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True or Fake?: A strategy to help individuals verify fake news and misinformation on social media

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Master Thesis

presented as partial requirement for obtaining a Master's Degree in Information Management

NOVA Information Management School

Instituto Superior de Estatística e Gestão de Informação

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by

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Master Thesis presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Information Systems and Technologies Management

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

[Madrid, 02.12.2024]

Inés González de Mendoza Cremades

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ABSTRACT

This thesis presents a collection of strategies to verify dis-/misinformation in online environments and examines how social media users apply these strategies in their regular use of social media via an experiment/survey. There is a higher flow of disinformation and fake news on social media platforms than ever seen before, and thus users are consuming unverified content on an everyday basis. This poses a problem for critical thinking, transparency and even democracy. By researching user's attitudes regarding misinformation and fake news and testing the ways in which they verify information, it demonstrates that there is a lack in education about information disorders and how to approach content on social media. Results show that most participants did not research the information presented to them and showed that their knowledge and application of these strategies is limited. Thus, the concern for a more educated social media audience and the need to improve and incorporate guidelines becomes clear.

KEYWORDS

Misinformation; Social media; Fake news; Education; Strategies; Awareness

Sustainable Development Goals (SDG): 

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1. INTRODUCTION

1.1. BACKGROUND AND PROBLEM IDENTIFICATION

Today's world is changing for everyone. From elderly people to the youngest generations, the environments in which we live and communicate are in constant shift and development. People have always had to adapt to their environment, which is one of the main abilities of evolving humans. In recent years, however, there has been a new force that drives this development and change to unprecedented fast rates, which is digital technologies. Technology overall, has been by our side since the earliest of days, but the pace at which it has developed in the last decades up until now has been incomparable (Roser, 2023).

One of the most important features of this rapid technological growth has been the rise of social media platforms. These are different from other internet platforms since they allow for massive content creation and are not passively used in which everyone can create information (Polanco-Levicán & Salvo-Garrido, 2022). They create very large online social networks in which the users can be constantly in contact with each other and with different kinds of content. Thus, it has revolutionized the way people socialize, communicate, spend free time, do business, do shopping, etc. It has overall become one of the most present technologies in our daily lives and has brought about a culture of constant information and updates about events all around the world (Khan et al., 2021). This aspect leads to large amounts of people sharing and feeding on information coming from many different outlets, which in turn results in the question of what kind of information is exactly being consumed, where does it come from, and to what extent does it represent the truth (Molina et al., 2019).

As a result of the exposure to these amounts of information on a daily basis, the risks also increase. It has even been estimated that nowadays people are consuming more false information than truthful, and that they have a hard time telling one apart from the other (Olan et al., 2022). One of the most popular appearances in the last years is the concept of fake news. It refers to the 'manipulation of information that can be carried out through the production of false information, or the distortion of true information' (Aïmeur et al., 2023). It involves pieces of information that claim to be true or do not disclaim that they have been altered, manipulated or created from false sources. It is part of the wider concept of

disinformation, which essentially refers to the purposeful distribution of false information. There are different kinds of information that fall into this category, such as articles, manipulated pictures and decontextualization of a visual.

The appearance of these concepts and their prevalence on a daily basis poses a threat to democracy, transparency and ultimately people's ability to think critically. Thus, it becomes increasingly important to not only address the danger of the dissemination of this content, but to actively look for ways to tackle it effectively (Ceylan, et.al.,2023). In a nutshell, fake news is not only spread directly from person to person, but on a bigger scale, with the use of algorithms on social media. This ensures that specific information reaches a specific audience. This happens based on their activity on the app and the kind of content that they normally interact with, which opens the door for new similar content. This results in the creation of echo chambers in which a person is exposed to one kind of perspective, narrative, and view of reality, and reinforces people's personal biases as a result (Donkers & Ziegler, 2023). The danger becomes even more worrisome when seeing that the spread of false information is six times faster than that of truthful information (Vosoughi et al., 2018). Thus, it is crucial to bring attention to this issue, and more importantly, to properly address the need to create or improve the methods to handle information carefully. Therefore, it becomes necessary to explore how social media users can identify, analyse, and assess information online to protect themselves from dis- and misinformation.

Thus, the following research questions are presented:

RQ1: What strategies are there to question and analyse information on online environments?

RQ2: To what extent are social media users aware of misinformation on social media?

RQ3: To what extent are social media users aware of ways to assess information online? To what extent do they apply these methods?

These interrogations can be clustered into a general research goal: To create an effective strategy to help social media users verify disinformation on social media.

1.2. OBJECTIVES

To address the formulated research question and the main research goal the following secondary objectives were defined:

- To bring light to the concept of fake news, misinformation, and digital literacy and address their importance in today's social media world.
- To study and analyse the attitudes of social media users towards disinformation and assess the extent they interact with it to determine its veracity.
- Propose guidelines showcasing different steps that can be taken by social media users to try to protect themselves from being deceived with false information.
- Validate the proposed strategy by exploring if its use can lead to assessing information in a better way.

The next sections will present the following sections: Firstly, a literature review in which the main concepts and background knowledge are presented. Secondly, the methodology used in this research, namely design science research. Thirdly, the framework compiles all the strategies, which are thoroughly described and clustered into a single artifact, and the survey/experiment is presented. Fourthly, the results from the survey and experiment are presented, analysed, and contextualised in the results and discussion sections. Finaly, the conclusion presents the main findings and contributions of this paper, together with its limitations and suggestions for further research.

2. LITERATURE REVIEW

The following section contains research gathered through various literature. The articles presented are gathered from different platforms such as Google Scholar, Elsevier, ResearchGate, and JSTOR. The gathered literature was found by some of the following search terms: “social media and disinformation”, “fake news”, “misinformation”, “social media users and disinformation”, etc. The following inclusion and exclusion criteria were also applied. Only literature from the last five years and in the English language were used. Furthermore, articles that were out of scope are excluded.

2.1. DISINFORMATION

In a world where most people’s daily lives are characterized by a high consumption of information on social media, it becomes trivial to understand where such information comes from and how it is created in the first place. The reason why this is so important is because it is not always clear what is true and what is not. The latter option has been referred to by many researchers, and is now more commonly known, as disinformation. A distinction must be made between the concepts of disinformation and misinformation, which are sometimes used interchangeably (Ferreira, 2021). On the one hand, disinformation refers to incorrect or false information deliberately made and propagated to harm an entity (Balakrishnan et al., 2022) and to manipulate perceptions of reality of politics and society (Pherson et al., 2021). Thus, it implies that there is a conscious factor of lies and intent of deception (Disinformation, 2024; Disinformation, N. Meanings, Etymology and More | Oxford English Dictionary, n.d.). Misinformation, on the other hand, although it entails the same principle of dissemination of false information, does not involve a deliberate intent to deceive (Zrnec et al., 2021). When attempting to study the topic of misinformation on social media, and to help in its mitigation, it is crucial to properly understand and use the different concepts that revolve around it.

2.2. CONCEPTS

The way disinformation looks and spreads on social media can encompass numerous intertwined concepts, which allow it to have a more impactful effect and range.

2.2.1. INTENT TO DECEIVE AND CONTEXT

The most inherited part of disinformation is that it bases its existence on the propagation of false information. There are many ways people use to refer to false information such as rumours, spam, fake news, etc. (Ruffo et al., 2022), but the most important characteristic that all of them have in common is the pursuit of a manipulated narrative. As described above, disinformation is created on purpose by actors that intend to propagate those false narratives as a form of manipulation of some kind. If one is reading a piece of news from a news website, one could come across some kind of disinformation without being aware of it. The problem becomes more complicated, when one is faced with endless threads of content on social media, such as the discover page on Instagram or any post by those that one follow, because it makes it harder to pinpoint the origin of that information and who is behind it.

This inherent intent to deceive is very popular in political contexts such as campaigns, speeches or propaganda. One of the main case studies that portrays the extent to which political actors are willing to go to attract voters is the Cambridge Analytica scandal. The event is linked to the the 2016 U.S elections, in which thousands of Facebook users were exposed to millions of fake stories, both pro-Clinton and pro-Trump, a couple of months prior to the election (Sharma et al., 2018). As a result, users, which in turn would become voters, were immersed in an environment of alerting news titles, media exposing the opponent party, and a social media feed flooded with sensationalist content. Another big moment in the history of fake news started with the COVID-19 pandemic and the vast amounts of information that were circulating on different platforms, such as home-made or unverified channels spreading fear and panic (Balakrishnan et al., 2022; De Beer & Matthee, 2020). People used social media platforms to try to make sense of what was going on and to be up-to date with the latest news about the topic, while in the meantime numerous fake stories were being shared among thousands of people. These are just mere examples that showcase the way in which disinformation has slithered into our daily lives through online content.

2.2.2. FAKE NEWS

As the topic of disinformation has existed for a long time, false information has taken over many forms and types, merging into different online environments and adapting to the newest technologies (Wu et al., 2019). Thus, new concepts revolving around the topic of disinformation have emerged in the last years.

When diving into this topic of false information, news and content online, there is a concept that most people currently have probably heard of at least once, namely fake news. This concept became most known during and after the 2016 US presidential election, which as previously mentioned, served as a catalyst for what would be one of the biggest disinformation scandals of the decade. Fake news was initially used to describe the deliberate creation and propagation of false information disguised as legitimate news reporting, aiming to mimic the structure and information legitimacy of well-established news organizations (Persily et al., 2020). However, as the appearance of false information has become more abundant, the concept of Fake News has become a synonym for false information all together (Sharma et al., 2018). It therefore serves as a way to refer to any misleading content that could turn into misinformation, such as news parody, manipulation, advertising, etc. (Rogers & Niederer, 2020). Although compared with the structure of regular news, Fake News works in a different way than mainstream journalism. It uses a different language that is specifically designed to appeal to the subconscious and emotional layer of readers, to which they in turn can relate and connect with their internal biases (Ruffo et al., 2023). The fact that it reaches readers by exploiting their personal biases influences the rates at which the content is shared, for instance Fake News is spread 70% faster than regular news (Barrutia-Barreto et al., 2021).

2.3. REACHING THE TARGET AUDIENCE

Therefore, it becomes very important to understand the ways in which disinformation is created and the purpose behind it. There are entities or individuals who intentionally create and disseminate false information, which is spread out through social media platforms as a way of feeding into a narrative or a story that pushes forward particular interests and agendas. Such outlets take features from legitimate accounts to disguise the false content (Wu et al., 2019). Because of the efforts of these actors to mimic the structure of real and renown news providers, it becomes a challenge for social media users to distinguish trustworthy articles from dishonest ones (Saldaña & Vu, 2021) and thus emerging into an environment in which one must doubt the legitimacy of every word.

One of the main strategies used to catch people's attention and draw them into a piece of news is commonly known as clickbait. It is a practice by which a text, a picture, or video is presented or titled in a way which incites strong feelings, such as fear, anger, happiness, etc. (Rogers & Niederer, 2020), making it as tempting as possible for users to click on a link.

Different studies have shown that posts that contain emotionally strong words (e.g. blame, hate, fear, etc.) are between 15-20% more likely to be shared online (Rathje et al., 2023). Such format of information flourishes on social media, because not only are people's attention more prone to be caught, but also social media profits from user engagement, and in turn will benefit from people spending time on the platform. Furthermore, social media algorithms, also known as recommender systems, filter and rank the information impacting the further exposure to self-selected information, and amplify content that draws attention (Geers et al., 2023; Ceylan et al., 2023).

The reason this poses an ever more concern to many researchers, is because of social media's growing presence in people's everyday lives, not only from a social perspective, but also as a source for news consumption. For instance, 2/3 of Americans report getting a large part of their news from social media (C. Pop & Popa, 2021). This means that a great number of people turn to social media to consume news, read the latest information and be up to date with events all around the world. Another aspect lays in the audience that is consuming content, which in some of the most popular platforms such as Instagram or TikTok most of the users are between 18-35 years old (Gottfried, 2024). In turn these users are even more exposed to fake news and sensationalist content. Instead of attending to the interests of social media platforms, which monetize attention and engagement, more efforts must be put into trying to create a more sustainable environment that optimizes transparency and morality (Roose et al. 2020).

2.4. IMPACTS IN SOCIETY

Being exposed to social media and the kinds of information disorders mentioned above poses important dangers for people as individuals and as a society (Radu & Petcu, 2024). People are being fed false narratives and stories as a way of moving masses in directions that only serve to divide populations and create fear through lies and sensationalism (Sultan, 2019). Furthermore, the nature of the means becomes a problem when users have a hard time telling apart true information from lies and fake news. As a result, social media's flow of misinformation shared continuously only grows, while members of society remain clueless about the environment they are living under. This poses a threat to democracy, when for instance, voters are indoctrinated by the consumption of manipulated media, that feeds off their biases and keeps users in a bubble (C. Pop & Popa, 2021). False information in its many

forms can be detrimental for society, but also for the economy of businesses. For instance, a false report about United Airlines' bankruptcy that was published in 2008, meant a drop of its stock price by 76% in just minutes (Sharma et al., 2018). As more and more people turn to social media to know the latest news around the world, it is crucial to incite and advocate for critical thinking, responsible sharing and commenting, and an overall understanding of how social media works and the dangers of blindly consuming content.

Thus, this paper recognizes firstly, the growth of biases as one of the most problematic and widely applicable problems across people, which involves people's opinions and views of reality to be further approved by seeing information that confirms their specific narrative. Secondly, it also recognizes one of the biggest challenges surrounding this topic, which is the fact that most people rely on their own perception of news to make a credibility assessment (Bryanov & Vziatysheva, 2021). When coming across fake news online, most of the times they are disguised as articles coming from trustworthy outlets, or it simply does not complement the information with reliable sources. These aspects, together with the constant content exposure that people have on social media nowadays, contribute to an environment where critical thinking and transparency become an endangered species.

2.5. CHALLENGES AND OPPORTUNITIES

As mentioned above, disinformation on social media is transforming and adapting to the changing environments and platforms and ultimately becoming harder to spot. When people spend more time online, they are also exposed to an environment that thrives off shares, likes and comments, and prioritizes content that will increase engagement (Rathje et al., 2023). Thus, there is a growing need for understanding the ways that platforms not only welcome, but also profit from such engaging content, how information reaches users, and the ways in which the spread of disinformation can be combated (Ceylan et.al., 2023). Literature shows different approaches to this issue. For instance, readjusting the current social media algorithms and the way they collect information about users and suggest content, developing various legislations for the management and control of fake news on social media environments, or simply demanding increased transparency form social media platforms about the way they profit from people's engagement and attention (Rathje et al., 2023). However, although these approaches are promising and can be useful in the mitigation of disinformation and fake news in the long run, bringing a change in how social media platforms

conduct their business, this paper focuses on a rather more personal perspective and seeks to find an approach that users can apply individually to avoid being deceived on an everyday basis.

3. METHODOLOGY

To properly address the topic at hand and create a valuable solution to the problem it is addressed using Design Research Methodology. In general terms, this type of research methodology serves as a way of imagining, creating and evaluating an artifact to solve a particular issue. Although the word 'artifact' seems to be linked with the idea of a tangible object in a more common vocabulary, it refers to 'constructs, models, methods, instantiations, or better theories' (Helms et al., 2010). In this case, the artifact will be presented in the form of guidelines that describe a strategy for the mitigation of creation and spread of fake news on social media.

3.1. DESIGN SCIENCE RESEARCH

In order to perceive the fitness of this research methodology on this research, it is important to understand more in detail what it essentially consists of. Helms et. al. (2010) describe it to entail seven main guidelines that researchers have to follow in oder to successfully use the methodology. The following guidelines apply:

Guideline 1. The artifact being developed needs to be new and innovative.

Guideline 2. The artifact has to directly refer to a relevant and well-defined business problem that the researchers must have previously identified, meaning that the evaluation methods and measures have to be defined before starting the process.

Guideline 3. The usefulness and efficacy of the artifact has to be proved by being evaluated through the already established method and measurement type.

Guideline 4. The research outcome (artifact) has to offer a specific contribution and not be only useful for practitioners.

Guideline 5. To develop the artifact proper research methods, have to be used.

Guideline 6. To develop a suitable artifact the researchers will have to look for the best artifact, which means that it should be expected to be changed and adapted throughout the process in order to attend to the initial requirements.

Guideline 7. The results of the research should be communicated and published to be useful for the scientific community and create a cumulative knowledge base.

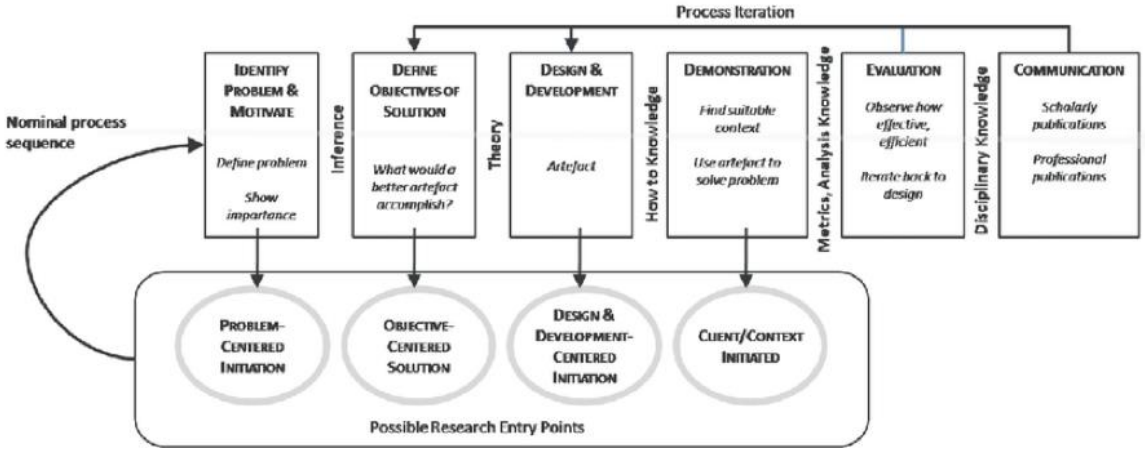

Figure 1 - General Steps of Design Science Research

3.1.1. PRINCIPLES

Figure 1. above shows the general steps to follow for the creation of an artifact as described by Peffers et al (2007). This methodology is intended to be followed step-by-step, however, one may start at any step if desired, and it is bound to include iterations and repetitions of some of the steps, depending on whether or not the proposed artifact is suitable to solve the problem at hand. The activities are listed and described as follows:

Identify & Motivate: The research importance and objective have to be defined and clearly stated and the solution justified. In this step the value of the research is presented and through the solution the audience acquires a better understanding of the researchers view and perception of the problem, as well as a motivation to pursue and get involved with the topic.

Define Objectives of Solution: The objectives of the research lead to a description of what kind of solutions are possible and realistic. Here it is defined whether the results will be acquired for instance through quantitative or qualitative methods.

Design & Development: In essence this is the step where the artifact is created. Here its functionality and architecture need to be defined and later the actual product is created, which involves going from objective further to design. Peffers et al. (2007) describe such an artifact as ‘any designed object in which a research contribution is embedded in the design’.

Demonstration: As the word describes, the artifact needs to be demonstrated, through experiments, simulations, case studies, etc. in order to showcase its usefulness to solve the problem.

Evaluation: Here the researchers need to take a closer look and see whether or not the proposed solution is actually fitting to the problem. It involves a direct comparison between objectives of the research and the end results from the demonstration phase. The way of evaluation needed will be an empirical proof and will depend on the nature of the problem at hand and what kind of data is required for creating the artifact in the first place. The iteration aspect first appears during this step, as the researcher will need to determine whether the results are successful, or if not, whether returning to step 3 to improve the artifact is necessary and feasible.

Communication: Communicating the problem and solution as well as the purpose and utility of the artifact to others is the last step of this methodology, and it ensures that the audience understands how the artifact helps to solve the problem. This last step can be compared to the empirical research process and is even used by some to structure their paper.

3.2. RESEARCH IMPLEMENTATION FOR THE CURRENT STUDY

Step 1 - Identify & Motivate

The main objectives of this research and the relevance of the topic is to explore the world of dis- and misinformation applied to social media. Furthermore, since users are increasingly becoming the ones affected by such an information disorder, they should be educated about the topic and provided with the necessary tools and skills to navigate this world safely.

Step 2 - Define Objectives of Solution:

As stated in the sections above, the problem this research paper addresses is a recurring and evermore present one, due to the involvement and effect of social media on people's lives. This society is moving towards a future where such communication channels and ways of interacting with each other and the outside world become extensively integrated in the way people think and act, and as such, its effects and consequences should be highly regarded. One of the ways in which these aspects can be considered and tackled is through the creation of a framework to help users navigate the vast world of social media as safely as possible. Such

a framework would provide the necessary guidance to address the dangers that information on social media poses to transparency and credibility. Such a guideline should include considerations that users should take into account when evaluating information and news on social media to try and decrease the chances of being deceived.

Step 3 - Design & Development:

The structure of the proposed artifact is that of a guideline combining different strategies to help individuals become more aware and educated about disinformation and fake news. These guidelines are collected from proposed strategies among various research.

Step 4 - Demonstration & evaluation:

Once the strategy is written it becomes very important to test its efficiency and how manageable it is to apply among social media users. In order to do this, a survey will be conducted to assess the way these strategies are helpful to tackle the issue at hand. In the survey participants were asked to assess the strategies, based on their knowledge and experience with the topic, and apply them in a case study to provide insights on its usability and efficiency. Having real social media users test these strategies means that its effectiveness is directly tested and analysed by the group it is supposed to tackle, and thus more accurate results are expected as opposed to using a different testing method. Any additional information found through the surveys regarding the design, efficiency and perception of the strategies can be helpful to provide a suggestion for further studies.

Step 5 - Communication:

The outcome of the strategies as presented in the artifact are translated through the outcome of the survey and are presented in the results and discussion of this paper.

Therefore, the following section collects and summarizes various literature regarding different kinds of measures that users can apply when actively trying to verify potential dis- and misinformation.

4. FRAMEWORK – STRATEGIES TO COMBAT MISINFORMATION

As the current environment that we live in thrives on the rapid spread of information, the vulnerability of social media users when it comes to standing up against it grows. There are different kinds of research revolving around this topic and providing insights on the best ways to address the problem. Some of them have chosen to focus on the ways in which current and developing technologies, such as AI, can be of great help in detecting and spotting fake news on social media environments through the use of machine learning techniques such as web scraping (C. Pop & Popa, 2021), or even blockchain technology to ensure a decentralized production and verification of sources as well as an increase in transparency and accountability (Farooq et al., 2021). Others have focused more on looking at this problem from a different lens and changing their perspective on how the issue can be solved. Instead of attempting to create a solution for the current media environment and structure, they suggest a complete change of network, by proposing a new Internet created by the government that prohibits the publishing of digital disinformation, or even the creation of a cloud managed by universities, nongovernmental organizations, newspapers, etc., where only evidence-based postings would be available (Pherson et al., 2021).

Although these initiatives tackle the issue "from the root" and have good potential to help solve a variety of the issues mentioned earlier, the role and burden that the users of these platforms carry are still not effectively addressed. Until such new algorithms are perfected or a new Internet governed by transparency and truth is adequately implemented, the damage will still ultimately affect users. Therefore, there is a growing need to address the topic at hand from the perspective of the users, those who are faced with it daily, and to find ways to help them individually recognize and detect fake news and disinformation on social media.

4.1. STRATEGIES

This section presents a collection of strategies, gathered from various literature, which can serve as guidelines for people in their attempts to fight disinformation. It is divided into the following three sections.

4.1.1. STOP, CHECK, THINK

The first article, written by Geers et al. (2023), presents a single unified source of the engagement stages of people with information in online environments. It collects findings from different sources that address some possibilities of cautious engagement with information on social media, as well as the lack thereof as a preventative measure. The following strategies are listed in order of how deeply people are engaging directly with the content of the information which they are trying to assess. These also pay special attention to the importance of taking accountability and autonomy for the use of attention towards information and suggest ways to do so. The authors explain that in order to apply these strategies as a social media user, one must have already identified the existence of the information disorder in current online environments, as well as the potential threats, and thus decides to actively engage in practices to try and remove themselves from exposure to dis- and misinformation by applying critical thinking and research skills.

4.1.1.1. CRITICAL IGNORING:

It is a practice in which people actively decide to not engage with certain information (Kozyreva et al., 2023). Here, users decide on blocking out and filtering unreliable information in pursuit of creating a safer online environment for themselves, free from as much disinformation and low-quality information as possible. In doing so, they seek to improve their digital literacy skills by applying a method that reinforces seeking and searching trustworthy channels of information. Kozyreva et al. (2023) analyse the role that people's individual attention plays in the way they seek and consume information. They describe how giving attention to certain cues is part of our evolutional condition, and we are designed to pay attention to things that we consider important for our survival, whether it represents a threat or a reward. As mentioned in previous sections, people will be reactive towards words that incite certain feelings or advice from certain dangers. However, this capacity for attention is limited, as one cannot possibly pay attention to every single stimulus around, or for instance cannot read every single article on the internet. When attention becomes the primary driver of the flow and retrieval of information, it becomes of great importance to those who create content, to try to incite as many people as possible to engage with it. Thus, this practice claims that users can take control of where and how they spend their attention by proposing to direct this resource towards selective reading and engagement of information and seeking to ignore

potential untrustworthy channels. Here for example, when a social media user comes across a post about COVID19 on Instagram or Twitter, they actively decide to not engage with it and instead choose to consume news around that topic exclusively from newspapers.

4.1.1.2. LATERAL READING:

This approach, as described by Walsh-Moorman and Pytash (2021) consists of deciding to leave a piece of information to actively search for the content in other places to contrast the former, with the purpose of assessing its credibility based on its spread in other channels and characteristics of the source. This way the reader is exposed to different sources that help put the information at hand into perspective. The reader can follow different links directly related to the information at hand, such as the 'about us' section, or examine the URL. Another tactic is to do research on the content of the information itself and try to find the same news in trustworthy media channels, such as the accounts and websites of traditional newspapers or centres specialized in the topic at hand (e.g. universities, health institutes, etc.). To effectively apply this method, one must already be aware of certain characteristics to look out for and investigate when trying to assess the credibility of a post. This is directly related to the aspect of digital literacy that has been mentioned in the point above. Those who decide to put this method into practice must understand how to research relevant information that can be used for assessment, as well as the components that have to be questioned and revised. Here critical thinking is applied first in recognizing that there is a need to analyse the information at hand and do further research, but also in the reviewing and assessment of the new information found.

4.1.1.3. DEBUNKING:

This third method deals with deliberately looking for information that proposes direct contradicting facts about another, which discards any credibility of the latter. When a piece of information looks suspicious, unprofessional or directly contradicts a known fact, one may apply efforts into finding alternative information that disproves the prior false narrative that is being proposed. Lewandowsky et al. (2020) address the previously mention the limited source that is our attention and thus explain how it is important to focus debunking efforts on information that is truly relevant and has dangerous potential, or alternatively, its correction has potential to do good. This practice is a very direct way of contradicting false information and brings a way of exposing it into the open. Normally, the effectiveness and perceived

credibility is very attached to the trustworthiness of the source that does the debunking (e.g. regular social media user vs. the World Climate Organization). However, social media users can still profit from practicing debunking when they seek to find the truth about a narrative or a story that is being spread out, as not only the efforts already enhance awareness about the potential false information, but also helps to decrease the amount of blind followers of fast information on social media.

4.1.2. EFFECTIVE SEARCHING

The methods above show promising potential, as they involve practices that can be applied by every social media user. Nonetheless, people can find it difficult to start at first and may need further guidance to navigate those methods. Additionally, if not done carefully and properly, the methods might not be as effective as their authors initially intended. Thus, this next section collects three different methods to accompany the use of the previous ones and give the users further advice when opting to do their own research.

4.1.2.1. CLICK RESTRAINT:

This is a practice in which people who look up information on a web browser refrain from exclusively clicking on the first links and rather engage in a selection process that goes further than the first suggested pages (McGrew & Glass, 2021). Oftentimes, the first links suggested after a search on google are advertisement links or are pages that pay Google to be at the top of the search, following a process called search engine optimization (Panizza et al., 2022), and thus may not be the most reliable source. Instead, people are urged to scroll down a bit and see what other sources are available besides the first ones, and to also explore the second or third page or results and see whether the pages there can be relevant.

4.1.2.2. CRAAP AND CCOW TEST:

The CRAAP test is an information evaluation framework developed to help students assess the credibility and reliability of information on the Internet (Zak, 2024), which stands for Currency, Relevance, Authority, Accuracy and Purpose. These are the aspects to be analysed in order to determine whether the information at hand is trustworthy or not. However, since this framework was developed in 2004, there are some studies that suggest that a new set of criteria must be used in order to properly address the relevant questions about information on today's social media age. Tardiff (2022) proposes an update of the CRAAP, the CCOW. This

method is in its nature the same principle as its predecessor in its aim to provide a checklist with aspects that students can look out for and analyse. CCOW stands for Credentials, Claims, Objectives and Worldview. The first one addresses the source of the information and whether the author or creator of it is qualified enough to speak about the topic. The second one points out the need to find different sources and relate and compare them to each other to contextualize the information at hand. The third one addresses the simple question of the 'why?' of the information and the purpose of its creation. Lastly, the fourth one pertains to the inner reaction of the person applying the method, which calls for an introspective look at internal biases, expectations and interpretations of the world. This framework helps provide guidance towards those who decide to apply the methods from the previous section.

4.1.3. INDIVIDUAL ASSESSMENT OF INFORMATION:

The methods and frameworks presented above can be helpful to assess information online and raise awareness about the topic of dis- and misinformation on social media. As previously stated, the application of these methods inherently involves a will to do research, read and engage with different sources to evaluate trustworthiness. However, not every user might find themselves in a position where they can or want to apply methods that imply leaving social media and actively seeking other means of information. Even if this would be more effective, this last section presents a list of characteristics of disinformation online that can be applied both as general aspects to look out for and be aware of when applying the methods presented above, as well as guidelines for what to keep in mind and what should be questioned when deciding to engage only with social media content and refrain from comparing other sources.

4.1.3.1. CHARACTERISTICS OF DISINFORMATION

Although disinformation can take many forms and shapes, and it is not always easy to spot it, there are certain aspects that can always be taken into consideration, even when just taking a quick look at a post, to distance oneself from believing something without question it first. The European Commission (2022) created a handbook with information and guidelines on tackling disinformation through education in schools. It presents a list with some common attributes of content on social media worth questioning:

Speaks to the emotions of the targeted person. This makes it harder for the person to think logically and critically.

- Attacks the opponent - promoting ‘Us versus Them’ views of reality.
- Simplifies facts and excludes content.
- Repeats an idea over and over again.
- Ignores the nuances of facts by presenting only one side of something.
- Manipulates images in various ways, such as retouching and cropping.
- Takes pictures from their original contexts and combines them with other pictures, music/ sounds, and texts to create new meanings.
- It makes use of famous people and celebrities that the target group admires.
- Increasingly makes use of cheapfakes and deepfakes.
- Is resistant to evidence that attempts to refute it.

4.2. ARTIFACT - STRATEGY TO VERIFY DISINFORMATION

Thus, the above-mentioned strategies can be compiled into six clusters. Together they create a guideline of how to spot, navigate, and educate oneself from disinformation on social media (Appendix A):

1. Critical Ignoring: refraining from engaging with certain information.
2. Lateral Reading: contrasting information.
3. Debunking: disproving the information.
4. Click restraint: researching further.
5. Asking “Why”: investigating the purpose of the information.
6. Knowing the characteristics of disinformation: recognising how dis- and misinformation typically look.

4.3. SURVEY TO TEST THE FRAMEWORK

In order to properly assess user’s awareness of the above-mentioned strategies and the extent to which they apply them in their interactions with online content it is crucial to establish a direct contact with social media users through a space where they can report on their experiences with this topic. Thus, this research makes use of a survey. This method is suitable when attempting to reach a wide audience in a short period of time. It can be accessed at the time of its dissemination or saved to complete later in case the person is not able to fill it in when they first encounter it. This allows great flexibility for the participants and a way to

quickly address different points about the topic of interest. It is also a helpful way to gather and analyse collected data, and to visualize it later.

The survey (Appendix B.) used for this research was divided into four main sections.

- Demographics
- Social media and attitudes towards disinformation
- Experiment
- Own assessment

Firstly, it contained general demographic questions such as age, occupation, level of education etc. This was made purposely to understand and characterize the demographic taking part in this study and be able to create meaningful comparisons with previous studies about the topic later. Secondly, it contained general questions about their knowledge and engagement with misinformation and social media. This offered the reader a good introduction to the topic and a chance to start reflecting on their own thoughts and experiences with the issue, which anticipated the next section. Thirdly, the next section took the form of an experiment, in which the participants were presented with seven different articles and had to assess whether they were fake news or whether they were real. The task below each article was designed to understand whether the participants applied any of the strategies presented in this paper to assess trustworthiness of the articles presented. This way they gave input about their knowledge on misinformation detection strategies without explicitly having to read an extensive text describing and explaining them. Lastly, this part was followed by some reflection questions about the experiment and the things they took into consideration to make their choices in the experiment. Here they were asked a question referring to the strategies presented in the artifact.

5. RESULTS

This next section provides an analysis of the data collected through the survey described above. Overall, there were a total of 75 respondents that took part in the survey over a period of two weeks.

5.1. DEMOGRAPHICS

The large majority of the people (85%) who took part in the survey were between 18-24 (43%) and between 25-35 (43%) years old, whereas the rest were between 40-60 years old (12%), and a minority (3%) above 60 years old (Figure 2.). Most of the people had a master's degree (55%) and followed by a 23% which had a bachelor's degree, and a 13% which had a doctorate degree (Figure 3.). Most of the participants were employed (75%), meaning that they were either exclusively so, or simultaneously a student. People who were exclusively students amounted to 20%, and only 3% were unemployed.

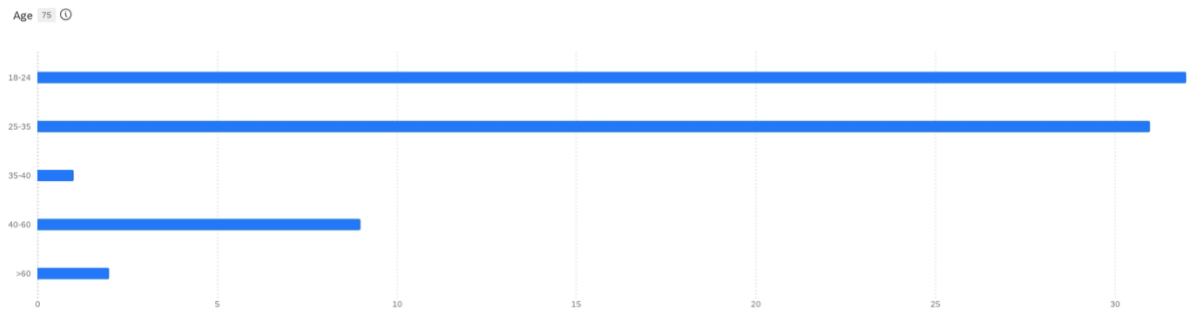

Figure 2 - Results age

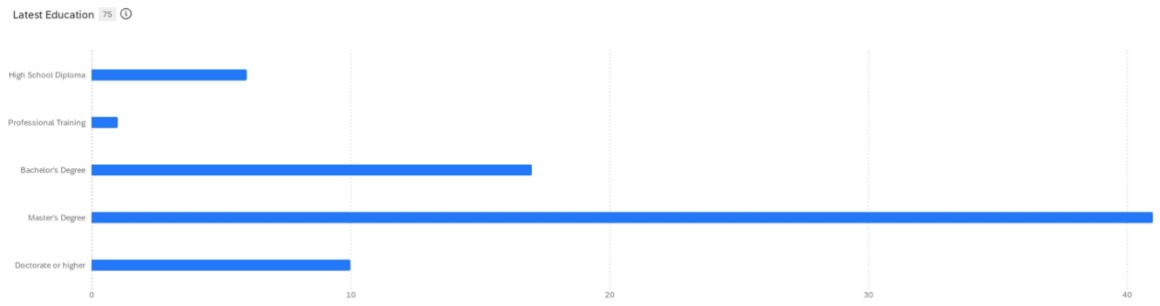

Figure 3 - Results latest education

5.2. Social Media Usage

The participants were asked questions about social media in their everyday lives to be able to understand the exposure to online content of the sample, and potential risk of encountering misinformation. Instagram was the most used social media among the people (84%) followed closely by YouTube (64%). TikTok (40%) and Twitter (27%) followed in popularity. In last place there is Facebook (25%) and Snapchat (15%) (Figure 4.). Table 1. shows the most popular social media platforms among each other the age groups. This question was designed with the option to choose multiple options if desired, as it is very common to be active on various social media at the same time. They were also asked the amount of time they spend on average on their social media, as a way to evaluate how often they consume content online. Most people said that they spent between one hour and two hours on a daily basis on social media (40%), followed by those who used it between two and three hours (31%) a day. There was a minority that used it for less than one hour a day (13%) and a total of 16% of participants that used it between three and more than five hours.

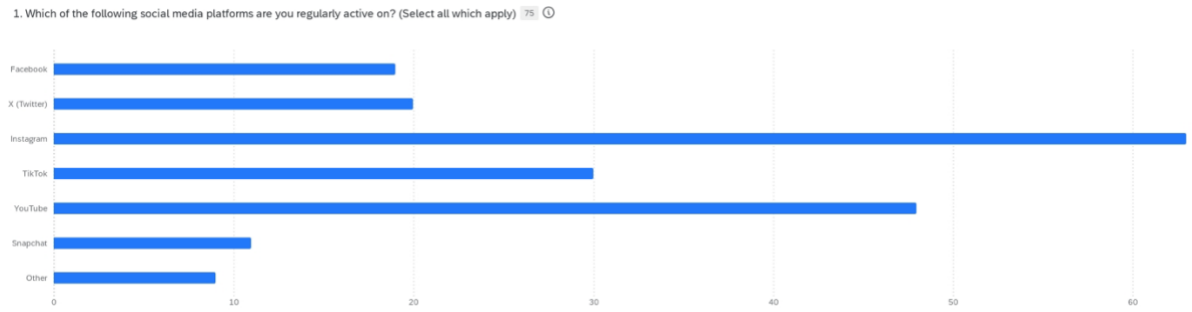

Figure 4 - Results social media platforms

Table 1 - Social media platforms and age groups

Social media platforms & age groups

		Q4: 1. Which of the following social media platforms are you regularly active on? (Select all which apply)							
		Total	Facebook	X (Twitter)	Instagram	TikTok	YouTube	Snapchat	Other
Q1: Age	Total Count (Answering)	200.0	19.0	20.0	63.0	30.0	48.0	11.0	9.0
	18-24	47.0%	15.8%	50.0%	49.2%	60.0%	43.8%	72.7%	33.3%
	25-35	38.5%	31.6%	40.0%	44.4%	36.7%	39.6%	27.3%	22.2%
	35-40	1.5%	5.3%	0.0%	1.6%	0.0%	2.1%	0.0%	0.0%
	40-60	11.0%	36.8%	10.0%	4.8%	3.3%	12.5%	0.0%	33.3%
	>60	2.0%	10.5%	0.0%	0.0%	0.0%	2.1%	0.0%	11.1%

5.3. FAMILIARITY WITH MISINFORMATION

Afterwards, they were met with some questions regarding their knowledge about the topic of misinformation in general. When asked how familiar they were with the term, most of them (61%) claimed to be between moderately familiar (32%) and very familiar (29%). The others were divided between just being extremely familiar (21%) and slightly familiar (15%), whereas only 3% claimed not to be familiar at all. Among the persons who were said to have higher familiarity, the vast majority were master students, followed by those with a bachelor's degree (Table 2). They were also asked how often they had read information on social media, which they had suspected could have been misinformation or fake news. Most people said that they sometimes do (44%), whereas some said they encounter it about half of the time (31%). The rest said that they do most of the time (23%) and a 3% who said always. Following this question, they were also asked whether they thought they had ever shared information on social media that they later found was misinformation or fake news. The majority responded with 'no' (44%), whereas the rest were an equal 28% for 'yes' and 'not sure'.

Table 2 - Familiarity with the terms dis- and misinformation and latest education

Familiarity with the terms dis- and misinformation & latest education		Q6: 3. How familiar are you with the terms "misinformation" and "disinformation"?					
		Total	Not familiar at all	Slightly familiar	Moderately familiar	Very familiar	Extremely familiar
Q2: Latest Education	Total Count (All)	75.0	2.0	11.0	24.0	22.0	16.0
	High School Diploma	8.0%	0.0%	18.2%	8.3%	4.5%	6.3%
	Professional Training	1.3%	0.0%	0.0%	0.0%	0.0%	6.3%
	Bachelor's Degree	22.7%	50.0%	27.3%	20.8%	27.3%	12.5%
	Master's Degree	54.7%	50.0%	36.4%	58.3%	59.1%	56.3%
	Doctorate or higher	13.3%	0.0%	18.2%	12.5%	9.1%	18.8%

5.4. MISINFORMATION AWARENESS AND ATTITUDES

Lastly, this first part presented some questions to understand their knowledge and feelings towards the topic and assess their awareness. They were asked about their thoughts on the criticality of misinformation on social media, to which a total of 77% responded between 'very critical' and 'extremely critical', and 17% 'moderately critical', followed by a total of 5% between 'slightly critical' and 'not critical at all'. Afterwards they had to rate their ability to spot misinformation and fake news and were asked express how confident they were in doing so. Most people (44%) said that they felt moderately confident, whereas the rest felt very confident (31%) and slightly confident (17%), whereas the rest were divided in equal 4% of 'extremely confident' and 'not confident at all'. The 61% and 67% of those who said to be very, and extremely confident respectively, were master students, as well as the majority of those

who were in the middle (Table 3.). Here it is also clear that participants with a doctorate or higher were more inclined to be extremely confident.

Lastly, they were asked to answer the extent to which they believe it is important for social media users to improve their information literacy. The great majority of respondents chose between 'strongly/somewhat agree' (94%) and the rest (6%) followed with 'neither agree nor disagree' and 'somewhat/strongly disagree'.

Table 3 - Confidence identifying misinformation and latest education

Confidence identifying misinformation & latest education		Q10: 7. How confident are you in your ability to identify misinformation on social media?					
		Total	Not confident at all	Slightly confident	Moderately confident	Very confident	Extremely confident
	Total Count (All)	75.0	3.0	13.0	33.0	23.0	3.0
Q2: Latest Education	High School Diploma	8.0%	0.0%	23.1%	3.0%	8.7%	0.0%
	Professional Training	1.3%	0.0%	0.0%	0.0%	4.3%	0.0%
	Bachelor's Degree	22.7%	0.0%	23.1%	30.3%	17.4%	0.0%
	Master's Degree	54.7%	100.0%	46.2%	48.5%	60.9%	66.7%
	Doctorate or higher	13.3%	0.0%	7.7%	18.2%	8.7%	33.3%

5.5. EXPERIMENT AND SELF-ASSESSMENT

This second part was presented in the form of an experiment. The participants were presented with seven different news and pictures (Appendix C.), all from online sources and social media posts. A task was specified at the beginning of the section, namely whether they thought the information presented was true or fake. This task was designed to represent the strategies presented in this paper. Thus, the participants assessed their knowledge about misinformation and fake news detection strategies based on their approach to this exercise.

Five out of the seven pictures were guessed correctly (Appendix D). Pictures 1, 3, 4 and 7 were true, whereas 2, 5, and 6 were fake. 83% of participants chose picture 1 to be fake, and 17% to be true. 68% chose picture 2 to be fake, and 32% to be true. 61% chose picture 3 to be fake, and 39% to be true. 23% chose picture 4 to be fake, and 77% to be true. 83% chose picture 5 to be fake, and 17% to be true. 73% of participants chose picture 6 to be fake, and 27% to be true. And finally, 39% chose picture 7 to be fake, and 61% to be true.

Table 4. shows the image results in relation to the confidence that participants showed about identifying misinformation on social media. Whether the participants guessed it right or wrong, their ratings about confidence looked quite similar throughout images 1, 2, 3, and 4, which were between high and moderate. However, among those who guessed image 5 right there were 9% more very confident people, among those who guessed image 6 right were

also around 12% more moderately confident people, and among those who guessed image 7 right were around 16% more moderately confident people. In images 1, 4, and 5 there was an outstanding performance by those who claimed to be extremely confident, whereas for the rest of the images this performance was the same as those who guessed wrong. In all the images that were answered correctly there was only around 30% of the people that were very confident. Table 5. shows image results in relation to looking up the information from the experiment. Regardless of having guessed right or wrong, most participants did not look up or investigate the information presented. Table 6. shows the image results in relation to the need of social media users to improve three information literacy. Regardless of the choice people made, both the vast majority of those who chose the right, and the wrong answers strongly agreed that there is a need for social media users to improve their information literacy.

Table 4 - Image results and confidence to identify dis- and misinformation

Image results & confidence to identify dis- and misinformation		1. (Image A)			2. (Image B)			3. (Image C)			4. (Image D		
		Total	True	Fake	Total	True	Fake	Total	True	Fake	Total	True	Fake
Q10: 7. How confident are you in your ability to identify misinformation on social media?	Total Count (All)	75.0	13.0	62.0	75.0	24.0	51.0	75.0	29.0	46.0	75.0	58.0	17.0
	Not confident at all	4.0%	0.0%	4.8%	4.0%	8.3%	2.0%	4.0%	6.9%	2.2%	4.0%	3.4%	5.9%
	Slightly confident	17.3%	7.7%	19.4%	17.3%	12.5%	19.6%	17.3%	13.8%	19.6%	17.3%	15.5%	23.5%
	Moderately confident	44.0%	46.2%	43.5%	44.0%	45.8%	43.1%	44.0%	44.8%	43.5%	44.0%	44.8%	41.2%
	Very confident	30.7%	30.8%	30.6%	30.7%	29.2%	31.4%	30.7%	31.0%	30.4%	30.7%	31.0%	29.4%
	Extremely confident	4.0%	15.4%	1.6%	4.0%	4.2%	3.9%	4.0%	3.4%	4.3%	4.0%	5.2%	0.0%

		5. (Image E)			6. (Image F)			7. (Image G)		
		Total	Tru e	Fake	Total	True	Fake	Total	True	Fake
	Total Count (All)	75.0	13.0	62.0	75.0	20.0	55.0	75.0	46.0	29.0
	Not confident at all	4.0%	7.7%	3.2%	4.0%	5.0%	3.6%	4.0%	2.2%	6.9%
	Slightly confident	17.3%	23.1%	16.1%	17.3%	25.0%	14.5%	17.3%	17.4%	17.2%
	Moderately confident	44.0%	46.2%	43.5%	44.0%	35.0%	47.3%	44.0%	50.0%	34.5%
	Very confident	30.7%	23.1%	32.3%	30.7%	30.0%	30.9%	30.7%	26.1%	37.9%
	Extremely confident	4.0%	0.0%	4.8%	4.0%	5.0%	3.6%	4.0%	4.3%	3.4%

Table 5 - Image results and looking up information

Image results & looking up information		1. (Image A)			2. (Image B)			3. (Image C)			4. (Image D)		
		Total	True	Fake	Total	True	Fake	Total	True	Fake	Total	True	Fake
Q14: 13. Did you look up the topic presented in the image (e.g. on Google)?	Total Count (All)	75.0	13.0	62.0	75.0	24.0	51.0	75.0	29.0	46.0	75.0	58.0	17.0
	Yes	22.7%	23.1%	22.6%	22.7%	25.0%	21.6%	22.7%	27.6%	19.6%	22.7%	22.4%	23.5%
	No	77.3%	76.9%	77.4%	77.3%	75.0%	78.4%	77.3%	72.4%	80.4%	77.3%	77.6%	76.5%

		5. (Image E)			6. (Image F)			7. (Image G)		
		Total	True	Fake	Total	True	Fake	Total	True	Fake
	Total Count (All)	75.0	13.0	62.0	75.0	20.0	55.0	75.0	46.0	29.0
	Yes	22.7%	15.4%	24.2%	22.7%	25.0%	21.8%	22.7%	28.3%	13.8%
	No	77.3%	84.6%	75.8%	77.3%	75.0%	78.2%	77.3%	71.7%	86.2%

Table 6 - Image results and improving information literacy

Image results & improving information literacy

		1. (Image A)			2. (Image B)			3. (Image C)			4. (Image D)		
		Total	True	Fake	Total	True	Fake	Total	True	Fake	Total	True	Fake
Q11: 8. To what extent do you think there is a need for social media users to improve their information literacy?	Total Count (All)	75.0	13.0	62.0	75.0	24.0	51.0	75.0	29.0	46.0	75.0	58.0	17.0
	Strongly disagree	1.3%	7.7%	0.0%	1.3%	0.0%	2.0%	1.3%	0.0%	2.2%	1.3%	1.7%	0.0%
	Somewhat disagree	1.3%	0.0%	1.6%	1.3%	0.0%	2.0%	1.3%	3.4%	0.0%	1.3%	1.7%	0.0%
	Neither agree nor disagree	4.0%	7.7%	3.2%	4.0%	4.2%	3.9%	4.0%	6.9%	2.2%	4.0%	3.4%	5.9%
	Somewhat agree	22.7%	15.4%	24.2%	22.7%	25.0%	21.6%	22.7%	20.7%	23.9%	22.7%	25.9%	11.8%
	Strongly agree	70.7%	69.2%	71.0%	70.7%	70.8%	70.6%	70.7%	69.0%	71.7%	70.7%	67.2%	82.4%

	5. (Image E)			6. (Image F)			7. (Image G)		
	Total	True	Fake	Total	True	Fake	Total	True	Fake
Total Count (All)	75.0	13.0	62.0	75.0	20.0	55.0	75.0	46.0	29.0
Strongly disagree	1.3%	0.0%	1.6%	1.3%	0.0%	1.8%	1.3%	0.0%	3.4%
Somewhat disagree	1.3%	0.0%	1.6%	1.3%	0.0%	1.8%	1.3%	2.2%	0.0%
Neither agree nor disagree	4.0%	7.7%	3.2%	4.0%	0.0%	5.5%	4.0%	2.2%	6.9%
Somewhat agree	22.7%	23.1%	22.6%	22.7%	20.0%	23.6%	22.7%	32.6%	6.9%
Strongly agree	70.7%	69.2%	71.0%	70.7%	80.0%	67.3%	70.7%	63.0%	82.8%

The last part of the survey was a self-assessment for participants to reflect on their approach to the experiment. They were presented with questions that referred to the strategies mentioned above. 60% of participants reported to have analysed the sources of the information, and 82% to have taken into consideration the use of language in cases with text. The great majority (96%) reported having questioned the images from the experiment. The majority of the participants had not looked up the piece of information (e.g. on Google) (77%), and claimed to not have searched for any information that disproved the one presented (83%) and to not have found indeed any such information (85%). Only a minority of the participants (7%) reported having ever heard of the CRAAP or CROW tests. And finally, the large majority (88%) claimed that their answers to the experiment would have been different if they had done all the things mentioned above. Table 7. shows the amount of people who rated the criticality of the spread of misinformation out of the total of participants that claimed to have and have not found any information that disproved/debunked or confirmed the information from the experiment. The results show that out of the majority of those who did not find anything, also the great majority (total of 82%) claimed that the spread of misinformation was very to extremely critical. Table 8. shows the amount of people who claimed their answers would have been different if they applied the strategies suggested with the criticality of the spread of misinformation on social media. The results show that out of those who claimed their answers would have been different, which was the majority, nearly all (a total of 94%) believed the spread to be very to extremely critical

Table 7 - Information disproved/debunked or confirmed and criticality of spread of misinformation

Information disproved/debunked or confirmed & criticality of spread of misinformation

		Q16: 15. Did you find any website that disproved/debunked or confirmed the information from the image?		
		Total	Yes	No
Q9: 6. How critical do you think is the spread of misinformation on social media?	Total Count (All)	75.0	11.0	64.0
	Not critical at all	1.3%	0.0%	1.6%
	Slightly critical	4.0%	18.2%	1.6%
	Moderately critical	17.3%	36.4%	14.1%
	Very critical	41.3%	27.3%	43.8%
	Extremely critical	36.0%	18.2%	39.1%

Table 8 - Applying research strategies and improving information literacy

Applying research strategies & improving information literacy

		Q17: 17. If you did all the things mentioned above, do you think your answers would have been different?		
		Total	Yes	No
Q11: 8. To what extent do you think there is a need for social media users to improve their information literacy?	Total Count (All)	75.0	66.0	9.0
	Strongly disagree	1.3%	1.5%	0.0%
	Somewhat disagree	1.3%	1.5%	0.0%
	Neither agree nor disagree	4.0%	3.0%	11.1%
	Somewhat agree	22.7%	22.7%	22.2%
	Strongly agree	70.7%	71.2%	66.7%

6. DISCUSSION

6.1. ANALYSIS OF RESULTS

The results collected referring to the demographics of participants are fitting with the demographics acquired in other studies (Gottfried, 2024) (Table 1.), and shows that Instagram, TikTok and Twitter are the most popular social media platforms among young adults. This is fitting, since these platforms appeared later than Facebook or YouTube, which is nowadays equally or even more popular among older adults. It becomes clear that there is a young demographic very present in the social media platforms in which the consumption of content runs at an unprecedented speed. In the context of dis- and misinformation, this can be a dangerous thing, since many people under this category, mostly the youngest, have incorporated these platforms since an early age. There is also evidence that most users spend up to three hours on a daily basis scrolling through their social media platforms, which translate in three hours of content consumption under which there can be misinformation. The education level was also an interesting variable to take into consideration. M. Pop and Ene (2019) state that the level of education is a determinant factor to engage with disinformation. As an addition, this paper shows that even people with higher levels of education, who mostly show an average to high confidence and familiarity level around disinformation, also need to improve or learn further the importance of looking up information and being more critical about information on social media, just like younger audiences in the earlier stages of their education.

In this study, the level of confidence was overall high and most of the people were very convinced in their ability to identify dis-/misinformation. Since most of the people who guessed the images correctly were moderately confident about doing so, it becomes clear that people do not feel totally sure about knowing how they can approach this topic effectively, and it therefore makes clear the need for more education around it. Most of the people that claimed to have analysed the source, did not even leave the survey to properly do so. This shows that even though people recognize analysing the source as an approach to verify information, they are not conscious enough about the way to do so. Just looking at it oftentimes is not enough, but instead, one must attempt to contrast the information with different sources, or at least research the source itself (Geers et al., 2023; European

Commission (2022). A good example of this is Image 6. Although it depicts a giant rabbit, which is not the usual size of most rabbits, people showed to not have looked up the source where the image came from. In this case the username is displayed on top of the image, which had they done, they would have seen it is a page dedicated to animal images created by AI. Although it was shown that among those who guessed the images right there were more very confident people than slightly or not confident, now it becomes clear that guessing it right did not involve any objective investigation and could thus be regarded for instance as own bias or luck. Since there were barely any participants that took the time to do some research about what they were seeing before building an opinion about it, it can be assumed that people on social media operate the same way.

As seen in Table 6, most of the participants had not found any website or source in which the information they had been presented with in the experiment was disproved/debunked or confirmed. Due to the nature of the images, this shows firstly, that they did not research the information presented, as all of the images had been selected due to the information available on Google where their veracity could be proved, and secondly, that should they have done so, they did not spend enough time engaging with different articles, or otherwise they would have been able to find such websites or sources. An example of this is Image 3, which it is said that real skeletons were used instead of props during the movie 'Poltergeist'. Just by searching 'did poltergeist use real skeletons?' on Google, the results are all filled with articles verifying this information extended on the first, second and even third result pages. Additionally, it was shown that most people who did not find any such websites or sources had classified the spread of misinformation on social media as a very or extremely critical issue. This further shows that the importance of misinformation is known to a large part of social media users, but that their knowledge about verifying information and their readiness to do so has to be further improved. Participants showed their understanding on this end and agreed on the fact that there is a growing need for those active on social media to become more ready and knowledgeable about strategies and approaches to verify information. They also acknowledge that applying the strategies that were mentioned in the survey would change their disinformation detecting skills in a positive way. Thus, most of the results presented cannot be regarded as the outcomes of research and verification, but mostly on guessing based on own biases and perceptions (Table 4).

6.2. CONNECTION WITH ARTIFACT

The fact that most people thought that the Image 7 was fake, for the mere fact that it was a selfie in space (two things that are uncommon to appear together) even though the source was the official Instagram channel of NASA and thus, a verified source, lets you know that in the context of this topic, people are willing to scroll through all the options and make their minds up quickly, without engaging too much with the information presented. This is how the world of information works on social media, and the same way was reflected by the survey. Even with a couple of images, people were not ready to take the time to investigate it before making a decision of whether it is fake or real news (Kozyreva et al., 2023). This is what would have been expected from the participants, investigating and gathering the necessary information to be able to properly choose between fake or real as well informed as possible (Walsh-Moorman & Pytash, 2021). One example that showcases an effective verification possibility is Image 5, to which there is an article from the New York Times that can be found on the second Google page explaining the topic (McGrew & Glass, 2021). Based on the number of participants that had heard about the CRAAP or CROW tests (Zak, 2024., Tardiff, 2022), the need for proper educational guidance on the topic of dis- and misinformation is further highlighted.

6.3. CONTEXTUALIZATION OF THE EXPERIMENT

Most of the scenarios presented in the survey came from a verified debunking website (Snopes.com, n.d.), and the rest from well-known news outlets (The Guardian, NASA). This was designed on purpose so that most of the information presented had a source online either confirming or denying that it was easy to find. Therefore, the choices that the participants made reflect whether they are aware of, and have applied, at least some of the strategies mentioned in this paper.

The reason why the need to verify the information presented in the images was not specifically stated in the survey, was because the aim of the experiment was to mimic social media as much as possible, in which there is no disclaimer or advice on every post that tells users to look up the information and contrast it to assess whether it is true or fake. This research has indirectly made users apply these strategies, the same way that real-life information on social media does it. By simply showing the information and leaving it up to them what they want to

do/ what they consider is important to verify. Users must be, and learn to be, aware of this aspect by themselves, as they will not encounter such advice in real life social media posts, at least not often. Previous research (Ceylan et al., 2023) has shown that users share information online due to habits based on social media platforms reward systems. Similarly, this paper provides a view on users' attitudes towards misinformation on social media and has additionally discovered that much of those attitudes and awareness are shaped by a lack of proper education around the issue.

The purpose of this research is not to see how many people guess the images from the experiment right or wrong, but instead the extent that the people go to verify the information that they encounter before believing it or not. It is not about if one believes that a giant rabbit can exist or whether it is possible to take a selfie in space, because that only reflects our own biases. The main point is to acknowledge the need to verify this information before deciding whether it can be regarded as true or fake. Social media users can use this research as guidelines to engage with information in a more educated way and to verify content that could potentially be dis-/misinformation.

Based on the observations mentioned above, the research questions of this paper can be answered as follows:

RQ1: A total of six strategies, coming from previous research, have been collected and analysed (see section 4.2.). These refer to different stages and kinds of information verification, and together they create a guideline for users to consult whenever they need a reference point to verify information online.

RQ2: Most users showed to be aware of dis-/misinformation on social media, whether it is based on their familiarity with the concepts or their confidence to spot it. They have also shown to be able to select most the fake news correctly. They also show concern for its implications and the importance of improving literacy around the topic.

RQ3: In contrast with the observations from RQ1, users show little to no knowledge about information verification strategies in the experiment. Based on the results, it becomes clear

that most people that took part in this study did not apply strategies to verify the information that was presented to them, and instead relied on other internal thought processes to assess the images from the experiment.

7. CONCLUSION

This paper has presented the topic of misinformation and fake news on social media and has studied it from the perspective of user awareness and consciousness about its implications and ways to verify it. It has aimed to provide an answer to the question of a) the extent to which a strategy can be made to verify misinformation on online environments, and b) the extent to which users apply these strategies in their regular use of social media.

The results and analysis of this paper state that people among different age groups are aware of the importance that dis- and misinformation have on social media and are conscious about the needs to improve information literacy. However, they have shown little to no evidence that they know how to properly verify the content that they consume on online environments. The rapid spread of misinformation on current social media platforms and the reduced application of strategies to combat it poses an important question about the ways information is consumed nowadays. This research shows that most users are still relying on their own perceptions and biases of information to decide whether it is true or fake, and thus, that objective fact-checking needs to become more present. It further shows that there is a growing need for users to grow their information literacy by getting educated about strategies to verify sources and information overall, question information by becoming more critical, and incorporate these practices in their everyday media consumption.

Thus, this paper has merged different research into one artifact to create relevant, valuable and accessible guidelines for users to verify misinformation. It therefore contributes to the overall investigation of information disorders and their involvement in today's society. Furthermore, it has tested the effectiveness of these proposed guidelines to verify information and the usability from social media users.

7.1. LIMITATIONS

This study contains a limitation in the sample that was used, since it contained exclusively European people, and thus should not be used to make assumptions about social media users worldwide. Furthermore, a larger sample size would have provided more diversity and a more accurate representation of the current social media environment. The limitation of the debunking website used has to be considered as well, as there are other websites, and many

news and images to choose from. Thus, the results of the experiment can be affected by the specific choice of images.

7.2. FUTURE WORK

This paper also calls for further research in the future on three main aspects. Firstly, this topic could be researched by doing on-site experiments or interviews as a form of data collection in which the participants would directly apply the strategies based on information given to them in real time, which would provide a more detailed and real-life perspective. Secondly, future research could include more strategies, for instance regarding AI tools, or new features of social media platforms' tools to mark and handle misinformation. And thirdly, the demographic could be extended to underage users ensuring prior informed consent. Since people under 18 years of age are increasingly active on social media platforms, it would be very interesting to investigate their attitudes towards these information disorders and see how a younger audience is navigating this environment while still growing up.

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APPENDIX A

Strategies to verify misinformation

Strategy	Description
1. Critical Ignoring	• Refraining from engaging with certain information • Blocking and filtering • Taking control of where attention goes
2. Lateral Reading	• Leaving a piece of information to contrast it with another • Exposing oneself to different sources and narratives • Investigate links and “about us” sections • Leave the information and search for other
3. Debunking	• Actively looking for sources that disprove the information • Focus debunking efforts on the most relevant information • Using reliable debunking websites
4. Click restraint	• Go further than the first results suggested on Google • Engage deeper in the process of searching
5. CRAAP / CCOW test	• Following a framework to assess the credibility and reliability of information • Asking “Why” to understand the purpose of the information
6. Knowing the characteristics of disinformation	• Learning the main ways in which disinformation presents itself • Recognizing them easier

APPENDIX B

Survey design:

Introduction

Hello there and welcome!

The topic of this survey is fake news and misinformation on social media, and it is a part of my master thesis.

The aim of this survey is for you to reflect on your knowledge about fake news and information assessment strategies, and see how capable you are of identifying misinformation.

It will only take 5-10 min to complete and your input is very appreciated.

Your participation is voluntary and you can opt out at any moment. The answers provided in this survey will remain anonymous and will only be used for the academic purpose presented above.

The survey will be closed on Friday 22.11.2024 at 19:00h.

Thank you in advance and enjoy!

General Questions

Age:

- 18-24
- 25-35
- 35-40
- 40-60
- >60

Latest Education:

- High School Diploma
- Professional Training
- Bachelor's degree
- Master's degree
- Doctorate or higher

Occupation:

- Student
- Employed

- Unemployed
- Other

Social Media Usage

1. Which of the following social media platforms are you active on regularly? (Select all that apply)

- Facebook
- X (Twitter)
- Instagram
- TikTok
- YouTube
- Snapchat
- Other

2. How many hours per day do you spend on social media?

- < 1 hour
- 1-2 hours
- 2-3 hours
- 3-4 hours
- 4-5 hours
- >5 hours

Familiarity with Misinformation

3. How familiar are you with the terms “misinformation” and “disinformation”?

- Not familiar at all
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

4. How often do you see/ read information on social media that you suspect could be false or misleading?

- Never
- Sometimes
- About half the time
- Most of the time
- Always

5. Have you ever shared information on social media that you later found out was false or misleading?

- Yes
- No
- Not sure

Attitudes Towards Misinformation

6. How critical do you think is the spread of misinformation on social media?

- Not critical at all
- Slightly critical
- Moderately critical
- Very critical
- Extremely critical

7. How confident are you in your ability to identify misinformation on social media?

- Not confident at all
- Slightly confident
- Moderately confident
- Very confident
- Extremely confident

8. To what extent do you think there is a need for social media users to improve their information literacy?

Strongly disagree
Somewhat disagree
Neither agree nor disagree
Somewhat agree
Strongly agree

Experiment: True or Fake?

In the following segment you will be presented with different pieces of information, as you would find them on social media. The task is simple, look at the image presented and choose whether you think the information is true or fake.

IMAGES 1, 2,3,4,5,6 & 7
True
Fake

Own assessment

9. In this last part of the survey, you will find questions to reflect on the previous exercise, so please try to be as honest as possible.

10. Did you analyze the sources of the information provided?

Yes
No

11. Did you take into consideration the use of the language in the texts/ headlines?

Yes
No

12. Did you question the images attached to the texts?

Yes
No

13. Did you look up the topic represented in the image (e.g. on Google)?

Yes
No

14. Did you search for information that disproved what was said in the image?

Yes
No

15. Did you search for information that disproved/debunked or confirmed the information from the image?

Yes
No

16. Have you ever heard of the CRAAP or CCOW test?

Yes
No

17. If you did all the things mentioned above, do you think your answers would have been different?

Yes
No

APPENDIX C

Images from the experiment/survey

Image 1.

Image 2.

Image 3.

Image 4.

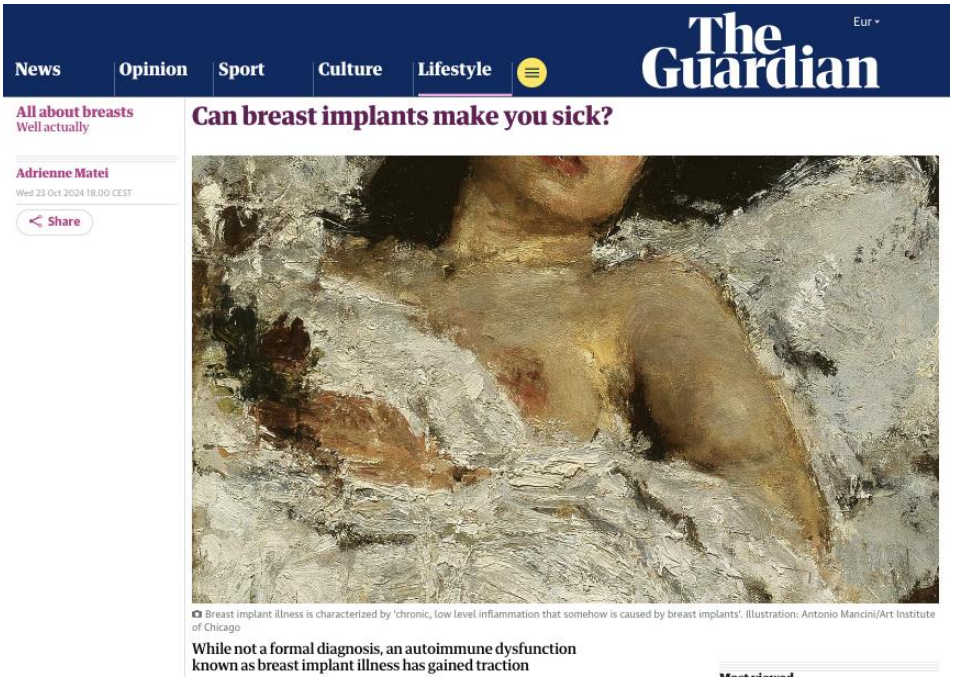

Image 5.

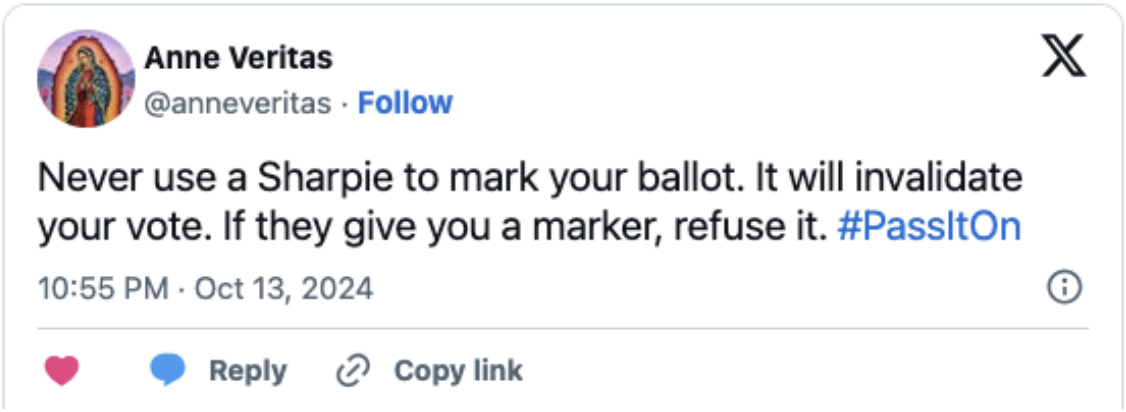

Image 6.

Image 7.

nasa

624.090 likes

nasa Oh, hey there!

These epic selfies were taken by @NASAAstronauts as they stepped outside the International Space Station (@ISS) over the last few years to make improvements and updates to station hardware and its suite of scientific instruments.

Image descriptions:

1. NASA astronaut and spacewalker Andrew Morgan appears in a white spacesuit with a reflective visor as he prepares to take a photograph with a camera shielded from the hazards of microgravity, taken on Nov. 22, 2019.
2. NASA astronaut Christina Koch takes a selfie with the Earth behind her on Oct. 18, 2019. Her smiling face is partially visible through the clear front of her helmet. Earth's clouds and ocean are reflected by the helmet.

APPENDIX D

Survey results for all images

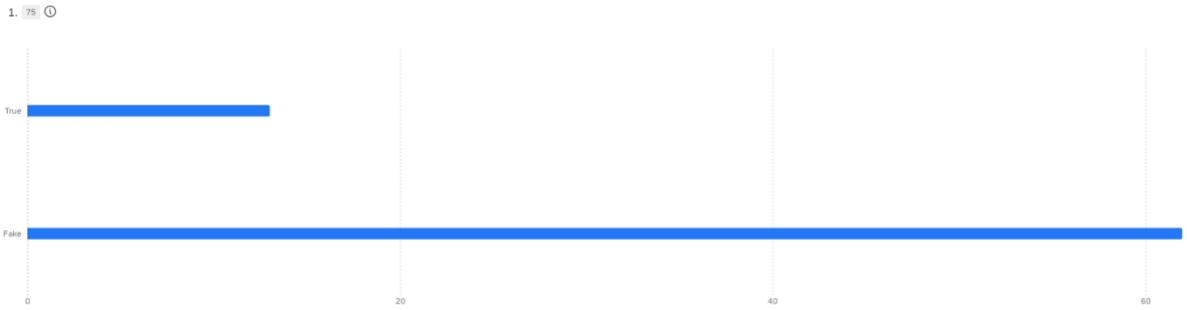

Figure D.1 – Survey results for image 1

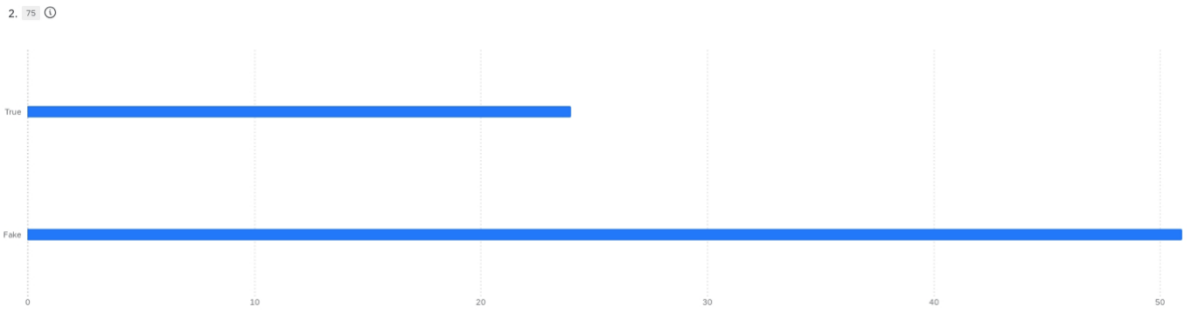

Figure D.2 – Survey results for image 2

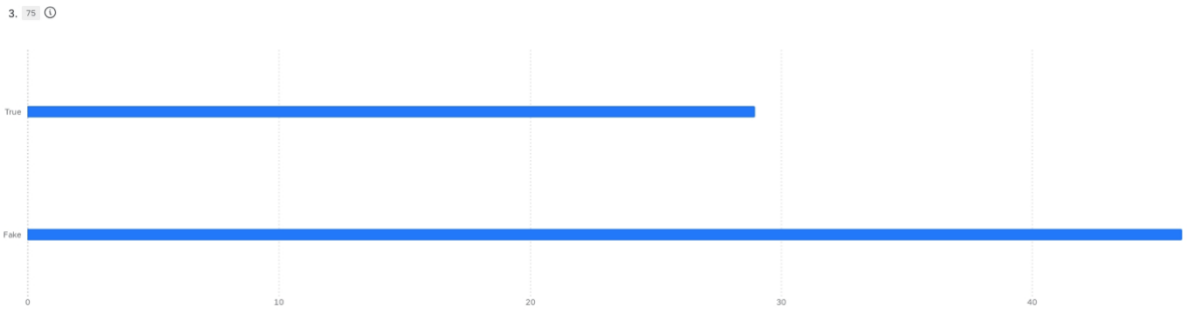

Figure D.3 – Survey results for image 3

Figure D.4 – Survey results for image 4

Figure D.5 – Survey results for image 5

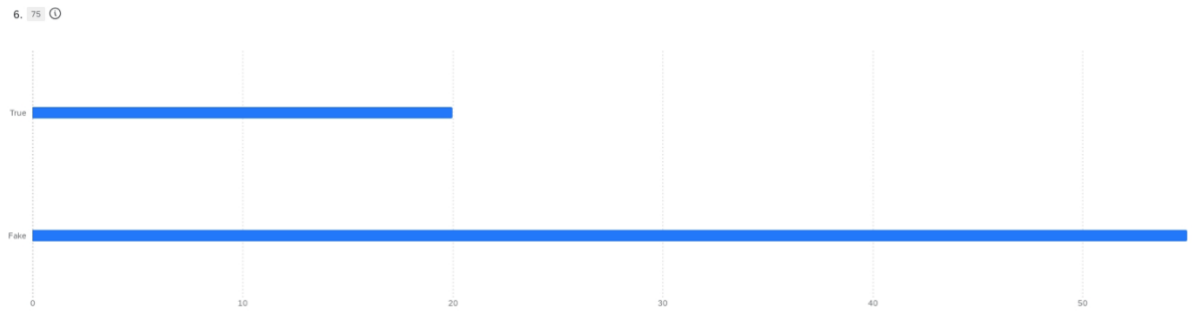

Figure D.6 – Survey results for image 6

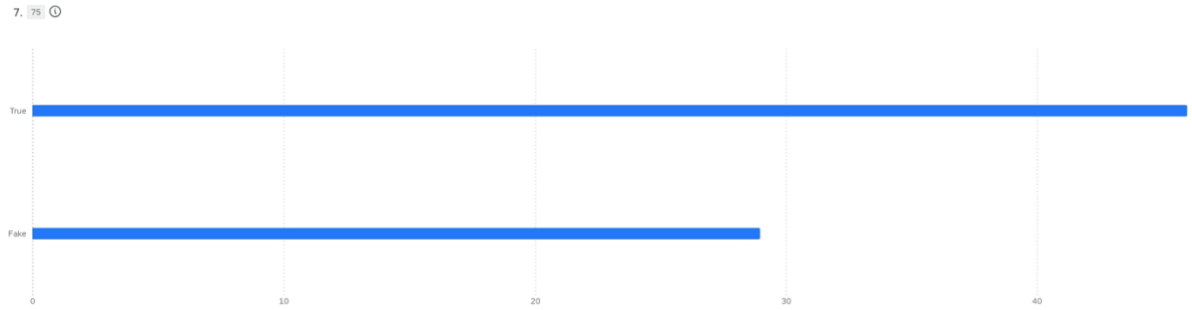

Figure D.7 – Survey results for image

APPENDIX E

Ethics Committee Report

This is to certify that
Project No.: **INFSYS2024-10-319339**
Project Title: **True or Fake?: A strategy to help individuals to mitigate fake news and misinformation on social media**
Principal Researcher: **Inés Gonzalez de Mendoza Cremades**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 10/31/2024.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of
- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 10/31/2024

NOVA IMS Ethics Committee
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