Social media literacy in the Iranian population regarding health information in the context of the COVID-19 pandemic

Hanisa Rahbari

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University of Ottawa

1 Abstract

Media literacy plays a pivotal role in combating misinformation related to health on social media platforms. This mixed-method thesis explores the level of social media literacy among the Iranian population regarding health information amid the COVID-19 pandemic. The research employed both quantitative and qualitative approaches: a public survey based on the UNESCO media literacy framework, and interviews with media experts.

The quantitative phase consisted of a 113-question survey, which received 38 final responses from the public. In the qualitative phase, ten media experts were interviewed to interpret the survey results and discuss potential strategies to enhance media literacy.

Findings revealed a significant discrepancy between the public's self-assessed media literacy and the experts' evaluations. Factors such as gender, education, and age did not significantly affect media literacy levels within the studied group. However, trust, generational gaps, and cultural values were found to influence the development of media literacy.

The COVID-19 pandemic presented opportunities to address media literacy challenges. Based on the research findings, several recommendations are provided for designing effective programs and strategies tailored to Iranian social media users. Recognizing the illusion of knowledge and the gap between public perception and expert assessment is crucial for effective intervention.

Improving media literacy can help Iranians avoid health-related misinformation on social media. Furthermore, this study offers a roadmap for identifying which areas of social media literacy require immediate attention and serves as a pilot for broader research into the impact of cultural, religious, and political factors on media literacy.

2 Résumé

L'éducation aux médias joue un rôle essentiel dans la lutte contre la désinformation sur la santé sur les réseaux sociaux. Cette thèse, utilisant une méthodologie mixte, analyse le niveau de littératie numérique de la population iranienne concernant l'information liée à la santé durant la pandémie de COVID-19. Deux approches complémentaires ont été utilisées : une enquête publique fondée sur le cadre de l'UNESCO pour l'éducation aux médias, et des entretiens avec dix experts des médias afin d'interpréter les résultats et proposer des stratégies d'amélioration.

L'enquête quantitative comportait 113 questions et a reçu 38 réponses finales. Les analyses révèlent un écart important entre l'auto-évaluation du public et celle des experts. Ni le genre, ni le niveau d'études, ni l'âge n'ont d'impact significatif dans ce groupe. En revanche, la confiance, les différences générationnelles et les valeurs culturelles influencent le développement de la littératie médiatique.

La pandémie a mis en lumière les défis mais aussi les opportunités pour renforcer l'éducation aux médias, en particulier face à la prolifération de fausses informations. Plusieurs recommandations sont formulées, adaptées aux spécificités culturelles des utilisateurs iraniens des réseaux sociaux. Il est essentiel de reconnaître l'illusion de connaissance et le décalage entre la perception populaire et l'avis des experts pour élaborer des interventions efficaces.

Enfin, cette recherche offre une feuille de route pour cibler les domaines de littératie médiatique nécessitant une attention urgente et sert de modèle pour des études futures sur l'influence des facteurs culturels, religieux et politiques sur l'éducation aux médias en Iran.

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1 Chapter 1: Introduction

This chapter provides a background on misinformation and disinformation on social media and their potential affects on public health. It explains the main purpose of the research and discusses how this research can be beneficial. The research questions are also listed in this chapter. Lastly, an introduction to the UNESCO framework in social media literacy is presented to provide conceptual grounding for the thesis and development of the questionnaire used in this study.

IN 2019, the world experienced a pandemic caused by the COVID-19 virus, which has impacted the health of individuals globally. From the onset of the pandemic, people have closely followed related news on social media, sharing their thoughts, opinions, and concerns. Given that COVID-19 directly impacts health and life, any discourse surrounding it potentially influenced individual well-being by disseminating inaccurate information, which could be harmful. Conversely, accurate information could potentially save lives or prevent adverse effects. Social media platforms such as Facebook and X (formerly Twitter) identified instances of misinformation regarding COVID-19 and implemented strategies to mitigate its spread (Shah, 2019; Shahi, 2020; Sing, 2020).

Given the prevalence of misinformation regarding, not only COVID-19, but also various health-related topics on social media, it is crucial to identify reliable sources and develop strategies to mitigate this type of erroneous information. Enhancing efforts to safeguard the media from the dissemination of incorrect information consequently serves to protect public health. This dissertation examined selective fake news related to health and reviews methods to address such misinformation. The aim was to gauge social media literacy as a tool to combat fake news on social media. The following section provides an overview of social media and other pertinent definitions associated with this dissertation.

1.1 Statement of the Problem

Social media has grown to become a key part of communication today. It has shifted from the "broadcast age," where messages were mostly one-sided with rare audience feedback, to the "interactive age," where communication is faster, cheaper, and accessible to many (Manning, 2014). Platforms like Facebook and X (formerly Twitter) allow people to share content and connect globally (Obar, 2015). While social media offers great opportunities for spreading information, it has also become a source of fake news, misinformation, and disinformation, especially during critical times like the COVID-19 pandemic.

Sharing false information can lead to serious harm, especially when people rely on social media for health-related decisions. Misinformation happens when false content is shared without the sender realizing it is wrong, while disinformation is intentionally created to mislead people (Wardle, 2017; Lazer, 2018). Fake news can take many forms, such as satire, manipulated photos, or propaganda. One example is the claim that COVID-19 vaccines caused magnetic effects at injection sites, which spread widely online (Tandoc et al., 2017; Miller, 2021).

Social media can also be used both positively and negatively in emergency situations. It helps improve communication and manage risks during disasters (Simon, 2014), but it can also be misused to mislead people for certain agendas (Wardle, 2017; Shu, 2017). For instance, during the COVID-19 pandemic, misinformation about vaccines included statements from the Iranian Supreme Leader in January 2021, who banned vaccines from the U.S. and Britain due to distrust (Karimi, 2021). Similarly, an Iranian parliament member claimed vaccines were part of a conspiracy by Bill Gates and the WHO to reduce the global population (Tahavori, 2020).

The anti-vaccine movement resulting from fake news in health is a well-known example of misinformation (Wang et al., 2019). Though this is more challenging as every parent considers their babies' health, it shows that there is a potential to have more health-

related fake news, either obvious or hidden. The most recent example is fake news related to COVID-19. Reports indicate that more than 30 million posts were shared only on Twitter about COVID-19, including related misinformation (Ramjung & Esomonu, 2020; Singh et al., 2020). The volume of wrong information on X (Twitter) was enough for its owners to take action. Despite X directly removing fake news related to COVID-19, Facebook let people report it (Hern, 2020).

The distribution of health-related misinformation on social media platforms is a topic of ongoing research, with studies indicating varying prevalence rates across different platforms. Past research reported rates such as 11.8% on Twitter (Shah, 2019) and 86.4% on WhatsApp (Al Khaja, 2018), while more recent studies continue to examine the extent of this phenomenon. For example, Su et al. (2022) observed that during the COVID-19 pandemic, misinformation comprised a notable proportion of health-related content on platforms including Facebook and Twitter, frequently surpassing 30%. Wang et al. (2023) also identified significant levels of misleading health information on TikTok, particularly related to unverified treatments and conspiracy theories. The academic interest in this area has increased notably during the COVID-19 pandemic, as highlighted by Adebesin et al. (2023), who conducted a bibliometric analysis mapping research on health misinformation and disinformation.

Regardless of specific prevalence statistics, research documents the potential impacts of misinformation and disinformation on public and individual health (Shah, 2019). Studies consistently note the influence of incorrect information on vaccination rates, which may contribute to vaccine hesitancy and subsequent outbreaks of vaccine-preventable diseases (Carrieri, 2019; Jamison, 2019; Oh, 2019; Shah, 2019; Steffens, 2019; Vraga, 2019; Yang, 2019). The COVID-19 pandemic brought renewed scholarly attention to the effects of health misinformation. Denniss and Lindberg (2025) describe misinformation as spreading rapidly and potentially undermining trust in established institutions, thereby influencing individual decisions regarding health interventions such as vaccines. This

viewpoint suggests a need for comprehensive strategies in public health to address not only immediate repercussions but also longer-term outcomes and underlying factors. Notably, health misinformation predates the COVID-19 pandemic and has been documented in previous disease outbreaks and public health emergencies, such as the 2009 H1N1 influenza pandemic, Ebola outbreaks, and ongoing false claims concerning diseases like measles and polio, illustrating a persistent pattern associated with major public health events.

According to the Center for Disease Control and Prevention (CDC) in the United States, the most recent significant pandemics include: 1918 (H1N1 virus), 1957 (H2N2 virus), 1968 (H3N2 virus), and 2009 (H1N1 virus) (Past Pandemics | Pandemic Influenza (Flu) | CDC, 2019). In addition, there have been other epidemics acknowledged in other parts of the world, including: Middle East MERS-CoV (2012), Ebola (2013), and Zika virus (2015) (List of Epidemics, 2020). Looking at the time sequence of these pandemics shows that they are happening more frequently. In fact, during the past ten years, there have been five worldwide pandemics. This suggests that the emergence of the next pandemic may happen in the near future, highlighting the critical importance of information dissemination.

At the same time, social media usage is increasing worldwide, and consequently, there will be more news sharing and more misinformation in several areas (Schefele, 2019). Concerning health, dozens of studies have focused on misinformation; however, not many have considered user demographic data (Eckert et al., 2018). Following the wrong direction about health can lead to risky behavior, damage, and danger to health. This makes health-related information critical and necessary to fight against misinformation and disinformation. Wang et al. (2019), in a review, showed that the most studied topic in health-related misinformation research was communicable diseases, in which vaccination plays a major part (Wang et al., 2019). According to the World Health Organization definition, "Communicable, or infectious diseases, are caused by microorganisms such as bacteria, viruses, parasites, and fungi that can be spread, directly or indirectly, from one person to

another." (World Health Organization, n.d.). Pandemics are a worldwide form of communicable diseases.

The increasing rate of pandemics, in conjunction with the widespread use of social media and its vulnerability to fake news, suggests that efforts to reduce health-related fake news are critical. The most common target for misinformation on social media has been communicable diseases (Wang et al., 2019). In an effort to manage future pandemics more effectively, an important area highlights strategies to reduce social media's wrong information. In this sense, it is helpful to learn from the current situation and analyze it to know what to do next time. Beyond pandemics, it is believed that health-related fake news and misinformation/disinformation are critical to deal with, but having grand plans, thinking globally and acting locally will benefit both (Manca et al., 2021).

Several approaches have been taken to fight fake news on digital social media. Some focus on the user side, including the human characteristics and socio-psychological aspects of creating, sharing, and believing fake news (Zhou & Zafarani, 2018, Denniss & Lindberg, 2025). Others are working on detecting and mitigating fake news from social media, either using machines and/or humans (Zhou & Zafarani, 2018, Denniss & Lindberg, 2025). One particularly promising approach that revolves around improving social media literacy. For instance, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has a program to support and improve "social media literacy," which is defined as "...access, search, critically assess, use and contribute content wisely, both online and offline" (UNESCO, 2013). This plan provides a framework for the related works, and the results can be communicated from different studies and countries. The other important characteristic of this framework is the fact that many experts have worked on it. A small group of scholars usually presents the other frameworks, and various approaches and definitions are possible. Therefore, the UNESCO framework avoids the repetitive task of preparing a framework, making it coherent across the countries and feasible to share, compare, and combine the results.

The increasing presence of Artificial Intelligence (AI) and bots on social media platforms has significant implications for social media literacy. AI-generated content, such as deepfakes, bot-generated tweets, and automated posts, can spread misinformation and manipulate public opinion (Keller & Ringham, 2019; Shao et al., 2018). By the time of the report from Woolley and Howard (2019), one-third of Twitter accounts were bots. Their broad estimate was that ten percent of social media activities are created and managed by machines. Taking that into account, social media literacy is not separated from the concept of AI.

AI-powered tools can create realistic and engaging content, like deepfakes: AI-generated videos or audio recordings that mimic real individuals (Keller & Ringham, 2019), bot-generated tweets: Automated accounts that spread information, often maliciously (Shao et al., 2018), and automated posts: AI-generated content that mimics human posts (Gentile et al., 2017). Hobbs (2017) believes this will affect the literacy level needed for users (Hobbs, 2017; Buckingham, 2017), and they need to be more resistant to the manipulations (Katz, 2017).

The intersection of AI-generated content and social media literacy highlights the need for critical thinking, media literacy skills, and digital literacy. As AI-generated content becomes increasingly prevalent, understanding its implications is crucial for navigating the complex social media landscape.

One key issue is the challenge of stopping the spread of false information and ensuring people have access to accurate and trustworthy news. Improving social media literacy by helping people learn to analyze and verify information could be an important way to solve these problems in this researcher’s view. This study aims to explore how social media literacy can protect public health and fight against the harm caused by fake news and misinformation.

1.2 Purpose of the study

This study aims to examine the level of social media literacy among Iranians, as well as assess the impact of the COVID-19 pandemic on it. Additionally, the research seeks to identify methods, as perceived by media and health professionals, that could potentially enhance public literacy in navigating online health information. Therefore, the main objectives of this study are the following: (1) to provide insight into social media literacy in Iran, (2) to Examine the COVID-19 pandemic's influence in Iran, and (3) to offer potential improvement strategies

1.3 Research Questions:

Based on the objectives mentioned above, three questions need to be addressed. These are:

1. What is the media literacy of Iranian users living in Iran regarding health-related information and news?
2. What are the possible influences of the COVID-19 pandemic on Iranian users' social media literacy?
3. From a health or media professional perspective, what are the possible methods to improve social media literacy related to health topics?

1.4 Researcher’s Perspective

The researcher is an international medical doctor with experience in information technology. As a medical doctor, the researcher encountered numerous patients in critical conditions due to following health advice from social media. On many occasions, the researcher observed misinformation provided by certain parties, which was not supported by medical textbooks or clinical research. Such advice included recommendations on managing health conditions and even discouraging individuals from seeking professional medical attention. Unfortunately, this often resulted in fatalities or permanent disabilities for the patients.

Observing the impact of misinformation on patients and public health through social media posts led the researcher to attempt to clarify facts and provide accurate information. However, as an individual facing a high volume of misinformation, the researcher was unable to effectively counteract erroneous advice. This prompted consideration of more systematic approaches to address health-related misinformation and disinformation. With this aim, the researcher began a Ph.D. program to leverage academic resources and insights from experts in the field. While preparing the proposal, the researcher reviewed current mitigation methods employed by various platforms. A review of the literature highlighted that similar initiatives are already underway to combat fake news. Further exploration identified social media literacy as a critical area with considerable potential for improvement.

Considering the researcher's experience living in Iran and understanding the country's political, religious, and cultural context, which may contribute to the spread of health-related misinformation, and noting the lack of studies on Iranian social media literacy, the researcher aimed to gain insights into the social media literacy of Iranian people and explore potential methods for enhancing this literacy from expert perspectives.

The COVID pandemic provided an opportunity to gauge public beliefs regarding health-related posts on social media. Due to lockdowns, people stayed at home and therefore spent more time online. Given the global health threat, people sought more information about health on social media. Focusing on health news could potentially change views towards these sources, as determining. To this end, the research aimed to explore changes in public behavior before and after COVID when encountering health-related information.

1.5 Significance of the Study

The ultimate objective of the researcher is to highlight health-related misinformation from online social media and enhance social media literacy to help reduce its negative influence. To reach this target, it is essential first to understand the current situation, identifying well-established elements and those that require further improvement. UNESCO

has developed a framework for governments worldwide to establish a universal evaluation method for social media literacy (UNESCO, 2013); however, there is no evidence to suggest that such a study has been conducted in Iran. This study adopts the UNESCO framework as a viable approach and grounding framework for future endeavors.

While general literacy benefits individuals, literacy specifically related to health can significantly impact their lives and well-being (Denniss & Lindberg, 2025). Learning not to follow unverified information in the media and to fact-check or refrain from broadcasting information outside one's knowledge can help mitigate misinformation (Wardle, 2017; Lazer et al., 2018). Avoiding advice from unqualified sources and consulting healthcare providers can reduce the harm already observed among patients (Vraga & Bode, 2020; Briandana & Dwityas, 2019). In other words, this study represents a small step towards raising awareness and providing a directive for decision-makers to equip people with the necessary literacy skills and prevent undesirable consequences (UNESCO, 2013; Hobbs, 2017).

The researcher believes that factors such as socio-economic status, political benefits, religious beliefs, and cultural aspects significantly influence people's reactions to health-related messages on social media. Highlighting the need for further and in-depth evaluation of media literacy levels can attract the attention of policymakers. This researcher believes it is crucial for individuals to recognize that their well-being is not adequately addressed on social media. Consequently, this study seeks to uncover contributing factors and strategies to enhance awareness.

1.6 Definitions of Terms

This section offers concise definitions of the key concepts used in this study, including: 1) social media, 2) fake news, 3) misinformation, 4) disinformation, and 5) media literacy.

1) **Social Media:** Defined by the Oxford Dictionary as "websites and applications that enable users to create and share content or to participate in social

networking." Manning (2014) further describes social media as having two key characteristics: participation and interaction, emphasizing the creation and sharing of content as central features (Obar, 2015; Shah, 2019; Wang, 2019).

2) **Fake News:** News is defined as recent and/or exciting events that significantly affect people and are supposed to be accurate and real (Kershner, 2005; Richardson, 2007). Fake news, therefore, is non-real or not valid information. Tandoc et al. (2018) describe various types, such as news satire, parody, fabrication, photo manipulation, advertising, and propaganda. Their definition emphasizes that fake news mimics real news in form and credibility and includes both misinformation and disinformation (Tandoc et al., 2017).
3) **Misinformation:** Misinformation is false or incorrect information that is shared or spread without any intention of misleading; the distributor believes it to be true (Lazer, 2018).
4) **Disinformation:** Disinformation is also false or incorrect information, but it is shared deliberately and intentionally to mislead others or achieve specific goals (Wardle, 2017).
5) **Media literacy** refers to the ability to access, analyze, create, and share news across different media, intersecting with information literacy (Briandana & Dwityas, 2019; Hobbs, 2017; Potter, 2010). It serves as a protective skill against media harms and requires ongoing development (Pfaff-Rüdiger & Riesmeyer, 2016; Potter, 2010). Core elements include awareness of negative media effects, continuous improvement, and recognition of its cognitive, emotional, aesthetic, and moral dimensions (Jones-Jang et al., 2019; Pereira & Moura, 2019; Tully et al., 2020; van Dijk & van Deursen, 2014; Vraga et al., 2020; Wardhani et al., 2019).

1.7 Theoretical framework

This study aims to explore social media literacy among Iranian users and examine possible strategies for its improvement. One approach for developing suitable methods was to create a questionnaire; however, a review of the literature revealed that UNESCO has already developed a relevant framework. As such, this framework was adopted as the evaluation tool for social media literacy. The UNESCO 2013 framework is primarily intended for large-scale government use and targets broad populations, with numerous steps and details not required for this research. Consequently, only parts of the framework were utilized, and the questionnaire addressed three out of four of its sections. For each category used, the questions were incorporated exactly as designed by UNESCO.

1.8 Thesis organization

Chapter One serves as the introduction to this dissertation, outlining the research problem and the objective of the study. It presents the research questions and offers the researcher's perspective, providing context for the initiation of this thesis. The chapter also discusses the significance of the study and defines key terms used throughout the dissertation. Additionally, the theoretical framework guiding the research is introduced in the final section.

The subsequent chapter includes a review of related literature. It begins with a concise overview of Iran and the current state of social media within the country, explaining the rationale for selecting Iran as the geographical focus of the research. This is followed by an examination of health-related content on social media and the impact of misinformation and fake news. Various strategies for mitigating misinformation are reviewed, including an introduction to different characteristics of fake news. Furthermore, the chapter explores discussions on media literacy and its influencing factors found in existing literature. This second chapter concludes with a summary of the UNESCO framework.

Chapter Three discusses the research methodology in detail, outlining the research questions, the integrated use of quantitative and qualitative approaches, and the variables

involved. Given that the study was conducted in two phases, each is described separately, including information on population and sampling, instruments, data collection and analysis procedures, and ethical considerations.

Chapter four presents the study's findings and is organised into two sections. The first section addresses the quantitative phase, providing a summary of respondents' demographic characteristics. It details responses to the UNESCO questionnaire across various dimensions and analyses the correlations between each response and demographic variables using statistical methods. The second section covers the qualitative phase, summarising expert responses to interview questions and categorising them according to themes identified during the analysis.

Chapter five discusses the findings and examines related studies that correspond to the presented data. A conclusion is then offered in the final section of the dissertation. This chapter also outlines the limitations and implications of the study, as well as suggestions for future research and subsequent actions.

2 Chapter 2: review of literature

2.1 Health Care System in Iran

As outlined by the World Health Organization (WHO, 2022), Iran's health care system is structured through a dual model that integrates both public and private sectors. The Ministry of Health and Medical Education (MOHME) functions as the central authority, overseeing policy development, regulation, and service delivery. Within this framework, the public sector provides the majority of primary health care through an extensive network of rural health houses and urban clinics, while the private sector predominantly delivers specialized and hospital-based services.

A distinctive feature of Iran's system is its primary health care (PHC) network, established in the 1980s, which has been credited with significant improvements in maternal and child health outcomes. Health houses staffed by trained community health workers (known as *behvarz*) serve rural populations, offering preventive services such as vaccinations, family planning, and basic treatment. This PHC model has been recognized internationally as a cost-effective approach to expanding access in resource-limited settings (WHO, 2022).

Medical education is closely integrated into the health system, with universities of medical sciences directly linked to MOHME. This structure allows for the alignment of training, research, and service delivery, ensuring that medical graduates are prepared to meet national health priorities (Moradi-Lakeh & Vosoogh-Moghaddam, 2015).

Financing mechanisms combine government allocations, social health insurance contributions, and direct out-of-pocket payments. However, reliance on household expenditures continues to pose equity challenges (Moradi-Lakeh & Vosoogh-Moghaddam, 2015). In response, the government introduced the Health Transformation Plan (HTP) in 2014, which sought to reduce patient costs, expand insurance coverage, and strengthen hospital infrastructure (Piroozi, Moradi, Nouri, Bolbanabad, & Safari, 2016).

Despite these reforms, systemic challenges remain. Persistent disparities between urban and rural populations, shortages of medical professionals in underserved regions, and concerns about financial sustainability highlight the ongoing tension between universal coverage goals and resource limitations (WHO, 2022). These dynamics underscore the complexity of Iran's health system and the need for continued policy innovation to balance accessibility, equity, and sustainability.

2.2 Impact of the COVID-19 Pandemic in Iran

The COVID-19 pandemic placed unprecedented strain on Iran's health care system, exposing both its strengths and vulnerabilities. Since the first confirmed case in February 2020, the country experienced five major waves of infection, resulting in more than 7.6 million confirmed cases and approximately 146,000 deaths by April 2024 (Worldometer, 2024; WHO, 2021). Morbidity was particularly high among older adults and individuals with comorbidities such as cardiovascular disease, diabetes, and respiratory conditions, which significantly increased case fatality rates in provinces like Khuzestan (Bastani et al., 2024).

Vaccination efforts were delayed due to sanctions, supply shortages, and geopolitical constraints, with Iran receiving its first vaccine shipments only in April 2021. By late 2021, coverage had expanded to around 60% of the adult population with two doses, supported by both imported and domestically produced vaccines (WHO, 2021). However, comparative analyses suggest that a faster roll-out could have averted tens of thousands of deaths; for example, adopting Turkey's vaccination pace might have prevented an estimated 50,000 additional fatalities (Ghafari et al., 2023). By late 2023, approximately 73% of Iranians had received at least one dose, and by 2025, vaccination coverage reached over 99% for routine immunizations, reflecting improved infrastructure and public acceptance (World Population Review, 2025; YCharts, 2023).

Post-pandemic management has focused on strengthening genomic surveillance, expanding hospital capacity, and integrating vaccination into routine health services. WHO support enabled Iran to scale up genomic sequencing from fewer than 100 samples in 2020

to more than 7,700 by 2022, improving variant tracking and preparedness (WHO, 2021). The government has also emphasized risk communication, community engagement, and equitable access, including vaccination for refugees and displaced populations. These measures highlight Iran's ongoing efforts to transition from emergency response to long-term resilience, while grappling with persistent challenges such as financial sustainability and rural-urban disparities.

2.3 Current Profile of Social Media in Iran

While the European committee has implemented specific social media policies, various countries adopt alternative strategies (Bebić & Volarević, 2018). The Iranian government generally enforces strict bans and extensive filtering of digital social media platforms. The Supreme Leader oversees the country's sole radio and television network and prohibits the creation of any private media outlets. International social media is regarded by Iranian authorities as a potential threat, leading them to promote domestic alternatives such as the Soroosh App (Freedom on the Net 2018 - Iran | Refworld, n.d.).

Major social media platforms such as Facebook, YouTube, certain Google services, and Telegram are officially prohibited in Iran (Freedom House, 2018). Individuals found accessing restricted platforms can face significant penalties, including possible jail sentences. Web filtering is comprehensive and robust, significantly restricting people's online access (ISNA, 2014). Additionally, U.S. sanctions against Iran have prompted many international tech companies to limit or suspend their services for Iranian users, further complicating access to global social media (Dehghan & Booth, 2013; Reuters, 2018).

In response, the Iranian government has explored building a domestic internet infrastructure, aiming to disconnect the general population from the global web, reserving broader access for select groups such as academics and researchers (Khabar Online, 2019; BBC News, 2019). There have also been efforts to promote domestic social media applications, such as Soroush, to replace international platforms and enhance state control and monitoring of online activity (Al Jazeera, 2022). Authorities have reportedly requested

international platforms to provide user data pertaining to Iranian citizens (Iran International, 2022).

During periods of political unrest or crisis, the government, which controls the main internet and mobile service providers, frequently disrupts connectivity, effectively isolating the population until the government regains control (Centre for International Governance Innovation, 2020).

In addition to governmental influences, cultural and religious backgrounds may also affect social media usage among Iranians. For instance, some individuals with a background primarily in religious studies now share health-related advice online, attributing their guidance to religious sources. As a result, some followers may adopt these methods without independently evaluating the content or consulting medical professionals. (Iran’s Clerics Push Unproven Islamic Covid Cures in a Wave of Anti-Science Hostility - Coda Story, n.d.)

2.4 **Social Media History in Iran**

The Iranian government's regulatory actions have significantly shaped the landscape of social media access within the country. This section offers an overview of the evolution of social media bans in Iran, examining the motives behind these restrictions and their broader implications for freedom of expression, information access, and social mobilization.

The first social media platform to gain widespread traction in Iran was Orkut, which enjoyed popularity in an era of relatively open internet use (Rahimi, 2011). Subsequently, Facebook supplanted Orkut as Iranians gravitated toward platforms offering richer features and wider connectivity (Rahimi, 2011).

However, in the aftermath of the 2009 Green Movement protests, the Iranian government initiated sweeping censorship measures. Platforms such as YouTube, Facebook, and Twitter were blocked in response to their perceived roles in facilitating protest organization and disseminating anti-government content (Fathi, 2009; Stone, 2009). Citing concerns over national security and the preservation of Islamic values, authorities sought to stifle what they considered destabilizing digital activism (Dehghan, 2009).

Building upon these restrictions, the government expanded internet censorship in subsequent years. Blogging platforms like Blogger and WordPress faced bans in 2010 due to the proliferation of dissenting voices (Dehghan, 2010). Temporary blocks of Google and Gmail in 2012 further underscored anxieties regarding the flow of information (The Guardian, 2012). Instagram was blocked in 2014, with officials pointing to concerns over immoral content (BBC News, 2014).

Messaging applications have also been targeted. After banning Viber, authorities blocked Telegram—a widely used messaging app—in 2018, again citing national security threats and the app's extensive use for protest organization (Ahmadian, 2018). Despite these measures, many Iranians circumvent such restrictions through VPNs and anti-filtering tools, highlighting the population's adaptive strategies (Khalili et al., 2022; Rahimi, 2011).

In 2020, TikTok was added to the roster of banned social media platforms, reflecting persistent fears about national security and moral integrity (Iran International, 2020). Following the Woman-Life-Freedom movement, WhatsApp was also blocked in 2023, which notably impacted research data collection efforts. Collectively, these evolving restrictions illustrate the government's ongoing attempts to manage and control the digital public sphere.

2.4.1 Motivations Behind Censorship

Iran's regulatory approach, as reflected in its computer crimes law, is driven by several motivations: the preservation of national security, the upholding of Islamic and moral values, and the prevention of anti-government mobilization (Rahimi, 2011; Dehghan, 2009). These legal and policy frameworks reveal a complex interplay between the state's desire for control and the society's persistent quest for connectivity and information.

Given the preceding discussion, the approach to social media in Iran offers a valuable case for examining digital social media, fake news, fact-checking practices, media literacy, and strategies employed to address misinformation. The influence of Iranian religion, culture, politics, and economic conditions on social media usage also represents a

significant area for further research. Such investigations can contribute to refining existing theories regarding fake news.

The context in Iran presents an opportunity to analyze social media literacy from multiple angles, including comparisons with other countries or cultures that share similar factors. In addition, this research evaluates the role of social media literacy in health communication. The current study specifically assesses levels of social media literacy among Iranian online users and explores the relationship between social media literacy and the effects of pandemic-related information disseminated through social media platforms.

2.4.2 Digital Connectivity Amidst State Control

Iran has a high level of internet and social media use, mostly because its population is young and familiar with digital technologies (Statista, 2023). Although the government blocks major international platforms like Facebook, Twitter, and YouTube, many Iranians use VPNs and anti-censorship tools to get around these restrictions (Rahimi, 2011). As a result, apps such as Instagram, Telegram, and WhatsApp have become important ways for people to share information, including reliable and unreliable health news.

2.4.3 Effects of Political Censorship and the Shadow Internet

Iran's robust filtering and surveillance create a distinct "shadow internet" landscape (Deibert et al., 2010). This environment introduces several challenges:

- Limited Access to Diverse Sources: Filtering sometimes blocks legitimate health resources, nudging users toward less regulated, user-generated content. For example, the government has at various times, blocked access to major international health organizations and medical journals, such as the World Health Organization (WHO) and PubMed, as documented by Human Rights Watch (2013). This filtering forces citizens to turn to less reliable sources, like user-generated content on social media or forums, for medical advice. This can expose individuals to misinformation and unproven treatments.

- Erosion of Trust: The necessity of circumventing censorship can foster general mistrust of official sources and, paradoxically, diminish critical scrutiny of sensational or conspiratorial content (Rahimi, 2011). The need to use tools like VPNs to bypass censorship has a paradoxical effect on user behavior, leading to an erosion of trust in official sources. This dynamic is explored by Rahimi (2011), who notes that the constant act of circumventing state-imposed filters fosters a general skepticism toward all official information, including public health campaigns. This can make users more susceptible to sensational or conspiratorial content, as they may view unofficial, filtered-out sources as more truthful simply because they are "forbidden." (Rahimi, 2011).
- Self-Censorship: Concerns regarding surveillance and legal consequences may encourage self-censorship, restricting open discourse on sensitive health topics (Freedom House, 2022).According to Freedom House's "Freedom on the Net" report (2022), many Iranians are hesitant to discuss politically sensitive or socially taboo health issues, such as mental health, sexual health, or HIV/AIDS, online. This fear of reprisal stifles open discourse and the sharing of vital personal experiences and information. Consequently, it creates a less supportive environment for individuals seeking help on these topics (Freedom House, 2022).

2.4.4 Reliance on Social Media for Health Information

Public skepticism toward official media—often perceived as politicized—drives many Iranians toward social media as an alternative and, at times, preferred source of health information (Khalili et al., 2022). Users increasingly turn to these platforms for self-diagnosis, peer discussions, and updates during public health crises, such as the COVID-19 pandemic. However, the lack of comprehensive, trustworthy, and accessible official online health resources exacerbates the risks associated with exposure to misinformation, pseudoscience, and unverified remedies (World Health Organization, 2021).

Examples include the widespread sharing of unproven "cures" for COVID-19 or conspiracy theories about the virus's origins, which gained considerable traction on various social media groups and channels (Alimardani & Elswah, 2020; Yoosefi Lebni et al., 2021).

2.4.5 Religious and Cultural Influences on Health Beliefs

Religion, particularly Shi'a Islam, plays a substantial role in shaping health perceptions and the propagation of health-related information in Iran (Ghiabi, 2019). The popularity of traditional Islamic medicine manifests itself through widespread social media promotion, sometimes in opposition to conventional medical advice. Religious authorities and clerics, wielding considerable moral influence, occasionally promote specific remedies or health views—sometimes at odds with contemporary scientific consensus (Ghiabi, 2019; Khalili et al., 2022). Their pronouncements can go viral, especially if they address contentious topics such as vaccination or pandemic responses.

One example is the endorsement of "prophetic medicine" treatments, such as black seed oil or honey-based mixtures, for various health conditions, which are sometimes promoted by religious figures. Religious authorities and clerics, due to their moral influence, have at times made statements on health-related topics that differ from the views held by the scientific community (Ghiabi, 2019; Khalili et al., 2022). Alimardani & Elswah (2020) examined how "religiously charged narratives by unofficial fringe figures" contributed to the spread of COVID-19 misinformation in Iran, providing examples such as Ayatollah Abbas Tabrizian's promotion of non-scientific remedies (e.g., violet oil) through Telegram channels, resulting in widespread circulation. They also addressed the reluctance to close religious shrines. Yoosefi et al. (2021) discussed a range of responses from clerics, including both supportive and critical perspectives, highlighting instances where clerics opposed vaccination initiatives and advocated traditional medicine approaches

instead of recommended public health measures for COVID-19 prevention (Yoosefi et al, 2021).

2.4.6 Educational Gaps in Media Literacy

Despite the complexity of Iran's information ecosystem, systematic Media and Information Literacy (MIL) education, especially regarding health, is not well established in the formal educational curriculum (UNESCO, 2020). This absence exacerbates challenges faced by citizens as they navigate politically charged, religiously influenced, and commercially driven health content online.

The methanol poisoning crisis is a direct consequence of low media literacy. The rumor that drinking methanol could cure COVID-19 was not a government directive or a religious decree; it was a **viral piece of misinformation** that spread rapidly on social media platforms like Telegram. Individuals without the ability to differentiate between a scientifically validated claim and a dangerous rumor acted on this information (Soltaninejad, K. (2020). The belief that a "forbidden" or unconventional cure must be effective demonstrates a fundamental inability to critically assess the source and content of online information, a core component of media literacy (Soltaninejad, K. (2020).

2.5 **Fake News in Iran**

According to research by Shu et al. (2018), a global map was created to indicate regions with higher activity in the dissemination of fake or real news (Shu et al., 2018). The study identified Tehran, the capital of Iran, as a notable source of fake news, while no significant instances of real news originating from Iran were observed on social media platforms.

Figure No.1

The Distribution of Fake News Resources In The World (Shu Et Al. 2018)

Figure No.2

The Distribution Of Real News Resources In The World (Shu Et Al. 2018)

While some activity is present in Iran, governmental filtering and restrictions on social media use may compromise the reliability of these findings. Moreover, Iranian citizens often utilize VPNs to bypass such controls, which alters their apparent IP addresses and may result in the misattribution of fake news origins to other locations, including Europe. Additionally, countries such as China display exceptionally low activity levels, warranting further investigation to fully understand the dynamics in these regions.

Despite restrictions, people use anti-filter software to bypass barriers and connect globally, which has mixed consequences. Although X (Twitter) and Instagram are banned, domestic researchers still access these platforms for social media studies (King, Pan, &

Roberts, 2013). However, most research is not published internationally or in English, and attempts to contact researchers or obtain English references were unsuccessful.

There is another specific situation regarding health-related fake news in Iran: the government's tacit support for religious fundamentalists seeking to replace modern medicine with traditional remedies under the banner of Islam (Aramesh, 2022). While health ministry officials emphasize the importance of scientific approaches, government-affiliated organizations often provide a platform for traditionalist voices.

Although every nation has a branch of traditional medicine, in Iran, some prominent figures within this movement have promoted conspiracy theories—for instance, claiming that practices such as vaccination, tooth brushing, contraceptive methods, and the use of chemical drugs are part of foreign plots to reduce the Iranian population (Sadeghi-Bazargani et al., 2020). During the COVID-19 pandemic, these beliefs fueled misinformation campaigns urging citizens to avoid mask-wearing and social distancing, contributing to critical public health risks (World Health Organization, 2021). In a widely circulated video, a religious scholar was seen burning the reference book "Harrison's Principles of Internal Medicine" in protest against modern medicine, symbolizing a call to ban scientific approaches (Coda Story, n.d.).

At the same time, a network of Iranian physicians living abroad launched online services to answer medical questions for people in Iran, attempting to ease the burden on local healthcare professionals (Khalili et al., 2022). Observations by the researcher, along with other medical professionals, indicate that health-related misinformation continues to circulate widely among the public, often categorized into domestic and international posts. While there are fact-checking initiatives focused on political content and some studies address the spread of fake news and the role of fact-checking websites (Shu et al., 2018), there is limited documented evidence of systematic efforts targeting health-related misinformation in Iran.

Focusing on Iran through the lens of the UNESCO MIL framework allows for a comprehensive understanding of how individuals negotiate the interplay of state policy, technological adaptation, and cultural beliefs in digital spaces. The findings from such research have the potential to inform targeted interventions designed to strengthen critical evaluation skills and empower citizens to make informed health decisions in a complex digital reality (UNESCO, 2020).

2.6 Studies on Fake News and Health

Since the 2016 US presidential election, most social media research has focused on political topics (Vosoughi, 2017), though fake news shares similar structures and characteristics across issues. While initial studies often focused on political misinformation following the 2016 US election, subsequent research, especially around the COVID-19 pandemic, has confirmed that the same underlying mechanisms, motivations, and mitigation strategies apply to health, economic, and other forms of fake news.

Studies reveal that psychological factors such as confirmation bias and emotional appeal drive both political and health misinformation—including false remedies and anti-vaccine claims (Soltaninejad, 2020; Wang et al., 2019; Alimardani & Elswah, 2020; Yoosefi Lebni et al., 2021). The World Health Organization has emphasized these dangers (WHO, 2021). Economic misinformation is also being studied, focusing on financial incentives behind sensational and clickbait content rather than political motives (Guess & Lyons, 2020).

This section begins by reviewing researchers' approaches to studying fake news and misinformation. These methods were grouped into four main categories, as summarized in Table 1 with corresponding citations. The table illustrates the range of strategies used to address fake news.

Table 1- A Summary of the Methods Used by Previous Studies

Method	Study
Content analysis (28 studies) Any study in which the contents, texts, news, messages, and similar structures were evaluated in social media	Al Khaja 2018, Allcott 2019, Alsyouf 2019, Bessi 2016, Bianchini 2019, Caulfield 2019, Chadwick 2018 Chen 2018, Chen 2018, Garrett 2019, Ghenai 2018, Guimarães 2018, Huber 2019, Jamison 2019, Jiang 2018, Lewandowsky 2017, Li 2017, Liu 2019, Oh 2019, Samuel-Azran 2019, Shah 2019, Sommariva 2018, Vicario 2016, Vijaykumar 2018, Vraga 2019, Zimmer 2019, Alimardani & Elswah 2020, Guess & Lyons 2020, Soltaninejad 2020
Reviews (16 studies) Any kind of systematic review and review of other works	Asha 2018, Assiroj 2019, Bratu 2018, Caulfield 2019, Eckert 2018, Scheufele 2019, Sharma 2019, Tandoc 2019, Walter 2019, Wang 2019, Zannettou 2019, Pennycook & Rand 2021, Soltaninejad 2020, Yoosefi Lebni et al. 2021, Penafiel-Saiz et al. 2024, Taylor & Francis Online 2024
Surveys (10 studies) Any study done by doing surveys, focus group, observations, etc.	Crilly 2019, Duffy 2019, Heuer 2018, Khan 2019, Sterrett 2019, Tandoc 2019, Tandoc 2018, Ünal 2019, Viviani 2017, Guess & Lyons 2020
Experiments (13 studies)	Bode 2018, Bonnet 2019, Carrieri 2019, Chua 2018, Colliander 2019, Goindani 2019, Heuer 2018 , Steffens 2019, Vraga

Any method in which the researcher(s) applied any intervention, change, or contribution	2018, Bago et al. 2020, Pennycook & Rand 2021, Soltaninejad 2020, Jha, A. K. 2025

2.7 Influencing Factors

Addressing the issue of fake news requires an understanding of both the motivations behind its creation and the factors that lead individuals to believe it. Additionally, identifying interventions for those who have already been influenced by fake news is an important consideration. This section provides a brief overview of the processes involved in the production of fake news.

2.7.1 Creation of fake news

First, the risk of misinformation exists when there are many sources to report news or create content. This magnifies social media so everyone can write, comment, and share posts (Viviani, 2017). Lewandowsky (2017) claims that the concept of fake news is increased by big societal changes, such as a decrease in incomes and money, more economic inequity, more polarization, and a loss of trust in scientists.

A possible reason for giving the wrong information is to gain some benefit: Delgado-López (2018) compares this with what charlatans did in the past to use the patient's conditions to make money from providing alternative treatments and medication, which were, at best, of no use. Nowadays, electronic devices and psychological approaches have added to those kinds of fraud (Delgado-López, 2018; Ghenai, 2018).

Research interest in fake news grew significantly when it impacted political and economic spheres (Vosoughi, 2018; Guimarães, 2018). To reach some political goals, social media is used to start "false-information campaigns with targeted manipulation of public opinion on specific topics" (Zannettou, 2019). From another angle, commercial companies

research the users' preferences to advertise what they may buy, while framing news that will attract potential customers (Eg, 2019).

Naturally, people like to share their own views and experiences with others, which is another source of misinformation (Asha, 2018). However, just because people may have a good experience with something does not mean it will be good for others.

2.7.2 Believe and share

Group communication psychology plays a role in spreading fake news. People tend to focus on information that aligns with their beliefs, leading to polarization and echo chambers, though the link between psychological profiles and group formation remains unclear (Bessi, 2016; Ünal, 2019; Vicario, 2016). Bessi et al. (2016) found that an individual's psychology influences their group choices, and groups can reinforce members' beliefs. Duffy (2019) notes these psychological changes may impact relationships, especially as interpersonal trust is key to accepting information as true (Heuer, 2018; O'Connor, 2019; Shah, 2019; Sterrett, 2019). Broken trust occurs when false information is discovered (Duffy, 2019).

Confirmation bias also affects echo chambers—people gravitate toward sources they like, regardless of accuracy (Zimmer, 2019; Sterrett, 2019; Tandoc et al., 2019). Narratives, particularly short and personal ones, enhance believability (Chen, 2018; Caulfield, 2019). Emotional content increases acceptance and spread of fake news, with emotional or moral language and certain symbols linked to higher falsehood rates (Brady, 2017; Jiang, 2018; Galeotti, 2019).

Additional factors such as age, gender, education, job, political view, ideology, topic relevance, access to accurate information, anxiety, and internet literacy influence susceptibility to fake news (Amazeen, 2019; Khan, 2019; Li, 2017; Oh, 2019; Scheufele, 2019; Vraga, 2019).

2.8 Suggested solutions

When people are asked not to share information, they cannot verify, some may think this is against freedom of speech. In other words, fake news is manipulating democracy and makes it a disadvantage. . Some social media have started to apply methods to reduce false information on their platforms (Allcott, 2019). Support Vector Machines and Artificial Intelligence are some of these methods (Assiroj, 2019). However, not enough work has been done to investigate possible interventions (Eckert et al., 2018). Table No.1 is a summary of suggestions. It provides an image of the different solutions that have been studied. As it shows, some researchers have focused on media literacy, and this topic has a similar misunderstood

Table 2- Example Of Studies Based on the Suggested Solutions

Suggested solution	Study
Artificial Intelligence and machines	Assiroj, 2019; Bode, 2018; Guimarães, 2018; Jamison, 2019; Lewandowsky, 2017; Viviani, 2017, Keele University, 2025, Yang & Menczer, 2023, Penafiel-Saiz et al., 2024
Setting policies	Goindani, 2019; Zannettou, 2019, Bode, 2018, OECD, 2024, Pew Research Center, 2023. USC, 2023
News and digital literacy	Bonnet, 2019; Jiang, 2018; Khan, 2019; Lewandowsky, 2017; Ünal, 2019; Viviani, 2017, The Canadian Medical Association, 2024, American Psychological Association, 2024, Taylor & Francis Online, 2024

Counter posts and narratives	Caulfield, 2019; Chen, 2018; Chua, 2018; Colliander, 2019; Ghenai, 2018; Steffens, 2019, Lazer et al., 2018, Taylor & Francis Online, 2025, Vogel & van der Linden, 2024
Social involvement (campaigns), public awareness	Bode, 2018; Gentile, 2018; Huber, 2019; Lewandowsky, 2017; Zannettou, 2019, Pew Research Center, 2023, CEPR, 2024

There is an observed trend towards direct action and dissemination of accurate information. This approach requires time, expertise, and has varying effectiveness depending on the individual (Shah, 2019; Tandoc et al., 2019). Methods suggested in the literature include providing explanations for misinformation, developing comprehensive narratives, addressing questions, creating supportive environments, facilitating opportunities for inquiry, proactively sharing accurate news, encouraging professional engagement on social media platforms, and conducting direct conversations with individuals regarding content they may encounter online. Recent research underscores that, despite advancements in automated solutions to combat misinformation, the lack of universally accepted standards continues to hinder progress in this field (Shu et al., 2020).

2.9 Fundamental theories

There are several theories and frameworks that address fake news, and researchers have employed a range of these approaches. When designing a methodology for research on fake news, it is useful to review previous methods used in the field. Zhou and Zafarani (2018) published a detailed paper that examines fake news from multiple perspectives, including frequently referenced theories in psychology, philosophy, social sciences, and economics. This compilation serves as a reference for analyzing fake news (Zhou & Zafarani, 2018). However, their work did not include an evaluation of the literature on these

theories; instead, it summarizes and collects them. Table No.2 in this document is adapted from their study. According to this table, foundational theories related to fake news can be grouped into three main categories: style-based, propagation-based, and user-based (Zhou & Zafarani, 2018).

Style-based theories focus on the structure and composition of news articles. For instance, they examine the differences in characteristics between real and fake news, such as the use of emojis (Zhou & Zafarani, 2018).

Propagation-based theories investigate the differences in how quickly information spreads among users, comparing real and fake news. One example is the backfire effect, where individuals respond more intensely to content with which they disagree (Nyhan and Reifler, 2010), potentially increasing the rate at which certain news spreads (Zhou & Zafarani, 2018).

User-based theories are divided into three subcategories (Zhou & Zafarani, 2018):

- Social influence: The impact of other individuals on a user's belief or rejection of news and ideas.
- Self-influence: The role of personal beliefs and experiences in shaping responses to new information.
- Benefit-influence: The extent to which perceived benefits, rewards, or values—financial, spiritual, political, or otherwise—influence acceptance or rejection (Zhou & Zafarani, 2018).

The first two categories often require specialized knowledge, such as expertise in linguistics or mathematical modeling, to analyze structures or propagation patterns. Given the objectives of the current study, this research falls within the user-based category, focusing specifically on the self-influence effect, as user responses to information are considered a function of social media literacy.

2.9.1 Strategies for Detecting and Combating Fake News

Fake news spreads across social media through various formats and channels, often fueled by both psychological and economic incentives (Rasool et al., 2019). Recognizing its pervasive nature, researchers have developed several frameworks to analyze and counteract fake news, generally categorized as style-based, user-based, and propagation-based theories (Zhang et al., 2019). These perspectives—focused on content features, dissemination patterns, and user behaviors—serve to explain not only how fake news originates and circulates but also inform potential strategies for its mitigation.

2.9.2 Frameworks for Understanding Fake News

- Style-based approaches examine the structural and linguistic characteristics of fake news, utilizing these features to differentiate misinformation from legitimate content.
- User-based approaches center on the behaviors and motivations of individuals who create, accept, or share fake news.
- Propagation-based approaches analyze how fake stories spread, looking at the speed, reach, and network patterns to identify and flag suspicious content.

The different ways of looking at fake news including style-based, user-based, and propagation-based, are useful for understanding how it works, but they are just the first step toward solving the problem. These ideas help set up tools and actions that can actually fight against misinformation.

In terms of style, researchers are now using sophisticated linguistic analysis and artificial intelligence to detect misinformation. Vogel & van der Linden (2024) demonstrate that inoculation theory—preparing individuals by exposing them to fake news tactics—can build resistance. Penafiel-Saiz et al. (2024) review how AI and

natural language processing help identify stylistic markers such as emotional language, while Keele University (2025) has developed an AI tool that accurately detects fake news based on writing style. Moreover, Yang & Menczer (2023) find that social bots employ distinct styles, aiding in detection efforts.

User-based research shows that cognitive reflection and media literacy play important roles in reducing susceptibility to misinformation. Pennycook & Rand (2021) stress the importance of analytical thinking, and surveys by The Canadian Medical Association (2024) and Statistique Canada (2024) highlight a need for improved media education and greater trust in institutions. Additionally, a study from Trinity Business School (2025) found that fake news about the future spreads more easily, largely due to uncertainty biases.

Finally, propagation-based research focuses on how misinformation spreads rapidly through network structures and platform design. Alimardani & Elswah (2020) describe its viral nature within certain communities, while Lazer et al. (2018) reveal that fake news disseminates faster than true news because of its novelty. Recent studies from The Dais (2024) and USC (2023) further connect the spread of misinformation to platform features, suggesting that algorithm changes may be necessary to reduce virality.

By combining these approaches with real examples and smart solutions, experts are building stronger ways to limit fake news. This mix of theory and practice makes it possible to use fact-checkers, teach media skills, make platform rules, and use new technology to help keep misinformation from spreading.

2.9.3 Key Strategies for Addressing Fake News

Vraga et al. (2020) distilled the main responses to fake news into four broad strategies:

- Stakeholder involvement and fact-checking: Journalists, social media managers, and other experts play a vital role in identifying and debunking misinformation. Fact-checking initiatives, such as FactCheck.org, provide resources for verifying claims, though the sheer volume of daily social media posts—over one million health-related posts are shared on platform X (formerly Twitter) alone (Social Media in Healthcare Statistics 2024 By Data, Insights, n.d.)—makes it impractical to vet every post with human review (Mustafaraj & Metaxas, 2017; Zhou & Zafarani, 2018).
- Media literacy: Educating users to analyze, assess, and critically evaluate news content empowers them to recognize and resist misinformation. Media literacy programs emphasize understanding news production processes and developing the practical skills required to identify falsehoods (Vraga & Tully, 2021).
- Limiting misinformation spread: Platforms and organizations can reduce the reach of fake news by restricting access to unreliable outlets and curbing the circulation of dubious content, either through policy or technological intervention (RHIhub, 2018).
- Technological tools: Machine learning and artificial intelligence can detect and filter fake news at scale by identifying telltale stylistic or propagation features. Automated systems—like those described by Wang (2017), Tacchini et al. (2017), and reviewed by Kumar & Shah (2018)—enable efficient screening, but may lack the nuanced understanding of context that human experts bring.

2.9.4 Effectiveness and Limitations

Every approach presents distinct strengths and drawbacks. Human fact-checkers bring an invaluable depth of understanding and contextual awareness that automated methods are unable to match. Their primary advantage is the ability to interpret sarcasm, satire, and the subtle cultural or linguistic signals that reveal whether information is misleading. They can assess nuanced political statements, dissect intricate scientific claims, and spot emerging forms of misinformation that algorithms have yet to encounter. For example, a skilled human reviewer can detect when a quotation has been deliberately taken out of context to shape a narrative—something that current technology often finds difficult to identify (Kertysova, 2018).

But one big problem with relying only on humans to check facts is that it's hard to do at a large scale. As the amount of online information keeps growing, people simply can't check everything fast enough to match how quickly false stories spread. Manually reviewing each claim takes a lot of time, effort, and resources (Abels, 2022). Because of this, wrong information can travel widely for hours or even days before anyone is able to correct it.

Automated systems use computer programs and artificial intelligence to check facts quickly. These systems can look at huge amounts of information at once, so they can spot possible false news very fast. This speed helps catch old rumors or fake stories that reappear online. Some studies show that AI tools can be very accurate on certain tasks, but their overall success depends on the data used to train them (Shu et al., 2020).

However, these systems have their own problems. They can only do well on things they have seen before, so they might miss new tricks used by people who spread false information. Also, AI often does not understand the details or context—sometimes something is true in one situation but false in another, and computers can get confused by this (Zhou & Zafarani, 2020). Computers may also have trouble with biased or tricky statements that are not exactly false but are still misleading.

Given the challenges in eradicating misinformation entirely, media literacy stands out as an essential, sustainable defense (Vraga & Tully, 2021). By equipping users of all backgrounds with the critical skills to recognize and question fake news, media literacy initiatives can help slow its spread. However, for these efforts to be effective, they must reach a broad audience and encourage the continuous development of critical thinking skills.

Combatting fake news requires an integrated strategy that combines expert fact-checking, technological innovation, platform policies, and user education (Vraga et al., 2020; Mustafaraj & Metaxas, 2017; Zhou & Zafarani, 2018; Wang, 2017; Tacchini et al., 2017; Kumar & Shah, 2018; Abels, 2022; Shu et al., 2020). No single approach is sufficient; together, they offer the best chance to reduce the impact of misinformation in an increasingly digital world.

2.10 Health news in social media

One benefit of social media is that it serves as a great tool to communicate during disasters. Eckert et al. (2018) showed that social media platforms could easily connect the government, health agencies, and people in case of disasters, in which rapid communication is vital and critical. Also, social media can engage patients in their treatment process and empower them (Eckert et al., 2018). More support and information can be given to them , which can improve the doctor-patient relationship (Gentile 2018). Also, the application of research in society can be facilitated by using social media (Dijkstra 2018),

However, the potential damage from broadcasting fake news was studied in different aspects, including the amount of misinformation and the mechanism behind sharing it, as well as frameworks that other researchers have used to investigate this area. Facebook is the most used platform to share health-related information (Huber, 2019). There has not been any study before 2018 that has reported health misinformation on social media. It shows that the topic was a point of interest in the last two years.

The proliferation of misinformation on social media platforms has become a critical concern in the medical and public health domains. Yeung et al. (2022) conducted a comprehensive bibliometric study highlighting the surge in scholarly publications addressing medical and health-related misinformation on social media. Their analysis revealed not only the growth of this research area but also the interdisciplinary nature of efforts aimed at understanding and countering misinformation across various platforms such as Facebook, Twitter (X) and YouTube (Yeung et al., 2022).

Adebesin et al. (2023) further explored this issue by performing a bibliometric analysis specifically focused on health misinformation and disinformation during the COVID-19 pandemic. Their findings emphasize the pivotal role social media played in both the dissemination and amplification of false health information during this global crisis, underscoring the urgent need for effective monitoring and intervention strategies.

Chou, Gaysynsky, and Cappella (2020) provided a critical perspective on the landscape of health misinformation, delineating the challenges faced in identifying, addressing, and ultimately reducing the spread of false health narratives on social networks. They highlighted the necessity for coordinated public health communication and policy measures to mitigate the impact of misinformation.

Lastly, Chen (2022) offered an in-depth overview of current methodologies for combating health misinformation on social media, discussing approaches to characterization, detection, and intervention. The paper also enumerated key open issues and research gaps, suggesting directions for future work in the development of more robust tools and frameworks for misinformation management.

Together, these studies collectively worked on the dynamics, challenges, and opportunities associated with health misinformation on social media, providing a robust foundation for further research and policy development (Yeung et al., 2022; Adebesin et al., 2023; Chou et al., 2020; Chen, 2022).

While misinformation may be widely spread, the volume may be mediated by the country and the topic discussed (Alyousef (2019). In a systematic literature review, the researcher emphasized the importance of fake news and its threat to human health. The most common threat includes vaccine refusals and, as a consequence, the increase in related diseases. No studies considered behavioural change after exposure to fake news except vaccination-related ones. Other researchers' methods were based on public data from vaccination databases and infectious disease reports. (Carrieri, 2019; Jamison, 2019; Oh, 2019; Shah, 2019; Steffens, 2019; Vraga, 2019; Yang, 2019).

Fake news about cancer is the next common threat to human health. Misinforming cancer patients is widespread and dangerous because these patients are desperately seeking solutions, and such misinformation may be misleading and cause harm (Alsyouf, 2019; Bianchini, 2019; Chen, 2018; Chua, 2018; Delgado-López, 2018; Gentile, 2018; Ghenai, 2018). The other studies did not follow the effect of social media on a specific disease; however, some were evaluating news about medical conditions and epidemics. Their main target was an evaluation of fake news itself, regardless of the type of disease. In other words, the specified topic was only a tool to evaluate the credibility of news, and the effects of the tool were not studied (Sommariva, 2018; Vijaykumar, 2018). The reason for the prevelence of health-related misinformation still needs more investigation (Sommariva, 2018).

Wang et al. (2019) reviewed 57 articles, and based on their result, the most studied topic in health-related misinformation research was communicable diseases (n=30), in which vaccination was the central part. This is similar to what the current review found.

Based on Eckert et al. review of 79 published types of research about health communication through social media, most of them still need to provide demographic information about users. Also, they mention no trace of the socioeconomic status of those who use social media and share posts (Eckert et al., 2018). In 2018, Guimarães reported that few works had been done on fake news posts' characteristics, while the review showed

content analysis, including structure and pattern findings in this matter. Keselman (2019) opposes Guimarães and claims many studies focused on the information characteristics and the senders rather than studying the targets. This somehow confirms what Eckert mentioned about the lack of work on the receivers' characteristics.

According to Sharma (2019) and Tandoc et al. (2019), researchers are shifting focus from identifying fake news user characteristics to finding ways to mitigate and stop its spread on social media.

2.11 Media literacy

In defining media literacy, it is important to note that scholars use various interconnected terms, including digital literacy, news literacy, social media literacy, and information literacy. Potter has identified approximately 20 definitions for media literacy (Briandana & Dwityas, 2019; Potter, 2010). These terms often refer to ways individuals approach news (Potter, 2010; Wardhani et al., 2019; Pfaff-Rüdiger & Riesmeyer, 2016). Media literacy commonly includes three main components: 1) locating or utilizing digital information, 2) creating information, and 3) sharing and distributing news. These elements contribute to the ability to access, interpret, analyze, create, and evaluate news across different forms of social and digital media (Hobbs, 2017; Wardhani et al., 2019; Potter, 2018; Kupersmidt, 2012; Pfaff-Rüdiger & Riesmeyer, 2016). There can be overlap between media and information literacy, as the latter focuses on obtaining information, while media literacy relates more specifically to news-related activities (van Dijk & van Deursen, 2014). Communication technology literacy also shares similarities with these concepts. Some researchers define media literacy as education that enables individuals to understand media processes (Briandana & Dwityas, 2019). Pfaff-Rüdiger & Riesmeyer (2016) further describe media literacy as a process linking knowledge and practice, involving both intrapersonal motivation and social factors.

James Potter (2010), after reviewing numerous definitions from the past decade, summarized key themes that are widely referenced by other scholars (Briandana & Dwityas,

2019; Jones-Jang et al., 2019; Pereira & Moura, 2019; Tully et al., 2020; van Dijk & van Deursen, 2014; Vraga et al., 2020; Wardhani et al., 2019). According to his analysis, four central themes emerge in most media literacy definitions: first, the potential for negative effects of social media on individuals; second, the role of media literacy as a tool for mitigating possible harm from social media, though the mechanisms for its effectiveness are still under discussion; third, the need for ongoing development, as media literacy is considered dynamic; and fourth, the multidimensional character of media literacy, with many definitions focusing on cognitive, emotional, aesthetic, and moral dimensions (Potter, 2010).

2.11.1 Evaluation of Media Literacy

Researchers have continued to examine media literacy through a variety of methods (Potter, 2010; Hargittai & Hsieh, 2012; Hobbs, 2017). According to Hargittai and Hsieh, some researchers utilise in-person techniques, which can provide more detailed and precise information on how individuals respond to social media news (van Deursen & van Dijk, 2009). However, these methods require considerable resources such as workforce and funding, limiting the generalisability of findings to larger sample sizes (Hargittai & Hsieh, 2012). To address these constraints, Hargittai (2009) introduced a method involving questions based on internet-related terms, which was further developed in 2012 (Hargittai & Hsieh, 2012).

Hobbs (2017) notes that diverse definitions of media literacy have resulted in a range of evaluation methods, each serving specific research objectives. He categorises evaluation approaches into two main groups: humanistic studies, which focus on semiotics, meaning, interpretation, and political economy, and social science, which investigates media effects (Hobbs, 2017, p. 256). In 2005, Hobbs proposed a theoretical framework for studying media and news literacy comprising three components: 1) author and audience (AA), 2) message and meaning (MM), and 3) representations and reality (RR) (Hobbs, 2005). This framework

has been utilised and refined by other researchers (e.g., Tully et al., 2020; Hargittai & Hsieh, 2012).

Efforts to assess media literacy across different contexts continue to evolve, reflecting variations in definition and methodology (Hobbs, 2012; Tully et al., 2019). Gross and Latham (2009) approached the concept from an information literacy perspective, using competency theory to explain why individuals who lack information literacy may still express high confidence in their abilities (Gross & Latham, 2009). Although information and media literacy are distinct, they share similarities. The study employed self-assessment and direct measurement tools to determine students' information literacy, finding a preference among participants for outcomes over reliable sources, suggesting tendencies toward confirmation bias (Gross & Latham, 2009). Extrapolating to media literacy, it appears users may gravitate towards content that aligns with their preferences regardless of accuracy. The development of both information and media literacy appears to be related to computer literacy, as skill levels vary across groups. Effective information retrieval and fact-checking online require digital literacy skills (Gross & Latham, 2009; Hargittai, 2005).

In addition to studies focusing on theories and frameworks for media literacy assessment (e.g., Tully, 2020), other research has measured user literacy levels. For example, Briandana and Dwityas (2019) evaluated media literacy among adolescents, reporting medium levels based on Potter's theory. Their evaluation used categories including use skills, critical understanding, and communication abilities, drawing upon frameworks developed by Potter (2010) and Hobbs (2010). Pereira and Moura (2019) used self-assessment and surveys to assess students, concluding that media literacy levels were basic and recommending relevant coursework; they also found surveys to be more effective than self-assessment.

Wardhani et al. (2019) explored environmental influences, noting that while parental roles are influential, media literacy is not commonly acquired from parents. They observed that generational differences in technology use and rapid changes in digital media impact

this process. The study recommended formal education, reporting that while participants demonstrated satisfactory media literacy, there were gaps in information literacy; therefore, additional resources beyond family and school are necessary (Wardhani et al., 2019). Similarly, Tully et al. (2020) examined media and information literacy in young people and reported results consistent with those of Pereira and Moura (2019).

2.11.2 Is Media Literacy Helpful?

Ziapour et al. (2024) conducted a systematic review examining the importance of social media literacy in managing the infodemic. The authors highlighted how improvements in social media literacy can empower users to better identify, assess, and respond to health misinformation online. Their findings suggest that fostering these skills is a critical strategy for mitigating the spread and impact of false information in digital health contexts.

Khan and Idris (2019) state that current approaches to addressing fake news and misinformation may not be sufficient, suggesting that additional measures, such as improving media literacy, are necessary. Tully et al. (2020) also support the potential value of media literacy, while Rasool et al. (2019) describe fake news as a multidimensional issue that requires multiple strategies. According to Rasool et al. (2019), media literacy is one strategy among many, but it is not a comprehensive solution. Some researchers, including Pfaff-Rüdiger & Riesmeyer (2016) and Turner et al. (2017), have indicated that enhancing media literacy can influence social behaviour. Pulideo (2020) discusses the social factors involved in the improvement of media literacy. Hobbs (2010) maintains that media literacy is important for all social media users and advocates its inclusion in educational curricula.

Bode and Vraga (2015) present findings that correcting information on social media can reduce the spread of misinformation, highlighting the role of fact-checking. Similarly, Tully et al. (2020) found that news literacy messages distributed via social media may offer some protection against fake news and misinformation, although the duration of this effect is

not fully understood. They suggest further research is needed to explore alternative methods for increasing media literacy.

Jones-Jang et al. (2019) compared various literacies, including media, information, news, and digital literacy, examining their effectiveness in combating fake news. Their definitions distinguished between these types: media literacy relates to people's perception of information; information literacy involves locating and navigating information; news literacy pertains to knowledge about the creation and function of news; and digital literacy concerns understanding the internet and related activities. Their results indicate that only information literacy had a direct impact on reducing fake news.

In a quantitative analysis, Khan and Idris (2019) identified individual information literacy as a key factor in limiting the spread of fake news, suggesting that effective information literacy may empower users through media literacy. Research by Mihailidis and Viotty (2017), focusing on the 2016 US presidential election, asserts that media literacy has a significant role in counteracting misinformation. Similarly, Pfaff-Rüdiger and Riesmeyer (2016) emphasize media literacy as important for social engagement, especially given increased social media use, and explored how it can develop from childhood with the influence of socialization.

Most scholars cited agree that media literacy is an important consideration in the context of fake news, alongside other approaches. Research discussed in this chapter has largely concentrated on media literacy education provided to young students within schools, rather than adults or other groups in public settings.

2.11.3 Using Media Literacy to Diminish Health-Related Fake News

Media literacy is crucial in combating health-related fake news, which can have serious, even fatal, consequences (Krishna & Thompson, 2019). The COVID-19 "infodemic" exemplifies how widespread misinformation complicates public understanding during crises (Pulido et al., 2020). Since such periods are not optimal for media literacy training, it is

essential to educate people beforehand, as schools do with students (Kupersmidt et al., 2012).

Kupersmidt et al. (2012) found that media literacy education helps improve health decision-making, reducing risky behaviors like substance abuse. Similarly, Rudd et al. (n.d.) highlight its importance.

The younger generation often relies on online sources for health information, making social media literacy essential (Taba et al., 2022). Maitz et al. (2020) also note that online literacy fosters health literacy among students.

Unlike topics like politics or economics, health concerns everyone. Social media provides opportunities for accessible communication but also spreads misinformation.

Health professionals can counteract fake news through fact-checking and providing clear explanations both online and offline (Mustafaraj & Metaxas, 2017; Tully et al., 2020). After the COVID-19 pandemic was declared, WHO responded to the rising infodemic by assembling a global task force to address misinformation (Zarocostas, 2020).

2.12 Health Communication

Health communication can involve different types of interactions, depending on the target audience. There are generally three main channels: communication among health professionals, communication between health professionals and the public, and communication within the general population (non-professionals). The first channel, among health professionals, often involves sharing health information or patient data with colleagues who have similar backgrounds or knowledge levels (Keskin et al., 2024). The second channel, between health professionals and the public, typically features a significant difference in medical expertise between the parties (Scholz et al, 2021). The third channel is communication among non-professionals in the general population (Eastin et al., 2021). This dissertation focuses on the third channel.

Within this category, even when individuals possess comparable amounts of medical information, their interpretations of health topics may vary greatly. Moorhead et al. (2013) updated these same categories in their systematic review examining the role of social media in health, aiming to assess how social media might influence health service outcomes (Moorhead et al., 2013).

A recent study by Chou, Gaysynsky, and Vanderpool (2020) demonstrates that people interpret health information on social media differently, even when exposed to the same medical facts. Individual beliefs, social context, and information framing all shape understanding and response, highlighting the challenge of misinformation in health communication.

While the first and second categories described above involve at least one expert participant, the third category is more susceptible to errors. The widespread sharing of information on social media can contribute to misinformation and its negative consequences (Jiang & Wilson, 2018). To address health-related fake news, it is essential to apply the same general principles used to combat misinformation more broadly.

2.12.1 Methods to Mitigate Health-Related Fake News

Health-related fake news mitigation can be classified into three dimensions: i) existing professional standards, ii) current models, and iii) ongoing intervention efforts. A primary challenge in the health field is identifying which types of misinformation may result in negative outcomes or influence population behavior (Chou et al., 2018).

Regarding standards, there is not a single or universal standard governing all aspects and regions. Social media platforms originate from various locations and thus often have different policies, which require separate analysis and comparison. Scholars, including Lowrey (2017), note that the landscape of fake news mitigation is varied and complex. Many platforms, such as Google, Facebook, and Twitter (X), have implemented tools designed to identify and remove fake news and misinformation (Jiang & Wilson, 2018; Shahi et al., 2020,

Vo & Lee, 2019). An example of regional standards is found in Europe, discussed in the subsequent paragraph.

The European Committee convened a group of experts to assess the current state of social media and offer recommendations. Their efforts resulted in five guidelines focused on addressing disinformation, including fake news, on social media: 1) enhancing transparency; 2) promoting media and information literacy; 3) developing tools to support users and journalists in addressing disinformation; 4) protecting the diversity and sustainability of the European news media ecosystem; and 5) encouraging continuous research on the effects of disinformation in Europe (Bebić & Volarević, 2018). Bebić & Volarević (2018) suggest that these guidelines are based on traditional views of journalism and propose further policy changes for social media, including: 1) understanding new media paradigms; 2) developing new media models; 3) regulating online environments; 4) providing training and education on emerging media trends; and 5) investigating the impact of new media paradigms.

Some countries have adopted different approaches. For example, Iran restricts access to some social media and encourages the use of domestic alternatives to increase content control. In China, WeChat serves as an alternative to international platforms, allowing for greater government regulation over content. Reports indicate that Iran's approach to social media governance is similar to that employed in China (One App, Two Systems: How WeChat Uses One Censorship Policy in China and Another Internationally—_The Citizen Lab_, 2016).

The second and third categories, current models and interventions,are generally collective in focus. Various interventional approaches have been proposed, each supported by different theories (Zhou & Zafarani, 2018). However, research indicates that additional methods still need to be developed and refined (Chou et al., 2018). The primary current efforts are outlined below:

1- Prevention from the spread: Techniques that identify fake news propagation behaviors and linguistic patterns immediately after social media posting can assist in limiting further dissemination (Shahi et al., 2020).

2- Fact-checking: This method has been examined and implemented globally (Amazeen, 2020). Amazeen notes that fact-checking requires substantial resources, funding, personnel, and time (Amazeen, 2020; Zhou & Zafarani, 2018). Despite these requirements, research suggests it contributes to a more accurately informed public and can influence policy outcomes (Amazeen, 2020).

Fact-checking is typically divided into two main approaches: manual and automatic (Shahi et al., 2020; Nguyen et al., 2018; Kim et al., 2019; Zhou & Zafarani, 2018; Hannak et al., 2014; Margolin et al., 2018):

- The manual method generally involves non-experts, though they may not possess specialized content or structural knowledge (Zhou & Zafarani, 2018). Hannak et al. (2014) suggested that since fake news originates within communities, mitigation should involve community participation. Shu et al. (2018) identified two challenges: a) fake news is intentionally created to bypass filters, and b) there is an absence of sufficient datasets to determine accuracy; however, human involvement through comments can guide others (Shu et al., 2018). Margolin et al. (2018) highlighted limitations in fact-checking but observed that human fact-checking tends to be "contingent," encouraging wider participation when initiated locally. This dynamic positions fact-checking as a potentially effective regional strategy (Margolin et al., 2018). Campaigns may motivate broader engagement in fact-checking activities (Shu et al., 2018), and user interventions remain valuable regardless of expertise (Jiang & Wilson, 2018).
- Mohammed et al. (2023) surveyed the impact of social media on COVID-related information, identifying perceived risk, e-health literacy, public awareness, and input from health experts as key factors for effective information flow—all linked to human activity.

- The automatic approach utilizes machines. Machine learning (ML) and Natural Language Processing (NLP) systems can detect fake news based on propagation rate, user comments, sharing times, and other metrics, subsequently removing such content from platforms (Nguyen et al., 2018; Zhou & Zafarani, 2018).

A notable aspect of automatic fact-checking is its independence from context-specific knowledge; it can operate across different languages and topics. Scholars recommend that fact-checking systems prioritize transparency, integrate user knowledge, and present uncertainty clearly (Nguyen et al., 2018; Zhou & Zafarani, 2018).

3- Media and information literacy, previously discussed, constitutes another strategy for addressing fake news.

When reviewing health information on social media, the methods used are similar to general strategies for addressing fake news and misinformation. There is currently no distinct approach specific to health-related topics. The involvement of experts in fact-checking is notable, as studies suggest people tend to trust them more than unfamiliar sources.

2.13 UNESCO Framework

Earlier, various frameworks used by researchers were reviewed. For this study, a specifically designed template was required to evaluate social media literacy. During this process, a comprehensive framework suitable for worldwide use was identified. UNESCO (United Nations Educational, Scientific, and Cultural Organization) has developed an assessment framework for media and information literacy that is intended for implementation across different countries. Publications by UNESCO provide justification for integrating media and information literacy and discuss the associated literacies shared between them (UNESCO, 2013). The UNESCO assessment framework is structured to be applicable globally and includes three primary levels: national, institutional, and individual (UNESCO, 2013).

To facilitate a universal assessment tool, UNESCO developed a framework based on the rationale that literacy is influenced by various social, economic, political, and technological factors, as well as societal institutions such as family, community, workplaces, religious organizations, policymakers, civil society, industry, and the state. Literacy is presented as culturally, linguistically, and temporally diverse rather than uniform (UNESCO, 2013).

The framework aims to support countries at the national program level and institutions responsible for teacher education and professional development. It addresses both country readiness and media and information literacy (MIL) competencies (UNESCO, 2013). The MIL competencies are relevant for evaluating individual skills and are organized into a competency matrix with three components: a) access and retrieval, b) understanding and evaluation, and c) creation and utilization (UNESCO, 2013). The following diagram provides a visual representation of this competency matrix.

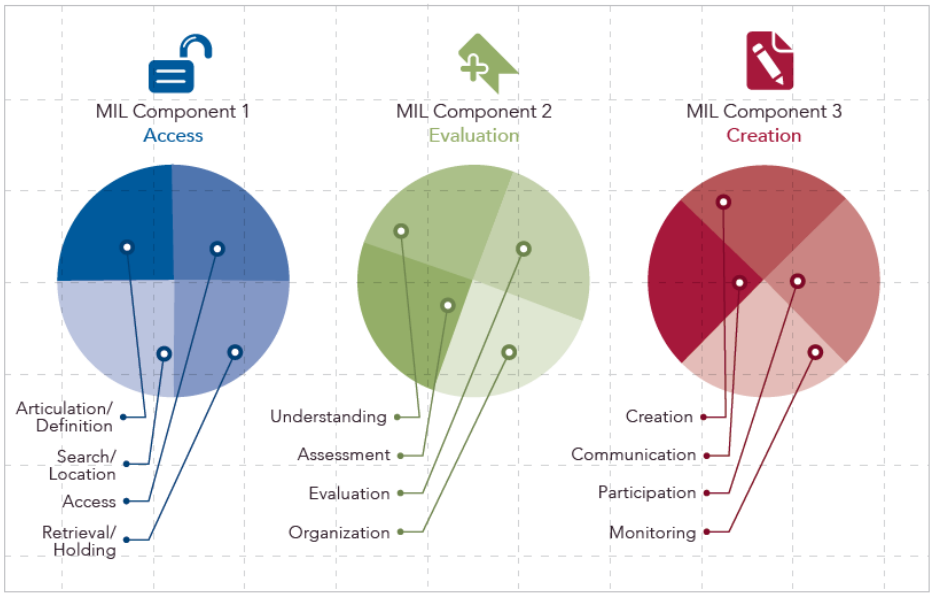

Figure 1- MIL Competency Matrix. (UNESCO, 2013)

2.13.1 Why UNESCO framework

The literature indicates that relatively few scholarly papers present a social media literacy assessment framework. Some relevant works include Ashley et al. (2013), who introduced a scale for news media literacy, and Lin et al. (2013), who proposed a media literacy framework and noted that only one such framework had been presented up to that point (Lin et al., 2013). Rad et al. (2020) examined statistical properties of social media context awareness, which relates to literacy (Rad et al., 2020). Additionally, Hobbs developed a framework intended to evaluate the media literacy process described in the literature review (Hobbs, 2005). Tully et al. (2020) focused on educational institutions, but their work is designed specifically for that context and may not be universally applicable like the UNESCO framework.

A comprehensive framework for global use was published by UNESCO in 2013. The UNESCO framework enables consistent assessment of literacy across countries, allowing results to be compared or summarized with other studies using the same approach. For these reasons, the current research adopts the UNESCO framework.

2.13.2 The framework

The UNESCO MIL assessment framework includes computer and technology literacy as a means of accessing news. This research, however, does not focus on computer literacy for news access. Instead, it examines individuals' media literacy skills, specifically their level of understanding of and response to news.

To facilitate the evaluation of media and information literacy for each individual, a matrix has been developed by UNESCO and is provided in Appendix A. The table outlines each component.

Table 3- Descriptions Of The UNESCO Framework Components (UNESCO, 2013)

Component	Description	Subject

Access	Recognizing the demand for, being able to search for, being able to access and retrieve information and media content	Articulation/Definition Search/Location Access Retrieval/Holding
Evaluation	Understanding, assessment, and evaluation of information and media	Understanding Assessment Evaluation Organization
Creation	Creation, utilization, and monitoring of information and media content	Creation Communication Participation Monitoring

The results for each subject contribute to the MIL profile for each individual. As a result, MIL is represented by a matrix rather than as a single variable. Each component is assessed by its respective subjects and presented as part of the profile. There are 113 total performance criteria across all components. A complete list of these criteria is provided in Appendix A.

2.13.3 Modification and Application

There are strong reasons for changing the UNESCO framework to better fit this study. The original framework has many parts, including content creation, communication, and participation. However, not all of these are useful for studying how people in Iran use health information and news on social media.

First, most health news and information are created by professionals like doctors, journalists, or organizations—not by ordinary people. While many people post about their daily lives, it is less common for them to share or create original health news. If we focus on

content creation, it will not show what regular users actually do. It would also not be very helpful for the research goals and could weaken the results.

Second, the original framework has 113 criteria. If we use all of them, the survey would have at least 113 questions, plus a demographic section. Such a long questionnaire would be too much for most participants. People might get tired, give short or less thoughtful answers, or not complete the survey at all. This would hurt the quality of the study.

Third, it is important to adapt the framework's language and design to the local context. The way Iranians use language and express themselves online can be different from the original UNESCO model. To make sure people understand the questions and feel comfortable answering, the survey should use language and examples that fit Iranian culture and everyday life.

Fourth, focusing the framework on the user as a consumer (not a creator) of health information makes the research more relevant. Most people get health information by reading or watching, not by making their own news. Limiting the study to the access (36 criteria) and evaluation (42 criteria) of information helps the research focus on what matters most for users.

Finally, some criteria can be merged into single questions to make the survey even shorter. This approach has been used in earlier studies, such as Li et al. (2017), who adjusted the UNESCO framework to design practical surveys.

Making these changes is necessary. It will make the research more accurate, easier for participants, and better matched to the Iranian context. This way, the study can provide clear and meaningful results about how people in Iran understand and use health information on social media.

In summary, adapting the UNESCO framework ensures the study reflects Iranian users' realities which can be compared to similar findings in other studies that use this framework. By focusing on information access and evaluation, the research avoids

unnecessary complexity, making participation easier and results more relevant. Customizing the language and merging criteria produces a survey that is clearer and more useful for participants.

This approach gives a clear, easy way to understand how people in Iran use health information online. By making these changes, the results will be more useful and better suited to what people in Iran actually need.

3 Chapter three: Methodology

3.1 Research design:

To better understand social media literacy among Iranian users, this study used a mixed-methods approach, combining both qualitative and quantitative research. First, people were asked to rate their own social media skills through a survey. Next, experts in social media were invited to share their professional opinions on the subject. By comparing what the public thinks with what experts see, the study gets extra views on the depth work that should be done in this field. This approach helps to get a fuller picture by using both types of research methods. A short introduction to the mixed method is presented here.

Qualitative, Quantitative and Mixed Method

The two commonly used methods in research are quantitative and qualitative, which have their own benefits and limitations. The table below is a summary of the characteristics of each method by Mahmoud (2013):

Table 4- Comparison Between Qualitative And Quantitative Research Methods (Mahmoud, 2013)

	qualitative	quantitative
Purpose	To understand and interpret social interactions.	To test hypotheses, look at cause and effect, and make predictions
Group Studied	Smaller and not randomly selected.	Larger and randomly selected.
Variables	Study of the whole, not variables.	Specific variables studied
Type of Data Collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open-ended responses,	Quantitative data based on precise measurements

	interviews, participant observations, field notes, and reflections.	using structured and verified data collection instruments
Type of Data Analysis	Identify patterns, features, themes	Identify statistical relationships.
Objectivity and Subjectivity	Subjectivity is expected	Objectivity is critical
Role of Researcher	Researcher and their biases may be known to participants in the study and participant characteristics may be known to the researcher	Researcher and their biases are not known to participants in the study, and participant characteristics are deliberately hidden from the researcher (double blind studies).
Results	Particular or specialized findings that are less generalizable.	Generalizable findings that can be applied to other populations
Scientific Method	Exploratory or bottom–up: the researcher generates a new hypothesis and theory from the data collected.	Confirmatory or top-down: the researcher tests the hypothesis and theory with the data.
View of Human Behavior	Dynamic, situational, social, and personal	Regular and predictable
Most Common Research Objectives	Explore, discover, and construct	Describe, explain, and predict

Focus	Wide-angle lens; examines the breadth and depth of phenomena	Narrow-angle lens; tests a specific hypothesis
Nature of Observation	Study behavior in a natural environment	Study behavior under controlled conditions; isolate causal effects.
Nature of Reality	Multiple realities; subjective	Single reality; objective
Final Report	Narrative report with contextual description and direct quotations from research participants	Statistical report with correlations, comparisons of means, and statistical significance of findings

A mixed method approach combines qualitative and quantitative methods to enhance research outcomes. While statistical methods allow for generalization, mixed methods provide deeper insight into underlying causes. The structure of a mixed method varies; Leech and Onwuegbuzie (2009) identify three categories: level of mixing (partial or full), time orientation (concurrent or sequential), and emphasis (dominant or equal). Time orientation specifies whether components occur simultaneously or in sequence, and dominancy indicates which element is more prominent (Johnson & Onwuegbuzie, 2004). Johnson and Onwuegbuzie (2004) also outline nine possible mixed method configurations.

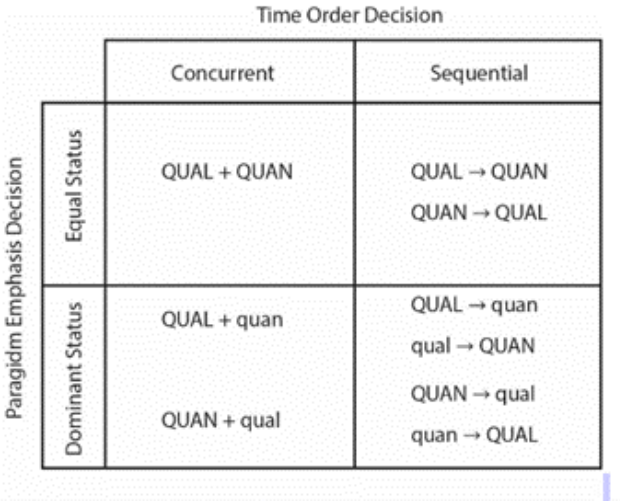

Figure 2- Classification Of Mixed Method Studies According To Johnson & Onwuegbuzie (2004)

Creswell (2012) introduced six types of mixed methods:

- The convergent parallel design
- The explanatory sequential design
- The exploratory sequential design
- The embedded design
- The transformative design
- The multiphase design

In relation to the initial objective of this research—evaluating media literature as a foundation for subsequent goals—two out of the six types described by Creswell (2012) are relevant: the explanatory sequential and the exploratory sequential design (Şahin & Öztürk, 2019). Both designs involve an initial quantitative phase, which is then followed by a qualitative element. In the explanatory sequential approach, the findings from the quantitative section are examined in greater detail, with each phase of data collection and analysis kept distinct. Conversely, the exploratory design is primarily employed to identify phenomena, recognize themes, and develop data collection instruments (Şahin & Öztürk, 2019). This research adopts the exploratory design to examine media literacy and to present an overview of its current status and perspectives. At the time this study was designed, no

published research addressed Iranian media literacy. This research therefore lays the groundwork for future studies in the field.

3.2 **Role of the researcher**

The researcher played a crucial role in both collecting and analyzing data for this study. Drawing upon extensive experience in clinical research and study design, the researcher carefully crafted an effective research plan. This expertise enabled the development of well-structured questions, clearly defined variables, and thoughtfully designed surveys, which are essential for ensuring reliable results in mixed-methods research (Creswell & Plano Clark, 2017).

Meticulous planning was particularly important during the quantitative phase, as selecting suitable variables directly influenced the precision of the study's findings (Bryman, 2016). The researcher's proficiency with analytical tools such as SPSS and Excel contributed to an accurate and efficient analysis of numerical data (Pallant, 2020).

The researcher's understanding of local conditions, including difficulties in accessing digital platforms within Iran and potential reluctance to participate in international research, shaped decisions about survey distribution and interview methods. This sensitivity helped ensure ethical standards were upheld and created a supportive environment for participants (Patton, 2015; Berger, 2015).

During the interview phase, the researcher prioritized establishing trust with participants and overcame recruitment challenges by relying on professional connections and snowball sampling techniques. These networks proved valuable not just for identifying appropriate participants but also for refining the analytic focus; for example, when participants' responses veered toward personal stories rather than research-relevant content, the researcher included only material pertinent to the study's objectives.

To reduce bias, the quantitative data collection was conducted anonymously. Data were analyzed using SPSS, minimizing the risk of inadvertent influence from the researcher.

For the qualitative component, an independent analyst performed a separate NVivo analysis without access to participant identities, which helped enhance the reliability and impartiality of the results.

Overall, the researcher's expertise, careful planning, and ethical approach strengthened the study's credibility and integrity hallmarks of sound mixed-methods research (Creswell & Creswell, 2018; Tashakkori & Teddlie, 2010).

In qualitative case study research, the researcher serves as the central instrument for gathering and interpreting data. Unlike quantitative research, which emphasizes objectivity, qualitative methods acknowledge that the researcher's subjectivity can present challenges but also offer valuable insights. Practicing reflexivity, regularly reflecting on personal perspectives and potential influences on the research, is essential to maintaining rigor and transparency (Olmos-Vega, Stalmeijer, Varpio, & Kahlke, 2023; McLeod, 2024).

The lead researcher in this study is an Iranian medical doctor who has directly witnessed the harmful effects of misinformation and disinformation in healthcare settings. Her clinical experience included encounters with patients who suffered serious consequences, and in some cases, death, after following misleading health advice found on social media. These experiences motivated her to pursue doctoral research focused on addressing the dangers of health misinformation, and her efforts to correct false information online deepened her dedication to this area.

Although her academic background is rooted in quantitative research, she sought mentorship from established qualitative researchers to ensure methodological rigor. Throughout the study, she maintained a reflexive journal to document decisions, reflections, and methodological steps, allowing for ongoing self-assessment and transparency about her influence on the research process (Olmos-Vega et al., 2023).

To further strengthen the study's validity, the researcher engaged in peer debriefing and invited an independent NVivo analyst to review the study's objectives and independently

code the interview data. By comparing her own coding and thematic analysis with the independent reviewer's, she identified both consensus and discrepancies, employing triangulation to ensure that the findings were not solely shaped by her perspective (Nowell, Norris, White, & Moules, 2017).

Ethical considerations were at the forefront of the researcher's approach. All participants received comprehensive information about the study, were assured of the confidentiality of their identities, and faced no risks by participating. All procedures were formally approved by the University of Ottawa Research Ethics Board, in line with modern standards for ethical qualitative research that emphasize respect, openness, and accountability (Tracy, 2010).

In conclusion, the researcher's professional expertise, personal motivation, and commitment to reflexivity shaped her involvement throughout the study. By acknowledging her own positionality, maintaining a reflexive journal, seeking independent analysis, and following ethical guidelines, she conducted a rigorous and trustworthy qualitative case study that advances understanding of health misinformation and media literacy.

3.3 **Quantitative phase**

Upon approval of the proposal, the survey was launched on the Qualtrics website, and the link was shared via WhatsApp. Originally, SurveyMonkey was chosen as the survey platform due to its user-friendly interface and widespread use in academic research (Evans & Mathur, 2005), but it was replaced by Qualtrics because SurveyMonkey is inaccessible in Iran due to government restrictions (Freedom House, 2023). At the time of proposal writing, some social media platforms such as Telegram and WhatsApp remained accessible; however, by the time the approval was granted, Telegram had also been banned, joining Instagram on the list of restricted platforms in Iran (Human Rights Watch, 2023). Consequently, WhatsApp was selected as the preferred platform for sharing the survey link, given its relative accessibility and popularity among Iranian users (Statista, 2024).

A partnership was established with the Transportation Industrial News Network (TINN) to distribute the survey link. The selection of TINN was based on two reasons: 1) its diverse audience, which increased the potential reach of the survey, and 2) the author's previous collaboration with TINN, which facilitated smoother coordination and trust in the process.

Iranian users residing within Iran were invited to complete the survey online. The survey was intended to remain open until either 1) a sample size of 250 participants was reached, or 2) 2.5 years had elapsed since the survey's inception (Bryman, 2016), following best practices for determining quantitative sample size and duration in similar research contexts.

After receiving ethical approval, the survey phase commenced. However, shortly afterward, protests related to the Woman-Life-Freedom movement erupted following the death of Mahsa Amini (Woman, Life, Freedom | Canadian Museum of History, 2024; Human Rights Watch, 2023). These events led to widespread unrest, with public attention focused on ongoing developments, which adversely affected participant engagement. Only 50 responses were collected during this period. Compounding these difficulties, the subsequent ban on WhatsApp further limited public access to the survey (Freedom House, 2023). Despite extended efforts over the following months, only eight additional responses were obtained, making it clear that the quantitative data collection phase could not continue effectively.

Upon the supervisors' approval to conclude the first phase, the collected data were subjected to analysis using Excel and SPSS, consistent with established quantitative research methodologies (Pallant, 2020), to prepare for the qualitative stage of the study.

3.4 Qualitative phase:

The initial target group for participation consisted of health professionals and/or social media experts. However, due to limited access to health professionals with expertise

in public behaviour on social media, the recruitment focus shifted toward engaging a greater number of social media experts and fewer health professionals. The intended sample size was 20 interviewees. Beginning with the most relevant candidates and utilising a snowball sampling method, subsequent participants were referred by earlier interviewees. Despite these efforts, the process encountered challenges; many potential participants declined without providing specific reasons. According to referrers, concerns included the researcher's location in Canada and participants' unfamiliarity with international interviews. Additionally, some individuals chose not to continue after receiving the topic and questions. Those who agreed to participate were given up to six months to complete the process.

Interview data collection followed a structured approach: initial findings were presented to participants, who were then asked to discuss their personal experiences, provide estimates regarding initial results, and offer interpretations. Further questions explored strategies for enhancing Iranian users' social media literacy.

Several factors necessitated conducting interviews offline and collecting responses via recorded voice messages. These factors included time zone differences, restricted internet access and filtering within Iran, as well as the time constraints of busy professionals. Telegram was selected as the primary platform for receiving responses, owing to its accessibility and versatility relative to alternative options. It is also noteworthy that during the study period, the use of anti-filtering tools among Iranians had returned to levels observed prior to the ban on Telegram.

After collecting the responses via Telegram in Farsi, all audio files were reviewed and manually transcribed into text by the researcher. Following preparation of these drafts, Google Translate was utilized to produce English translations. Subsequently, all translations underwent thorough proofreading to ensure accuracy. Finally, the data were imported into NVivo for analysis.

3.5 Inclusion criteria:

3.5.1 *Quantitative part:*

- The use of social media applications with smartphones (the general population possibly uses smartphones instead of internet browsers. Besides, smartphones make it easier and more accessible to read and share the news).
- Using social media applications either legally or illegally (illegal references applications banned by the Iranian government, such as Telegram).
- Living within the political borders of Iran
- Giving consent to participate in the study

3.5.2 *Quantitative part:*

- Educational or work experience background in social media, preferably online
- Living within the political borders of Iran
- Giving consent to participate in the study

3.5.3 Exclusion criteria:

- Iranians who are not living in Iran
- Not being an Iranian citizen

3.6 Demographic variables

Table 5- Demographic Variables in the Study and Descriptions

Name	**Description**	**unit**
Year of birth	The year of birth of the person.	number
Highest level of education	The maximum level of education that a person has acheived. In the case of multiple degrees, the highest one will be considered.	Primary Secondary Diploma

		Bachelor Master PhD/MD
Field of education	the field of study contained in the highest degree. Answers are categorized into two main groups: related to health/medical science and not related.	Related Not related
Using smartphone	If the person is using a smartphone to access social media or not. (If not, will be excluded)	Yes/No
The application	Mobile application(s) used by social media to get health-related information/news. The list will be confirmed with an engineering lab inside Iran related to study social media contents.	Telegram Whatsapp Twitter Instagram Others
Nationality	The person is an Iranian citizen	Yes/No
Place of permanent residence	Whether the person is a permanent resident in Iran or not (If not, will be excluded)	Yes/ No
Source of information about COVID	The media that the user has used to get news and information about COVID. Mobile applications or others	Mobile apps Others
Attitude change	Based on their experiences during the COIVD-19 pandemic, if a person has experienced any change in	Yes/ No

	attitude regarding truth about health-related information on social media or not.	
Trust change	Any change in their trust about the news on social media mobile apps from their COVID experience	Yes/No
Lesson/ suggestion for media literacy	Any experience or suggestion based on the pandemic to improve individual and media literacy	Open answer

The variables related to the competency profile are presented in the component matrix in Appendix A.

3.7 Data Analysis

During the quantitative analysis, the first stage was the thorough validation of the survey data. Data validation refers to checking the integrity, completeness, and reliability of the responses before proceeding to any statistical testing. This involves several key steps, including verifying that responses are not missing essential information, identifying and removing duplicate entries, and ensuring that participants' answers are logically consistent (Field, 2018; Hair et al., 2020).

For this research, all responses were meticulously examined. Seven cases were removed from the analysis due to failing the following criteria:

- More than 50% of the questionnaire items were unanswered. These incomplete responses were excluded, as insufficient data can lead to biased results and weaken the statistical power of the study.
- Possible duplicate entries were screened by comparing demographic data and response patterns. If two or more sets of answers matched perfectly—including demographics and pattern of answers—these were flagged as potential duplicates. Only one set of responses per individual was retained to ensure data independence and avoid skewed

results. However, in this dataset, no duplicates were detected; each respondent contributed a unique set of answers.

Validating data prior to analysis is widely recognized as essential for maintaining the integrity of statistical inferences. Ensuring data quality at this preliminary stage allows researchers to identify inconsistencies or errors that could otherwise undermine the credibility of the findings (Kwak & Kim, 2017; Field, 2018). By adhering to these standards, the study ensures that subsequent analyses are conducted on a reliable and robust dataset, increasing the overall trustworthiness and transparency of the research process.

SPSS v.16.0 and MS Excel from Office 365 were employed to conduct the quantitative data analysis for this study. To examine relationships and differences among variables, several statistical tests were utilized, including the independent samples T-test, Analysis of Variance (ANOVA), and correlation analysis.

The independent samples T-test is a statistical technique used to determine whether there is a significant difference between the means of two independent groups (Field, 2018). For instance, it can be employed to compare the media literacy scores between different demographic groups. ANOVA, or Analysis of Variance, extends this methodology by allowing comparisons across three or more groups simultaneously, assessing whether at least one group mean differs significantly from the others (Hair et al., 2020). Correlation analysis, on the other hand, evaluates the strength and direction of the relationship between two continuous variables, such as the association between age and media literacy levels (Kwak & Kim, 2017).

A significance level (often denoted as α) was set at 0.05, corresponding to a 95% confidence interval. The significance level represents the threshold below which the null hypothesis is rejected—that is, results are considered statistically significant if the p-value obtained from a test is less than or equal to 0.05. The p-value itself is defined as the probability of obtaining a result at least as extreme as the one observed, assuming the null

hypothesis is true. In other words, a small p-value (typically ≤ 0.05) suggests that the observed effect is unlikely to have occurred by random chance alone and is therefore considered statistically significant (Field, 2018; Kim, 2017).

By applying these statistical tests and adhering to established significance thresholds, the analysis ensures a rigorous evaluation of the relationships and differences present within the data, thereby supporting robust and credible research findings.

For UNESCO components, each individual is assigned a MIL profile based on specific criteria and corresponding scores. The resulting profiles for each person are treated as distinct variables for analysis.

For the second part of the research, the interview responses were carefully reviewed using NVivo software based on Braun and Clarke’s (2006) six-phase framework for thematic analysis.

Braun and Clarke's (2006) six-phase framework for thematic analysis is a widely recognized method for identifying, analyzing, and reporting patterns (themes) within qualitative data. This framework consists of six distinct phases: 1) familiarizing yourself with the data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing the report.

The first phase involves immersing oneself in the data to become thoroughly familiar with its content. The second phase focuses on generating initial codes that capture interesting features of the data in a systematic manner. In the third phase, these codes are collated into potential themes, which are then reviewed and refined in the fourth phase to ensure they accurately reflect the data. The fifth phase involves defining and naming the themes, providing clear definitions and names for each theme. Finally, the sixth phase involves producing the report, which includes a detailed analysis of the themes and their relevance to the research question. NVivo helps organize and sort the information from the

interviews so that the main ideas and important themes could be found and grouped together.

The researcher used two main approaches to coding the interview data:

- Deductive coding: For question that compared the opinions of the public and experts, the researchers used the results from the first phase and reviewed the answers from interviews.
- Inductive coding: For other questions, the researchers let new ideas and themes emerge naturally from the data by reading through the interviews and making notes about interesting or repeated points that came up. These were not based on any prior theory but on what was actually said by the participants.

The process began by reading through each interview several times including in Farsi and then translations in English. Then followed by marking sentences that presented an idea. NVivo made it easy to keep track of where each idea appeared and how often. If new themes or patterns were noticed during the coding, the researchers could easily add or adjust codes in the software.

After coding all the interviews, NVivo's tools were used to look for connections between different codes and to check that coding was consistent throughout the data. The researchers also took notes of the progress of development of themes. In order to avoid possible bias, an independent expert in Nvivio helped to review the analysis of interviews blindly and find any potential discrepancies.

3.8 Ethical consideration

The study design adhered strictly to ethical standards to protect participants' privacy and ensure informed consent. Before taking part, all participants were fully briefed on the study's aims, the voluntary nature of participation, expected confidentiality measures, and their right to withdraw at any time without penalty—a best practice echoed by the Declaration

of Helsinki (World Medical Association, 2013) and widely adopted in social science research (Sieber, 1992).

To safeguard anonymity, questionnaires did not collect any directly identifying information such as names. Instead, each respondent was assigned a unique number, ensuring that their identities remained protected throughout data collection and subsequent data analysis (Creswell & Creswell, 2018).

The research commenced only after obtaining approval from the relevant institutional ethics committee, which reviewed all study procedures for compliance with established standards. One point of inquiry from the committee concerned the collection of debit card numbers for participant compensation. As explained during the review, in Iran, sharing debit card numbers functions similarly to providing a bank account number for direct transfers—this practice is standard and does not grant access to sensitive financial information, as confirmed by the Central Bank of Iran (CBI, 2022). No data beyond what was necessary for compensation was retained, further reducing risk to participants.

4 Chapter four- Findings

This chapter presents the findings from both phases of the study, covering quantitative and qualitative results. First, demographic data for both groups are summarized, followed by quantitative and qualitative outcomes. The section includes descriptive statistics as well as brief inferential analysis to examine relationships and correlations among contributing factors. All original SPSS outputs are attached as an appendix.

4.1 Demographics

Phase one: During the survey phase of the research, 62 individuals began the questionnaire. Of these, 24 participants (38.7%) were excluded based on the exclusion criteria described in chapter three. Among the remaining 38 participants, 23 (60.5%) were female and 15 (39.5%) were male. The respondents' ages ranged from 17 to 74 years, with a mean age of 43.07±12.8. Details regarding education level and online application usage are provided in the following tables:

Table 6- level of education

	Frequency	Percent	Cumulative Percent
Under diploma	1	2.6	2.6
High school Diploma	5	13.2	15.8
Bachelor	8	21.1	36.9
Master	19	50	86.9
Doctorate	5	13.2	100.0

This result shows that the majority of respondents had post graduate degrees with 63.2%.

Table 7- the application(s) used by participants

Application	Frequency	Percent

Instagram	3	7.9
WhatsApp	3	7.9
WhatsApp, Domestic apps	1	2.6
WhatsApp, Instagram	5	13.2
WhatsApp, Telegram	1	2.6
WhatsApp, Telegram,, Domestic apps	2	5.3
WhatsApp, Telegram, Instagram	16	42.1
WhatsApp, Telegram, Instagram, Domestic apps	2	5.3
WhatsApp, Telegram, Instagram, Domestic apps	1	2.6
WhatsApp, Telegram, Instagram, Twitter	3	7.9
WhatsApp, Telegram, Instagram, Twitter, Domestic apps	1	2.6
Total	38	100.0

As shown in the table, except two people, the others were using WhatsApp which is the platform used to share the survey and may or may not reflect the popularity of this application. Seven people (18.4%) are using domestic applications and X (former twitter) has only four (10.5%) people in this survey.

Phase two: This part of the study involved ten experts in the field of social media. Three participants were female (30%) and seven were male (70%). As noted in chapter three, health professionals with experience in social media were limited. Consequently, only one interviewee was a health professional specializing in social media, serving as a professor in Health Communications. Another participant was a social media administrator,

while the remaining eight worked directly with social media as news reporters or in related fields. Three participants held Ph.D. degrees, and the other seven had master's degrees.

4.2 Survey results:

The answer to the question about using online social media for health-related information, 29 people (76.3%) said "yes" and 8 people (21.1%) answered "no" and one person (2.6%) didn't respond to this question.

Participants were questioned about their trust on social media about heath related information and were asked to present the level of trust as a number in percentage. The result is presented in table No. 8. In this table, "news" represents the general information about health, "advises" reflects the suggestions to health conditions on social media and "solutions" reflects taking action based on the advises toward health conditions by user.

Table 8- self-reported level of trust to health-related news on social media

	Minimum	Maximum	Mean	Std. Deviation
Trust on news	0	99	46.84	24.703
Trust on advises	1	90	46.81	25.508
Trust on solutions	0	91	36.42	25.907

The survey indicates that respondents reported identical mean levels of trust for news and advice, with a decrease observed for solutions. These findings were analysed based on two demographic variables: gender and education. Given that numerical values were compared across categorical variables, an independent samples t-test was conducted for gender, while an ANOVA was employed to assess differences by education level.

In the following tables, the title of the variable is shortened as news, advice and solutions and the word "trust on" is removed in order to save the space.

Table 9- Trust On Health Information on Social Media Based On Gender

Trust on	Gender	N	Mean	Std. Deviation
News	male	15	47.60	29.529
	female	23	46.35	21.698
Advices	male	14	51.07	27.869
	female	22	44.09	24.162
Solutions	male	14	31.43	25.630
	female	22	39.59	26.169

Table 10- T-test result for the effect of gender on trust

		Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
News	Equal variances assumed	.881	1.252	-15.599	18.104
	Equal variances not assumed	.889	1.252	-17.057	19.561
Advice	Equal variances assumed	.431	6.981	-10.836	24.797

	Equal variances not assumed	.448	6.981	-11.675	25.636
Solutions	Equal variances assumed	.364	-8.162	-26.202	9.877
	Equal variances not assumed	.363	-8.162	-26.251	9.927

On average, men and women are showing almost the same trust on health-related news, but in terms of advice, men claim more trust while in solutions, women hold the higher average. Applying t-test, no statistical significance was seen in any of three categories between men and women (all p-values>0.05).

Table 11- level of trust based on level of education

Education		News	Advices	Solutions
Under diploma	Mean	42.00	49.00	57.00
	N	1	1	1
	Std. Deviation	.	.	.
High school diploma	Mean	49.80	60.00	57.00
	N	5	5	5
	Std. Deviation	14.873	20.384	26.344
bachelor	Mean	54.50	53.86	40.14
	N	8	7	7
	Std. Deviation	19.640	21.106	23.674

master	Mean	48.95	44.11	34.22
	N	19	19	18
	Std. Deviation	25.196	26.633	26.105
doctorate	Mean	24.60	30.25	14.40
	N	5	4	5
	Std. Deviation	33.441	32.725	12.422
Total	Mean	46.84	46.81	36.42
	N	38	36	36
	Std. Deviation	24.703	25.508	25.907

The ANOVA test was applied to evaluate the effect of education on trust showed no significant difference among levels of education. The calculated p-value for the relationship between level of education and trust on news, advice and solutions were consequently 0.287, 0.456, and 0.095 which all are more than 0.05 to be significantly meaningful.

An analysis of the previous table yields several insights regarding the relationship between education level and trust in social media. The primary observation is that overall education level does not correlate with trust in social media platforms. However, due to the limited sample size—especially for respondents with less than a high school diploma—these findings may not be fully representative.

Within the various respondent groups (excluding the under high school diploma category due to its singularity), a consistent trend emerges: all groups exhibit a decrease in trust from "advice" to "solutions." Notably, respondents with a high school diploma have mean trust levels in news comparable to those with a doctorate, and both groups display greater trust in advice than in the other two topics. Respondents holding bachelor's and

master's degrees tend to express higher trust in news, followed by decreasing trust in advice and solutions, respectively.

4.3 WHO MIL competencies

4.3.1 MIL mention: Definition and articulation of a need for information

4.3.1.1 Competency-1: literate person is able to determine and articulate the nature, role and scope of the information and media (content) through a variety of resources

As indicated by the title, this competency concerns the fundamental steps involved in handling information. It comprises seven criteria, which participants were asked to self-evaluate and express as percentages. The corresponding table presents the descriptive results for this competency.

Table 12- Competency-1 Self-Evaluation Results

Performance criteria	Min	Max	Mean	Std. Deviation
Recognizes the need for information and media content	0	100	75.68	27.446
Recognizes the need and importance of media and information providers	12	100	83.21	18.625
Determines and specifies information needs linking with key and relevant concepts, disciplines and subjects in order to transform a need into a form for an action	0	100	75.97	23.653
Knows that different types of information needs / problems require different sources of information (other people, groups, organizations or objects) and/or places from which something comes, arises, was created or obtained (such as library, archive, media, Internet	16	100	89.42	17.735

Assumes that different types of information needs / problems may not be solved without others' help, such as people, groups or organizations	10	100	66.45	28.490
Connects and consults with other individuals, groups, organizations, or levels to formulate a general statement / question	18	100	70.26	24.239
Formulates a general statement / question based on information need into a form of an active statement / question, vocalizes, writes down, types, constructs,	13	100	76.06	24.631

One observation from the table is that, in most instances, the minimum mark is above zero, indicating that participants generally report some level of confidence in these criteria. However, for two criteria, a minimum value of zero percent is noted.

The table shows that the criterion "assuming that different problems may need help" has the lowest mean score at 66.45%, while "knowing about the variety of information" has the highest mean, recorded at 89.42%.

4.3.2 MIL mention: Search and location of information and media content

4.3.2.1 Competency-2: literate person is able to search and locate information and media content

This competency includes thirteen criteria that are presented in the following table. Despite of the first competency, here only two items have a minimum of more than zero.

Table 13- Competency-2 Self-Evaluation Results

Performance criteria	Min	Max	Mean	Std. Deviation

Develops search strategy (-ies) to find appropriate information, media content, information providers, means and tools	0	100	77.70	25.989
Knows roles and functions of information producers and media institutions in society where information and media content could be found and located	0	100	73.11	30.291
Explores, determines and situates the place / site where information and media content could be located by any instrument/tool and place, such as any physical and/or virtual place	0	100	65.97	29.853
Seeks to identify an author, producer, organizer, disseminator of information and media content	0	100	55.39	30.618
Understands the role of metadata	0	100	52.11	36.501
Identifies, differentiates and prioritizes potential information sources by type of information source, date, topic, author, sender, receiver, keywords, tags and terms, etc.	0	100	56.95	30.583
Appreciates diversity of information and media content provided by information providers and media, as well as appreciates diverse formats	0	100	65.70	28.678
Distinguishes formats of information and media resources	14	100	64.16	28.239
Decides what types of information and media resources are required	10	100	68.59	26.038

Knows importance and relevance of tools for locating information and media content	0	100	66.95	26.047
Recognizes limitations, challenges and possibilities of locating information and media content due to technical, legal, economic, social-cultural, political and other reasons	0	100	64.08	26.928
Refines search strategy, if required	0	100	65.57	30.492
Locates those information sources, using appropriate tools	0	100	68.97	25.700

The pattern of these results show that people are less confident in terms of search strategies. The best mean is 77.7 despite the least one which is 52.11.

4.3.3 MIL mention: Access to information, media content and media and information providers

4.3.3.1 Competency-3: literate person is able to access needed information and media content effectively, efficiently and ethically, as well as media and information providers

The third competency with eight elements follows the pattern of the second one, with similar levels of means.

Table 14- Competency-3 Self-Evaluation Results

Performance criteria	Min	Max	Mean	Std. Deviation
Determines the method(s) and strategy(-ies) for accessing information and media content	20	100	64.42	24.870

Determines the availability, costs, time, benefits and applicability of acquiring the needed information and media content, applying the method(s) and strategy(-ies) formulated above	20	100	59.37	25.045
Follows basic laws, regulations, policies, rights and principles related to ethical access to: information, documentary heritage, media content, ICTs, other media and information providers	0	100	59.58	29.522
Acknowledges the importance of the rules, laws and regulations related to access to information	0	100	62.34	27.827
Knows that access to information and media content could be restricted	20	100	74.59	22.226
Uses diverse tools to access information and media content	0	100	72.03	25.346
Accesses selected information and media content through a variety of media and other information providers	0	100	70.08	27.687
Accesses media and other information providers, including those on the Internet, for self- expression, creativity, social and political participation	0	100	66.25	26.886

4.3.4 MIL mention: Retrieval and holding / storage/ retention of information and media content

4.3.4.1 Competency-4: literate person is able to retrieve and temporally hold information and media content using a variety of methods and tools.

The table below is about the information retrieval which is the first one with a mean of criteria less than 50%. Also, only one criterion shows a minimum more than zero. The level of self-evaluation in this competency gets lower than previous ones. The best mean in this table is 70.09%.

Table 15- Competency-4 Self-Evaluation Results

	Min	Max	Mean	Std. Deviation
Uses various systems and tools to retrieve most suitable information and media content in a variety of formats	0	100	64.42	27.474
Uses other forms of inquiry in order to retrieve information	20	100	68.29	27.003
Retrieves different types of information	0	100	70.09	21.390
Selects, organizes and holds onto the retrieved information and media content using appropriate technologies and tool	0	99	56.23	26.597
Knows requirements, rules and practices of holding information and media content	0	100	56.71	28.297
Assumes that retrieved information and media content could be useful in future	0	100	67.77	27.087

Applies basic requirements of holding information and media content	0	100	48.22	30.411

4.3.5 MIL mention: Understanding of information and media

4.3.5.1 Competency-5: literate person understands necessity of media and information providers in society

The fifth competency with 16 criteria is the most extensive one. This competency is evaluating how people understand media and its role in society. Despite the previous competency with getting less means all across the board, the fifth competency shows higher means of responses. However, the lowest means in this table is 50.06%, some other criteria show a high of 84.24%.

Table 16- Competency-5 Self-Evaluation Results

	Min	Max	Mean	Std. Deviation
Understands principles and conditions necessary for media and information providers to fulfil their functions	0	100	56.18	26.858
Understands role and functions of media and information providers in society to inform, teach, influence and entertain	38	100	73.55	18.698
Recognizes that media and information providers have implications for society	34	100	76.65	21.672
Knows that the work of media and information providers and their impact can and should be monitored	9	100	72.88	24.630

Knows concepts of ethics and rights related to media and information and international and professional standards	0	100	50.06	30.450
Recognizes the impact of information and media content on oneself	23	100	78.61	21.144
Identifies how information and media content can be represented differently and in different formats	10	100	74.44	23.588
Identifies and differentiates who owns and creates information and media content	0	100	69.18	25.439
Understands authorship and rights of authors	0	100	70.29	28.245
Appreciates the importance of acknowledging others' work in terms of authorship and rights	4	100	69.82	30.225
Knows about editorial independence and censorship of information and media content, as well as media and information institutions	0	100	64.66	31.253
Recognizes that audiences/users interpret information and media content in different ways	30	100	82.00	21.736
Knows that there are various viewpoints in any information and media content	20	100	84.24	21.349
Appreciates information and media content applying aesthetic criteria and formats	0	100	60.85	31.433
Understands the codes and genres of different media and information platforms	0	100	57.09	28.825

Understands the importance of advertisement in media and information providers	20	100	82.45	20.044

4.3.6 MIL mention: Assessment of information and media content, and media and information providers

4.3.6.1 Competency-6: literate person is able to assess, analyse, compare, articulate and apply initial criteria for assessment of the information retrieved and its sources, as well as evaluate media and information providers in society

The last competency evaluated in this research is about assessing and analysing the data which can help people to fact check information on social media. There are nine criteria in this competency as presented in the following table.

Table 17- Competency-6 Self-Evaluation Results

	Min	Max	Mean	Std. Deviation
Defines assessment criteria for information and media content retrieved and information sources: purpose, audience, authorship, credibility, significance, supplier, relevance, currency, reliability, completeness, accuracy, timelines, scope, and coverage.	0	100	61.31	28.766
Creates or uses basic assessment instrument(s) / tool(s) for evaluation of information and media content, as well as media and other information providers	0	100	69.36	25.351

Selects and summarizes main elements such as ideas, keywords, concepts, messages and themes from retrieved information and media content	0	100	63.89	23.988
Understands the purpose and importance / significance of information and media content and its context on sustainable development	0	100	64.87	26.804
Interprets, makes connections on the retrieved information and media content, and restates in own words	0	100	63.73	26.787
Distinguishes editorial independence and recognizes censorship of information and media content and media content, and media and other information providers	0	100	63.53	25.973
Describes the intended audiences of the retrieved information and media content	20	100	63.10	25.176
Identifies, analyses and differentiates diverse advertising messages, processes, techniques, standards, and codes of practice	10	100	65.91	23.370
Identifies and verifies additional information sources, methods and search strategies using diverse tools	23	100	70.75	23.078

In this table, the mean of percentages is getting higher and similar to the first competency. The minimum 61.31% and the maximum is 70.75% with a smaller gap between these two numbers.

The final calculated numbers for the whole sample for all six competencies are listed below. "N" indicated the total valid number of participant that their evaluation contributed in the overall competency mark. According to this calculation, the best mark for competency belongs to the fifth one, and the lowest mark goes to the fourth.

Table 18- Overall Calculation Of Each Competency In The Surveyed Sample

Competency	N	Min	Max	Mean	Std. Deviation
1- Definition and articulation of a need for information	34	15.43	100.00	77.59	16.91
2- Search and location of information and media content	34	3.31	100.00	65.07	23.29
3- Access to information, media content and media and information providers	30	37.12	100.00	68.03	18.57
4- Retrieval and holding / storage/ retention of information and media content	35	2.86	97.29	61.94	21.43
5- Understanding of information and media	31	24.38	98.00	70.96	18.43
6- Assessment of information and media content, and media and information providers	25	32.22	98.00	67.43	15.23

After the calculation of each competency, the next step in the quantitative phase was analyzing the possible effect of age, gender and education on it.

4.3.7 Age and competencies:

As both age and self-evaluation results are numerical values, to see a correlation between them a correlation test was performed by SPSS separately for each competency. To avoid repeating the report individually for each test, all are summarized together in the table below. This result also shows if any two competencies are correlated or not. The term "Pearson" is removed from the "Pearson Correlation" to make the table easier to read.

Table 19- Bivariate Correlation To Test The Relationship Among Age And Competencies.

		Age	Comp1	Comp2	Comp3	Comp4	Copm5	Comp6
Age	Correlation	1	.001	-.099	.074	-.033	-.171	-.295
	Sig. (2-tailed)		.996	.632	.738	.869	.402	.194
	N	28	27	26	23	27	26	21
Comp1	Correlation	.001	1	.416*	.366	.286	.203	.166
	Sig. (2-tailed)	.996		.020	.055	.112	.292	.450
	N	27	34	31	28	32	29	23
Comp2	Correlation	-.099	.416*	1	.858**	.728**	.771**	.512*
	Sig. (2-tailed)	.632	.020		.000	.000	.000	.010
	N	26	31	34	28	33	29	24
Comp3	Correlation	.074	.366	.858**	1	.678**	.693**	.574**
	Sig. (2-tailed)	.738	.055	.000		.000	.000	.004
	N	23	28	28	30	30	27	23
Comp4	Correlation	-.033	.286	.728**	.678**	1	.689**	.553**

	Sig. (2-tailed)	.869	.112	.000	.000		.000	.004
	N	27	32	33	30	35	31	25
Copm5	Correlation	-.171	.203	.771**	.693**	.689**	1	.720**
	Sig. (2-tailed)	.402	.292	.000	.000	.000		.000
	N	26	29	29	27	31	31	24
Comp6	Correlation	-.295	.166	.512*	.574**	.553**	.720**	1
	Sig. (2-tailed)	.194	.450	.010	.004	.004	.000	
	N	21	23	24	23	25	24	25

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

A significance level below 0.05 (P-value < 0.05) indicates a correlation between the two variables. The "[Pearson] correlation" value "r" in the table shows the strength and direction of this relationship; values closer to one indicate stronger correlations, with positive values showing direct relationships and negative values indicating inverse ones.

The table indicates that there is no observed correlation between age and any of the competencies. Competencies 2 to 6 show a strong positive correlation with each other, suggesting that an increase in one of these competencies corresponds with increases in the others. There is no correlation between the first competency and the remaining competencies, indicating that changes in the first competency do not follow or influence the pattern of the others in this study.

4.3.8 Gender and competencies

Since gender was recorded as a string variable with only two categories (in line with Iranian policies and laws), competency values were compared between these groups using an independent sample t-test. Results are shown in the tables below.

Table 20- The Mean of Each Competency Within Each Gender Group

	Gender	N	Mean	Std. Deviation
Comp1	male	14	76.26	20.44
	female	20	78.52	14.44
Comp2	male	14	71.10	20.18
	female	20	60.85	24.86
Comp3	male	13	72.05	15.67
	female	17	64.96	20.44
Comp4	male	15	65.94	20.23
	female	20	58.94	22.32
Copm5	male	14	72.79	18.00
	female	17	69.44	19.18
Comp6	male	12	67.83	14.81
	female	13	67.05	16.21

Table 21- Statistical Test on The Relationship Between Gender And Competencies

		Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Comp1	Equal variances assumed	.708	-2.25	-14.42	9.90
	Equal variances not assumed	.726	-2.25	-15.42	10.91
Comp2	Equal variances assumed	.211	10.25	-6.12	26.63
	Equal variances not assumed	.195	10.25	-5.54	26.05
Comp3	Equal variances assumed	.308	7.09	-6.90	21.09
	Equal variances not assumed	.291	7.09	-6.41	20.60
Comp4	Equal variances assumed	.347	7.00	-7.91	21.91
	Equal variances not assumed	.340	7.00	-7.72	21.72
Copm5	Equal variances assumed	.623	3.35	-10.42	17.13
	Equal variances not assumed	.621	3.35	-10.35	17.05
Comp6	Equal variances assumed	.902	.77	-12.11	13.65
	Equal variances not assumed	.902	.77	-12.06	13.61

As shown in the table above, no statistically significant differences is seen between two genders in all competencies.

4.3.9 Education and competencies

The following table compares the level of each competency against each level of education. ANOVA was used for this purpose.

Table 22- ANOVA Test Results To Compare The Mean Of Competencies Based On Education Level

		df	Sig.
Comp1	Between Groups	4	.269
	Within Groups	29	
	Total	33	
Comp2	Between Groups	4	.166
	Within Groups	29	
	Total	33	
Comp3	Between Groups	4	.960
	Within Groups	25	
	Total	29	
Comp4	Between Groups	4	.366
	Within Groups	30	
	Total	34	
Copm5	Between Groups	4	.477
	Within Groups	26	
	Total	30	

Comp6	Between Groups	4	.377
	Within Groups	20	
	Total	24	

The same as gender, again no relationship between the level of education and the mean calculated for each competency based on self-evaluations.

4.4 Interview results:

This section presents a thematic analysis of ten semi-structured interviews conducted with nine Iranian media experts and one health professional. The aim is to explore the level of media literacy among Iranian users, particularly in relation to health-related information, assess the influence of the COVID-19 pandemic on social media literacy, and identify potential methods for improving media literacy from expert perspectives.

The analysis is done by using NVivo and follows Braun and Clarke's (2006) six-phase framework for thematic analysis, emphasizing a data-driven approach that allows themes to emerge organically from participant narratives.

The interviews had seven questions as follows to gather information to answer research questions:

1. demographic limited to field of work or any background related to social media. As the interviews were designed and based on the experts, factors like gender or age were not related and thus were not questions, however gender was known, but again has no effect on professional opinion related to this research.
2. The interviewees provided estimates about Iranian users six competency that were addressed in the quantitative phase. Interviewees were asked to give a number as percentage which shows their estimate about the perceived competency levels of Iranian users. The results of this question are reported in the first section of findings.

3. The interpretation about the differences between estimates and perceived percentages was gauged by asking participants in the first phase (if any)? This question addressed the professional view of the perceived results compared to professional opinions about each competency.
4. According to the interviewees' point of view, which competencies have better and easier chance to improve and which one(s) are more difficult and challenging?
5. What are the challenges to improving social media literacy in Iran?
6. In general, what can improve the social media literacy in Iranian users?
7. Were there any changes in Iranian users' behavior on social media after COVID-19 pandemic compared to before that?

The results of the thematic analysis are first shown in the following table to facilitate the correlation between the answers to each question and their respective themes. It should be noted that questions one, two and four were analyzed differently and were not a part of qualitative analysis to extract themes. After the table, the answers are presented in the order of the questions listed above, along with explanations for each theme.

Table 23- NVivo-Style Matrix: Themes and Participant Coding

Theme	**Subtheme**	**Answer to question**	**Participants Coded number**
Illusion of Knowledge	Overconfidence in media skills	3	Cases 2,3,4,5
Undefined Needs	Lack of clarity in information needed	5	Cases 4,7,8
Generational and educational gap	Rural and elderly population	5	Cases 4,7,8

Cultural Influence	Traditional medicine bias/value disorientation	5	Cases 1,2,9
Informal Trust	Reliance on family/friends/ Confirmation bias and Echo chambers	5	Cases 2,9,10
Structural barriers	Government/ media distrust	5	Cases 2,9,10
Education	Early and continuous learning	6	Cases 2,3,10
Informal Leaders	Community influencers	6	Cases 1,9
Critical Thinking	Need for critique culture	6	Cases 4,9
NGOs & Media	Role of independent bodies	6	cases 6,9
COVID Impact	Uncertainty/ Fake news amplification	7	Cases 1,3,5,9,10

4.4.1 Answers:

After collecting the questionnaires and analysing the data to extract competency scores, the average for each competency was calculated and shown to interviewees in the second phase. Before sharing the initial results, each interviewee reviewed the questionnaire to understand each competency, then estimated Iranian users' levels for each one. The

combined results of experts' opinions and public self-evaluations are presented in the table below. Each row shows the answers provided by experts based on each competency, except the last row that reflects the public answer. Decimals are removed except for the total average at the last column.

Table 24- Summary of The Competency Grading Done by Interviewees and Public

Case #	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Mean
1	50	40	30	30	25	25	33.33
2	40	30	35	20	25	25	29.18
3	40	30	30	20	20	40	30.0
4	0	20	30	10	10	10	13.33
5	20	50	80	30	40	30	41.66
6	50	40	80	40	40	30	46.66
7	10	70	90	30	10	10	36.66
8	80	35	35	30	50	55	47.5
9	50	50	50	50	50	50	50.0
10	50	50	65	50	60	47	53.66
Average	39	41.5	52.5	31	33	32.2	38.19
Public	76	71	72	65	72	67	70.5
Difference	37	29.5	19.5	34	39	34.8	32.30

The lowest estimate was provided by case-4, which assigned a value of zero to competency-1: "Definition and articulation of a need for information." According to this expert, "people even don't know that they need information". The overall average for all competencies was also lowest in this case at 13.33, while the highest expert average is 53.66.

All experts' averages are lower than the perceived average of 70.5. Interviewees' estimates exceeded those of the public in only two instances: for the first competency by participant-8, and for the third competency by participants 5, 6, and 7. All other expert estimates were below the public average.

By calculating the average percentage given by experts for each competency separately, it shows that the lowest average belongs to the fourth competency while the third has the best among all. The biggest gap between perceived results and expert opinion is on competency number five with 39% difference while the closest number is for competency three with almost 20% difference.

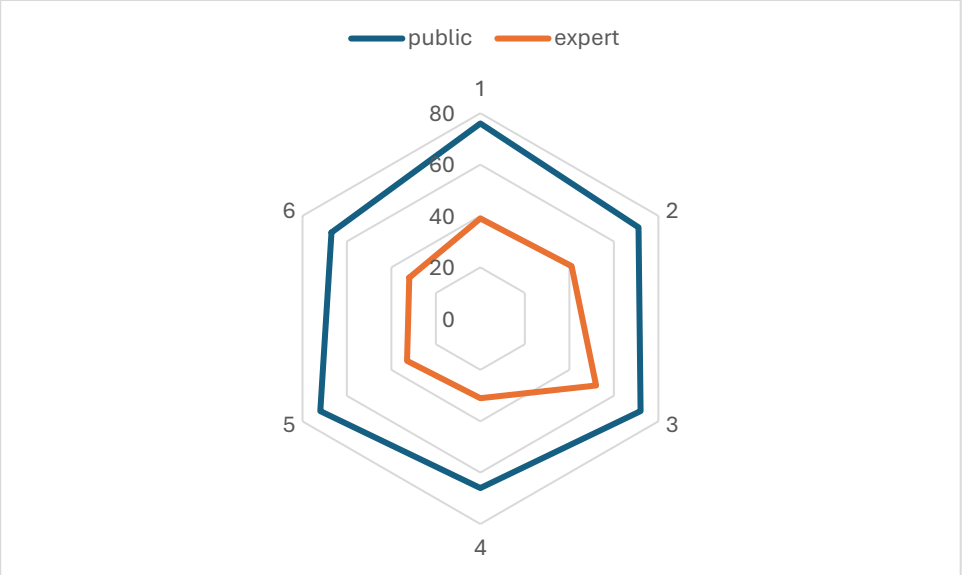

Figure 3- Comparison Between Perceived Results and Experts' Opinion

4.4.2 Discrepancy

As noted, there is a significant disparity between public and expert estimates. Consequently, experts were asked to provide their perspectives on the factors contributing to this discrepancy. The responses formed one of the main themes identified from the data analysis, which was the "illusion of knowledge" among Iranian users. All participants described a widespread overestimation of media literacy, where individuals believe they have critical thinking skills but lack the training to apply them effectively.

“People consider themselves experts in everything… this makes it easier to be deceived.” – Case-3

This overconfidence leads users to accept information and specifically health-related claims without verification, particularly when those claims align with their pre-existing beliefs. The illusion is compounded by the superficial consumption of information, such as skimming headlines or relying on social media posts.

4.4.3 Competency improvement

The third question asked of interviewees was their opinion about which competencies are easier to improve and which ones have more barrier and difficulties. According to the responses, the most probable ones to improve are as follows:

Table 25- Competencies that are easier to improve

Competency	Description	frequency	Supporting Quotes/Interviewees
Comp1. Defining Information Needs	Helping users identify what information they need.	4	Case-9: “I think that the first to sixth are easier... defining information needs... are relatively easier.” Case-4: “...definition of information needs should be worked on a lot.” Case-10: “...important that people understand their needs... this could be changed.”
Comp2. Searching for Information	Teaching users how to search for reliable info.	3	Case-3: “...easier to work on extracting, storing, and manipulating information.” Case-7: “...searching and accessing information... relatively easier.”

			Case-10: “...searching content can be very effective.”
Comp3. Accessing Information	Improving digital access and platform use.	2	Case-7: “Access to information has become very good... more appropriate.” Case-10: “...perhaps access to information [is teachable]...”
Comp4. Extracting and Storing Information	Training users to retain or archive useful data.	3	Case-3: “...second and fourth axis... are more teachable...” Case10: “...next stage of extracting and storing information...”

As indicated in the table above, respondents ranked the competencies from easiest to most difficult in the same sequence as their order of competency. In other words, those listed earlier are considered easier than those listed later. According to their assessment, these competencies are considered more teachable and do not require advanced cognitive abilities or critical thinking skills. Based on these findings, it appears that individuals from all backgrounds can benefit from education in these areas of social media literacy. The following table summarizes the more challenging competencies identified for improvement.

Table 26- Competencies that are harder to improve

Competency	**Description**	**Frequency**	**Supporting Quotes/Interviewees**
Comp5. Understanding Media and the Flow of Information	Teaching how media shapes messages and public opinion.	2	Case-4: “...fifth axis... also very important, but harder to teach.” Jalili: “...understanding media

			and flow of information... harder to create.”
Comp6. Evaluating News and Critical Thinking	Teaching analytical thinking, skepticism, and evaluation skills.	4	Case-1: “Axes 5 and 6... require a background and precedents... just teaching is not enough.” Case-9: “...understanding the media and evaluating it... may go to the next priority.” Case-8: “...axis six... should have higher priority, but it’s harder.”

Although all interviewees responded to the second question, there are no quotes from them in the tables above because some only referenced a competency without providing additional explanation.

4.4.4 Challenges in Iran

The next question asked during interviews was about opportunities or challenges that are on the way of social media literacy improvements. The answers created another themes:

4.4.4.1 **undefined need of information:** Participants said that Iranian users often have trouble figuring out exactly what health information they need. Because of this, people might read lots of health content, sometimes choosing things just because they are fun or make them feel something, not because they are accurate or really helpful.

“I see a society that doesn’t know what information is useful to it.” – Case-4

Not knowing what makes health information helpful can make people more likely to believe false information or be affected by ads.

4.4.4.2 **Generational and educational gap:** This theme was mentioned by several interviewees, highlighting the challenges faced by rural and elderly populations in accessing and understanding social media literacy.

Cases 4 and 7 pointed out the lack of clarity in information needed by these groups.

Case-8 also emphasized the difficulties faced by these populations due to cultural influences and traditional medicine biases and as case-10 mentioned: "these gaps were especially pronounced among the elderly and rural communities. "

Participants observed that younger users were more adept at navigating digital media and identifying misinformation, while older users were more susceptible.

“Retirees and elderly forward everything… younger generation understands better.” – Case-10

This generational divide suggests that future interventions should be tailored to different age groups.

4.4.4.3 **cultural and traditional Influence:** Cultural habits and old beliefs also change how people use health media. A few interviewees pointed out that some people trust traditional medicine and old stories more than science.

“In Iran, this issue of coldness and warmth and food customs… is very prominent.” – Case-2

These cultural views affect how people take in health news and can cause them to accept or reject new ideas. Therefore, it makes it a barrier to convince people to look different from what they believe and seek more reliable information instead of trusting their traditional background.

Case-4 believes that the values in society are destroyed and damaged people's internal compass is "dismantled". In this case, when no value is defined, consequently assessment of valid sources of information cannot be determined.

4.4.4.4 Informal Trust: A close personal circle can be a double-edged sword for social media literacy. Friends and family may be trusted sources of information, whether or not their information is accurate. The next subtheme from the responses is based on this idea:

4.4.4.5 **Trust in Informal Sources, Confirmation bias and echo chambers:** Trust in informal networks—such as family, friends, and online group chats like WhatsApp groups—was identified as a major factor in media literacy behavior. Participants noted that users often accept information from trusted individuals without questioning its validity.

"If I trust a news source… I accept everything." – Case-2

This reliance on informal sources undermines critical engagement and perpetuates misinformation, particularly in health contexts. Several responses mentioned that people seek the sources that confirms what they believe or want to hear.

4.4.4.6 **Structural and institutional barriers:** Interviewees noted that the Iranian state plays a central role in shaping media literacy outcomes. Caee-9 pointed out that "independent media cannot exist in Iran," while others criticized censorship and political influence in public education. In their opinion, the controlled media by government acts as a barrier to provide enough space for people to grow their literacy.

4.5 Strategies for Improving Health-Related Media Literacy

The next question was about hot the social media literacy can improve in Iranian users. The review of the answers showed four major themes to address this question.

4.5.1.1 **Early and Ongoing Education:** Education was mentioned most often as a key solution. Participants suggested adding media literacy lessons from early childhood and continuing them through school years.

"Start with kindergarten… children take what they learn into their families." – Case-1

This shows how important it is to build strong skills early and keep learning over time.

4.5.1.2 **Empowering Trusted Community Members:** Some interviewees stressed the role of trusted people—family members, community leaders, and teachers—in helping others learn about media.

"Thought leaders in a family… are more influential than official channels." – Case-1

Using these trusted individuals could help grow media literacy from the beginning steps.

4.5.1.3 **Encouraging Critical Thinking and Openness to Critique:** Participants said that people need to get used to asking questions and thinking critically, both about media and about social values.

"Space must be open for criticism… even of mainstream media." – Case-4

This means not only changing how we teach but also being more open as a society and accept new facts and data.

4.5.1.4 **Supporting NGOs and Independent Media:** Non-governmental organizations and independent media were seen as more helpful than government groups for teaching media literacy.

"NGOs can be effective… government intervention is not needed." – Case-6

These groups can give more unbiased information and help people think more critically. It was also mentioned that the government hold the media in its control which according to some responses be helpful, and some others, be harmful to develop social media literacy, but all respondents agree on the benefits of NGOs.

4.6 Influence of the COVID-19 Pandemic on Media Literacy

In this part, interview moved to the possible effect of Covid-19 pandemic on social media literacy, as during the pandemic, people had to spend more time at home and

therefore had higher chances to be exposed to health information on social media. The following themes were extracted from the answers.

4.6.1 Increased Exposure, Limited Literacy Gains

While the pandemic increased users' exposure to health information, participants were skeptical about whether this translated into improved media literacy. The surge in media consumption did not come with structured education or guidance, limiting its impact on long-term literacy.

"Remote work and staying home caused an influx of social networks… but I do not believe it increased literacy." – Case-6

4.6.2 Trial-and-Error Learning and Skepticism

COVID-19 created a climate of uncertainty that led users to question previously held beliefs. Participants described a shift toward skepticism and more cautious media engagement.

"Corona created a state of uncertainty… people came to the point that nothing is absolute." – Case=1

This experiential learning, while informal, contributed to a more critical stance among some users, though it lacked institutional support.

4.6.3 Amplification of Misinformation

The pandemic also amplified the spread of fake news, particularly in health domains. Interviewees cited numerous examples of harmful misinformation being widely accepted and shared.

"Rate of acceptance of fake news during Corona was much higher." – Case-3

These insights suggest that while the pandemic did increase engagement with social media, it also highlighted the need for better media literacy education to help users navigate the influx of information more effectively.

Nearly all interviewees saw COVID-19 as a critical moment that temporarily increased public awareness about misinformation. However, they also agreed that this effect lacked long-term sustainability due to the absence of institutional follow-up.

4.7 Chapter five- discussion

Before addressing the research questions, the findings from the first phase are reviewed. This study did not establish any relationship between social media competencies and demographic variables such as age, gender, or education.

It is important to note that the sample size for this study was small, which limits the generalizability of the findings. However, these results offer a preliminary overview and may serve as a foundation for subsequent interviews. The following section provides a review of the demographic findings.

Recent demographic analysis revealed that the study sample consisted of 40% men and 60% women, a distribution that does not align with official Iranian statistics, which indicate a near-even gender split of 50% men and 50% women (Statistical Center of Iran, 2022). Furthermore, the average participant age in this research was 43 years, notably higher than the national average age of 34 years in Iran (World Bank, 2023). This suggests that the study's respondents tended to be older compared to the general population, a factor that may influence the interpretation and relevance of the findings.

Collected data on education in the study group showed that half of the participants had a master's degree, meaning most were highly educated. This is quite different from the national average, where only about 23% of people in Iran have a postgraduate degree (Statistical Center of Iran, 2022). This difference makes it clear that the study group does not fully represent the general population.

Neither gender nor educational level correlated significantly with measured media literacy competencies. This aligns with Buckingham's (2003) and Livingstone, Van Couvering, and Thumim's (2008) findings that exposure to formal education does not necessarily enhance critical media skills unless media literacy is explicitly addressed in curricula. Systemic factors—such as centralized media control, censorship, and limited access to pluralistic content—likely overshadow the potential benefits of demographic

distinctions. Shirazi and Sadeghi (2020) note that these constraints create an environment in which critical engagement is stifled, regardless of individual background.

When looking at perceived competencies level, there are two way to look at it: the higher self-reported skills may come from the group's high education level, or, if education truly leads to better skills, these results cannot be easily applied to everyone in the country while the public has lower level of education. This uncertainty shows why future research should include more people and make sure the group matches the wider population, to better understand the link between education and social media skills (World Bank, 2023; Statistical Center of Iran, 2022).

The review of literature didn't find more than three studies that have used UNESCO framework to evaluate social media literacy which none of them were from Iran (Li, et al., 2017; Msauki & Kwangwa, 2023 & Iqal & Idrees, 2022). Also, to this point, no research is found published that evaluated Iranian media literacy, therefore the discussion is more based on the current findings and available sources that have similarity with the context.

4.7.1 Overview of Key Findings

The quantitative analysis revealed that Iranian social media users frequently overestimate their media literacy—particularly regarding their ability to define and articulate information needs, where public self-assessment was markedly higher than expert evaluation. The qualitative component underscored this gap, revealing underlying causes such as the "illusion of knowledge" and the influence of informal trust networks. No significant differences were observed in media literacy competencies by gender or education level. The study also identified intergenerational differences and cultural factors influencing how health information is processed and trusted.

Research question-1: What is the media literacy level of Iranian users living in Iran regarding health-related information and news?

One of the most striking patterns was the divergence between self-perceived and expert-assessed competencies. Participants tended to rate their skills in identifying information needs highly (average self-rating: 76%), while experts gave notably lower scores (average: 39%). This tendency reflects what Kruger and Dunning (1999) famously described as the “illusion of knowledge,” where less skilled individuals inflate their self-assessments. Metzger et al. (2010) further substantiated this effect, showing that high social media use often breeds confidence without corresponding competence. In the Iranian setting, Mihailidis and Viotty (2017) argue that extensive digital access, in the absence of formal media literacy education, perpetuates overconfidence.

4.7.2 Application of the UNESCO MIL Framework

Competency 1: Definition and Articulation of Information Needs

The gap between public confidence and expert assessment was most pronounced in this area, echoing global trends where digital familiarity does not equate to nuanced information awareness (Grizzle, Wilson, & Torres, 2021).

Competencies 2–4: Searching, Accessing, and Storing Information

While users demonstrated moderate proficiency in these operational skills, experts noted a lack of critical engagement in information navigation. UNESCO (2013) stresses that mechanical use of digital tools must be supplemented by critical thinking exercises.

Competencies 5–6: Understanding and Assessing Content

Both experts and participants acknowledged these as the most challenging competencies, requiring not just technical ability but also interpretive and evaluative skill. Buckingham (2003) emphasizes that such competencies can only develop within a culture that encourages critical dialogue and skepticism.

4.7.3 Cultural Values and Institutional Distrust

Cultural attitudes and entrenched value systems further shaped participants' interactions with online health content. Many interviewees referenced the influence of traditional medicine, familial authority, and skepticism toward official sources. Shirazi and Sadeghi (2020) describe this as "value disorientation," a state where citizens are caught between state narratives and alternative knowledge systems. The absence of independent media—a concern echoed by several participants—limits opportunities for the public to verify information and build genuine literacy.

4.7.4 Generational Divides in Media Literacy

The qualitative research identified a clear generational gap: older adults were more susceptible to misinformation and less likely to verify sources before sharing, while younger users showed slightly stronger—but still limited—discriminatory skills. Loomba et al. (2021) and Livingstone et al. (2008) highlight the necessity of age-appropriate interventions, as media literacy skills are not uniformly distributed across age groups.

4.7.5 The Power of Informal Trust Networks

A recurrent theme in both survey responses and interviews was the reliance on informal networks—family, friends, and community figures—for interpreting and sharing health information. Ahmad and Latiff (2022) observed that Iranian users often favor peer-generated content over institutional messaging. This phenomenon can be understood through the concept of "epistemic closure" (Stroud, 2011), where close-knit social circles reinforce existing beliefs and discourage critical scrutiny. Vosoughi, Roy, and Aral (2018) found that misinformation spreads more rapidly through such networks, especially when institutional trust is low—a condition prevalent in the Iranian context.

4.8 The Impact of the COVID-19 Pandemic

The pandemic served as both a challenge and a catalyst for media literacy in Iran. While exposure to conflicting information heightened public skepticism, it also revealed gaps in critical evaluation skills. Roozenbeek et al. (2020) describe this global phenomenon as a “misinfodemic,” where information overload can breed confusion as much as insight. Loomba et al. (2021) suggest that such periods can either foster deeper critical thinking or entrench pre-existing biases, depending on the user's baseline competencies. It also aligns with Ziapour et al. (2024) conclusion about the effect of media literacy on infodemic in Iran.

4.9 Recommendations for Improving Social Media Literacy

Based on these findings and supported by international best practices, several pathways for enhancing media literacy in Iran are proposed:

- Execution of comprehensive evaluation on social media literacy in iran and influencing factors like culture and religion to consider and incorporate their effectiveness into designing educational plans.
- Integration of Media Literacy in Education: Early and sustained incorporation of media literacy into school curricula is essential for building foundational competencies (Grizzle et al., 2021).
- Leveraging Community Influencers: Engaging trusted local leaders and educators can help bridge formal and informal modes of learning (Yang et al., 2022).
- Supporting Independent and Non-Governmental Organizations: Such institutions play a crucial role in advancing unbiased literacy programs, especially where state involvement is distrusted (Zhang et al., 2021). However, it should be kept away from commercialization which is now happening in Iran (Shahghasemi, 2021).
- Fostering Critical Dialogue: As Buckingham (2003) notes, meaningful media literacy requires an environment that encourages questioning and critique of all sources, including government and traditional authority.

4.10 Limitations

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4.11 Limitations

The validity of the findings from this study is subject to several important limitations. First, the small sample sizes (comprising 38 survey respondents for the quantitative component and 10 participants for the qualitative interviews) significantly constrain the generalizability of the results. The sample predominantly consists of highly educated individuals within a narrow age range, which may not accurately reflect the broader Iranian population's views or experiences. As such, extrapolating the conclusions to the general population should be approached with caution.

Second, the study was conducted in an environment characterized by substantial external constraints. Government restrictions on social media access in Iran posed significant barriers for both researchers and participants. The widespread need for anti-filter software or VPNs to bypass bans on platforms like WhatsApp (Freedom House, 2023; Article 19, 2022) may have influenced both who was able to participate and how candidly they responded. Although the research team considered all possible access methods and benefited from the unblocked status of Qualtrics at the time of data collection (Qualtrics, 2023), nearly all respondents relied on circumvention tools, introducing potential selection bias.

Furthermore, the prevailing climate of low social trust and concerns about personal security likely affected the reliability of participant responses. As observed in both the literature and this study, distrust in news disseminated by public organizations, suspicion regarding the motives of researchers (particularly those based abroad), and fears linked to discussing national matters may have led some participants to withhold information or provide socially desirable answers (Ghodsi & Hasani, 2021; Keshavarz & Karimi, 2020). The need for incentives to encourage participation and the hesitancy surrounding compensation further underscore these trust-related challenges.

The context of data collection was further complicated by the timing of significant political events. The outbreak of civil unrest following the death of Mahsa Amini in September 2022 and the escalation of the Iran-Israel conflict after October 7th, 2023, contributed to shifting public priorities and heightened stress, resulting in dramatically reduced response rates (Tait, 2022; Yeganeh & Madani, 2023). These sociopolitical disruptions not only limited the number of completed questionnaires but may also have influenced the content and candor of the responses received.

While the study's methodology and analysis are robust within their context, the environmental limitations inherent to the Iranian setting like governmental censorship, low trust, and political instability, must be acknowledged as significant factors affecting the reliability and transferability of the results. If similar research were conducted in countries without restrictions on social media access and with greater public trust in health-related information, it is likely that the validity and applicability of the conclusions and recommendations would be substantially enhanced.

4.12 Conclusion

The integration of quantitative and qualitative findings underscores a persistent gap between public confidence and actual media literacy among Iranian users. Structural, cultural, and generational dynamics shape this landscape far more than demographic factors like gender or education. Addressing these challenges requires comprehensive, context-sensitive interventions at both the policy and grassroots levels. As the digital information ecosystem continues to evolve, ongoing scholarly attention and adaptive educational strategies will be vital for narrowing the gap between perceived and actual media literacy competencies.

A different perspective on these findings, particularly the illusion of knowledge, suggests that promoting social media literacy may be more complex in societies where this illusion prevails. Individuals might not perceive the need to enhance their skills if they

already believe themselves proficient. This potential resistance should be carefully considered in the development and implementation of social media literacy initiatives.

Another critical consideration is the definition and application of social media literacy in contexts where social media faces political and regional challenges. In other words, existing frameworks—such as those provided by UNESCO—generally assume unrestricted access to media, rather than environments subject to governmental filtering. It may therefore be necessary to address political barriers when discussing literacy in climates characterised by censorship and lack of impartiality.

4.13 Contribution

The findings from the proposed thesis will help improve media literacy in the Iranian population and help provide a base for future research to address the areas that can be worked on to improve literacy. It will also provide a source of experience to help news media literacy in case of possible pandemics in the future to decrease the harmful effects of fake news and misinformation. Health professionals' contribution as an essential part of fighting against fake news will be studied and can become a guide for human-based approaches.

I have updated the list of references, removing duplicates, completing incomplete citations, and formatting them alphabetically according to APA 7th edition style. I have also added URLs and DOIs where needed.

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5 Appendix A- UNESCO MIL assessment framework- Components and descriptions

MIL component

Component 1 Access	Recognizing the demand for, being able to search for, being able to access and retrieve information and media content (Component 1 – Access)[22]. This first MIL component is crucial and is understood as the ability to access, retrieve and store information and media content, using appropriate technologies. It includes the ability to recognize the need for information, media content and knowledge and to be able to identify useful information and media content from all sources and formats, including print, audio, visual and digital to satisfy this need. Retrieval may be from libraries, museums, personal files or any other source, and which may be stored physically or electronically.
Component 2 Evaluation	Understanding, assessment and evaluation of information and media (Component 2 – Evaluation)[23]. This second MIL component is defined as the ability to understand, critically analyse and evaluate information, media content, the work and functions of media and information institutions, within the context of universal human rights and fundamental freedoms. This includes comparing facts, distinguishing facts from opinion, being aware of timing (new/news/obsolete), identifying underlining ideologies and values, and questioning how social, economic, political, professional, and technological forces shape media and information content. It also involves evaluating the quality (accuracy, relevance, currency, reliability, and completeness) of information. Furthermore, in an age of information overload, individuals need also to master the technical skills of organizing, selecting and synthesizing media and information. An understanding of the nature, functions and operations of media institutions, media professionals and information providers is crucial for knowing how to deconstruct information and media messages. It is important to recognize the role of the media and information in the broader context, particularly for promoting freedom of expression, freedom of information and access to information. It will also help to understand the relationship and impact of MIL, citizenship, democracy and good governance. Media and information literate individuals recognize the economic, social and political power and control of media companies and information providers, as well as public institutions.
Component 3 Creation	Creation, utilization and monitoring of information and media content (MIL Component 3 – Creation)[24]. This third MIL component is defined as the ability to master the production know-how of information, media content and new knowledge and effectively communicate with others. It also includes ethical and effective use of information, media content and in general knowledge for instance intellectual property aspects. Being media and information literate not only means being equipped with analytical and production skills, but also requires knowledge about the media and information, and requires the attitudes and values to use media and information and ICTs in an ethical manner. MIL citizens are also those who participate in and monitor democratic processes. The 21st century offers new ways to be creative and innovative as well as collaborative: with Web 2.0 Internet applications, everyone with adequate ICT access and skills can produce, share, network and monitor information and media messages. Media production and knowledge creation, as well as use and impact monitoring, are therefore key elements of MIL.

Table 4. Description of MIL components (UNESCO, 2013)A range of MIL subject matters are defined and proposed, based on three broad MIL components (in total 12)

MIL component	MIL subject matters
1. Recognizing the demand for, being able to search for, being able to access and retrieve information and media content	1.1. Definition and articulation of a need for information
	1.2. Search for and location of information and media content
	1.3. Access to information, media content and media and information providers
	1.4. Retrieval and holding / storage of information and media content
2. Understanding, assessment and evaluation of information and media	2.1. Understanding of information and media
	2.2. Assessment of information and media content, and media and information providers
	2.3. Evaluation of information and media content, and media and information providers
	2.4. Organization of information and media content
3. Creation, utilization and monitoring of information and media content	3.2. Creation of knowledge and creative expression
	3.2. Communication of information, media content and knowledge in an ethical and effective manner
	3.3. Participating in societal-public activities as active citizen
	3.4. Monitoring influence of information, media content, knowledge production and use, as well as of media and information providers

Table 5: MIL components and its associated with MIL subject matters (UNESCO, 2013)

Competency, as a MIL competency standard, is used to describe levels of individual competencies with respect to MIL (Table 6). The MIL Assessment Framework proposes 12 major competencies, which are related to the broad MIL components and subject matters mentioned above. It is important to point out that UNESCO does not set a MIL competency standard, but provides suggestions for the national institutions, which may decide to set a national standard on MIL competency.

MIL component	MIL subject matters	MIL Competency Media and Information literate person is able to:
1. Recognizing the demand for, being able to search for, being able to access and retrieve information and media content	1.1. Definition and articulation of a need for information	1. Determine and articulate the nature, role and scope of the information and media (content) through a variety of resources.
	1.2. Search and location of information and media content	2. Search and locate information and media content.
	1.3. Access to information, media content and media and information providers	3. Access needed information and media content effectively, efficiently and ethically as well as media and information providers.
	1.4. Retrieval and holding / storage / retention of information and media content	4. Retrieve and temporally hold information and media content using a variety of methods and tools.
2. Understanding, assessment and evaluation of information and media	2.1. Understanding of information and media	5. Understand necessity of media and information providers in society.
	2.2 Assessment of information and media content, and media and information providers	6. Assess, analyse, compare, articulate and apply initial criteria for assessment of the information retrieved and its sources, as well as evaluate media and information providers in society.
	2.3. Evaluation of information and media content, and media and information providers	7. Evaluate and authenticate information and media content gathered and its sources and media and information providers in society.
	2.4. Organization of information and media content	8. Synthesize and organize information and media content gathered.
3. Creation, utilization and monitoring of information and media content	3.1. Creation of knowledge and creative expression	9. Create and produce new information, media content or knowledge for a specific purpose in an innovative, ethical and creative manner.

	3.2. Communication of information, media content and knowledge in ethical and effective manner	10. Communicate information, media content and knowledge in an ethical, legal and effective manner using appropriate channels and tools.
	3.3. Participating in societal-public activities as active citizen	11. Engaged with media and information providers for self-expression, intercultural dialogue and democratic participation through various means in ethical, effective and efficient manner.
	3.4. Monitoring influence of information, media content, knowledge production and use as well as media and information providers	12. Monitor the impact of created and distributed information, media content and knowledge as well as use existing media and other information providers.

Table 6. Summary of MIL components, subject matters and competencies (UNESCO, 2013)

A performance criterion is used to guide the concrete assessment of the competencies and development of competency-based standards. The performance criterion also specifies what is to be assessed and the required level of performance. In addition, it details the activities, skills, knowledge and understanding/attitudes that provide evidence of competent performance for each competency. There are a number of associated performance criteria for each competency.

There is a total of 113 performance criteria for all competencies proposed by the MIL Assessment Framework:

- MIL component One: 4 competencies, associated with 36 performance criteria,
- MIL component Two: 4 competencies and 42 associated performance criteria,
- MIL component Three: 4 competencies and 35 performance criteria.

The full MIL Competency Matrix, including the performance criteria that an individual should demonstrate in order to locate her/his level on each competency continuum is provided in Technical Annex E.

The MIL framework leads to the assessment of proficiency levels for grading the various MIL competencies:

Basic level a respondent has basic level of knowledge, training, or experience on MIL, but significant improvements are needed for effective application. *It enables the individual to:*	Intermediate level a respondent has a good level of knowledge and skills acquired from practice and training on MIL, but there are gaps in certain areas. *It enables the individual to :*	Advanced level a respondent has a very good level of knowledge and skills acquired from practice and training on MIL. *It enables the individual to:*
Recognize his or her information and media (content) need, identify and save information and media content from easily located and accessed information sources using basic tools.	Specify the nature, role and scope of his or her information and media (content) need, in order to locate and select from various and potentially conflicting information sources and providers of information and media content using various tools, storing it and applying key legal and ethical principles.	Formulate his or her information and media (content) needs into concrete strategies and plans to search for and access information from diverse sources using relevant and where necessary diverse tools in a systematic, explicit and efficient manner, and retrieve existing information for further utilization.
Select information sources without clear assessment criteria, and with limited application and awareness of major principles, conditions and functions of media and information providers in society as well as authentication of information and media content.	Analyze and differentiate quality of and evidence of relevant information sources and content, understanding the necessity of media and information providers and their implications for society, being unable to recognize different viewpoints; as well as store selected information and media content for further application.	Within the context and multiple conditions applicable, interpret, compare, critically evaluate, authenticate and hold synthesized information and media content, appreciating work of author(s), and media and information providers within the context of sustainable development of society, organization or community.

Organize and save retrieved information without substantive synthesis using basic tools and distribute without critical appraisal or ethical and legal considerations for limited application.	Create, produce and communicate new information and media content in new formats using appropriate channels and tools for well-defined application as well as engaging in a dialogue with others with limited awareness of ethical and legal implications.	Combine information and media content for creation and production of new knowledge considering socio-cultural aspects of the target audiences and then communicate and distribute in various appropriate formats and tools for multiple applications in a participatory, legal, ethical and efficient manner, as well as monitor influence and impact made.

Table 7. MIL framework of proficiency levels (UNESCO, 2013)

and weakness among a population, before appropriate policies are elaborated. It is important to note that an individual can perform higher on some dimensions but lower on others. For example, an individual can perform very well on activities related to the evaluation or understanding of the functions of media and information providers (MIL component 2), but not in the access and retrieval of media and information (MIL component 1), particularly if access is only possible through a computer or the Internet. On the other hand, individual performances on MIL component 3 activities may be correlated with those in the other two competencies. Figures 9, 10 and 11 show examples of profiles for each MIL component.

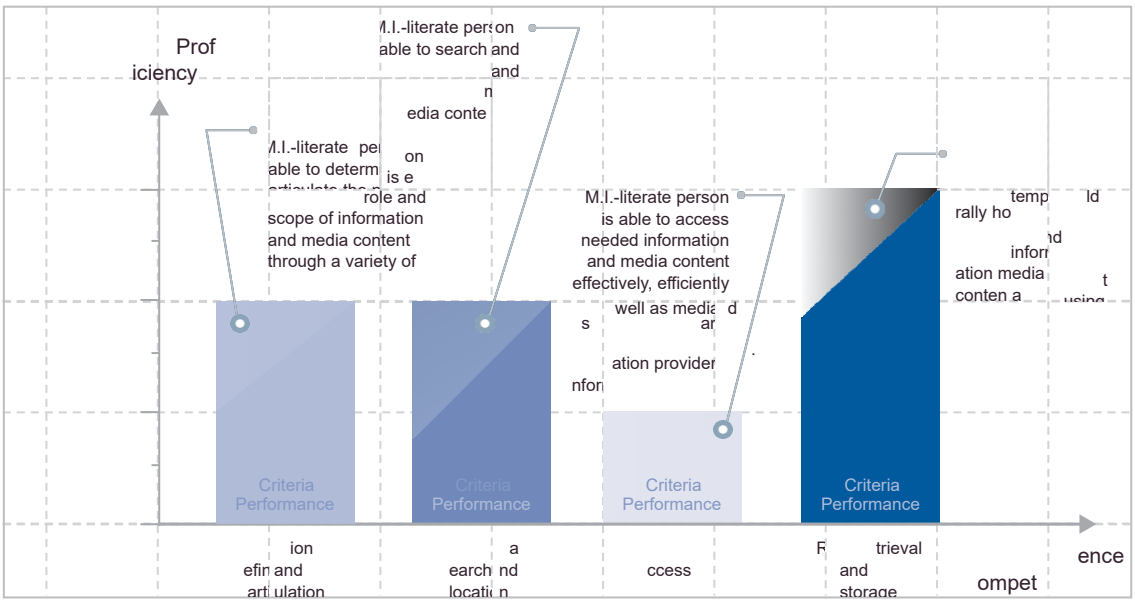

Figure 9. Profile example for the MIL component – Access (UNESCO, 2013)

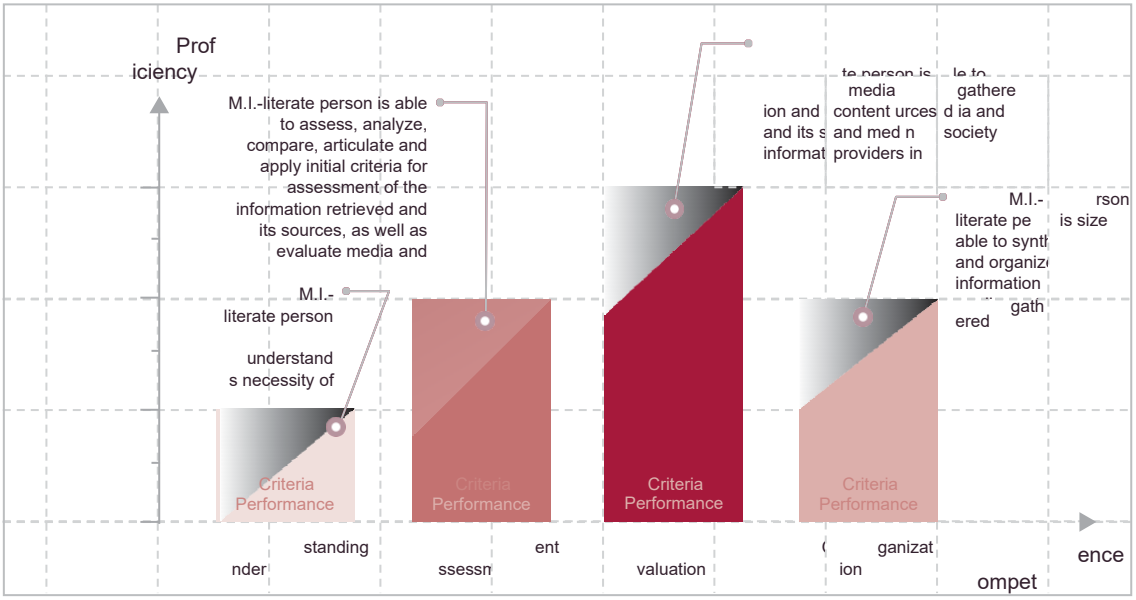

Figure 10. Profile example for the MIL component – Evaluation (UNESCO, 2013)

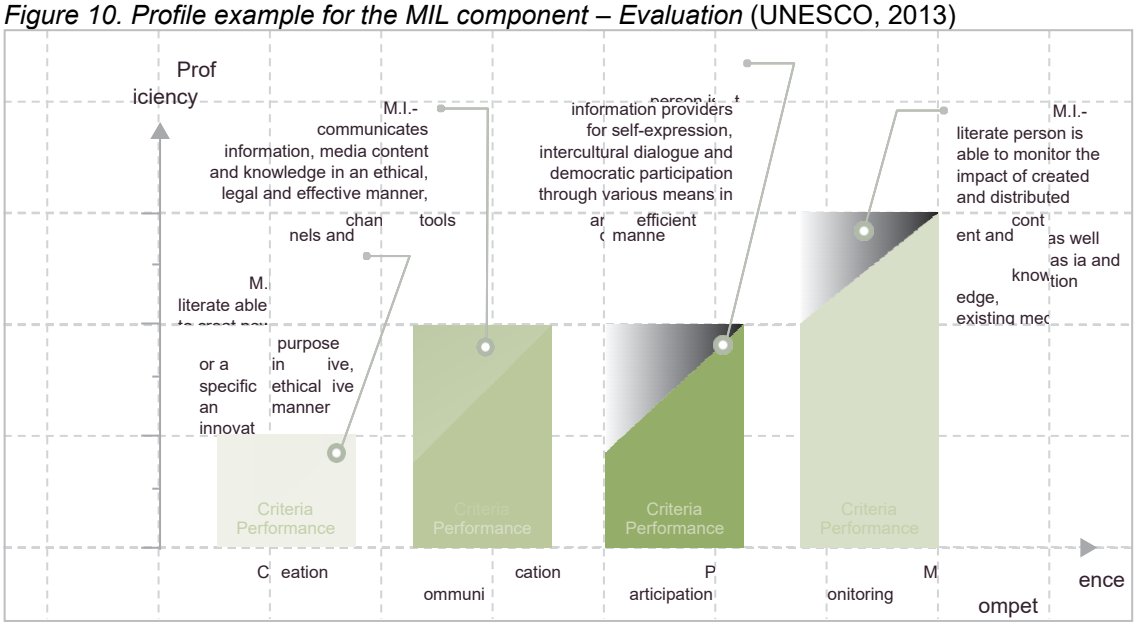

Figure 11. Profile example for the MIL component – Creation (UNESCO, 2013)

Furthermore, levels of individual competencies are influenced by several contextual factors, both at the individual and the societal level. For example, ICT literacy levels of students and teachers in a given country may depend on the degree of pedagogical ICT integration in the classroom or in the teaching process, the quality and the implementation of national ICT policies in education, the access (at school, home and in other places as well as connection costs) to ICTs and teachers' and students' levels of ICT familiarity, including activities performed at school and other places by the students through ICTs.

In theory, MIL is a multidimensional latent trait, with each of the MIL components treated as an independent latent trait (Catts, 2010 UNESCO, 2011a). Multidimensional latent trait measurement can hence be applied. While independence among the latent traits is assumed in theory, data may reveal weak and negligible correlations among themselves

6 Appendix B- ethic committee approval

11/02/2022

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	H-11-21-7482
Titre du projet / Project Title	Social media literacy and health information in the Iranian population during the COVID-19 pandemic
Type de projet / Project Type	Thèse de doctorat / Doctoral thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	11/02/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	10/02/2023

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Hanisa RAHBARI	École de science informatique et de génie électrique / School of Electrical Engineering and Computer Science	Chercheur Principal / Principal Investigator
Rocci LUPPICINI	Département de communication / Department of Communication	Superviseur / Supervisor
Rukhsana AHMED	Département de communication / Department of Communication	Co-superviseur / Co-supervisor

Conditions spéciales ou commentaires / Special conditions or comments

550, rue Cumberland, pièce 154 Ottawa (Ontario) K1N 6N5 Canada
550 Cumberland Street, Room 154 Ottawa, Ontario K1N 6N5 Canada

613-562-5387 • 613-562-5338 • ethique@uOttawa.ca / ethics@uOttawa.ca
www.recherche.uottawa.ca/deontologie | www.recherche.uottawa.ca/ethics

7 Appendix C- Questionnaire

General questions:

Age: Gender: Highest education level:

Filed of study in the highest educational degree:

Which social media applications do you use regularly?

Telegram- WhatsApp- Instagram- Twitter- Viber- Sorooush- others (name:)

Are you currently live in Iran? - yes - No

Do you receive health related information **(**like news or guides**)** through social media?

How much do you trust these information?

What was the effect of following health related news during Covid pandemic on your trust?

سوالات عمومی

سن: جنسیت: بالاترین مدرک تحصیلی: رشته تحصیلی مرتبط با این مدرک:

از کدام اپلیکیشن معمولا استفاده میکنید؟

تلگرام، وات آپ، اینستاگرام، توئیتر، وایبر، سروش، غیره

آیا در حال حاضر ساکن ایران هستید؟

آیا اطلاعات مرتبط با سلامت (مانند اخبار و راهنمایی ها) را از طریق این اپلیکشن ها دریافت میکنید؟

تا چه حد به این اطلاعات بطور کلی اعتماد میکنید

به نظر شما پیگیری مطالب مربوط به سلامت در دوران کرونا تاثیری بر اعتماد شما داشته است؟

MIL Competency Matrix

Competency element 1:

Recognizes the demand for, is able to search for,accesses and retrieves information and media content

MIL mention: Definition and articulation of a need for information
Competency: M.I.-literate person is able to determine and articulate the nature, role and scope of the information and media (content) through a variety of resources

1. Recognizes the need for information and media content

آگاه هست که به اطلاعات و رسانه نیاز دارد.

2. Recognizeس the need for and importance of media and information providers

میدانم که داشتن رسانه و منابغی برای کسب اطلاعات نیاز هست

4. Determines and specifies information needs linking with key and relevant concepts, disciplines and subjects in order to transform a need into a form for an action

میتوانم مشخص کنم که برای یک موضوع خاص چه اطلاعاتی لازم هست و چطور آن اطلاعات را بدست آورم.

5. Knows that different types of information needs / problems require different sources of information (other people, groups, organizations or objects) and/or places from which something comes, arises, was created or obtained (such as library, archive, media, Internet)

برای کسب اطلاعات مختلف لازم است از منابع مختلف مانند سایر افراد، مراکز و ...) یا جاهایی که مرکز تولید و توزیع اطلاعات هستند (مثل کتابخانه، مجلات، اینترنت و ...) استفاده کرد.

6. Assumes that different types of information needs / problems may not be solved without others' help, such as people, groups or organizations

گاهی کسب اطلاعات درست بدون کمک سایر افراد امکان پذیر نیست.

7. Connects and consults with other individuals, groups, organizations, or levels to formulate a general statement / question

میتوانم از راهنمایی و کمک دیگران برای ایجاد و طرح یک پرسش استفاده کنم

8. Formulates a general statement / question based on information need into a form of an active statement / question, vocalizes, writes down, types, constructs, expresses using any technique in an explicit and efficient manner

قادر هستم یک سؤال کلی را بر اساس نیاز اطلاعاتی به شکل یک پیام صوتی، نوشته، تصویر یا هر روش متناسب دیگر مطرح کنم.

MIL mention: Search and location of information and media content

Competency: M.I.-literate person is able to search and locate information and media content

9. Develops search strategy (-ies) to find appropriate information, media content, information providers, means and tools

میتوانم برای یافتن اطلاعات مناسب، محتوای رسانه ای، منابع و مراجع اطلاعاتی، و .... روش جستجوی متناسبی بکار بگیرم.

10. Knows roles and functions of information producers and media institutions in society where information and media content could be found and located

میدانم که نقش و کارکرد منابع خبر و موسسات رسانه ای در جامعه ای که اخبار و اطلاعات در آن هست، چیست

11. Explores, determines and situates the place / site where information and media content could be located by any instrument/tool and place, such as any physical and/or virtual place

میتوانم جایی را که در آن اطلاعات و اخبار به هر شکل فیزیکی یا مجازی قرار داده شده بخوبی مشخص کنم.

12. Seeks to identify an author, producer, organizer, disseminator of information and

media content

نویسنده، تهیه کننده، سازمان دهنده، انتشار دهنده اطلاعات و محتوای رسانه ای را شناسایی میکنم

13. Understands the role of metadata

میدانم فراداده چیست

14. Identifies, differentiates and prioritizes potential information sources by type of information source, date, topic, author, sender, receiver, keywords, tags and terms, etc.

قادر هستم منابع اطلاعاتی احتمالی را بر اساس نوع منبع اطلاعات، تاریخ، موضوع، نویسنده، فرستنده، گیرنده، کلمات کلیدی، برچسب ها و اصطلاحات و غیره شناسایی، متمایز و اولویت بندی کنم.

15. Appreciates diversity of information and media content provided by information providers and media, as well as appreciates diverse formats

از اهمیت تنوع اطلاعات و محتوای رسانه ای ارائه شده توسط منابع خبری و رسانه ها آگاهم و همچنین قالب های متنوع خبری را به رسمیت میشناسم.

16. Distinguishes formats of information and media resources

میتوانم تفاوت بین قالب های مختلف منابع خبری را تشخیص دهم.

17. Decides what types of information and media resources are required

مشخص میکنم که چه نوع اطلاعات و منابع رسانه ای مورد نیاز است

18. Knows importance and relevance of tools for locating information and media content

اهمیت و ارتباط ابزارهای یافتن اخبار و اطلاعات را می دانم

19. Recognizes limitations, challenges and possibilities of locating information and media content due to technical, legal, economic, social-cultural, political and other reasons

محدودیت ها، چالش ها و امکانات یافتن اخبار و اطلاعات رسانه ها را به دلایل فنی، حقوقی، اقتصادی، اجتماعی- فرهنگی، سیاسی و غیره تشخیص می دهم.

20. Refines search strategy, if required

در صورت لزوم، استراتژی جستجو را اصلاح می کنم

21. Locates those information sources, using appropriate tools

منابع اطلاعاتی را با استفاده از ابزارهای مناسب پیدا میکنم

MIL mention: Access to information, media content and media and information providers

Competency: M.I.-literate person is able to access needed information and media content

effectively, efficiently and ethically, as well as media and information providers

22. Determines the method(s) and strategy(-ies) for accessing information and media content

روش(ها) و استراتژی(های) برای دسترسی به اطلاعات و محتوای رسانه را تعیین می کنم

23. Determines the availability, costs, time, benefits and applicability of acquiring the needed information and media content, applying the method(s) and strategy(-ies) formulated above

با استفاده از روش(ها) و استراتژی(های) فرموله شده فوق، در دسترس بودن، هزینه ها، زمان، مزایا و قابلیت استفاده بودن کسب اطلاعات و اخبار رسانه مورد نیاز را تعیین می کنم.

24. Follows basic laws, regulations, policies, rights and principles related to ethical access to: information, documentary heritage, media content, ICTs, other media and information providers

از قوانین اساسی، مقررات، خط مشی ها، حقوق و اصول مربوط به دسترسی اخلاقی به: اطلاعات، میراث اسنادی، محتوای رسانه ای، فناوری اطلاعات و ارتباطات، سایر رسانه ها و ارائه دهندگان اطلاعات پیروی می کنم.

25. Acknowledges the importance of the rules, laws and regulations related to access to information

اهمیت قواعد، قوانین و مقررات مربوط به دسترسی به اطلاعات را تایید می کنم

26. Knows that access to information and media content could be restricted

می دانم که دسترسی به اطلاعات و محتوای رسانه ها می تواند محدود شود

27. Uses diverse tools to access information and media content

از ابزارهای متنوع برای دسترسی به اطلاعات و محتوای رسانه ای استفاده می کنم

28. Accesses selected information and media content through a variety of media and other information providers

از طریق انواع رسانه ها و سایر ارائه دهندگان اطلاعات به اطلاعات و اخبار رسانه ای منتخب دسترسی پیدا میکنم

29. Accesses media and other information providers, including those on the Internet, for self- expression, creativity, social and political participation

به رسانه ها و سایر ارائه دهندگان اطلاعات، از جمله آنهایی که در اینترنت هستند و برای ابراز نظرات، خلاقیت ها، مشارکت اجتماعی و سیاسی منتشر شده اند میتوانم دسترسی داشته باشم

MIL mention: Retrieval and holding / storage/ retention of information and media content

Competency: M.I.-literate person is able to retrieve and temporally hold information and media content using a variety of methods and tools.

30. Uses various systems and tools to retrieve most suitable information and media content in a variety of formats

از سیستم ها و ابزارهای مختلف برای بازیابی مناسب ترین اطلاعات و محتوای رسانه ای در قالب های مختلف استفاده می کنم

31. Uses other forms of inquiry in order to retrieve information

از اشکال دیگر پرس و جو هم به منظور کسب اطلاعات استفاده می کنم

32. Retrieves different types of information

انواع مختلف اطلاعات را در مورد یک موضوع استخراج می کنم

33. Selects, organizes and holds onto the retrieved information and media content using appropriate technologies and tools

.33اطلاعات و اخبار بدست آمده را با استفاده از فناوری ها و ابزارهای مناسب انتخاب، سازماندهی و نگهداری می کنم.

34. Knows requirements, rules and practices of holding information and media content

الزامات، قوانین و شیوه های نگهداری اطلاعات و محتوای رسانه ای را می دانم

35. Assumes that retrieved information and media content could be useful in future

فرض بر این است که اطلاعات بازیابی شده و محتوای رسانه ای می تواند در آینده مفید باشد

36. Applies basic requirements of holding information and media content

الزامات اساسی نگهداری اخبار و اطلاعات را بکار میگیرم.

Competency element 2:
Understands, assesses and evaluates information and media

MIL matter: Understanding of information and media Competency: M.I.-literate person understands necessity of media and information providers in society

1. Understands principles and conditions necessary for media and information providers to fulfil their functions

از اصول و شرایط لازم متعلق به رسانه ها و ارائه دهندگان اطلاعات برای انجام وظایف خودشان اطلاع دارم

2. Understands role and functions of media and information providers in society to inform, teach, influence and entertain

نقش و کارکرد رسانه ها و ارائه دهندگان اطلاعات در جامعه برای اطلاع رسانی، آموزش، نفوذ و سرگرمی را درک می کنم.

3. Recognizes that media and information providers have implications for society

متوجه هستم که رسانه ها و ارائه دهندگان اطلاعات پیامدهایی برای جامعه دارند

4. Knows that the work of media and information providers and their impact can and should be monitored

می دانم که کار رسانه ها و ارائه دهندگان اطلاعات و تأثیر آنها می تواند و باید نظارت شود

5. Knows concepts of ethics and rights related to media and information and international and professional standards

به مفاهیم اخلاق و حقوق مرتبط با رسانه و اطلاعات و استانداردهای بین المللی و حرفه ای آشنایی دارم

6. Recognizes the impact of information and media content on oneself

تأثیر اطلاعات و محتوای رسانه ها را بر خود تشخیص می دهم

7. Identifies how information and media content can be represented differently and in different formats

تشخیص میدهم که چگونه اطلاعات و محتوای رسانه ای می تواند به طور متفاوت و در قالب های مختلف نمایش داده شود

8. Identifies and differentiates who owns and creates information and media content

تفاوت بین کسی که صاحب خبر هست و کسی که خبر را تولید میکند تشخیص میدهم.

9. Understands authorship and rights of authors

متوجه حق تألیف و حقوق نویسندگان هستم

10. Appreciates the importance of acknowledging others' work in terms of authorship and rights

کار دیگران را از نظر تألیف و حقوق به رسمیت میشناسم

11. Knows about editorial independence and censorship of information and media content, as well as media and information institutions

از استقلال تحریریه و سانسور اطلاعات و اخبار و رسانه ها و موسسات اطلاع رسانی اطلاع دارم.

12. Recognizes that audiences/users interpret information and media content in different ways

متوجه هستم که مخاطبان/کاربران اطلاعات و اخبار را به روش های مختلف تفسیر می کنند

13. Knows that there are various viewpoints in any information and media content

می دانم که در هر اطلاعات و اخبار دیدگاه های مختلفی وجود دارد

14. Appreciates information and media content applying aesthetic criteria and formats

.2اطلاعات و محتوای رسانه ای را با به کارگیری معیارها و قالب های زیبایی شناختی ارج می نهد

15. Understands the codes and genres of different media and information platforms

کدها و ژانرهای رسانه ها و بسترهای اطلاعاتی مختلف را درک می کنم

16. Understands the importance of advertisement in media and information providers

میدانم تبلیغات در رسانه ها و منابع خبری چه اهمیتی دارد.

MIL matter: Assessment of information and media content, and media and information providers

Competency: M.I.-literate person is able to assess, analyse, compare, articulate and apply initial criteria for assessment of the information retrieved and its sources, as well as evaluate media and information providers in society

17. Defines assessment criteria for information and media content retrieved and information sources: purpose, audience, authorship, credibility, significance, supplier, relevance, currency, reliability, completeness, accuracy, timelines, scope, and coverage.

معیارهای ارزیابی اطلاعات و اخبار بدست آمده از منابع اطلاعاتی را تعریف می کنم مانند: هدف مطلب، مخاطب، نویسنده، اعتبار، اهمیت، تامین کننده، ارتباط، نقش پول، قابلیت اطمینان، کامل بودن، دقت، جدول زمانی، دامنه و پوشش.

18. Creates or uses basic assessment instrument(s)/tool(s) for evaluation of information and media content, as well as media and other information providers

ابزار(های) ارزیابی پایه برای ارزیابی اطلاعات و اخبار و همچنین رسانه ها و سایر ارائه دهندگان اطلاعات را ایجاد کرده یا از موارد موجود استفاده می کنم

19. Selects and summarizes main elements such as ideas, keywords, concepts, messages and themes from retrieved information and media content

عناصر اصلی مانند ایده ها، کلمات کلیدی، مفاهیم، پیام ها و مضامین را از اطلاعات بازیابی شده و اخبار را انتخاب و خلاصه می کنم.

20. Understands the purpose and importance / significance of information and media content and its context on sustainable development

متوجه نقش و اهمیت/ارزش اطلاعات و اخبار و زمینه آن در توسعه پایدار هستم

21. Interprets, makes connections on the retrieved information and media content, and restates in own words

اطلاعات بدست آمده و اخبار را تفسیر کرده، با آن ارتباط برقرار می کنم و میتوانم با کلمات خودم آن را بازگو می کند.

22. Distinguishes editorial independence and recognizes censorship of information and media content and other information providers

قایل به مستقل بودن نویسنده هستم و متوجه سانسور اطلاعات و اخبار و سایر ارائه دهندگان اطلاعات میشوم

23. Describes the intended audiences of theretrieved information and media content

میتوانم مشخص کنم چه کسانی مخاطب اطلاعات و اخبار منتشر شده هستند.

24. Identifies, analyses and differentiates diverse advertising messages, processes, techniques, standards, and codes of practice

پیام های تبلیغی متنوع، فرآیندها، تکنیک ها، استانداردها و کدهای عملی را شناسایی، تجزیه و تحلیل و متمایز می کنم.

25. Identifies and verifies additional information sources, methods and search strategies using diverse tools

با استفاده از ابزارهای متنوع قادر هستم منابع اطلاعاتی دیپر، روش ها و استراتژی های جستجو را شناسایی و تأیید کنم.

MIL matter: Evaluation of information and media content, and media and information providers

Competency: M.I.-literate person is able to evaluate and authenticate information and media content gathered and its sources and media and information providers in society

26. Defines evaluation criteria and appropriate tools

معیارهای و ابزار مناسب ارزیابی را تعریف می کنم

27. Aware about limitations and subjectivity of evaluation

از محدودیت ها و ذهنی بودن ارزشیابی آگاه هستم

28. Identifies and unionizes related needs / topics / issues and asks additional questions

نیازها/موضوعات/مسائل مرتبط را شناسایی و جمع بندی می کنمد و سوالات بیشتری در مورد آنها میپرسم

29. Examines information and media content gathered, and its sources as well as media and information providers

وقتی اطلاعات و اخباری بدستم میرسد، منابع آن و همچنین رسانه محل درج مطلب و ارائه دهنده ی آن را چک میکنم

30. Evaluates information and media content gathered, its sources as well as media and information providers

اطلاعات و اخبار جمع آوری شده، منابع آن و همچنین رسانه ها و ارائه دهندگان اطلاعات را ارزشیابی می کند

31. Compares information from different media and information sources

اطلاعات بدست آمده از رسانه ها و منابع اطلاعاتی مختلف را با هم مقایسه می کنم

32. Understands the importance of life cycle of information and media content for evaluation

اهمیت چرخه حیات اطلاعات و محتوای رسانه ای را برای ارزیابی درک می کنم

33. Draws conclusions from information and media content gathered using various technique and makes a judgement

اطلاعات و اخبار بدست آمده از طرق مختلف را جمع بندی کرده و در مورد آن تصمیم میگیرم.

34. Provides arguments for the drawn conclusions

برای نتایجی که به دست آورده ام استدلال ارائه می کنم

Interview questions:

1) Please introduce yourself and include your highest degree, related work experience with social media content,
2) What do you think about how public is doing well about these items (for example in a scale of one to ten)?

    a. Recognizes the demand for, is able to search for,accesses and retrieves information and media content

    b. Understands, assesses and evaluates information and media

3) How different is the presented results with your estimates?
4) What are the possible backgrounds and reasons about the outcomes in the presented results?
5) In your opinion, which part(s) could be better and has space to develop more? Which parts looks to have less chance?
6) In your opinion, what can improve the media literacy and what are the possible barriers?
7) How do you see the effect of Covid pandemic on media literacy in Iranian users?

سوالات مصاحبه:

(1لطفاً خود را معرفی کنید و بالاترین مدرک تحصیلی، تجربه کاری مرتبط با محتوای رسانه های اجتماعی را درج کنید.
(2نظر شما در مورد نحوه عملکرد عمومی در مورد این موارد (مثلاً در مقیاس یک تا ده) چیست؟

(3نتایج ارائه شده چقدر با برآورد شما متفاوت است؟
(4زمینه ها و دلایل احتمالی در مورد نتایج در نتایج ارائه شده چیست؟
(5به نظر شما کدام قسمت می تواند بهتر باشد و فضایی برای توسعه بیشتر دارد؟ به نظر می رسد کدام قسمت ها شانس کمتری دارند؟
(6به نظر شما چه چیزی می تواند سواد رسانه ای را بهبود بخشد و چه موانعی وجود دارد؟
7)تأثیر دوران کرونا بر سواد رسانه ای ایرانیان را چگونه ارزیابی میکنید؟

8 Appendix D- SPSS output tables

Frequencies

Statistics

Gender

N	Valid	38
	Missing	0

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	15	39.5	39.5	39.5
	female	23	60.5	60.5	100.0
	Total	38	100.0	100.0	

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Ageat2024	28	17.00	74.00	43.0714	12.85800
Valid N (listwise)	28				

.

Frequencies

Statistics

Education

N	Valid	38
	Missing	0

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	8	21.1	21.1	21.1
	Diploma	5	13.2	13.2	34.2
	Doctrate	5	13.2	13.2	47.4
	Master	19	50.0	50.0	97.4
	Under diploma	1	2.6	2.6	100.0
	Total	38	100.0	100.0	

Frequencies

Application

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Instagram	3	7.9	7.9	7.9
	WhatsApp	3	7.9	7.9	15.8
	WhatsApp,???? ? ???? ????????? ??? ??????	1	2.6	2.6	18.4
	WhatsApp,Instagram	5	13.2	13.2	31.6
	WhatsApp,Telegram	1	2.6	2.6	34.2
	WhatsApp,Telegram,????	2	5.3	5.3	39.5
	WhatsApp,Telegram,Instagram	16	42.1	42.1	81.6
	WhatsApp,Telegram,Instagram,???? ? ???? ????????? ??? ??????	2	5.3	5.3	86.8
	WhatsApp,Telegram,Instagram,???? ? ???? ????????? ??? ??????,????	1	2.6	2.6	89.5
	WhatsApp,Telegram,Instagram,Twitter	3	7.9	7.9	97.4

	WhatsApp,Telegram,Instagram,Twitter,???? ? ???? ????????? ??? ??????,????	1	2.6	2.6	100.0
	Total	38	100.0	100.0	

Frequencies

Statistics

Q9

N	Valid	38
	Missing	0

Q9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	2.6	2.6	2.6
	No	8	21.1	21.1	23.7
	Yes	29	76.3	76.3	100.0
	Total	38	100.0	100.0	

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
News	38	0	99	46.84	24.703
Advices	36	1	90	46.81	25.508
Solutions	36	0	91	36.42	25.907
Valid N (listwise)	35				

T-Test

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
News	male	15	47.60	29.529	7.624
	female	23	46.35	21.698	4.524
Advices	male	14	51.07	27.869	7.448
	female	22	44.09	24.162	5.151
Solutions	male	14	31.43	25.630	6.850
	female	22	39.59	26.169	5.579

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
News	Equal variances assumed	3.003	.092	.151	36	.881	1.252	8.309	-15.599	18.104
	Equal variances not assumed			.141	23.723	.889	1.252	8.866	-17.057	19.561
Advices	Equal variances assumed	.972	.331	.796	34	.431	6.981	8.767	-10.836	24.797
	Equal variances not assumed			.771	24.886	.448	6.981	9.056	-11.675	25.636
Solutions	Equal variances assumed	.316	.578	-.920	34	.364	-8.162	8.877	-26.202	9.877
	Equal variances not assumed			-.924	28.269	.363	-8.162	8.834	-26.251	9.927

Oneway

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
News	Between Groups	3094.105	4	773.526	1.310	.287
	Within Groups	19484.947	33	590.453		
	Total	22579.053	37			
Advices	Between Groups	2458.242	4	614.561	.938	.455
	Within Groups	20315.397	31	655.335		
	Total	22773.639	35			
Solutions	Between Groups	5149.582	4	1287.395	2.176	.095
	Within Groups	18341.168	31	591.651		
	Total	23490.750	35			

Means

Report

Education		News	Advices	Solutions
under	Mean	42.00	49.00	57.00
	N	1	1	1
	Std. Deviation	.	.	.
diploma	Mean	49.80	60.00	57.00
	N	5	5	5
	Std. Deviation	14.873	20.384	26.344
bachelore	Mean	54.50	53.86	40.14
	N	8	7	7
	Std. Deviation	19.640	21.106	23.674
master	Mean	48.95	44.11	34.22
	N	19	19	18
	Std. Deviation	25.196	26.633	26.105
doctorate	Mean	24.60	30.25	14.40
	N	5	4	5
	Std. Deviation	33.441	32.725	12.422

Total	Mean	46.84	46.81	36.42
	N	38	36	36
	Std. Deviation	24.703	25.508	25.907

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
News * Education	Between Groups	(Combined)	3094.105	4	773.526	1.310	.287
	Within Groups		19484.947	33	590.453		
	Total		22579.053	37			
Advices * Education	Between Groups	(Combined)	2458.242	4	614.561	.938	.455
	Within Groups		20315.397	31	655.335		
	Total		22773.639	35			
Solutions * Education	Between Groups	(Combined)	5149.582	4	1287.395	2.176	.095
	Within Groups		18341.168	31	591.651		
	Total		23490.750	35			

Measures of Association

	Eta	Eta Squared
News * Education	.370	.137
Advices * Education	.329	.108
Solutions * Education	.468	.219

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q12_1	38	0	100	75.68	27.446
Q12_2	38	12	100	83.21	18.625
Q12_3	38	0	100	75.97	23.653
Q12_4	38	16	100	89.42	17.735
Q12_5	38	10	100	66.45	28.490
Q12_6	38	18	100	70.26	24.239
Q12_7	34	13	100	76.06	24.631
Valid N (listwise)	34				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q13_1	37	0	100	77.70	25.989
Q13_2	38	0	100	73.11	30.291
Q13_3	38	0	100	65.97	29.853
Q13_4	38	0	100	55.39	30.618
Q13_5	35	0	100	52.11	36.501
Q13_6	38	0	100	56.95	30.583
Q13_7	37	0	100	65.70	28.678
Q13_8	37	14	100	64.16	28.239
Q13_9	37	10	100	68.59	26.038
Q13_10	38	0	100	66.95	26.047
Q13_11	37	0	100	64.08	26.928
Q13_12	37	0	100	65.57	30.492
Q13_13	37	0	100	68.97	25.700
Valid N (listwise)	34				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q14_1	36	20	100	64.42	24.870
Q14_2	35	20	100	59.37	25.045
Q14_3	36	0	100	59.58	29.522
Q14_4	35	0	100	62.34	27.827
Q14_5	34	20	100	74.59	22.226
Q14_6	36	0	100	72.03	25.346
Q14_7	36	0	100	70.08	27.687
Q14_8	32	0	100	66.25	26.886
Valid N (listwise)	30				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q15_1	36	0	100	64.42	27.474
Q15_2	35	20	100	68.29	27.003
Q15_3	35	0	100	70.09	21.390
Q15_4	35	0	99	56.23	26.597
Q15_5	35	0	100	56.71	28.297
Q15_6	35	0	100	67.77	27.087
Q15_7	36	0	100	48.22	30.411
Valid N (listwise)	35				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q16_1	33	0	100	56.18	26.858
Q16_2	33	38	100	73.55	18.698
Q16_3	34	34	100	76.65	21.672
Q16_4	34	9	100	72.88	24.630
Q16_5	34	0	100	50.06	30.450
Q16_6	33	23	100	78.61	21.144
Q16_7	34	10	100	74.44	23.588
Q16_8	33	0	100	69.18	25.439
Q16_9	34	0	100	70.29	28.245
Q16_10	34	4	100	69.82	30.225
Q16_11	32	0	100	64.66	31.253
Q16_12	33	30	100	82.00	21.736
Q16_13	34	20	100	84.24	21.349
Q16_14	33	0	100	60.85	31.433
Q16_15	34	0	100	57.09	28.825
Q16_16	33	20	100	82.45	20.044

Valid N (listwise)	31				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q18_1	29	0	100	61.31	28.766
Q18_2	28	0	100	69.36	25.351
Q18_3	28	0	100	63.89	23.988
Q18_4	32	0	100	64.87	26.804
Q18_5	33	0	100	63.73	26.787
Q18_6	32	0	100	63.53	25.973
Q18_7	31	20	100	63.10	25.176
Q18_8	32	10	100	65.91	23.370
Q18_9	32	23	100	70.75	23.078
Valid N (listwise)	25				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Comp1	34	15.43	100.00	77.5924	16.91362
Comp2	34	3.31	100.00	65.0724	23.29738
Comp3	30	37.12	100.00	68.0375	18.57728
Comp4	35	2.86	97.29	61.9429	21.43183
Copm5	31	24.38	98.00	70.9617	18.43316
Comp6	25	32.22	98.00	67.4311	15.23659
Valid N (listwise)	19				

Correlations

Correlations

		Ageat2024	Comp1	Comp2	Comp3	Comp4	Copm5	Comp6
Ageat2024	Pearson Correlation	1	.001	-.099	.074	-.033	-.171	-.295
	Sig. (2-tailed)		.996	.632	.738	.869	.402	.194
	N	28	27	26	23	27	26	21
Comp1	Pearson Correlation	.001	1	.416*	.366	.286	.203	.166
	Sig. (2-tailed)	.996		.020	.055	.112	.292	.450
	N	27	34	31	28	32	29	23
Comp2	Pearson Correlation	-.099	.416*	1	.858**	.728**	.771**	.512*
	Sig. (2-tailed)	.632	.020		.000	.000	.000	.010
	N	26	31	34	28	33	29	24
Comp3	Pearson Correlation	.074	.366	.858**	1	.678**	.693**	.574**
	Sig. (2-tailed)	.738	.055	.000		.000	.000	.004
	N	23	28	28	30	30	27	23
Comp4	Pearson Correlation	-.033	.286	.728**	.678**	1	.689**	.553**
	Sig. (2-tailed)	.869	.112	.000	.000		.000	.004
	N	27	32	33	30	35	31	25

Copm5	Pearson Correlation	-.171	.203	.771**	.693**	.689**	1	.720**
	Sig. (2-tailed)	.402	.292	.000	.000	.000		.000
	N	26	29	29	27	31	31	24
Comp6	Pearson Correlation	-.295	.166	.512*	.574**	.553**	.720**	1
	Sig. (2-tailed)	.194	.450	.010	.004	.004	.000	
	N	21	23	24	23	25	24	25

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

T-Test

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Comp1	male	14	76.2653	20.44765	5.46486
	female	20	78.5214	14.44232	3.22940
Comp2	male	14	71.1044	20.18232	5.39395
	female	20	60.8500	24.86823	5.56071
Comp3	male	13	72.0577	15.67555	4.34762
	female	17	64.9632	20.44642	4.95899
Comp4	male	15	65.9429	20.23303	5.22415
	female	20	58.9429	22.32031	4.99097
Copm5	male	14	72.7991	18.00776	4.81278
	female	17	69.4485	19.18922	4.65407
Comp6	male	12	67.8333	14.81404	4.27644
	female	13	67.0598	16.21198	4.49640

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidenc Differ
									Lower
Comp1	Equal variances assumed	.087	.770	-.378	32	.708	-2.25612	5.97190	-14.42049
	Equal variances not assumed			-.355	21.842	.726	-2.25612	6.34774	-15.42604
Comp2	Equal variances assumed	.657	.424	1.275	32	.211	10.25440	8.04246	-6.12756
	Equal variances not assumed			1.324	31.202	.195	10.25440	7.74701	-5.54158
Comp3	Equal variances assumed	1.694	.204	1.038	28	.308	7.09446	6.83549	-6.90740
	Equal variances not assumed			1.076	27.996	.291	7.09446	6.59495	-6.41477
Comp4	Equal variances assumed	.012	.915	.955	33	.347	7.00000	7.32985	-7.91270
	Equal variances not assumed			.969	31.738	.340	7.00000	7.22506	-7.72174
Copm5	Equal variances assumed	.038	.847	.497	29	.623	3.35058	6.73767	-10.42951
	Equal variances not assumed			.500	28.460	.621	3.35058	6.69501	-10.35355

Comp6	Equal variances assumed	.006	.938	.124	23	.902	.77350	6.22862	-12.11137
	Equal variances not assumed			.125	22.999	.902	.77350	6.20528	-12.06313

Oneway

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Comp1	Between Groups	1500.520	4	375.130	1.370	.269
	Within Groups	7939.812	29	273.787		
	Total	9440.332	33			
Comp2	Between Groups	3485.200	4	871.300	1.752	.166
	Within Groups	14426.149	29	497.453		
	Total	17911.348	33			
Comp3	Between Groups	239.502	4	59.875	.153	.960
	Within Groups	9768.847	25	390.754		
	Total	10008.348	29			
Comp4	Between Groups	2026.534	4	506.634	1.118	.366
	Within Groups	13590.454	30	453.015		
	Total	15616.988	34			
Copm5	Between Groups	1241.692	4	310.423	.902	.477
	Within Groups	8951.751	26	344.298		
	Total	10193.443	30			

Comp6	Between Groups	1016.077	4	254.019	1.115	.377
	Within Groups	4555.610	20	227.781		
	Total	5571.687	24			