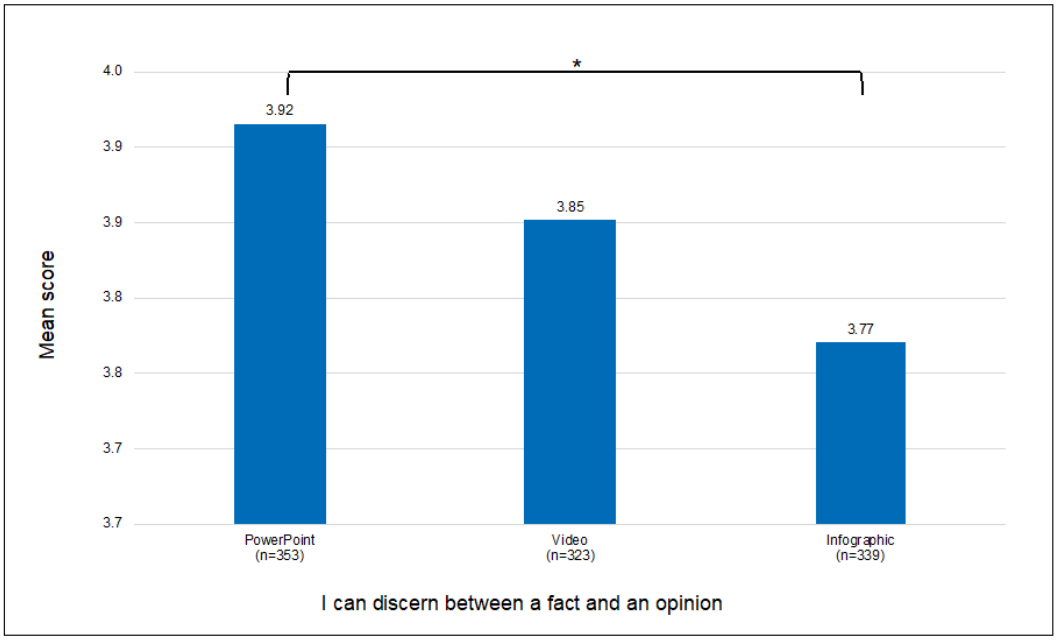


Figure 28: Mean differences in self-efficacy in performing the "U" step of S.U.R.E.



[63] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .001). Post-hoc tests revealed significant differences between "PowerPoint" and "infographic" group means (p-value = .001) and between "video" and "infographic" group means (p-value = .027)

Figure 29: Mean differences in self-efficacy in performing the "R" step of S.U.R.E.

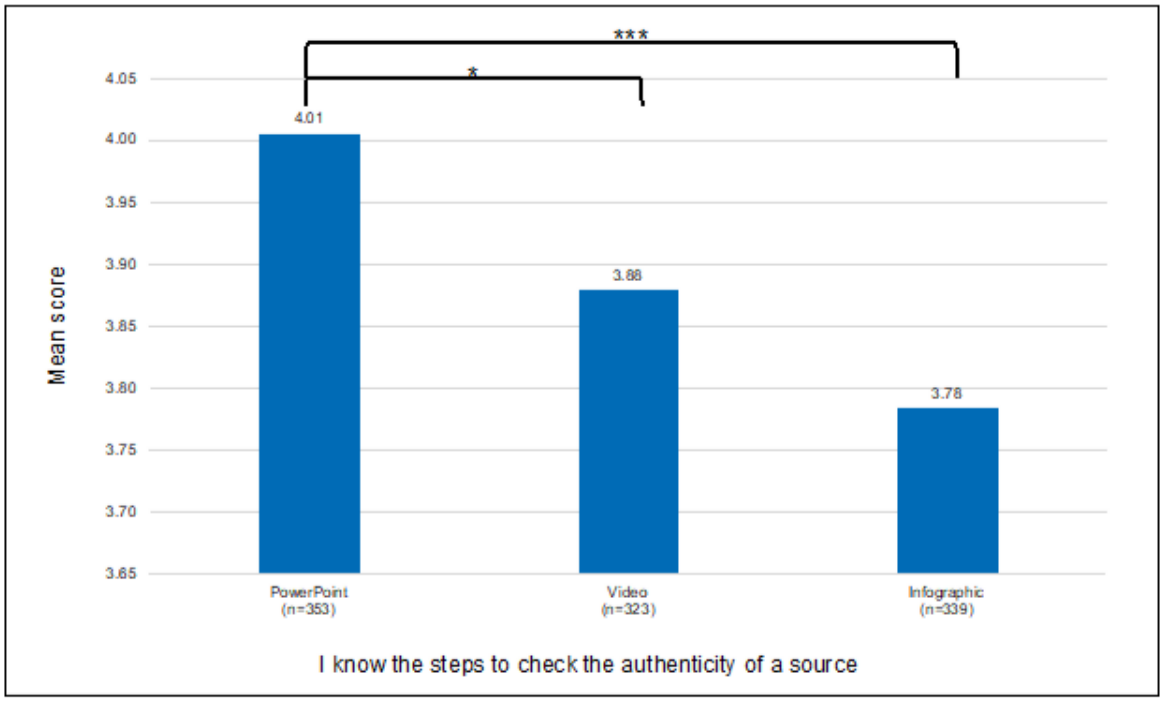
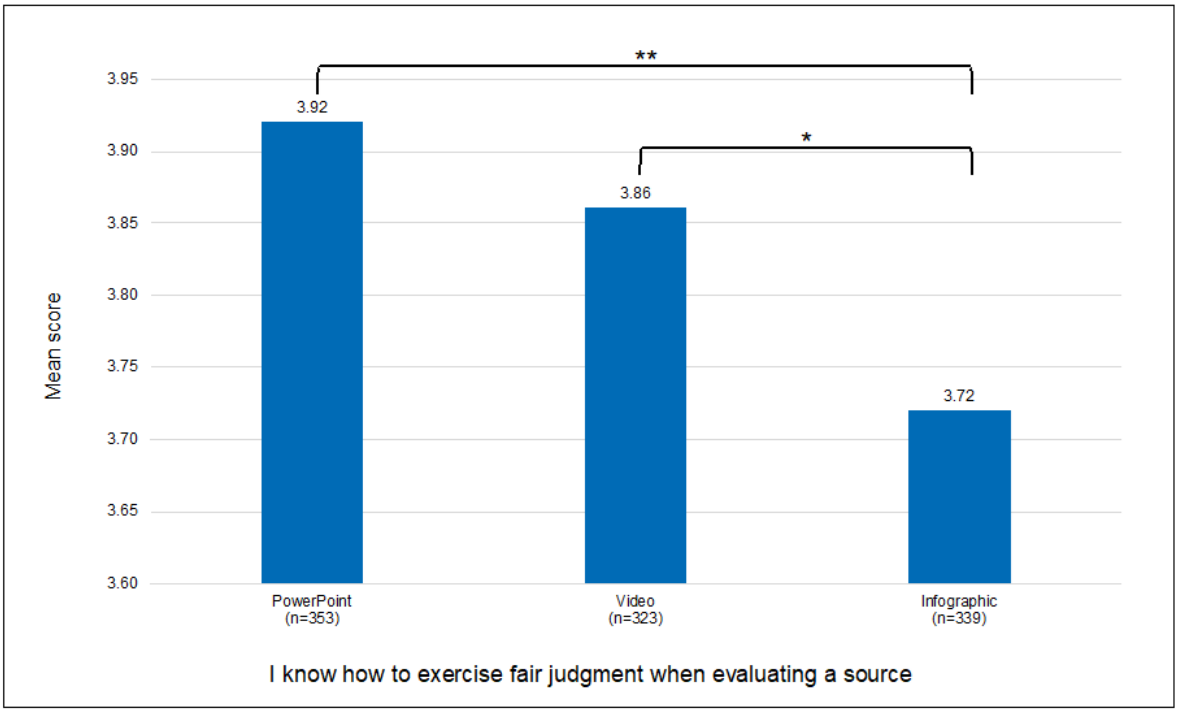


Figure 30: Mean differences in self-efficacy in performing the "E" step of S.U.R.E.



In short, our findings demonstrated that exposure to the S.U.R.E. framework had an observable impact on respondents. The majority of the respondents were able to accurately recall information about the S.U.R.E. framework and possessed a high level of knowledge

about the S.U.R.E. framework as well. When it came to having a good level of understanding about the S.U.R.E. framework however, respondents generally fared more poorly. That said, the PowerPoint resulted in a better understanding of the S.U.R.E. framework when compared with the video or infographic. In terms of respondents' perceived self-efficacy, exposure to the S.U.R.E. framework resulted in a statistically significant increase in self-efficacy in discerning between real and false information. In addition, we also observed some modality differences when it came to respondents' self-efficacy — compared with the video or infographic, the PowerPoint resulted in higher self-efficacy in discerning between real and false information in general, as well as higher self-efficacy in performing each of the S.U.R.E. steps. Table 19 below provides a summary of the impact of the S.U.R.E. framework.

Table 19: Summary table on impact of the S.U.R.E. framework

- About 80 per cent of the respondents answered all four questions on recall correctly. Respondents performed best at recalling the "U" ("Understand") step of the S.U.R.E. framework, but performed most poorly at recalling the "E" ("Evaluate") step.
- About 80 per cent of the respondents had a high level of knowledge about the S.U.R.E. framework.
- Just over a third of the respondents answered all four questions on understanding correctly. Respondents demonstrated strongest understanding about the "U" ("Understand") step of the S.U.R.E. framework, but demonstrated weakest understanding about the "E" ("Evaluate") step.
- Respondents demonstrated a significant increase, from Phase 1 to Phase 3, in their self-efficacy in discerning real from false information and being better at spotting false information than the average Singaporean.
- Respondents demonstrated the highest self-efficacy in performing the "R" ("Research") step of the S.U.R.E. framework, but showed lowest self-efficacy in performing the "S" ("Source") step.
- Among the three modalities, the PowerPoint performed best in terms of respondents' (1) level of understanding of the S.U.R.E. framework, (2) self-efficacy in discerning real from false information, and (3) self-efficacy in performing each of the S.U.R.E. steps.

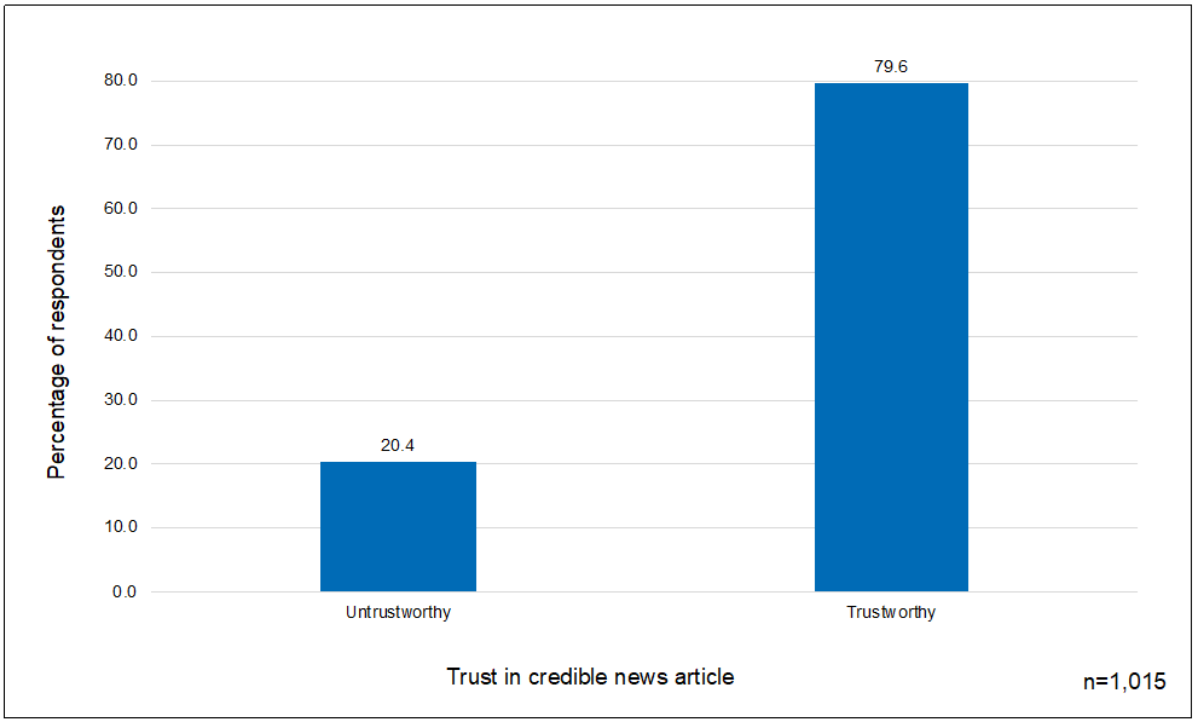
5.2.5. Ability to authenticate information

As mentioned in the Methodology section (Section 3.2.1.), to better examine the impact of the S.U.R.E. framework, we included a component in our survey that was designed to directly assess respondents' ability to put what they had learnt from the S.U.R.E. framework to practice, by verifying and authenticating a piece of information. We presented respondents with a credible news article that was published by an established and reputable news media outlet in Singapore, TODAY Online, which respondents were asked to read and subsequently indicate the extent to which they felt that the news article could be trusted.[64]

[64] We presented respondents with a news article that was published by an established news media outlet and asked them indicate on a four-point Likert scale (from "untrustworthy" to "very trustworthy") the extent to which they trusted or distrusted the article after reading it.

As seen in Figure 31, close to eight in 10 respondents (79.6 per cent) said they trusted the credible news article that was presented to them, which was the desired response. About a fifth of the respondents said the credible news article was untrustworthy (20.4 per cent).[65] This is in stark contrast to the findings from the Phase 1 survey, where we had presented respondents with a manipulated news article and about two-thirds of the respondents failed to distrust the manipulated news article.[66] Taken together, the findings suggest that exposure to literacy programmes such as the S.U.R.E. framework may have had the impact of equipping respondents with the necessary skills and knowledge to accurately assess the veracity of a piece of information.

Figure 31: Trust in credible news article



A one-way ANOVA analysis did not find any statistically significant differences in respondents' trust in the credible news article when presented with different modalities.

In addition to asking respondents to rate the trustworthiness of the news article that they were presented with, we also examined the reasons behind why respondents found the news article untrustworthy or trustworthy.[67]

Among the respondents who said the credible news article could not be trusted, about seven out of 10 of them (71 per cent) said it was because the article did not look legitimate. Slightly over half of the respondents (51.2 per cent) said it was because the picture in the article appeared to be manipulated. About a third of the respondents (31.4 per cent) also said it was

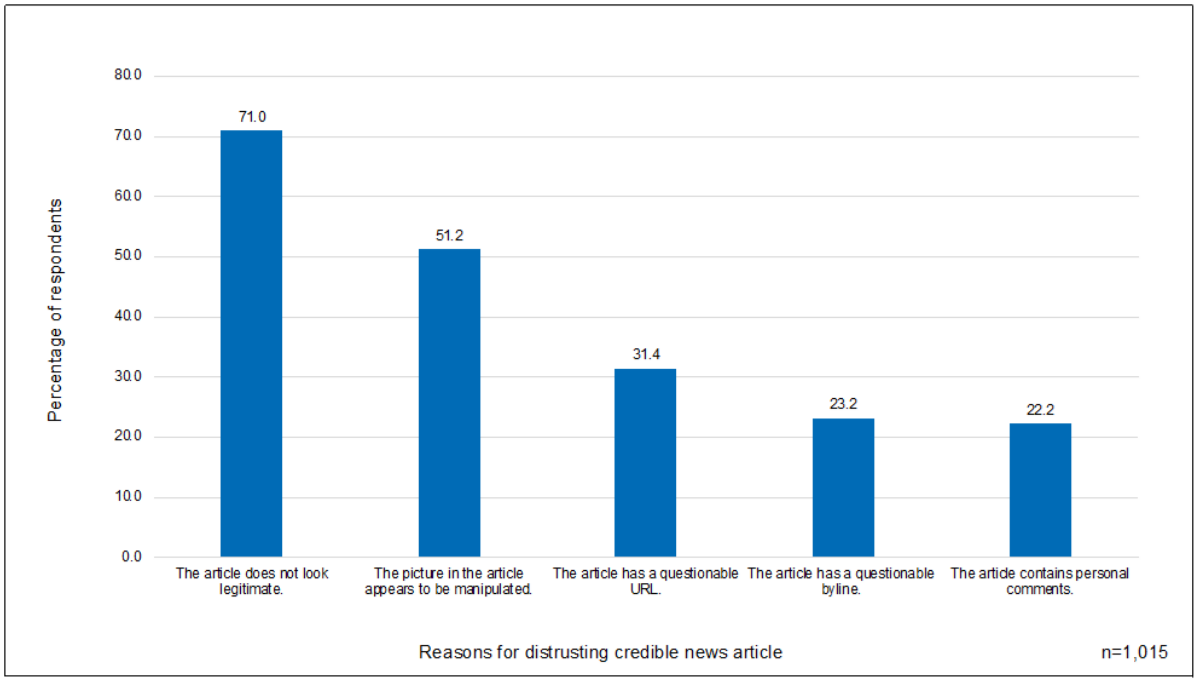
[65] Responses in "a little trustworthy", "trustworthy", and "very trustworthy" were combined into a single category — "trustworthy".

[66] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (see Section 6.7.).

[67] Using a skip-logic branching, respondents were presented with a set of reasons tailored to their responses and were asked to select all the reasons that applied to them (i.e., percentages do not add up to 100 per cent). Respondents who said the credible news article was "untrustworthy" were presented with reasons such as "*the article had a questionable URL*" and "*the picture in the article appears to be manipulated*". On the other hand, respondents who said the credible news article was "trustworthy" were presented with reasons such as "*the article is from a well-known and established source*" and "*the article cites official authorities*".

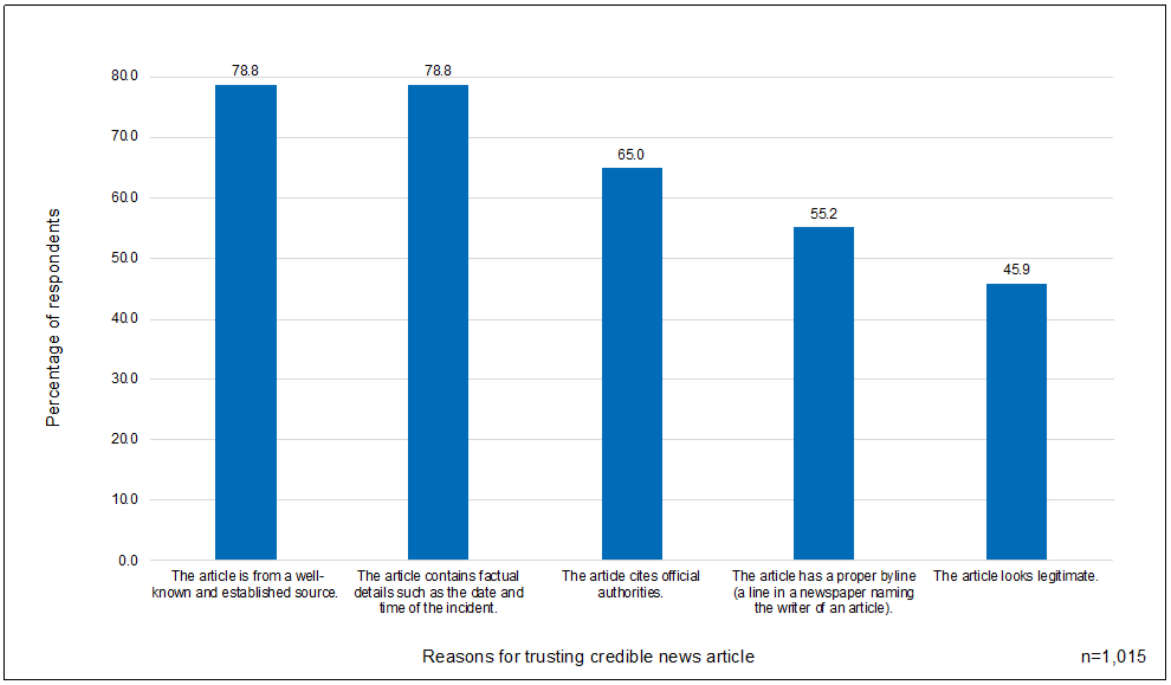
because the article had a questionable URL, and around one-fifth of them said it was because the article had a questionable byline (23.2 per cent) and contained personal comments (22.2 per cent). See Figure 32.

Figure 32: Reasons for distrusting credible news article



On the other hand, among the respondents who said the credible news article could be trusted, more than three-quarters of them (78.8 per cent) said it was because the article was a well-known and established source, and because it contained factual details such as the date and time of the incident. The second most popularly cited reason was because the article cited official authorities (e.g., Vice President of SMRT's corporate information and communications), with 65 per cent of the respondents who also selected this reason. Finally, about half of the respondents said they trusted the article because it had a proper byline (55.2 per cent) and because it looked legitimate (45.9 per cent). See Figure 33.

Figure 33: Reasons for trusting credible news article



5.3. Demographic differences in attitudes towards the S.U.R.E. framework

In this section, we present the findings on whether certain modalities produced better outcomes for certain demographics. As mentioned in our literature review (Section 2.8.), existing studies that compared the effectiveness of different modalities have also taken a more nuanced look at understanding whether certain modalities worked better for certain segments of the population. These studies examined key demographic factors, such as age and education level, as the insights from such analysis have clear implications on improving the interventions for an easily identifiable and targeted segment of the population.

In Phase 3, the demographic factors we considered were age, gender, ethnicity, education, housing and income, and the variables of interest we examined include: (1) perceived usefulness of the S.U.R.E. framework; (2) perceived clarity of the S.U.R.E. framework; (3) perceived helpfulness of the S.U.R.E. framework; (4) perceived applicability of the S.U.R.E. framework (both to themselves and to others); and (5) level of recall of the S.U.R.E. framework. As the one-way ANOVA analysis did not reveal statistically significant mean differences in the variables of interest examined for gender and ethnicity, this section focuses on the effects of age, education, housing, and income.

5.3.1. Age

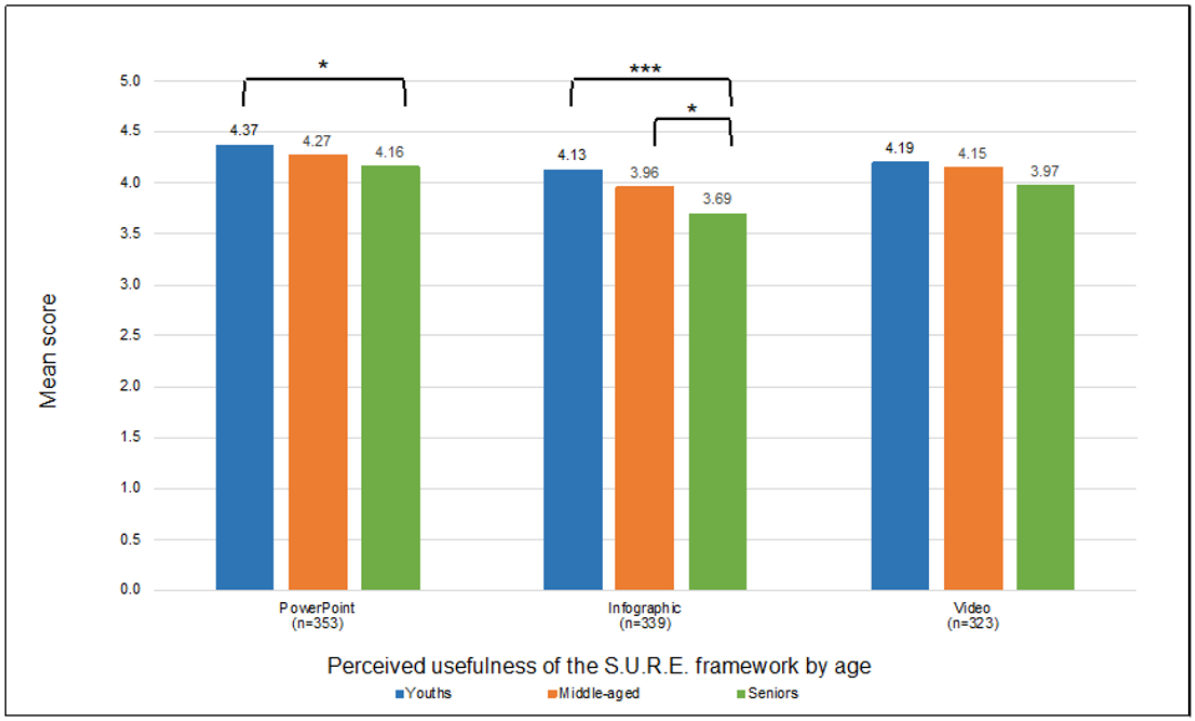
We conducted one-way ANOVA analyses and post-hoc tests to examine whether age had an effect on respondents' attitudes towards the S.U.R.E. framework when presented with different modalities.[68]

As seen in Figure 34, in general, youths were more likely than seniors to find the S.U.R.E. framework useful, regardless of the modality. For example, among respondents presented

[68] Respondents were categorised into three age groups: (1) youths (i.e., those aged between 18 and 34 years old); (2) middle-aged (i.e., those aged between 35 and 59 years old); and (3) seniors (i.e., those aged 60 years old and above).

with the PowerPoint, youths recorded a mean score of 4.37 for perceived usefulness of the S.U.R.E. framework, which was a statistically significant higher mean score than that recorded by seniors ($\bar{x}$ = 4.16).[69] The same trend was observed among respondents presented with the infographic — youths ($\bar{x}$ = 4.13) were more likely than seniors ($\bar{x}$ = 3.69) to find the S.U.R.E. framework useful. In addition, middle-aged respondents ($\bar{x}$ = 3.96) also recorded a statistically significant higher mean score than seniors.[70] When it came to respondents presented with the video however, the one-way ANOVA analysis did not reveal a statistically significant difference in mean scores among the different age groups.

Figure 34: Mean differences in perceived usefulness of the S.U.R.E. framework by age

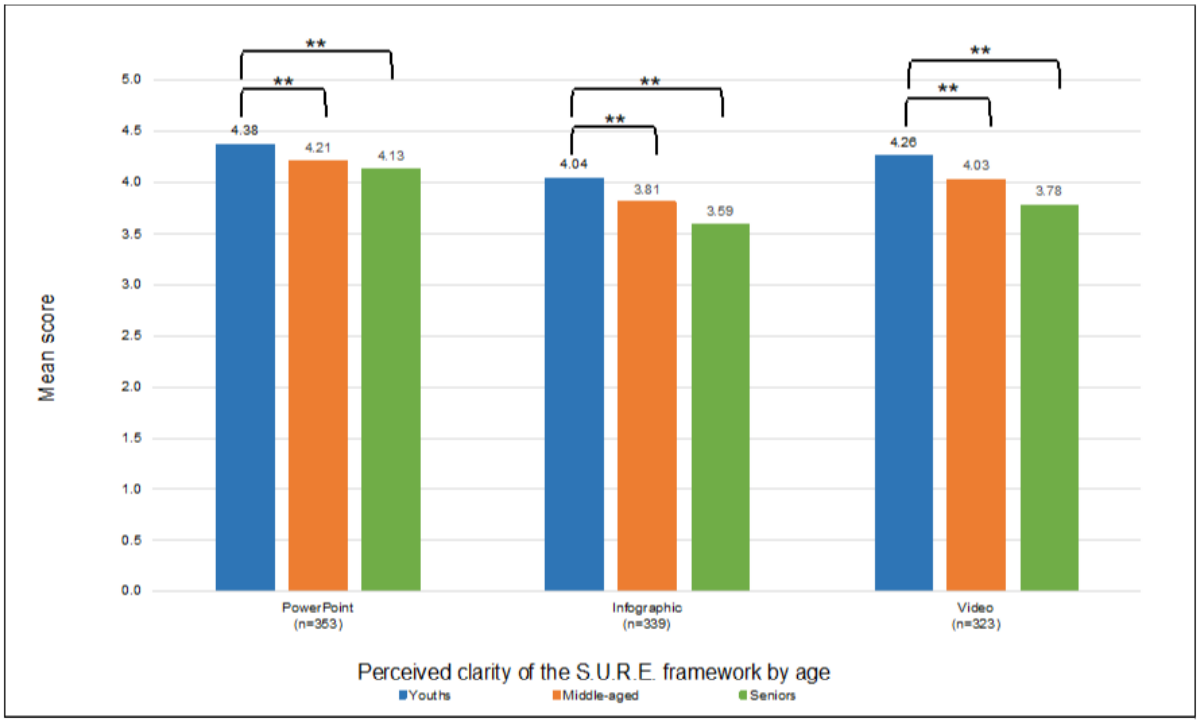


A similar trend was observed when it came to perceived clarity of the S.U.R.E. framework. Youths were more likely than both middle-aged respondents and seniors to find the S.U.R.E. framework clear, regardless of the modality. Among respondents presented with the PowerPoint, youths recorded a mean score of 4.38 for perceived clarity of the S.U.R.E. framework, which was a statistically significant higher mean score than that recorded by both middle-aged respondents ($\bar{x}$ = 4.21) and seniors ($\bar{x}$ = 4.13).[71] Among respondents presented with the infographic, youths recorded a mean score of 4.04 for perceived clarity of the S.U.R.E. framework, significantly higher than the mean scores recorded by both middle-aged respondents ($\bar{x}$ = 3.81) and seniors ($\bar{x}$ = 3.59).[72] When it came to respondents presented with the video, youths recorded a mean score of 4.26, which was again significantly higher than

[69] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .043). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .035).
[70] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .000), and between "middle-aged" and "seniors" group means (p-value = .036).
[71] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .007). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .013), and between "youths" and "middle-aged" group means (p-value = .031).
[72] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .001). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .004), and between "youths" and "middle-aged" group means (p-value = .013).

the mean scores recorded by both middle-aged respondents ($\bar{x}$ = 4.03) and seniors ($\bar{x}$ = 3.78).[73] See Figure 35.

Figure 35: Mean differences in perceived clarity of the S.U.R.E. framework by age

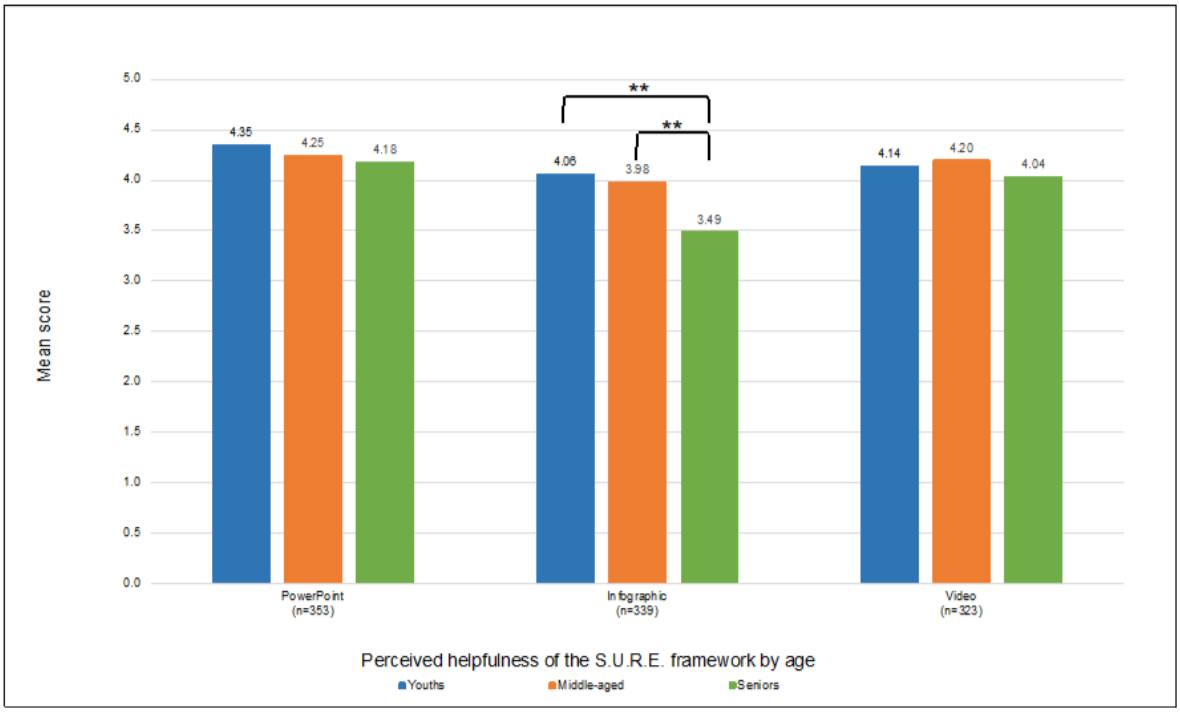


In terms of perceived helpfulness of the S.U.R.E. framework, we found that seniors were less likely than youths and middle-aged respondents to find the S.U.R.E. framework helpful. However, this difference was significant only among those presented with the infographic. Among those presented with the infographic, seniors recorded a mean score of 3.49 for perceived helpfulness of the S.U.R.E. framework, which was a statistically significant lower mean score than that recorded by both middle-aged respondents ($\bar{x}$ = 3.98) and youths ($\bar{x}$ = 4.06).[74] This finding resonates with some of the open-ended responses shared (see Section 5.1.2.), where respondents felt that the infographic may be less helpful to seniors because it was too wordy and had fewer visual communication elements. The one-way ANOVA analysis did not reveal a statistically significant difference in mean scores among the different age groups when it came to respondents who were presented with the PowerPoint and video. See Figure 36.

[73] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .001), and between "youths" and "middle-aged" group means (p-value = .003).

[74] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .001). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .001), and between "middle-aged" and "seniors" group means (p-value = .003).

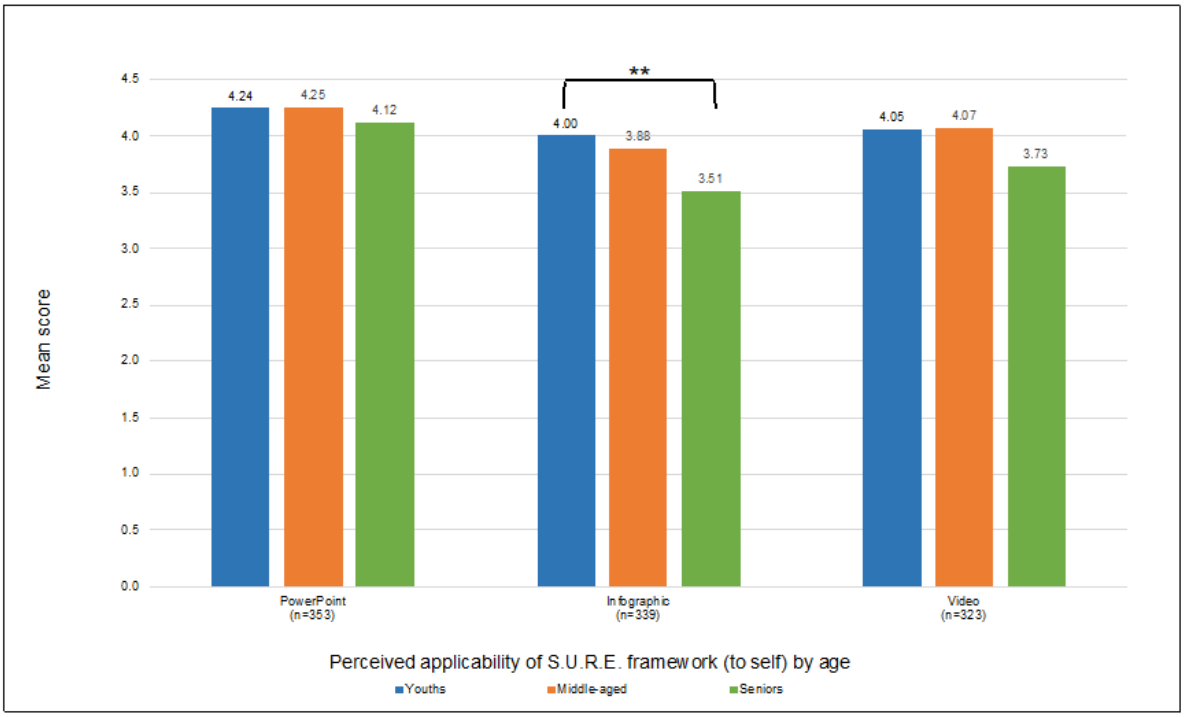
Figure 36: Mean differences in perceived helpfulness of the S.U.R.E. framework by age



A similar trend was observed when it came to perceived applicability of the S.U.R.E. framework. Seniors were less likely than youths to find the S.U.R.E. framework applicable, but this difference was significant only among those presented with the infographic. As seen in Figure 37, among respondents presented with the infographic, seniors recorded a mean score of 3.51 for perceived applicability of the S.U.R.E. framework (to self), which was a statistically significant lower than the mean score than that recorded by youths ($\bar{x}$ = 4.00).[75] The one-way ANOVA analysis also did not reveal a statistically significant difference in mean scores among the different age groups when it came to respondents presented with the PowerPoint and video.

[75] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .017). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .013).

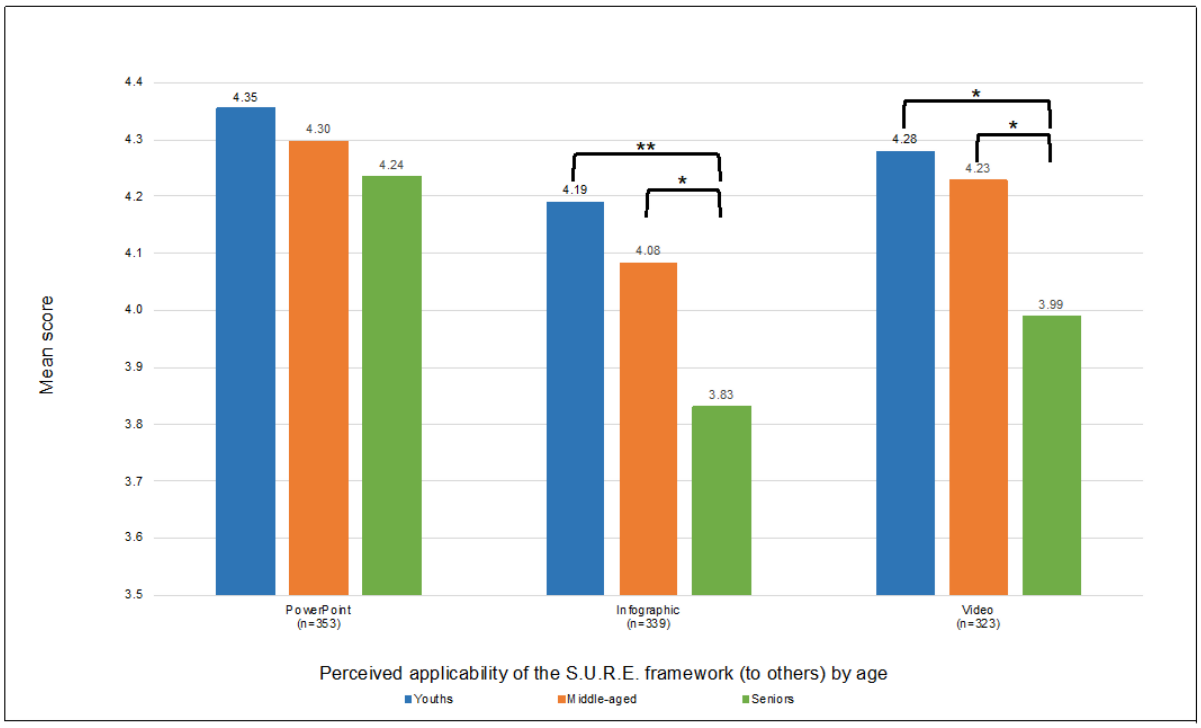
Figure 37: Mean differences in perceived applicability of the S.U.R.E. framework (to self) by age



In general, seniors were again least likely to find the S.U.R.E. framework applicable to others — among respondents presented with the infographic, seniors recorded a mean score of 3.83 for perceived applicability of the S.U.R.E. framework (to others), which was a statistically significant lower mean score than that recorded by both middle-aged respondents ($\bar{x}$ = 4.08) and youths ($\bar{x}$ = 4.19).[76] Among respondents presented with the video, seniors recorded a mean score of 3.99, which was also significantly lower than the mean scores recorded by both middle-aged respondents ($\bar{x}$ = 4.23) and youths ($\bar{x}$ = 4.28).[77] The one-way ANOVA analysis did not reveal a statistically significant difference in mean scores among the different age groups when it came to respondents presented with the PowerPoint. See Figure 38.

[76] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .003). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .002), and between "middle-aged" and "seniors" group means (p-value = .031).
[77] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .013). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .010), and between "middle-aged" and "seniors" group means (p-value = .039).

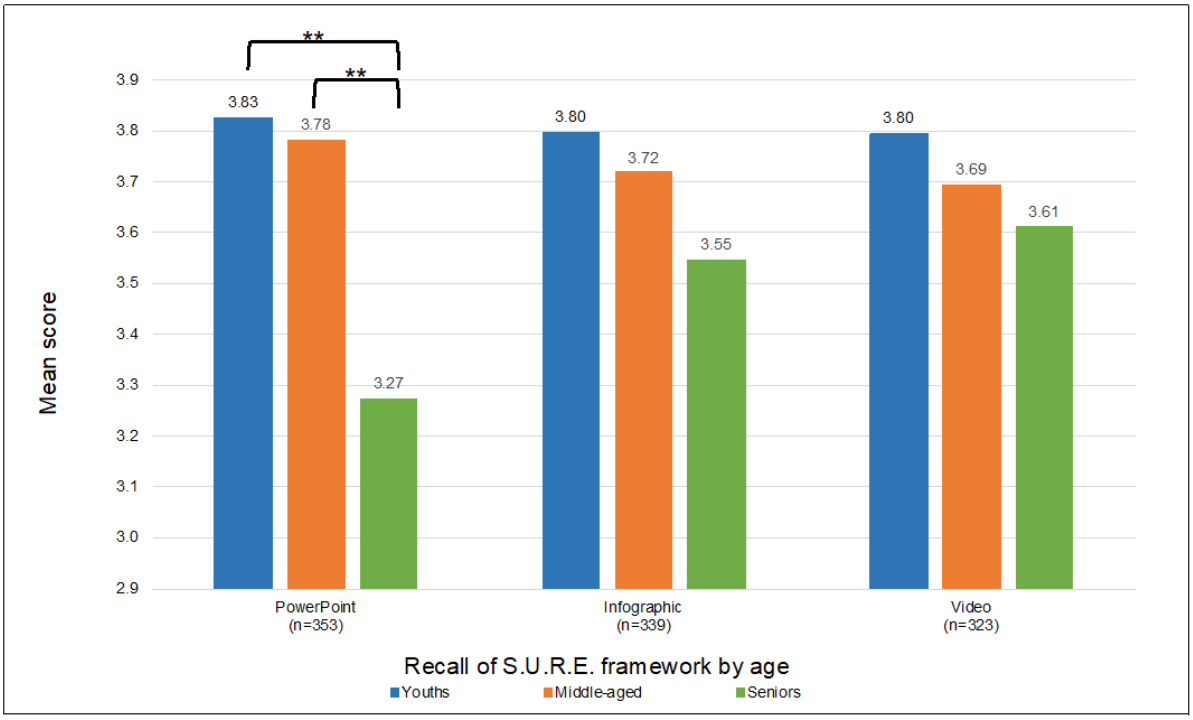
Figure 38: Mean differences in perceived applicability of the S.U.R.E. framework (to others) by age



Finally, when it came to recalling information about the S.U.R.E. framework, seniors were again least likely to accurately recall information about the S.U.R.E. framework. However, this difference was significant only among those presented with the PowerPoint. Among those presented with the PowerPoint, seniors recorded a mean score of 3.27 for level of recall of the S.U.R.E. framework, which was a statistically significant lower than mean score than that recorded by both middle-aged respondents ($\bar{x}$ = 3.78) and youths ($\bar{x}$ = 3.83).[78] The one-way ANOVA analysis did not reveal a statistically significant difference in mean scores among the different age groups when it came to respondents presented with the infographic and video. See Figure 39.

[78] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .003). Post-hoc tests revealed significant differences between "youths" and "seniors" group means (p-value = .002), and between "middle-aged" and "seniors" group means (p-value = .005).

Figure 39: Mean differences in recall of the S.U.R.E. framework by age



In short, our analyses revealed consistent effects of age on respondents' attitudes towards the S.U.R.E. framework when it was delivered using different modalities. In general, seniors were least likely to find the S.U.R.E. framework useful and clear, regardless of the modality. Moreover, seniors were also least likely to find the S.U.R.E. framework, especially when delivered through the infographic, helpful and applicable to their everyday lives. This suggests room for the National Library Board (NLB) to optimise and tailor the S.U.R.E. framework to better appeal to seniors. One suggestion would be to tweak its content to include examples that are more relatable and relevant to seniors to enhance the applicability of the framework to their lives. Interestingly, seniors also performed the poorest when it came to recalling information about the S.U.R.E. framework delivered through the PowerPoint. One possible reason could be that seniors might be less familiar with the PowerPoint format of information delivery.

5.3.2. Education

Our study found significant differences between respondents with different education levels for three variables of interest[79] — (1) perceived usefulness of the S.U.R.E. framework; (2) perceived clarity of the S.U.R.E. framework; and (3) level of recall of information about the S.U.R.E. framework.

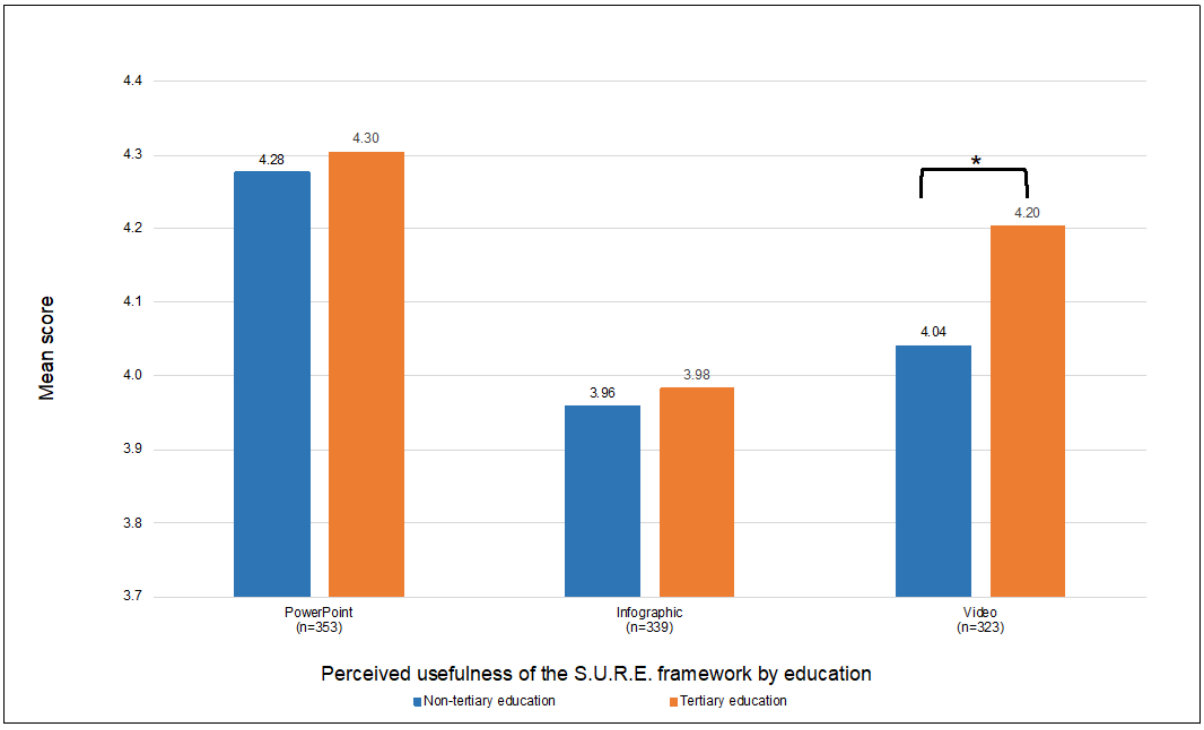
As seen in Figures 40 and 41, respondents without tertiary education were less likely than those with tertiary education to find the S.U.R.E. framework useful and clear when it came to those who were presented with the video. Based on the independent t-test, respondents without tertiary education recorded a mean score of 4.04 for perceived usefulness of the S.U.R.E. framework, which was a statistically significant lower mean score than that recorded

[79] Respondents were categorised into two education level groups: (1) "without tertiary education" (i.e., those with below secondary, secondary, and post-secondary (non-tertiary) education levels; and (2) "with tertiary education" (i.e., those with diploma and professional qualifications, and university and above education levels).

by respondents with tertiary education ($\bar{x}$ = 4.20).[80] The independent t-tests did not reveal a statistically significant difference in mean scores between the different education level groups when it came to respondents presented with the PowerPoint and infographic.

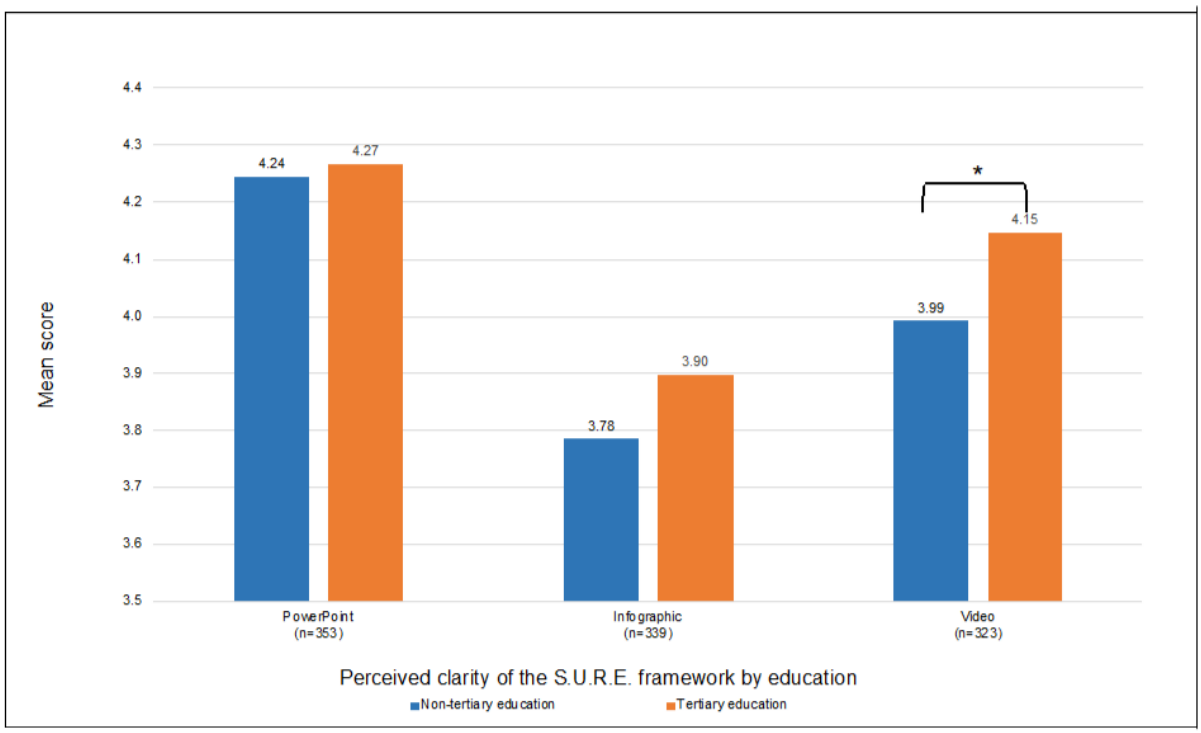
Similarly, respondents without tertiary education recorded a mean score of 3.99 for perceived clarity of the S.U.R.E. framework, significantly lower than the mean score recorded by respondents with tertiary education ($\bar{x}$ = 4.15).[81] No significant differences in mean scores was found between the different education level groups when it came to respondents presented with the PowerPoint and infographic.

Figure 40: Mean differences in perceived usefulness of the S.U.R.E. framework by education



[80] An independent t-test was conducted instead of a one-way ANOVA as there were only two comparison groups. The independent t-test revealed statistically significant differences between "without tertiary education" and "with tertiary education" group means (p-value = .019).
[81] The independent t-test revealed statistically significant differences between "without tertiary education" and "with tertiary education" group means (p-value = .033).

Figure 41: Mean differences in perceived clarity of the S.U.R.E. framework by education

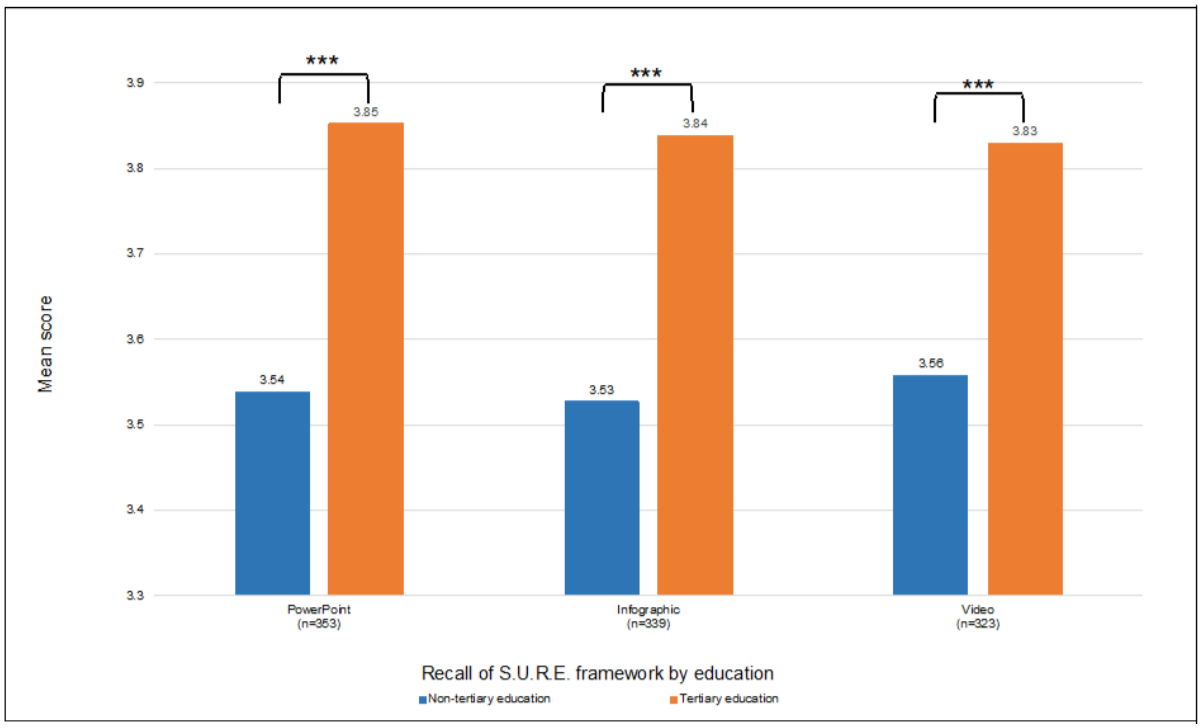


When it came to the level of recall of information about the S.U.R.E. framework, we found that respondents without tertiary education were less likely than those with tertiary education to accurately recall information about the S.U.R.E. framework, regardless of the modality.

For example, among respondents presented with the PowerPoint, those without tertiary education recorded a mean score of 3.54 for the level of recall of the S.U.R.E. framework, which was a statistically significant lower mean score than that recorded by those with tertiary education ($\bar{x}$ = 3.85).[82] Among respondents presented with the infographic, those without tertiary education recorded a mean score of 3.53, significantly lower than the mean score recorded by those with tertiary education ($\bar{x}$ = 3.84).[83] Similarly, among respondents presented with the video, those without tertiary education recorded a mean score of 3.56, significantly lower than the mean score recorded by those with tertiary education ($\bar{x}$ = 3.83).[84] See Figure 42.

[82] The independent t-test revealed statistically significant differences between “without tertiary education” and “with tertiary education” group means (p-value = .000).
[83] The independent t-test revealed statistically significant differences between “without tertiary education” and “with tertiary education” group means (p-value = .000).
[84] The independent t-test revealed statistically significant differences between “without tertiary education” and “with tertiary education” group means (p-value = .000).

Figure 42: Mean differences in recall of the S.U.R.E. framework by education



5.3.3. Housing type and income

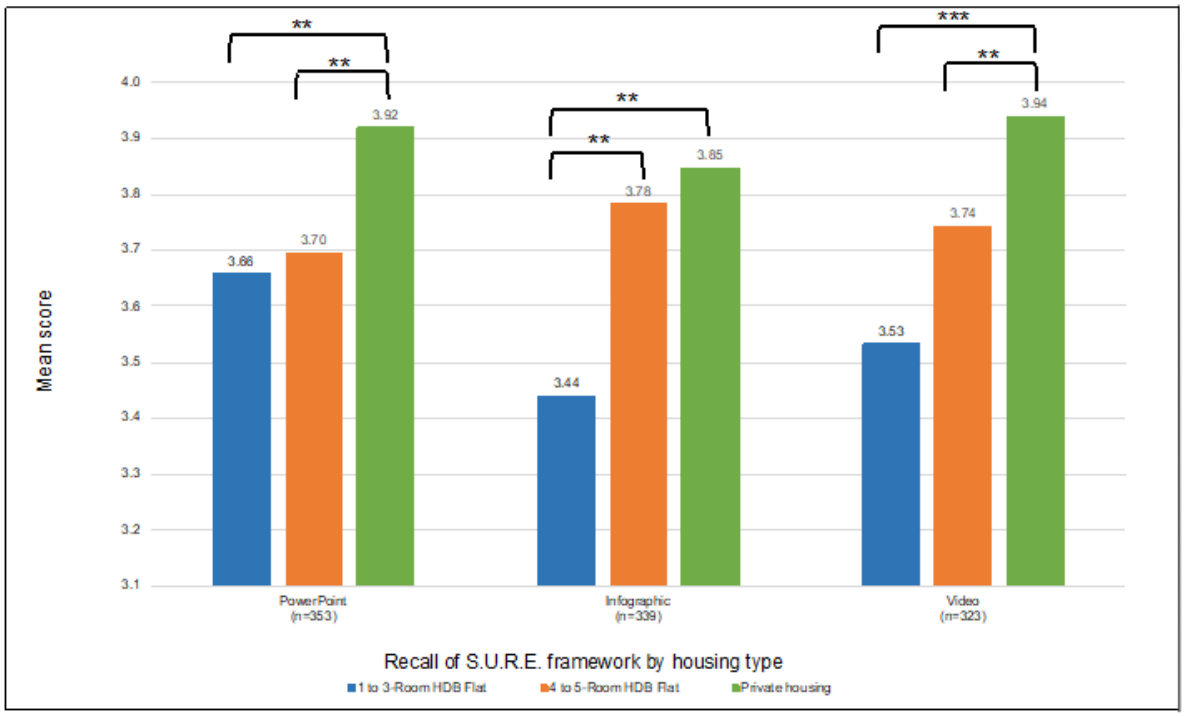
Lastly, we also conducted one-way ANOVA analyses and independent t-tests to examine whether respondents' socio-economic status (i.e., housing type[85] and monthly household income[86]) had an effect on respondents' attitudes towards the S.U.R.E. framework when presented with different modalities. Our study showed significant differences only for respondents' ability to accurately recall information about the S.U.R.E. framework.

Our findings showed that both respondents' housing type and monthly household income had an effect on their ability to accurately recall information about the S.U.R.E. framework, regardless of their assigned modality. As seen in Figure 43, respondents living in private housing were more likely than both respondents living in HDB 4-5 Room Flats and respondents living in HDB 1-3 Room Flats to accurately recall information about the S.U.R.E. framework. This was observed for all three groups of respondents. Among respondents presented with the PowerPoint, respondents living in private housing recorded a mean score of 3.92, which was a statistically significant higher mean score than that recorded by both respondents living in HDB 4-5 Room Flats ($\bar{x}$ = 3.70) and respondents living in HDB 1-3 Room Flats ($\bar{x}$ = 3.66).[87] Among respondents presented with the infographic, those living in private housing recorded a mean score of 3.85, significantly higher than the mean scores recorded by those living in HDB 4-5 Room Flats ($\bar{x}$ = 3.78) and those living in HDB 1-3 Room Flats ($\bar{x}$ =

[85] Respondents were categorised into three housing type groups — those living in (1) HDB 1- to 3-Room Flats; (2) HDB 4- and 5-Room Flats; and (3) private housing (i.e., those living in condominiums and landed property).
[86] Respondents were categorised into two broad income groups: (1) monthly household income below the national median (i.e., less than $9,000) and (2) monthly household income above the national median (i.e., $9,000 and above). According to the 2019 Key Household Income Trends published by the Department of Statistics, Singapore, the national median household income as of 2019 was $9,425.
[87] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "private housing" and "HDB 1-3 Room Flat" group means (p-value = .006), and between "private housing" and "HDB 4-5 Room Flat" group means (p-value = .001).

3.44).[88] Similarly, when it came to respondents presented with the video, respondents living in private housing recorded the highest mean score of 3.94 for the level of recall of information about the S.U.R.E. framework.[89]

Figure 43: Mean differences in recall of the S.U.R.E. framework by housing type

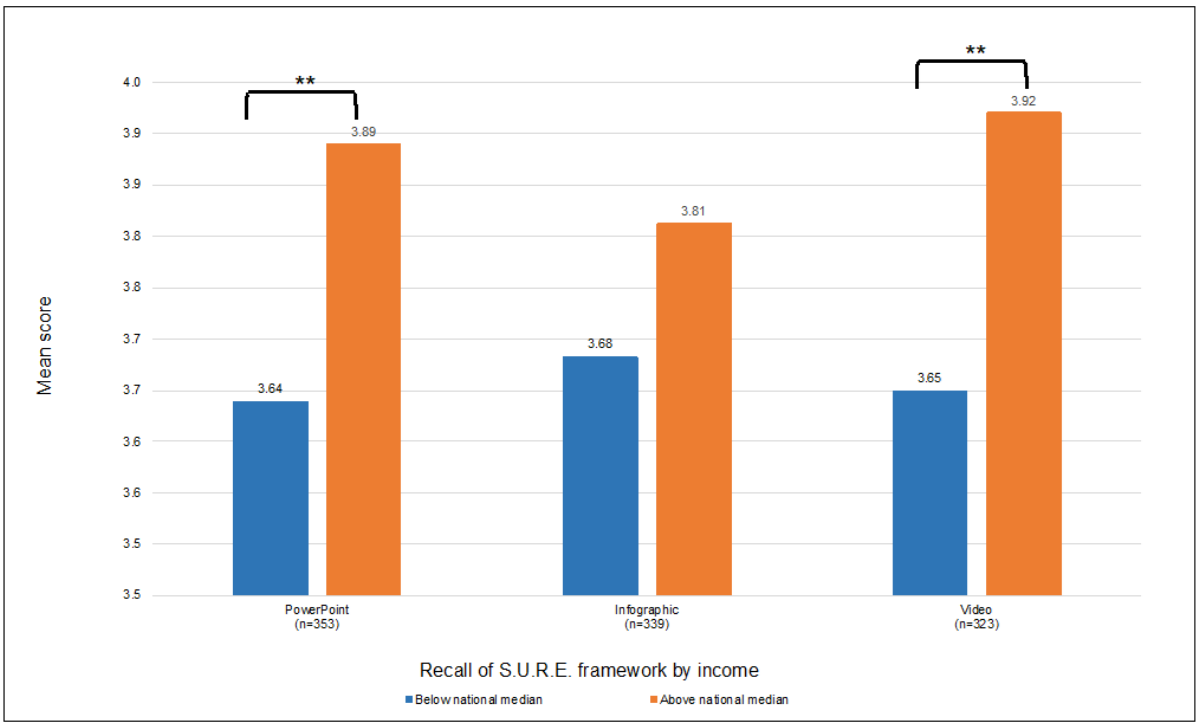


Similarly, respondents whose monthly household income was above the national median were more likely than respondents whose monthly household income was below the national median to accurately recall information about the S.U.R.E. framework. Significant differences were observed for respondents presented with the PowerPoint and the video (see Figure 44).

As seen in Figure 44, among respondents presented with the PowerPoint, respondents whose monthly household income was above the national median recorded a mean score of 3.89, which was a statistically significant higher mean score than that recorded by respondents whose monthly household income was below the national median ($\bar{x}$ = 3.84).[90] Among respondents presented with the video, those whose monthly household income was above the national median recorded a mean score of 3.92, significantly higher than the mean score recorded by those whose monthly household income was below the national median ($\bar{x}$ = 3.65).[91] No significant differences in mean scores was found among the different income groups when it came to respondents presented with the infographic.

[88] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .002). Post-hoc tests revealed significant differences between "private housing" and "HDB 1-3 Room Flat" group means (p-value = .006), and between "HDB 1-3 Room Flat" and "HDB 4-5 Room Flat" group means (p-value = .005).
[89] One-way ANOVA analysis revealed statistically significant differences between group means (p-value = .000). Post-hoc tests revealed significant differences between "private housing" and "HDB 1-3 Room Flat" group means (p-value = .000), and between "private housing" and "HDB 4-5 Room Flat" group means (p-value = .003).
[90] The independent t-test revealed statistically significant differences between "below national median" and "above national median" group means (p-value = .003).
[91] The independent t-test revealed statistically significant differences between "below national median" and "above national median" group means (p-value = .005).

Figure 44: Mean differences in recall of the S.U.R.E. framework by monthly household income



Taken together with the earlier findings on the effects of education, our findings suggest room for the NLB to tweak the S.U.R.E. framework to better suit it to the needs and likings of those without tertiary education and those from lower socio-economic backgrounds, on top of revising it to suit the needs of seniors (as recommended earlier). Table 20 below summarises the findings on how the different demographic factors influence the effectiveness of the different modalities.

Table 20: Summary table on effects of demographic factors on modality efficacy

No.	Demographic	Effect of demographic factors on modality efficacy
1	Age	• Seniors were least likely to find the S.U.R.E. framework useful and clear, compared with middle-aged and young respondents. This difference was observed for all three modalities. • Seniors were least likely to find the S.U.R.E. framework helpful and applicable to their everyday lives, compared with middle-aged and young respondents. This difference was observed for the infographic modality. • Seniors performed the most poorly at accurately recalling information about the S.U.R.E. framework, compared with middle-aged and young respondents. This difference was observed for the PowerPoint modality.
2	Education	• Respondents with tertiary education were more likely to find the S.U.R.E. framework useful and clear, compared with

		respondents without tertiary education. This difference was observed for the video modality. • Respondents with tertiary education were better at accurately recalling information about the S.U.R.E. framework, compared with respondents without tertiary education. This difference was observed for all three modalities.
3	Housing type	• Respondents who lived in private housing were better at accurately recalling information about the S.U.R.E. framework, compared with respondents who did not live in private housing. This difference was observed for all three modalities.
4	Income	• Respondents with a monthly household income above the national median were better at accurately recalling information about the S.U.R.E. framework, compared with respondents with a monthly household income below the national median. This difference was observed for the PowerPoint and video modalities.

Chapter 6

Discussion and Conclusion

CHAPTER 6: DISCUSSION AND CONCLUSION

In the first phase of the study, we looked at the false information landscape in Singapore and surveyed Singaporeans' news consumption and information-seeking habits (e.g., their use of and trust in different sources), their demographic and non-demographic traits (e.g., their level of civic engagement and psychological traits), their exposure and responses towards false information, as well as their ability to discern real information from false information. The findings from Phase 1 generated a range of recommendations to counter the problem of false information at both the micro and macro levels. They included targeting interventions at the more susceptible segments of the society (specifically the elderly and those living in 1-room to 3-room public housing flats), broadening and strengthening digital literacy efforts, adopting an ecosystem approach (e.g., improving the quality of journalism of different media types and partnering tech companies), and cultivating network immunity. [92]

The second and third phases of the study took a deep dive and focused on the internal processes that Singaporeans went through while seeking news and verifying information, as well as the efficacy of a specific intervention (i.e., the S.U.R.E. framework used in the National Library Board [NLB]'s public education programme). To recap, Phase 2 used the self-confrontation interview method to examine Singaporeans' immunity against false information, by understanding their online news consumption practices, and their responses and strategies pertaining to false information. The final phase of the study, Phase 3, focused on the effects of the S.U.R.E. framework delivered through three different modalities on people's recall, understanding, perceived usefulness, perceived applicability, and knowledge, as well as their impact on people's efficacy in discerning real information from false information.

Existing digital literacy initiatives are heading in the right direction. The study, taken in its totality, reinforces the need to continue with such interventions, given the observable positive impact on respondents. The findings from Phase 2 and Phase 3 of the study inform the future development of information and digital literacy programmes. The recommendations below focus on strengthening digital literacy programmes through design, improving content delivery to better equip people with the necessary competencies, targeting different groups more effectively, and improving the policy communications concerning the fight against false information.

6.1. Leverage the modality that works best

As presented in the earlier sections of the report, the PowerPoint modality that delivered the S.U.R.E. framework was most well-received among the respondents in Phase 3 of the study. This was evident from how it was perceived to be the clearest, most interesting, and most useful, compared to the video and infographic. It also led to the greatest knowledge gain about the S.U.R.E. framework among the respondents. The infographic, on the other hand, fared most poorly consistently — it was perceived to be the least clear, least interesting, least visually attractive, least useful and resulted in the least knowledge gain.

Existing research on the use of different modalities to deliver public education programmes suggests that animation (defined as "*a simulated motion picture depicting movement of drawn [or simulated] objects*") promotes learning (Mayer & Moreno, 2002). According to the Cognitive Theory of Multimedia Learning, presentations that involve multimedia (e.g., animation) generally create better learning outcomes than those delivered in a static medium (e.g., narration only). This is because learners

[92] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (Section 7).

cognitively engage more deeply from animation as they are better able to build mental connections between corresponding words and pictures when both are presented together, compared with when only one is presented and learners must mentally create the other (Mayer & Moreno, 2002).

However, between both multimedia modalities (i.e., video and PowerPoint), Phase 3 of the study found that despite its snazzier production, the video was second to the PowerPoint in all aforementioned effects on respondents, except for visual attractiveness. The high performance of the PowerPoint could be attributed to its key feature — the incorporation of a "talking head" — which most respondents could relate to. According to the personalisation principle in the Cognitive Theory of Multimedia Learning, people tend to learn more deeply when narration is conducted in a conversational style (e.g., the use of first- and second-person address), than when in a formal style to explain concepts (Mayer et al., 2004). In a study by Mayer and Moreno, student respondents who were presented with multimedia content delivered in a conversational rather than formal style consistently performed better in transferring what they had learnt to new problems (Mayer et al., 2004). This could be due to students expending more effort to understand an explanation when they feel more personally involved in a conversation. The demonstrated impact on recall and understanding, as observed in Phase 3, as well as from existing literature, point to a strong appetite among people for a more conversational style and use of personal language when it comes to content delivery.

The efficacy of the "talking head" could also be attributed to instructor immediacy. Research on communications and pedagogy design has found that an instructor's verbal and nonverbal behaviours increased relational closeness, and contributed to better student learning outcomes and student experiences (Mehrabian, 1967; Witt et al., 2004). In an online setting, instructor immediacy transmitted via interface cues or channels has been found to increase perceptions of goodwill, competence and trustworthiness (O'Sullivan et al., 2004; Wei et al., 2012). Furthermore, the addition of voice in lecture materials resulted in students feeling a greater sense of closeness with the instructor and possess more positive evaluations of credibility (Limperos, 2015).

As for the infographic, a common feedback gathered from the open-ended responses was that it was too wordy. It had fewer illustrations and examples, compared with the PowerPoint and video. The positive comments for the PowerPoint and the video emphasised the importance of illustrations and examples, which helped respondents understand the steps advocated in the S.U.R.E. framework. This finding is in line with existing research, which showed that learners preferred content that was short and had less static text (Bury, 2005). On the other hand, "text-heavy" content was generally found to be boring to learners (Sachs et al., 2013).

Currently, the delivery of the S.U.R.E framework through the PowerPoint modality is largely limited to classroom settings. The consistently positive outcomes observed for this modality point to a strong potential for the modality — the combination of graphics, text and "talking head" — to be adapted to settings beyond the classrooms, such as in public venues like public transport hubs and digital noticeboards in public housing estates, with some tweaks to the aesthetics. While there are limitations to the infographic, it remains a useful supplementary channel for delivery of the S.U.R.E. framework, given its ease of distribution. To enhance its clarity and appeal, the infographic could be modified to adopt a series format. For instance, a series of four infographics (i.e., one for each step of the S.U.R.E framework) would allow more room for the inclusion of examples and illustrations. Finally, in addition to revising and adapting existing modalities, our study highlights the need for repeated exposure to the S.U.R.E. framework. The high recall yet lower understanding of the concepts underscores the need to repeat exposure of the framework to the public for internalisation.

6.2. Strengthen the S.U.R.E. framework

The findings from this study shed light on how the existing S.U.R.E. framework could be updated for greater efficacy. Responses to the open-ended questions in Phase 3 indicated an appreciation for the systematic, step-by-step way of news verification taught in the S.U.R.E framework. The succinct, sharp, and catchy "S.U.R.E." acronym contributed to its clarity and perceived usefulness, which served as a good reminder of the concepts advocated. The ease of recall bodes well for applying the four essential steps of verification in respondents' daily lives. A scrutiny of the effect of each of the step provides useful indications on how to improve or upgrade the framework.

As presented in Section 5.1.3., respondents found the "R" ("Research") step of the framework most useful. The current tips included in the "R" step are as follows: (1) using credible sources to find out the authenticity of an article or message one receives; (2) digging deeper and going beyond the initial source by doing a quick search of any suspicious article or message one receives and treating it with suspicion if there is lack of news coverage or evidence; and (3) finding at least two or more sources to confirm if the information is real. As the findings from Phase 2 of the study also showed, there were differences in how Informationally Savvy respondents and those from other groups (i.e., Informationally Disengaged, Informationally Overconfident and Informationally Diffident) practised verification of the Health Nut News (HNN) article that contained false information on 5G technology.

Respondents from the Informationally Savvy group who demonstrated a stronger immunity against false information were more likely to practise lateral reading, a technique used by fact-checkers, while those from the other groups were more likely to rely on vertical reading (i.e., relying solely on the source of the information itself to determine its veracity). When practising lateral reading, individuals leave the website in question and look up other digital sources. In Stanford History Education Group's Online Civic Reasoning Course, students are taught how to "*contrast lateral reading with vertical reading (staying on a single webpage), and learn how checking what other websites say about a source is a better evaluation strategy than trusting what the source says about itself.*" Given the increasing sophistication of false information producers who are becoming more adept at mimicking professional news reporting strategies (e.g., including the use of statistics and data), lateral reading will become more important. Thus, a possible addition to the "R" step of the framework would be to delve deeper into the need to conduct lateral reading and how to do so.

The study also found that the "E" ("Evaluation") step was least clear, compared with the other three steps (see Section 5.1.4.). Currently, the "E" step advises people to: (1) assess if the information is fair and balanced; (2) exercise fair judgment and consider if the headline or media may be manipulated before choosing to share or forward the information; and (3) evaluate any information one receives, as they may not reflect the real actual incident. The possible reasons for the relative low clarity of the "E" step could be gleaned from the self-confrontation interviews in Phase 2 of the study. Respondents' interpretations of what "fake news" constituted were wide-ranging. Some interpretations were simplistic and erroneous. For instance, the absence of informational characteristics such as numbers and statistics, and anything that was not a fact, such as an opinion, were considered fake. Others felt that what was "fake" was subjective and depended on factors such as the communicator's intent and one's personal experiences and opinions on a topic or issue. This suggests that the "E" step could focus on the tangible and normative aspects of fake news, as opposed to advocating for the practice of exercising "fair judgment" and considering if the information is "fair and balanced". Enhancements to this step could perhaps include instructions pertaining to: (1) the types of statements can be fact-checked; (2) questions one should ask when verifying content; and (3) the available tools that one can use to help validate images (more details are available at Poynter's "Hands-on fact-checking: A short course").

According to the Phase 3 survey data, respondents found that the "U" ("Understand") step of the framework was the clearest (see Section 5.1.4.). Currently, the "U" step advises people to do the following: (1) know that personal expressions and opinions on social media can potentially expose one to misinformation; (2) understand the difference between factual information and opinions; and (3) recognise that some fake news are vague in their details and lack factual information. The qualitative data collected from Phase 2 support this finding as most of the respondents looked out for informational characteristics such as the date, time, and links to other official sources to confirm the information. However, the survey data also indicated that respondents found the "U" step least useful, suggesting that majority already knew of the recommended techniques and perhaps were already practising them. To keep pace with the increased sophistication of false information producers, the "U" step could incorporate higher-order or advanced techniques, such as those recommended by FactCheck.org — for example, reading beyond the headline, considering the support given, and checking one's personal biases (Kiely & Robertson, 2016).

6.3. Expand digital literacy efforts

While the above recommendations addressed the S.U.R.E. framework specifically, some of them have relevance for broader efforts aimed at increasing information and digital literacy among Singaporeans. The self-confrontation interviews showed that information users who were not from the Informationally Savvy group and who had weaker immunity against false information were more prone to relying on vertical reading when assessing the authenticity and credibility of a source. This group either limited their verification to the HNN website solely or spent most of their time on the website and little time on other sources. In contrast, those who were from the Informationally Savvy group and who had stronger immunity against false information were quick in looking up other online sources to verify the claims on 5G killing hundreds of birds in the Hague. In addition to teaching lateral reading, more curriculum emphasis should be placed on cultivating critical assessment of data. The presence of data in a source should not be the sole indicator of veracity because numbers and statistics can be easily fabricated or manipulated.

Based on the differences observed between those from the Informationally Savvy group and those from the other three groups in terms of their news verification techniques in Phase 2, and the suggestions provided in the open-ended responses in Phase 3, there is room to explore including more workman-like techniques (i.e., the "how-to") in terms of checking if an image or headline is manipulated. While respondents' understanding of "what a factual piece of information will not contain" was high, their understanding of "what they should do" to evaluate the information was low. This suggests a paucity of knowledge pertaining to the specific techniques they can use in their daily lives when processing information and news. The efficacy of teaching workman-like skills has been supported by research on pedagogy and learning — in general, learning materials that included progressive cues and hands-on exercises were more positively received by learners as they were perceived as less static and more "to-the-point" (Bury & Oud, 2005). In the field of fake news debunking, games such as Factitious developed by the Centre for Information Technology and Society at UC Santa Barbara University have been used to help players learn how to detect fake news stories. The premise of these games is that players will learn to recognise fake news based on common patterns that emerge after playing a few rounds and transfer these skills to other contexts.

The self-confrontation interviews also found another difference between those from the Informationally Savvy groups and those from the other three information user groups. The former who had stronger immunity against false information ascribed different levels of trustworthiness and credibility to different sources. For instance, they were more sceptical of their friends and family members as sources because they were aware of how personal biases

shaped their information sharing. While existing literacy efforts stress the importance of considering the source when evaluating news, they could include more facts and illustrations to explicate the wide array of sources (e.g., legacy media, non-legacy media, social networks), and their news production or information dissemination processes. A more contextualised approach to teaching people about source evaluation is required. For instance, while search engines such as Google Search are trusted by people, a greater sensitivity for the wide array of sources of different reliability should be cultivated.

Fact-checking websites, another potentially useful source of corrective information, are currently under-utilised in Singapore. Phase 1 of the study found that turning to fact-checking websites was the least frequently performed verification strategy among Singaporeans (only 22 per cent of the respondents had done so sometimes, often or very often).[93] The self-confrontation interviews conducted in Phase 2 showed that majority of the respondents had not heard of fact-checking websites such as FactCheck.org, Snopes.com, and PolitiFact.com, despite these sites being the top search results when they were verifying claims in the HNN article. Existing literacy programmes (e.g., S.U.R.E. campaign and Media Literacy Council campaign) should include information and examples of both local and international fact-checkers in their resources to increase the public's awareness and nudge their adoption of fact-checkers. This is particularly important for false information on international topics that may not be addressed adequately or in a timely manner by local sources.

Our study also found that majority of the respondents did not call out false information when they received false information from their family members or friends. One of the reasons was they did not want to offend their social contacts. This could account for why most of the respondents did not take any action when they encountered false information on social networking sites and Instant Messaging platforms — 75.5 per cent of the respondents for Phase 1 sometimes, often, or very often ignored the false information that they had encountered on social networking sites, and 76.2 per cent sometimes, often, or very often ignored the false information that they had encountered on Instant Messaging platforms.[94] Thus, there is a need for existing literacy programmes to fill this gap, by equipping people with the soft skills to intervene sensitively and effectively in their social networks. PEN America and First Draft have published tips that people can use when talking to their family and friends who share false information (PEN America, 2020; Ahmadi, 2020). See Tables 21 and 22 below for elaboration on their tips provided.

Table 21: List of tips from PEN America on engaging those who share false information

No.	Tips	Actions and considerations
1	Verify that the content is misleading or false before engaging	• Before correcting someone, search keywords from the headline to confirm if a story has been reported by more than one credible source. • Check if a story has been verified by fact-checking websites like PolitiFact, Snopes or FactCheck.org.
2	To comment or not to comment?	• Send a private note (e.g., direct text message) to politely point out that something is false or incorrect if someone has posted it.

[93] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (Section 6.6.).
[94] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (Section 6.5.1.).

		• If a post has gained traction (e.g., received many likes and comments), a public correction may better reduce the harm of the misinformation.
3	Consider the perspective of the person who shared the story	• Say something like, "*I was curious about what you posted, so I did some Googling and here's what I found …*" or share a personal experience of a time you shared false information to politely begin conversations with people who share misinformation. • Show empathy when correcting others.
4	Avoid escalation	• Offer others the tools to perform their own fact-checking if they get defensive when you correct them.
5	Be a resource for others	• Proactively share factual information and resources (e.g., information from credible sources like the World Health Organisation and trusted fact-checkers) on your social media feed. • Provide others with the resources and tools to conduct their own fact-checking. • Share tip sheets and guides on verifying sources and images.

Table 22: List of tips from First Draft on engaging those who share false information

No.	Tips	Actions and considerations
1	Do not shame	• Do not publicly call out someone who has shared false information. • Instead, send a private message to ask who they received the message from, if they know where it originated, and why they have decided to pass it on to you.
2	Show empathy	• Do not react emotionally or take a tone of "you are wrong and I am right". • Instead, approach them with a "we are all in this together" attitude.
3	Be responsible	• Do not ignore false information that gets sent to you. • Instead, take the responsibility to call out your contacts, especially those closest to you, for spreading a false message.
4	Do not expect immediate change	• Understand that views do not change overnight. • Continue to politely challenge others so that they will be more likely to think about the things they share and question the source.

6.4. Target and tier literacy programmes

As presented in earlier sections, respondents with stronger immunity against false information demonstrated higher-order thinking and skills when assessing the credibility of news sources and when conducting information verification. There is thus an opportunity to imbue people with higher-order verification skills, especially among those who are savvier and have stronger appetite for higher-order competencies (e.g., dealing with ambiguous information). On the other hand, seniors and those from lower socio-economic and education backgrounds may benefit from programmes that are simplified and foundational. The analysis of Phase 3 survey data showed that youths were more likely than the middle-aged and seniors to find the S.U.R.E. framework useful and clear, regardless of the modality. Seniors were also generally less likely

to find the framework helpful and applicable, and to recall the steps that needed to be done. Those from lower education and lower socio-economic backgrounds (in terms of dwelling type and income) were also less likely to recall the S.U.R.E. framework accurately.

Currently, the Cyber Wellness in Character and Citizenship Education offered by the Ministry of Education focuses on equipping children and youths with the knowledge and skills to harness information communications technology positively, safely, and responsibly.[95] The principles advocated by the programme are: (1) respect for self and others, (2) safe and responsible use, and (3) positive peer influence. See Table 23 below for the scope of the programme.

Table 23: MOE's Cyber Wellness Curriculum at a glance

Topics	What your child will learn about
Cyber use	• Maintaining a healthy balance of online and offline activities
Cyber identity	• Developing a healthy online identity • Appropriate online expression
Cyber relationships	• Netiquette • Cyber bullying • Developing safe, respectful, and meaningful online relationships
Cyber citizenship	• Understanding the cyber world • Handling online content and behaviour • Having a positive presence in the cyber community
Cyber ethics	• Creating and sharing of online content in a responsible manner • Respecting copyright

While the above topics are fundamental to cultivating a healthy (e.g., "maintaining a healthy balance of online and offline activities"), safe (e.g., "developing a healthy online identity" and "developing safe, respectful and meaningful online relationships"), productive (e.g., "having a positive presence in the cyber community") and responsible (e.g., "cyberbullying" and "netiquette") use of digital technology, the programme could be levelled up to impart more skills that enable youths, especially those in secondary schools and junior colleges, to play a more active role in debunking false information. This is because these youths would have acquired a competent level of digital technology use. For instance, in the US, MediaWise for Gen Z teaches students how to create original fact-checking videos for Instagram and help teach fact-checking tips along the way (Poynter, n.d.). Such an approach has the potential to engage youths who are increasingly playing the role of "prosumers" (i.e., people who consume and produce news content and information) in the online space and converting them to digital ambassadors who can help spread the savvy and responsible use of information among those in their social networks.

As for seniors, existing programmes can be revised in three ways. Currently, under its Seniors Go Digital programme, the Infocomm Media Development Authority focuses on equipping seniors with skills on communication apps, digital government services, e-payment, and digital banking (Infocomm Media Development Authority, n.d.). The programmes are delivered in the form of small group settings (e.g., learning journeys), one-on-one guided learning (e.g., SG Digital Community Hubs), and online learning. First, seniors would benefit greatly from content designed to help them recognise false information and verify information. During the self-confrontation interviews, we observed that seniors could operate digital devices and conduct simple keyword searches, but they had difficulties with information verification and fact-

[95] The Cyber Wellness education is usually conducted during curriculum time for students from primary schools, secondary schools, junior colleges and Millennia Institute. Retrieved from https://www.moe.gov.sg/programmes/cyber-wellness.

checking as they did not know what they had to do with the search results presented and which websites they could rely on.

Second, the self-confrontation interviews conducted in Phase 2 found that seniors were more comfortable performing information search on their mobile phones than on a laptop. Content can be developed with a focus on helping seniors learn how to conduct information verification in a mobile environment. Third, policymakers can tap on the network effect. Currently, the Digital Ambassador programme engages youths to teach seniors how to use digital devices. While inter-generational teaching is useful, what might also work would be to expand the recruitment of seniors who can be trusted nodes of information that other seniors can communicate more frequently with and turn to when they are unsure.

6.5. Public messaging to build resilience against false information

The findings from Phase 2 pointed to the prevalence of optimism bias as most respondents tended to feel that others (e.g., youths, seniors), but not themselves, were more vulnerable to false information. If left unchecked, this complacency and over-confidence may become a pain point in Singapore's resilience against false information. As evident from the Phase 1 findings, no one is immune to the problem of false information. While some segments of the population (e.g., seniors) may be more vulnerable than others, those who were considered more information-savvy can be equally vulnerable. Furthermore, the findings from both Phase 1 and Phase 2 suggest that more can be done to encourage Singaporeans to take on a more proactive role in tackling false information. For example, Phase 1 of the study found that most Singaporeans tended to ignore the false information that they encountered online,[96] while Phase 2 found that many respondents looked to institutional players, such as the government and media outlets, to solve the problem. Taken altogether, public messaging to strengthen the nation's resilience against false information should appeal to Singaporeans that no one is immune to false information, but everyone should and can be fighters against falsehoods by actively intervening within their social networks.

Finally, the findings from Phase 2 provide some guidance for debunking efforts. Informational characteristics such as visuals, headlines, and flags (e.g., "false claim" and "fact-check" flags) were important signposts that attracted people's attention to a source. Other critical stylistic elements that influenced people's perception of a source's trustworthiness and credibility include simple and brief language, a balanced tone, and the incorporation of evidence such as statistics. Future debunking efforts and the design of corrective information should leverage these informational characteristics to capture people's attention and to increase their reach and impact. See Table 24 below for a summary of the recommendations proposed.

[96] Refer to "Study on Singaporeans and false information — Phase one: Singaporeans' susceptibility to false information", available at https://lkyspp.nus.edu.sg/docs/default-source/ips/ips-study-on-singaporeans-and-false-information_phase-1_report.pdf (Section 6.5.1.).

Table 24: Summary table of recommendations

No.	Recommendation	Key points under recommendation
1.	Leverage the modality that works best	• Expand the use of multimedia modalities (e.g., PowerPoint) combined with more a conversational style of content delivery, and adapt it beyond classroom settings to more public ones. • Enhance the clarity and appeal of the infographic by repackaging it into a series of four (i.e., one for each step of the S.U.R.E. framework), thus allowing room for more examples and illustrations. • Ensure repeated exposure of the S.U.R.E. framework to promote deeper learning.
2.	Strengthen the S.U.R.E. framework	• Incorporate more advanced techniques (e.g., read beyond the headline, consider what is the support provided and check one's personal biases) to the "U" ("Understand") step, given people's familiarity with current content. • Build on the usefulness of the "R" ("Research") step by delving deeper into the importance of performing lateral reading and the steps to do so. • Enhance the "E" ("Evaluate") step by providing tangible and clear instructions on how to evaluate information — e.g., listing types of statements can be fact-checked, questions to ask when verifying information, available tools for validating images.
3.	Expand digital literacy efforts	• Include more workman-like techniques (i.e., the "how-to") and hands-on exercises in digital literacy curricula. • Adopt a more contextualised approach to teaching people about source evaluation in different information environments (e.g., legacy media, non-legacy media, social media). • Increase people's familiarity with and knowledge about fact-checking websites (e.g., Factually.sg, Snopes.com) to nudge their adoption in people's information diet. • Equip people with the soft skills to correct others sensitively and effectively when they share false information.

No.	Recommendation	Key points under recommendation
4	Target and tier literacy programmes	• Offer those who are savvier the opportunity to pick up higher-order skills and knowledge (e.g., dealing with ambiguous information) while tailoring more basic or foundational programmes for those who may need to start smaller. • Incorporate lessons on navigating the online information space via mobile devices for seniors in existing digital literacy programmes like the Seniors Go Digital programme. • Expand the recruitment of digitally savvy seniors who can serve as trusted information nodes in their social circles whom other seniors can turn to. • Include fact-checking techniques and skills in Cyber Wellness in Character and Citizenship Education curriculum in secondary schools and junior colleges.
5	Public messaging to build resilience against false information	• Stress that no one is immune to false information, but everyone can play a role in the fight against it. • Leverage popular informational characteristics (e.g., visuals, headlines) and stylistic elements (e.g., simple language, balanced tone) in future debunking messages to improve their reach and impact.

In summary, the above recommendations counter the problem of false information at three levels: the micro (e.g., design and content tweaks to the S.U.R.E. framework and its accompanying modalities for improved efficacy); the meso (e.g., expanding and tailoring of ongoing and future digital literacy programmes); and the macro (e.g., public messaging and public corrections) levels. Such a multi-pronged approach will be key to Singapore's continued efforts in combatting a wicked problem like online falsehoods.

Appendix 1

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APPENDIX 1: REFERENCES

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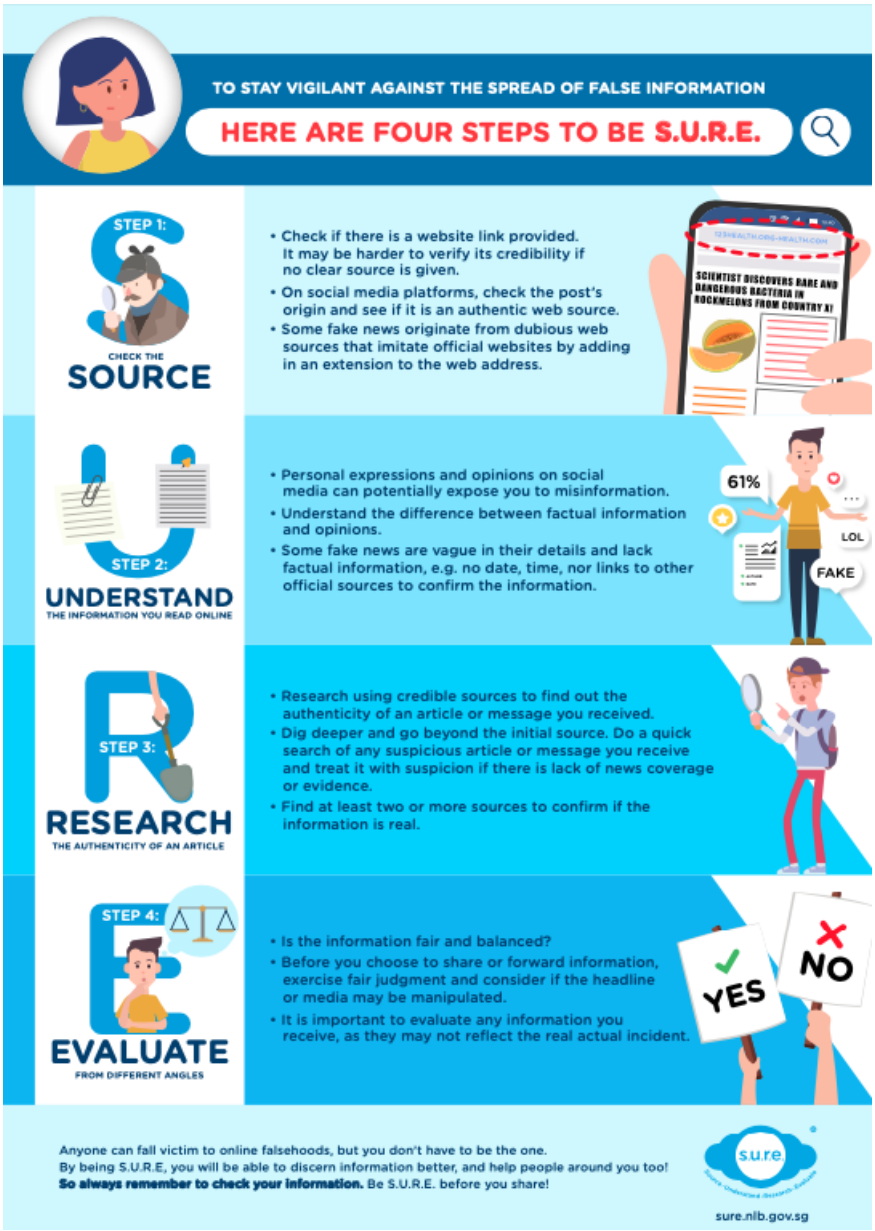
Appendix 2

S.U.R.E. Framework

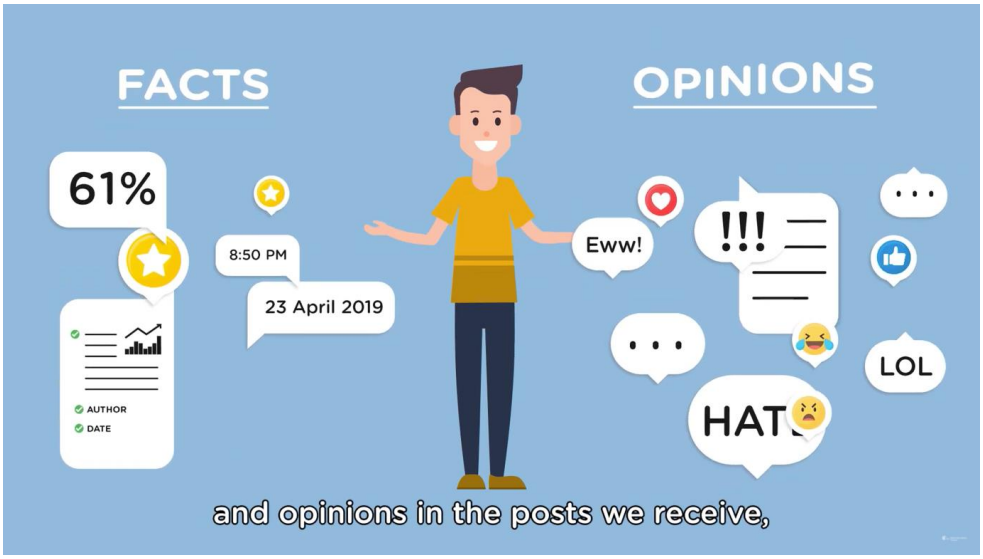
APPENDIX 2: S.U.R.E. FRAMEWORK

Infographic[97]

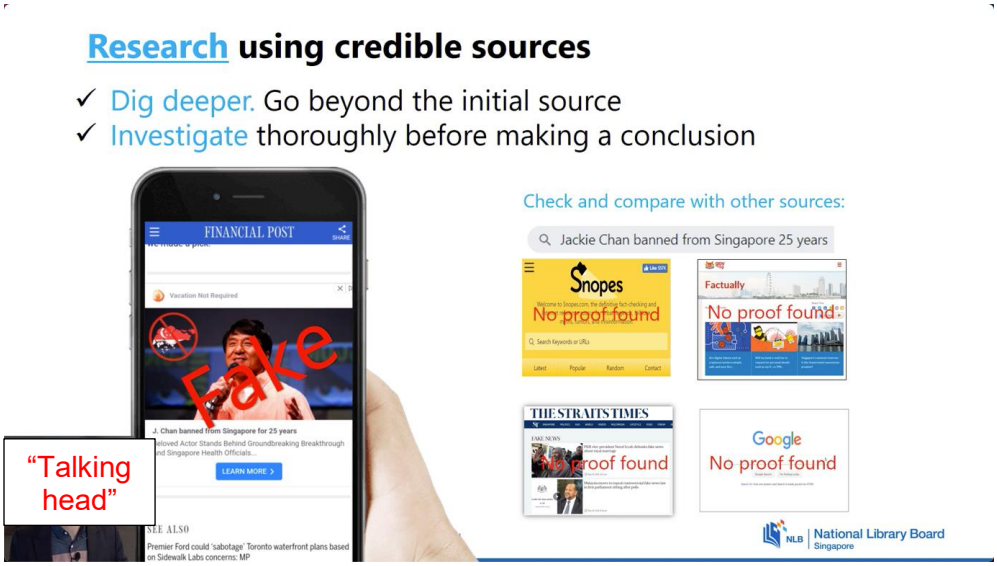


[97] The infographic can be accessed at https://sure.nlb.gov.sg/infographic/4-Ways-of-SURE.pdf.

Video[98]



PowerPoint[99]



[98] The video, which is available in three languages, can be accessed at https://sure.nlb.gov.sg/blog/fake-news/fn0004.
[99] The PowerPoint can be accessed at https://sure.nlb.gov.sg/blog/fake-news/fn0002.

Appendix 3

About the Authors

APPENDIX 3: ABOUT THE AUTHORS

Carol **SOON** is Senior Research Fellow at the Institute of Policy Studies (Lee Kuan Yew School of Public Policy, National University of Singapore) where she heads the Society and Culture department. Her research interests include false information, media regulation, digital inclusion, and public engagement. She has published her research in books and peer-reviewed journals such as the Journal of Computer-Mediated Communication, Asian Journal of Communication and Public Integrity. Carol is also Associate Director of the Asia Journalism Fellowship and Vice Chair of Singapore's Media Literacy Council.

Shawn **GOH** was Research Assistant at the Institute of Policy Studies (Lee Kuan Yew School of Public Policy, National University of Singapore). His research focused on the social and policy implications of digital media and the Internet, including false information, digital literacy and inclusion, policy communications, and online civic engagement. His publications include a book chapter in *The Routledge Companion to Media Disinformation and Populism*, and a peer-reviewed journal article on governing the information ecosystem in Southeast Asia that was published in *Public Integrity* in 2019.

Nandhini **BALA KRISHNAN** is Research Assistant in the Society and Culture department at the Institute of Policy Studies (Lee Kuan Yew School of Public Policy, National University of Singapore). Her research primarily focuses on digital literacy, internet culture and the arts and culture. She holds a bachelor's degree from the National University of Singapore where she majored in Sociology and South Asian Studies.