THE MEDIATING ROLE OF SOCIAL MEDIA ENGAGEMENT ON THE IMPACT OF PERCEIVED VISUAL INFORMATIVENESS TO HEALTH LITERACY

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Abstrak

Kesihatan adalah penting untuk kesejahteraan manusia dan maklumat yang boleh dipercayai adalah penting untuk pemahaman penyakit dan pengurusan kesihatan. Secara tradisinya, organisasi dan penyedia penjagaan kesihatan merupakan sumber maklumat kesihatan yang paling dipercayai. Walau bagaimanapun, kini ramai orang bergantung kepada media sosial untuk mendapatkan maklumat dan sokongan kesihatan, terutamanya semasa krisis seperti COVID-19. Kandungan berkaitan kesihatan yang meluas di media sosial menjadikan pengguna menghadapi lebih cabaran dalam menentukan maklumat yang tepat. Kajian ini meneliti hubungan antara Persepsi Kebermaklumatan Visual (PVI), Literasi Kesihatan (HL), dan Keterlibatan Media Sosial (SME) dalam konteks endemik COVID-19. Ia juga menentukan sama ada SME menjadi pengantara antara hubungan PVI dan HL. Kajian ini menggunakan pendekatan kuantitatif Dimana data dikumpul menggunakan soal selidik daripada sampel 410 pengguna media sosial aktif di Jordan. Keputusan menunjukkan hubungan positif yang signifikan di antara tiga pembolehubah utama: Persepsi Kebermaklumatan Visual (PVI), Literasi Kesihatan (HL) dan Keterlibatan Media Sosial (SME). Selain itu, SME juga didapati menjadi pengantara hubungan antara PVI dan HL. Berdasarkan keputusan ini, kajian mengesyorkan bahawa semua jenis institusi kesihatan harus menggunakan platform media sosial yang pelbagai untuk melibatkan diri secara berkesan dengan individu dan menyebarkan maklumat kesihatan yang boleh dipercayai. Ia juga turut menyokong keperluan bagi kajian menyeluruh tentang penentu yang mempengaruhi literasi kesihatan, serta punca asas yang mendorong orang ramai bergantung kepada platform media sosial untuk memperoleh maklumat kesihatan.

Kata kunci: Persepsi Kebermaklumatan Visual (PVI), Literasi Kesihatan (HL), Keterlibatan Media Sosial (SME), COVID-19.

Abstract

Health is crucial to human well-being and reliable information is essential for disease understanding and health management. Traditionally, healthcare organizations and providers were the most trusted sources of health information. However, many people now rely on social media for health information and support particularly during crises such as COVID-19. The vast amount of health-related content available on social media makes it more challenging for users to discern accurate information. This study examines the relationships between Perceived Visual Informativeness (PVI), Health Literacy (HL), and Social Media Engagement (SME) within the context of the COVID-19 endemic. It also determines whether SME mediates the relationship between PVI and HL. This study adopts a quantitative approach whereby data were collected using a survey from a sample of 410 active social media users in Jordan. The results show a significant positive relationship among the three key variables: Perceived Visual Informativeness (PVI), Health Literacy (HL) and Social Media Engagement (SME). Additionally, SME was found as mediator in the relationship between PVI and HL. Based on these results, the study recommends that health institutions of all types should utilize diverse social media platforms to effectively engage with individuals and disseminate reliable health information. It is also imperative for thorough investigation on the determinants influencing health literacy, as well as the underlying causes that push people to depend on social media platforms in acquiring health information.

Keywords: Perceived Visual Informativeness (PVI), Health Literacy (HL), and Social Media Engagement (SME), COVID-19.

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List Of Abbreviations

PVI	Perceived Visual Informativeness
PMQ	Perceived Message Quality
PI	Perceived Informativeness
PA	Perceived Attractiveness
PE	Perceived Effectiveness
HL	Health Literacy
FI	Finding Information
UI	Understanding Information
EI	Evaluating Information
AI	Applying Information
SME	Social Media Engagement
SI	Seeking Information
CT	Content Trust
BC	Behaviour Change
DHL	Digital health literacy
WHO	World Health Organization
HCC	Health Care Coverage
HLA	Health Literacy Awareness
SCT	Social Cognitive Theory
SLT	Social Learning Theory
PHE	Public Health Emergencies
SEM	Structural Equation Modeling
AVE	Average Variance Extracted
AVE	Average Variation Extracted
UVI	Understanding Visual information
EVI	Evaluating Visual information
FVI	Finding Visual information
AVI	Applying Visual information
SVI	Seeking Visual information

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CHAPTER ONE

1.1 Introduction

In modern society, social media has evolved beyond a simple communication tool to become a crucial platform for global interaction, information sharing, and public conversation (Yepes et al., 2015). Platforms such as Facebook, Twitter, YouTube, and Instagram empower individuals of diverse backgrounds to participate actively in creating, sharing, and debating content on a global scale (Tafesse, 2015). This digital transformation has revolutionized how information, including health-related knowledge, is accessed and communicated, particularly among the digitally informed younger generations.

Alongside the benefits of social media, its impact on public opinion is two-sided, with the ability to both amplify and distort information (Merchant & Lurie, 2020). Properly harnessed, social media can positively shape behaviors and community well-being by facilitating rapid information dissemination and fostering virtual communities of support (Merchant & Lurie, 2020). However, the prevalence of misinformation on these platforms, exacerbated during crises such as the COVID-19 pandemic, poses significant challenges to public health efforts (Vosoughi et al., 2018; Silverman, 2016). This "infodemic" highlights the vital importance of health literacy while simultaneously making it more difficult for the general population to obtain reliable health information.

Health literacy, defined as “the ability to obtain, process, and understand health information to make informed decisions about one's health” (Paakkari & Okan, 2020), is increasingly vital in the digital age. The internet's ubiquity has democratized access to health information, yet it has also amplified the spread of misinformation (Van der Vaart & Drossaert, 2017). Consequently, individuals must navigate through a myriad of digital sources, critically

evaluate information credibility, and distinguish between reliable health guidance and misleading content (Norman & Skinner, 2006; Stormacq et al., 2019).

Visual communication plays a pivotal role in health messaging, influencing how information is perceived, understood, and acted upon (Abdel-Rahim & Ali, 2016). Effective visual design not only enhances engagement but also facilitates comprehension of complex health concepts, making it a cornerstone of successful health communication strategies (Abdel-Rahim & Ali, 2016; King et al., 2014). Despite its importance, there remains a gap in understanding how different visual elements—such as infographics, videos, and images—affect audience perception and behavioral outcomes in health contexts (King et al., 2014).

The importance of visual communication in public health has been further highlighted by the COVID-19 pandemic. As the global community faced unprecedented challenges, digital platforms became primary conduits for disseminating urgent health information and mitigating the spread of misinformation (Xiang et al., 2020; Zarocostas, 2020). The effective presentation of health information through visual formats on social media platforms has become paramount, influencing public understanding and response to health crises.

The present study examines the intricate relationships between Social Media Engagement (SME), Health Literacy (HL), and Perceived Visual Informativeness (PVI) within the context of the COVID-19 pandemic. In particular, the study analyzes how health literacy outcomes are shaped by perceived visual informativeness and the mediating function that social media engagement plays in this process. The objective of this research was to aid in the creation of improved health communication strategies for the digital age by investigating the efficient presentation of information on social media using visual mediums.

1.2 Background of Study

The health literacy term was coined in the 1970s and is gaining importance in the fields of public health and healthcare (Simonds, 1974). It has to do with people's ability to handle the challenging components of contemporary healthcare (Kickbusch & Maag, 2008). Being health literate means contextualizing individual health which includes the family and society, recognizing the elements that impact it, and learning how to deal with them. A person who is health literate do not only take responsibility for their own personal health, but also the health of their family and society (Sørensen et al., 2012).

Sørensen et al. (2012) define health literacy as the skills to find, comprehend, assess, and utilize information to make informed decisions, adjustments, or actions regarding health matters. Digital health literacy (DHL) or e-health literacy, as described by Van der Vaart and Drossaert (2017) and Norman and Skinner (2006), refers to an individual's capacity to access information electronically, critically evaluate it, and apply it to make informed health-related recommendations.

In general, Health literacy refers to an individual's ability to read and understand how healthcare information is used to make treatment decisions. Within the literature, Health literacy has several definitions; this is partly because healthy enlightenment includes both the context in which its requirements are made and the skills that people bring into those contexts (Htay et al., 2022).

Several factors contribute to the effectiveness of health education materials or interventions in terms of health literacy. These factors include readability, numeracy skills, language barriers, cultural relevance, format, style, sentence complexity, use of visuals, promotion of engagement, and various other elements that influence the accessibility and applicability of information (Kickbusch & Maag, 2008).

According to Dubey et al. (2016) in areas away from medical specialists and health authorities, health information and perspectives regarding their impacts on human health are communicated informally through social media. It is worth indicating that social news networks enable people and groups to share information about any issue or concern, even if they are a minority or unaware of other methods of expression. Social media is considered an essential means of connection that allows for the growth and transmission of data to individuals online (Laranjo et al., 2015).

New ways of sharing and disseminating information and news have been publicly available as social media has grown popularity. They are swift and efficient. However, they may also be used to spread both superficial and misleading statements. For a piece of information to deliver the desired impacts in the digital market, one must curate contents which are personalized to the target demography and distribute through proper social media channels (Merchant & Lurie, 2020). Previous research has tried to come out with numerous guidelines for developing a health communication messages. For instance, the National Cancer Institute (2002, 2007) released a how-to guidance for developing health issue products, but only supplied broad, ambiguous advice for picture selection. Buki, Salazar, and Pitton (2009), on the contrary, given a checklist to guarantee the quality of the hard copies and motivated to employ simple, eye-catching, and key standards photographs and visual representations, but no guidelines were provided on how to choose such visual messages. In designing a health communication message, it is important that individual differences be addressed. However, this can be challenging since there are few ways for analyzing visual messages in health connected resources (Springston & Champion, 2004).

Uncertainty regarding the use of visual information and characteristics to improve health connection resources is most likely owing to the variability of prior studies, as well as

contradictory study outcomes. Stephenson and Witte (1998) discovered that vibrant visuals did not boost the persuasiveness of text-based skin cancer messages. On the other hand, Slater et al. (2002) revealed that vivid visuals aided in enhancing message processes related to warnings presented in television advertising. People who were shown graphs incorporating statistical data reported a lower comprehension level and rated the evidence in the graphics as less persuasive and lower quality than the material presented only as text (Parrott et al., 2005). Other studies that employed graphs to communicate risk and statistical information revealed that when particular graph formats were used, individuals were more likely to absorb such data (Ancker et al., 2006).

Furthermore, the literature gives contradicting clues about the effects of perceived visual informativeness and social media on users' health literacy, emphasizing both the potential detrimental effects and the potential social betterment. Many previous studies have indicated the need to further examine social media platforms, particularly its social and cultural implications Jiao et al. (2017) argue that there is a critical need to understand the effect of perceived visual informativeness on health literacy, specifically by taking into account other elements that mediate and further describe this impact, such as social media. This is especially crucial in dealing with a global pandemic such as the COVID-19 which require concerted efforts for it to deliver positive impacts.

Coronavirus (COVID-19) has become a crucial public health concern globally since its discovery in China, causing acute respiratory syndrome (SARS). Covid-19 is a contagious respiratory disease ranging from a simple cold to real complications. Bats, reptiles, squirrel puppies, live and wild animals, and other products are being sold in early December 2019 at the Hunan seafood market in Wuhan, China (Shereen et al., 2020), and the World Health Organization (WHO) designates it as contagion on March 11, 2020. Since its discovery, the

virus has killed around 5,502,267 people worldwide, out of 307,392,117 positive cases, a figure that unfortunately grew dramatically daily (WHO, 2022).

As the pandemic spread and emasculated global activities, individuals turned to social media channels for information. Its importance has been enhanced in recent years, partly owing to states' implementation of a lockup policy to halt the transmission of the Covid-19 virus. Consequently, it has become a major tool for participation and communication, propagating both plausible and improbable misinformation (Obi-Ani et al., 2020). It is unavoidable that the pandemic be contained in public and clinical settings. Depending on their assessments of the threat, the economy, healthcare policy, and the structure of their healthcare systems, several countries have reacted differently. They have used a variety of social distancing tactics, such as testing every questionable case, working from home, avoiding social interactions, practicing medicine, and keeping a contact log (Chan et al., 2020).

Curfews and social isolation brought about by the COVID-19 pandemic made social media platforms the main and most trustworthy source of information and knowledge about the outbreak; Yigitcanlar et al. (2020) reported that social media analytics can help in a pandemic and help paramedical professionals understand the community's views and expectations; Gluskin et al. (2014) suggested that social media networks contribute to favorable meteorological and socioeconomic conditions; and the debate that came before it made it clear that social media engagement is important in the relationship between perceived visual informativeness and health literacy.

The current research tried to narrow down the theoretical gap regarding the role of perceived visual informativeness in maintaining a smooth interaction between communication channels and the transmission of awareness about the Covid-19 pandemic. Moreover, it also clarified the importance of perceived visual informativeness in social media and the significant role it

plays in impacting the behavior and attitudes of individuals and how it can be used to increase individuals' awareness about a particular phenomenon as serious as Covid-19.

1.3 Problem Statement

COVID-19 has been one of the major global outbreaks in humankind's history. At the early stage of this endemic, the majority of COVID-19 healthcare information were posted on social media platform. Suggestions on preventing the infection from spreading include keeping a safe distance from others, washing their hands, and wearing a mask. Campaigns to stop the COVID-19 from spreading are very critical; yet basic knowledge is scarce, resulting in a low prevalence rate (Ahmad & Murad, 2020). Despite the ever-increasing recognition of digital media's importance in pandemics of communicable illnesses, little is known about how using social media alters the perception of risk and preventative behavior during such outbreaks (Al-Dmour et al., 2020).

Recent research conducted in Germany during the spring of 2020, when the coronavirus began to spread, revealed that half of the population (50.1%) had low or inadequate health literacy regarding the disease. Many individuals felt overwhelmed by the abundance of information available. Social media, a primary source of information for many, played a significant role in this scenario. Platforms such as Facebook, Twitter, and Instagram were flooded with both accurate information and misinformation. The rapid and widespread sharing of content made it challenging for individuals to discern credible sources from unreliable ones. This phenomenon was reflected in the findings that 47.8% of individuals reported difficulty in discerning the reliability of information obtained through various media channels (Okan et al., 2020). This highlights the crucial role of social media engagement in influencing public health literacy, particularly in how visual information is perceived and processed. By understanding how perceived visual informativeness impacts health literacy,

we can better appreciate the complexities introduced by social media in disseminating health information.

Social media's meteoric ascent has had far-reaching implications for healthcare practices and research. Social media is transforming management of health information in a range of ways, including aiding in the discovery of fresh healthcare data and information, improving healthcare professional contact, and exchanging wellbeing experiences and information (Zhou et al., 2017; Brennen et al., 2020). Despite some early results, the relationship between social media and improving health is still in their early stages as a research topic (Krishna & Thompson, 2019). As a result, researchers may be able to play an important role in improving discipline.

Despite the importance of visual information in social media and the great role it plays in the dissemination of news and health information (whether true or false), many previous studies (Ostic et al., 2021; Bekalu, McCloud & Viswanath, 2019; Tripathi et al., 2019) indicated that there has been little study conducted on the visual imagery utilized in health communication messaging and campaign materials. Despite the fact that many studies recommend more research into these visual signals and their qualities.

Furthermore, King and Lazard (2020) stated that there is a need for more rigorous study the literature on how humans understand, act on, and engage with visual deception and visual storytelling is very lacking. Having More studies into these visual health messages will enhance public communication in the event of future health emergencies.

Moreover, the role of perceived visual informativeness in social media is quite understated. Perceived visual informativeness is heavily associated with social media engagement. Perceived visual informativeness and social media engagement have a mutually beneficial relationship (Lee et al., 2024), it seeks the users' attention and compels them to gain

information regarding contemporary issues, such as COVID-19. More importantly, visual information enhances users' understanding of the problem and help in adoption of preventive measures. It affects the users' cognitive comprehension and acceptance of the news (Won, 2019).

Given that social media is used dominantly as the primary source of health information and professed even more so in emergencies, such as the COVID-19 pandemic, it is critical to examine the mediating role of SME in terms of the impact of perceived visual informativeness on health literacy. Present traditional models fail to take into consideration various aspects of social media interaction and their relation with health behaviors, thus demanding further explicatory efforts.

Social media has become influential in changing the way information dissemination of health information is done. Despite rich potentials of these platforms for public health messaging, there are limitations due to information overload, which results in confusion and exposure to fake news (Kbaier et al., 2024). Even though acknowledging the role of visualization in improving health literacy researchers paid little attention to how perceived visual informativeness of SME impacts on this process. Affirmative to what Putri et al., (2023), currently, there is a woefully little scarcity of supposed main arteries elucidating how audience members interact with visual narration and deception in Health Communication. This gap emphasizes the need to look at SME as a mediator that might help explain how sustainability-related visual cues in health communication affect the user's understanding and more importantly the subsequent behavior in regard to health.

In addition, the existing models do not capture features since they do not consider the interaction of social media as a dynamic process. Many conventional theories emphasize uni-directional linkages rather than a dual-way interaction that appears in social media contexts

(Panayiotou et al., 2023). This oversight can lead to impoverished pictures of how users interact with and respond to" health information. Through incorporating SME in these models, researchers will be in a position to get a rich description of users' interaction with them and how engagements with the visual content influence perceived and behavioral health literacy.

Current models mainly focus on the perceived visual informativeness and health outcome association without sufficient consideration of the level of engagement. For instance, some research has found that a higher level of perceived visual informativeness is associated with better health literacy (Ayre et al., 2023) but rarely investigates how interactions with content by featuring, sharing, or commenting add to the understanding and recall of the content. This absence of engagement constrains the utilization of models in practical contexts which highly depend on the responses of its users in the management of information (Shine et al., 2023).

In addition, existing modelling does not differentiate between various forms of social media interactions. For instance, giving or receiving knowledge in some channels may have different effects from possibly actively interacting with knowledge or forwarding content. Studied shows that when people are actively involved, they indeed make more sense of heath information and retain (Esmaeilzadeh et al., 2024). Hence, future research should compare these differences to maintain the understanding of how various types of SME mediate the perceived visual informativeness to health literacy relationship. In light of these developments, the current study looked into the impact of perceived visual informativeness on health literacy, particularly concerning the COVID-19 pandemic. In addition, this research also examined the role of social media engagement on the relationship between perceived visual informativeness and health literacy within the context of COVID-19 to close this gap.

1.4 Study Questions

The questions that guide this research study are as follows:

i. What is the relationship between Perceived Visual Informativeness (PVI) and Health Literacy in the light of COVID-19 pandemic?
ii. What is the relationship between Perceived Visual Informativeness (PVI) and social media engagement in the light of COVID-19 pandemic?
iii. What is the relationship between social media engagement and Health Literacy in the light of COVID-19 pandemic?
iv. Does social media engagement have a mediating role in explaining the relationship between PVI and Health literacy in the light of COVID-19 pandemic?

1.5 Study Objectives

The objectives of the research study are:

i. To examine the relationship between Perceived Visual Informativeness (PVI) and Health Literacy in the light of COVID-19 pandemic.
ii. To examine the relationship between Perceived Visual Informativeness (PVI) and social media engagement in the light of COVID-19 pandemic.
iii. To examine the relationship between social media engagement and Health Literacy in the light of COVID-19 pandemic.
iv. To determine and explain the role of social media engagement in the relationship between PVI and Health literacy in the light of COVID-19 pandemic.

1.6 Study Significance

This study is significant because it analyzez the current health risk of the COVID-19 pandemic. This research focuses on social media, commonly recognized as the essential medium for conveying news and information regarding worldwide pandemics and calamities such as the COVID-19 pandemic. Social media plays a critical role in our lives, whether for social, helpful, or educational reasons. Since the use of social media sites has reached unprecedented levels, they are extensively used to contact friends or family, keep up with current events, and, most importantly, seek knowledge about current topics.

1.6.1 Practical Significance

The results of this research have the potential to yield significant insights for global governments and public health organizations, especially with regard to developing plans for responding to pandemics and promoting health awareness. Through clarifying how social media campaigns affect public health practices in times of crisis such as COVID-19, the research provided important direction for determining which populations to target with interventions. It clarified the efficacy of various communication tactics and the dissemination of health information by assisting in determining the degree to which changes in public health performance and behaviors can be attributed to these interventions.

Moreover, the study's findings underscored the importance of leveraging visual design on social media to enhance health literacy regarding COVID-19. By identifying which visual elements and messaging strategies are most effective in engaging the public and conveying critical health information, the research aimed at encouraging authorities to adopt more targeted and visually compelling communication approaches. This focus on visual informativeness can significantly improve the clarity and impact of public health messages, ultimately fostering better understanding and compliance with health guidelines.

Additionally, the study explored how variations in visual presentation and social media engagement influence public perception and behavior. This analysis enabled policymakers to refine their communication strategies, ensuring that health messages are not only disseminated widely but are also tailored to resonate with diverse audience segments. By enhancing the visual appeal and informational quality of health campaigns, the findings supported the development of more effective public health interventions, promoting better health outcomes and resilience in the face of future pandemics.

1.6.2 Theoretical Significance

Apart from practical significance, this study will also entail theoretical relevance. First of all, the current study was a valuable addition to the existing literature on the COVID-19 pandemic, which forced the countries to close all sectors resulting in disruptions of all spectrums of society in all countries around the world. The current study contributes to advancing theoretical understanding by examining how perceived visual informativeness, social media engagement, and health literacy interact within the context of public health communication during crises such as COVID-19, thereby informing strategies to enhance health communication effectiveness in digital environments. Moreover, it bridged the gap in literature by examine the relationship between the variables. Furthermore, this study also opened doors for other researchers to conduct extensive research on this subject. The findings of the current research assisted in comprehending the significance of social media and perceived visual informativeness in controlling pandemics such as COVID-19.

The study emphasizes the significance of integrating perceived visual information into health literacy research. Despite its acknowledged importance, the impact of perceived visual information on individuals' health behaviors and knowledge acquisition remains underexplored. This research aims to fill this gap by investigating how perceived visual

information directly influences health literacy, shedding light on its role in shaping public health information.

Furthermore, by means of social media engagement, the current study seeks to determine the indirect impact of perceived visual information on health literacy. Although social media platforms include a wealth of health-related information, prior study has not looked closely at this specific connection. The goal of this research is to close this knowledge gap and improve our understanding of how social media use influences perceptions of perceived visual information and health literacy.

1.7 Scope of the Study

The research addresses perceived visual informativeness, health literacy, and social media engagement among Jordanian citizens. Hence, the research framework was tested using a quantitative cross-sectional approach based on the data gathered from Jordanian citizens.

According to the Information and Communications Technology Association of Jordan (Intaj), there are more than 7 million individuals using social media in Jordan (Ministry of Digital Economy and Entrepreneurship, 2022). At the top of the list of social media used in Jordan are Facebook, Twitter, and Instagram, while other applications have a small number of users, such as Linkedin. Interestingly, there are also small number of users on banned platform such as TikTok, For the purpose of this research study, Facebook has been chosen as the context of research due to several reasons. First of all, Facebook is one of the most popular social media platforms in Jordan. With over 12 million Jordanian accounts registered on the platform, it is largely regarded as the most popular website in Jordan. Facebook is the ideal social media platform for carrying out the current study because, secondly, Jordanian government organizations are more inclined to post content-including images, videos, and information-there than on other platforms.

1.8 Summary

The rapid rise of social media has had significant consequences for healthcare practices and research. Social media is revolutionizing the management of health information by facilitating the discovery of new healthcare data, enhancing communication among healthcare professionals, and enabling the exchange of well-being experiences and knowledge.

Social media influences how individuals perceive illness, make decisions, and engage in risky behaviors. People create social media material that may be erroneous or biased, sometimes including conspiracy theories and misinformation. Therefore, precise and prompt knowledge on emerging dangers such as COVID-19 is essential.

Amid the ongoing COVID-19 epidemic, physical contact was almost non-existent owing to the significant risks associated with illness transfer. The worldwide lockdown stopped in-person meetings, leading to a notable decrease in face-to-face contact. Social media was the most effective means of communication among individuals. Social media was identified as a crucial connection between government institutions and the public in raising awareness about the effects and preventive measures of the coronavirus pandemic. Social media effectively spread information and awareness to health personnel.

In this chapter, an overview of the study variables was presented gradually, as topics (health literacy, Perceived Visual Informativeness, and social media engagement) were discussed in general, then the three variables were linked together and their relationship to each other was determined, in addition to identifying research gaps in the study variables, and stating the importance of this study and the need to reveal the nature of the relationship between the variables.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature published on the study variables including Perceived Visual Informativeness (PVI), health literacy, COVID-19, and social media engagement. First, it identifies the research variables and determines their dimensions. Then, the relationship between these variables is examined through a review of previous studies related to each variable. It examines the earlier research on the connection between health and social media, providing a critical study and appraisal of empirical literature to determine the link between social media and PVI. This chapter also evaluates empirical literature to pinpoint the existing gaps in research studies regarding the subject of this study. Finally, it explains the underlying theories related to the study variables and determines and explains the theoretical framework.

The central aim of this study was to determine the impact of Perceived Visual Informativeness (PVI) on health literacy, particularly in the context of the COVID-19 pandemic, and to understand the role of social media engagement in this relationship. Given the increasing reliance on visual content shared via social media platforms during the pandemic, it is crucial to explore how this content influences individuals' understanding of health information. The study focuses on how effectively visual information enhances health literacy and how social media engagement mediates this effect. By reviewing the literature on these key concepts, this chapter sets the stage for a deeper understanding of the mechanisms at play and provides a foundation for the research hypotheses and methodology discussed in subsequent chapters.

2.2 Perceived Visual Informativeness (PVI)

Information that is conveyed visually, such as through pictures, films, graphs, and charts, is referred to as visual information, the ability to understand and interpret our environment, as well as communicate with and share information with others through visual methods, is made possible by information that is perceived and processed by the eyes and brain (Lazard et al., 2016).

Any information that is viewed or processed by the visual system, more specifically the sense of sight, is referred to as visual information. Visual inputs, which are often portrayed as images, movies, or graphical elements, must be absorbed, interpreted, and understood (Lazard & Mackert, 2014). A tremendous amount of visual data can be processed instantly by the highly developed human visual system. The brain analyzes and interprets these electrical impulses to create a coherent and meaningful representation of the environment around us. It involves the eyes, which gather light and transform it into electrical signals (King et al., 2014).

The complexity of visual information can range from straightforward shapes and colors to complicated scenes and patterns. It is essential to our daily functioning because it gives us the ability to read language, comprehend visual media such as art, movies, and photography, navigate our environment, identify things and faces, and interpret emotions (Kujur & Singh, 2020).

Visual information is becoming considerably more common and available in the digital age thanks to a variety of gadgets including computers, smartphones, and televisions. The development of systems that can automatically analyze and interpret visual input to carry out operations like object recognition, image classification, and facial recognition has been

facilitated by this, giving rise to fields such as computer vision and image processing (Karpenka et al., 2021).

Perceived Visual Informativeness is proposed as an overarching indicator of the quality of visual proof in messaging and resources (Khan, Turner & Butt, 2024); it must be connected to, but distinct from another category of message such as regarded perceived informativeness, considered message value, and attractiveness (King et al., 2014).

The informativeness of information field objects is a critical attribute (svetkov, 2014). Perception and analysis are particular to visual objects and visual models (Veerapaneni, 2020). It distinguishes their informativeness (Nomokonov & Tsvetkov, 2015). The extraction of tacit knowledge (Sigov & Tsvetkov, 2015) from a visual picture may be thought of as the judgment of informativeness. The primary issue in assessing informativeness is "the dogma of one dimensionality" (Tsvetkov, 2013). This dogma proposes using a single indication to describe a complex (multidimensional) occurrence.

PVI (Perceived Visual Informativeness) is a notion that should comprise a person's judgment of the visual proof provided in a picture. The visual design assessment criteria developed by Wileman (1993) is one way to analyze visual information and images in health knowledge items (Doak, Doak, & Root, 1996). Excellent perceived clarity images are easily understood and of high quality. Clarity and simplicity are not the same; complex data diagrams can effectively and clearly convey information, whereas overly simplistic visual tools might obscure the same knowledge.

In the absence of numerical data, it is equally critical to analyze the persuasive and instructive qualities of visual messages. Chong, Momin, & Narayan (2023) proposed indexicality as one approach for visual pictures to be persuasive. The power of pictures to confirm that a certain person, item, interaction, event, or behavior has happened or existed, now exists or occurs, or

might exist or occur is referred to as indexicality. Examples of indexical data are the sequences of images illustrating how to do health self-exams as depicted in health brochures and images depicting varying food portion sizes. Furthermore, image-text consistency is also linked to clarity and indexicality. PVI assesses evidence and information that visually represents a notion, thinking, or set of data. In this regard, the concept of verbal and visual message unity (Wileman, 1993) is important since both communication formats aim to convey the same message.

According to Chaffee (1991), description gave a model for analyzing a construct's validity, illustrating how the construction might connect with other relevant factors. New measurement techniques assisted in exploring that framework. To ensure internal consistency reliability, along with convergent, divergent, concurrent, and predictive validity, a robust measuring technique should be applied (Erwin, Tran, & Koutstaal, 2022).

Perceived Visual Informativeness (PVI) serves as a unified assessment of the visual evidence value in messages and resources. It is related to, but distinct from, other communication types such as perceived attractiveness, perceived informativeness, and messaging value. Additionally, personal visual learning patterns are connected to but remain distinct from PVI, highlighting the unique role PVI plays in the evaluation of visual content.

Physical visual function (the ability to see a pamphlet) and Perceived Visual Informativeness (PVI) are not always connected. This is because visual function influences an individual's capacity to read and comprehend the text that accompanies visual cues or to notice details in an image. Finally, Perceived Visual Informativeness should help predict perceived effectiveness of communication, which will help predict real message efficacy (Occa et al., 2021). Researchers analyze if suggested construct predicts variation in decisional contentment and key qualities based on the health belief model to see if PVI can affect other

behavioral antecedents at the same time (Fabio, Stracuzzi, & Lo Faro, 2022). According to Chaffee (1991), description provided a model for analyzing a construct's validity, illustrating how the construction might connect with other relevant factors. New measurement techniques assisted in exploring that framework. To ensure internal consistency reliability, along with convergent, divergent, concurrent, and predictive validity, a robust measuring technique should be applied (Erwin, Tran, & Koutstaal, 2022).

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Researchers analyze if the suggested construct predicts variation in decisional satisfaction and key qualities from the health belief model to see if PVI can affect other behavioral antecedents at the same time (Fabio, Stracuzzi, & Lo Faro, 2022). This analysis helps to understand whether PVI not only stands alone in its influence but also intersects with established behavioral models, thereby offering a comprehensive view of its impact on health-related decision-making.

Readers' thoughts are always influenced by visuals and words. Infographics and visual information aid readers in comprehending and interpreting complicated information. Because information consumption is increasing at a faster rate in this age of technological growth, the narrative potential of information visualization tales is advantageous. In the midst of the worldwide health crisis like COVID-19, growing panic drives individuals to search for true and authoritative information as quickly as possible and to alter their health behavior’s accordingly (Jacop, 2020).

While reading magazines and daily newspapers or surfing social media sites, info graphics come across the new age of information transmission (pictorials rich in information) (Ma, 2022). Info graphics are visual representations of data that attempt to inform, simplify, delight, and encourage readers (Martin, & Unsworth, 2023). People now live in a faster and more sophisticated world, and they want to see and absorb more accurate and intelligent information (Chamorro-Premuzic, 2023). Data visualization seeks to provide multipart information in an understandable and easy-to-consume fashion (Mohammed, AlHabshy, & ElDahshan, 2022).

Perceived visual informativeness (PVI) is a construct that the authors developed to describe the perception of visual elements in conveying information effectively (King et al., 2014). The perception of a message's content as more important and of greater quality are just two benefits of perceived visual informativeness, which have been connected to high scores in user engagement and comprehension. Nevertheless, PVI has not yet been researched in regard to interactivity or information about clinical trials, despite being acknowledged as a crucial aspect influencing people's impressions of health information (Lazard & Mackert, 2014).

2.2.1 Info Graphics

Info graphics are used widely due to their ability to quickly capture attention, clarify complicated concepts, and integrate complex concept components (Damman et al., 2018). They gain strength by tapping into the extremely powerful (but occasionally quirky) system of visual information processing in humans (Wickens & Carswell, 2021). According to Baxter (2022) because the human brain analyzes images faster than text, approximately half of the brain is dedicated to visual processing - the human brain can detect visually is in a fraction of a second or less.

Info graphics uncover untold stories in figures and data while also swiftly and effectively delivering a wide range of information (Baxter, 2022). Furthermore, it uses variants to analyze varied and vast volumes of data, providing risk-bound knowledge quickly in a compact space (Dur et al., 2014; Dur, 2012).

An info graphic is currently a useful tool for supplementing information in a news piece and providing a visual picture of significant events (Salas, 2018; Castaneda, 2018). According to the report, the usage of info graphics in newspapers or interactive info graphics created from predefined templates is growing (Gazizov & Fatykhova, 2019). Info graphics combined with health-related data have the ability to influence behavior. Health communication tries to establish good behaviors in individuals in order to overcome health (Nan, Iles, Yang, & Ma, 2022).

It has been demonstrated that the inclusion of graphics enhances message comprehension and memory (Houts et al., 2006). Visuals can, however, be misinterpreted (King et al., 2014). Additionally, processing visual signals may involve greater cognitive work than processing text-only messages (Lazard et al., 2016; King et al., 2015). To determine the potential efficiency of a visual message, King et al. (2014) said that evaluating an individual's evaluation of the caliber of visual data is necessary.

Any type of information that is presented visually, including photos, graphics, charts, diagrams, maps, or videos, is referred to as visual information. Visual information may be used to transmit a wide range of ideas and concepts, and it can be particularly successful at doing so in a way that is simple to understand and easy to recall when it comes to complex or abstract information, when comparing data, showing patterns or trends, or describing procedures, visual information can be especially helpful (Cao, X & Xu, 2022).

Any data or information that is displayed visually, such as text, photos, graphics, charts, diagrams, and so on, is referred to as visual information (Baxter, 2022). Due to their ability to communicate complicated ideas or patterns more quickly and clearly than text alone, these visual representations of data can help users understand and analyze information more simply (Kardgar, 2024).

In graphic design, visual data is employed to convey a message or idea in a way that is interesting, educational, and aesthetically appealing (Boer & Lemke 2024). Information graphics, data visualization, info graphic design, and information architecture are just a few of the many disciplines that fall under the umbrella of visual information design (Mohamed & Romeia 2023). Each of these professions focuses on how to effectively convey information visually for improved comprehension and communication (Baechler, et al., 2024). Additionally, visual data can be shown across a range of media, including print, digital, and even tangible items (Lazard & Mackert, 2014).

In this study perceived visual information is information that is published on social media in images form, videos or graphs related to human general health, and especially the COVID-19 pandemic.

2.2.2 Perceived Visual Informativeness Dimensions

A collection of pictures, data visualizations like pie charts and bar graphs, and an explanation that provides a clear overview of a subject is termed as info graphic. The info graphics are an efficient visual communication instrument. The most visually striking, imaginative info graphics are frequently the most effective as they draw and maintain our interest (Zaman, 2019).

Info graphics are excellent at simplifying difficult concepts (Bevan-Dye, 2022). They can be useful whenever you need to, give a short summary of a subject, clarify a difficult process,

present research results or survey data, condense a lengthy blog post or report, contrast and compare various solutions, or spread awareness of a cause or problem (Khan et al., 2024).

An info graphic, always known as "information graphic," is a graphic representation of information designed to facilitate rapid and simple comprehension of the content (Zaman, 2019). Info graphics are graphic visual representations of facts, information, or knowledge designed to deliver information rapidly and clearly (Roth, 2021). The words "information" and "graphics" are joined together to produce this term (Yang, 2013). Utilizing graphics can improve cognition by strengthening the human visual system's ability to identify patterns and trends. (Card, 2009; Jeffrey et al., 2010). Information visualization, data visualization, information design, statistical graphics, and information architecture are related fields of study (Ninkov et al., 2022). Info graphics are made with less presumptions about the readers' level of knowledge than other sorts of visualizations due to their evolution in recent years to be for mass communication (Zaman, 2019). Isotypes are a historical example of info graphics that swiftly and simply inform the general public (del Mar Navarro, 2023).

Info graphics have been around for a while, but recently a big portion of the population has been able to create them thanks to the rise in the number of simple, free software (Gaboury, 2021). Individual info graphics can now be shared with large audiences worldwide thanks to social media platforms such as X and Facebook. In this age of attention deficit disorder, info graphics are frequently employed (Zaman, 2019).

A few studies (King et al., 2014; King & Lazard, 2020; Deraz & Awuah, 2015; Occa et al., 2018) have dealt with the topic of (PVI), and four main dimensions of this variable have been identified. The (King et al., 2014) study is considered one of the first studies to define the dimensions of this variable, as follows:

a) **Perceived Message Quality**: A crucial component of encouraging healthy behavior is giving people persuasive health messages. Health messages are frequently more successful when they are personalized to fit significant recipient characteristics, according to a growing body of research (Itzchakov, Reis & Weinstein, 2022). For instance, research on the congruency impact (Mann et al., 2004) has demonstrated that health messages that are structured to fit an individual's dominant orientation towards motivation are more successful than those that are not congruent. For people who are primarily motivated by avoiding negative results (i.e., avoidance-oriented individuals; Carver, Sutton, & Scheier, 2000), loss-framed messages, which communicate the costs of failing to engage in a health behavior, have been discovered to be more effective in promoting health behavior change. For persons who are primarily driven to pursue positive outcomes, or approach-oriented people, gain-framed messages—which express the advantages of engaging in a specific health behavior—have been proven to be more efficient (Carver et al., 2000).

Similar to this, additional research has demonstrated the efficacy of adjusting health information to account for other individual differences, like health locus of control, need for cognition, and monitoring style (Zerna, Strobel & Strobel, 2024). The effectiveness of messages that are specifically tailored to the ethnicity of the recipient (Christy et al., 2022), phase in the process of changing behavior (Prochaska, et al., 1993), or a number of psychosocial and behavioral characteristics simultaneously (Kim et al., 2019) has been demonstrated in yet additional studies.

b) **Perceived Informativeness**: Information that the individual believes is likely to be regarded by the recipient of the information as essential and non-trivial, fascinating, novel (but relating to an already well-known issue), relevant, and favorable to the

individual's reputation should be used to define perceived informativeness (Holdack, Lurie-Stoyanov & Fromme, 2022). Consumers' overall assessment of the quality-related qualities of online review material is known as perceived informativeness, while their perception of the persuasiveness of those reviews is known as perceived persuasiveness (Zhang, Zhao, Cheung, & Lee, 2014). Perceived usefulness is a variable that is utilized as a moderating variable. Customers rate applications based on their perceptions of their advantages and costs (Hsu & Lin, 2015).

The ability of an advertisement to give consumers important and pertinent information is referred to as informativeness in advertising. It entails disseminating details about the commodity or service being advertised, including its attributes, advantages, and cost. According to Tien, Amaya Rivas, and Liao (2019), informativeness is crucial since it aids consumers in making educated judgments and assessing the worth of the advertised good or service. In order to maximize their economic rent, it can also help advertisers build and strengthen their market power. Additionally, research has shown that informed advertising has a favorable impact on advertising purchase and attitude intention. It has been discovered that some forms of advertising, such as web and application commercials, are more enlightening and successful at fostering a positive ad attitude than text-only ads. Overall, through giving customers useful information and affecting their views and behaviors, informativeness plays a critical role in advertising (Teng, Khong, Goh & Chong, 2014).

c) **Perceived Attractiveness**: The phrase "attractiveness" refers to a favorable orientation or attitude towards other people and has its roots in the study of interpersonal psychology. Because it is dependent on personal expectations, social trends can also have significant impact on it (Oliveira, Proença & Ferreira, 2022). Individual qualities are significant in this setting, according to evolutionary

approaches to attractiveness measurement (Gangestad & Scheyd, 2005). Truth-of-consensus methodology, a straightforward confirmatory approach, is frequently used by researchers to gauge attraction (Donovan et al., 1989). Inter-coder reliability is controlled, and test participants are required to assess the degree of attractiveness. According to Langlois et al. (2000), the psychological construct of attractiveness has an impact on social interaction and self-perception.

The objects that are studied in the field of object-related attractiveness study are diverse, ranging from more physical objects such as toys to more abstract objects and object-related information. Only a few scientific works have addressed appeal in relation to interactive systems. The majority of them either cover only the most fundamental conceptual issues (Gluckman, Bardsley & Kaiser, 2021) or are overly too particular (Chippendale et al., 2008) to be modified for social media. To provide a working definition, definitional characteristics of physical appeal are translated into digital systems. According to Byrne and Klebl et al., (1973), physical attractiveness is a socially accepted orientation towards other people that has a positive valence. Therefore, attractiveness can be viewed in the context of social media and digital systems as a common, total positive valence across users (Hsu et al., 2015). It encompasses both the intellectual and emotional aspects of future or existing usage scenarios and usage experiences since it is a holistic judgment. The idea has ramifications for both our attitudes and our behavior in this regard. One way or another, a digital system's appeal should influence people's views and attitudes, for instance in the context of user happiness. On the other hand, it should also have a favorable impact on user behaviors, such as loyalty or continuous use**)**

d) Perceived Effectiveness: A message is successful if it accomplishes what it was meant to. Changing the mediators of behavior, like attitudes, intentions, norms,

beliefs, self-efficacy, and finally the behavior itself, is the aim of many health communication programs (Wang et al., 2024). The degree to which exposure to a message causes changes in these outcomes is known as message effectiveness. In research and field trials, this is sometimes referred to as real message efficacy (Bigsby et al., 2013; Grima, Kizilkaya, Sood & ErdemDelice, 2021). For example, a test of messages intended to boost participants' self-assurance to stop smoking may look at whether the communications were successful in doing that or not. Importantly, this type of effectiveness test would only look at whether participants' self-efficacy rose rather than whether they believed the messages had raised it (Tharp-Taylor, 2012; Wong & Cappella, 2009).

While actual changes in outcomes are referred to as message effectiveness, PME is only interested in perceptions of the potential efficacy of communications. In general, PME might be deemed relevant to any participant's assessment of a message that indicates efficacy. For instance, a message's perceived plausibility may be a required (though maybe insufficient) condition for efficacy, but it does not guarantee that the message will have any impact. Similar to the last example, impressions of a message's memorability, interest, or significance may not necessarily translate into efficacy, but they may influence it. As a matter of fact, several PME measures are based on these message perceptions (Duke et al., 2015; Kim, 2006), and this strategy is comparable to what (Dillard et al., 2007) described as message characteristics in their conception of PME.

2.3 Health Literacy (HL)

In the last years, health literacy (HL) has been considered from the different and often interdisciplinary perspectives and approaches of academic scholarship, healthcare practice and policy. This interest is mainly because of the realization that competencies of citizens in

grasping and applying health information is invaluable in the management of their health and health systems. Scholarly literature, e.g., European Health Literacy Project, for example, stress the importance of action within this domain, pointing to differences in health outcomes related to different health literacy levels (Okan, et al., 2019).

Today's world also witnesses the insight focus on health literacy as one of the key elements of modern population health improvement strategies of the twenty-first century. Outside the synoptic, it is highly important both for adult enfranchisement, and to fashion a healthier population. HLA also links directly with HHC, as well as with costs, and with healthy behaviors, which positions it centrally in resolving issues of equity and sustainability in health systems requirements (Rudd et al., 2023). Most interactions experienced in formal and informal education show that social, contextual, and personal factors have a great influence on HL development (Sørensen et al., 2021).

2.3.1 Overview of Health Literacy (HL)

Recent years have witnessed an increase in interest in health literacy subject among academics, professionals, along with= decision-makers from various fields. The comprehension capacity, clarity, and ability to address individual and group disparities in various health findings have been cited as a main cause of this significant in relevance. Such viewpoints have been confirmed by empirical findings, such as those from the European Health Literacy Project, which repeatedly emphasize the need of taking action. The zeitgeist that permeates Western society and is spreading to other areas of the globe has also contributed to the rise of the issue of health literacy in many policies and research agendas (Okan et al., 2019).

The 21st century has seen a rise in the importance of health literacy (Sørensen et al., 2021). It is essential for individuals to control health related issues and utilize their healthcare system.

The ability of health groups to assist patients and customers, and the ability of community to safeguard the health and welfare of its residents, are all based on health literacy. Through both formal capacity development and instruction and informal learning, health literacy develops throughout life. It affects healthcare usage and expenses, health status and behavior, empowerment and participation, sustainability, and equality (Rudd et al., 2023). Social, contextual, and personal factors all affect it.

According to Shah et al., (2024), the idea of health literacy has been used in many situations and methods. It is ascribed with value, which indicates that it is relative; for example, when discussing patients, it relies on what is meant by "low health literacy." It has drawn attention from many different stakeholders as a new word. Concerning health education provided in schools, Simonds addressed it for the first time in 1974. In contrast, the first scientific publication was published in the 1980s, the subsequent was published in the early 1990s, and more than 100 pieces were released in that year. A decade later, according to PubMed, over 1,000 scientific articles per year dealt with health literacy, and this exponential expansion has produced more than 7,000 records to this point (Okan et al., 2019).

Recent study has shown that the existing definitions are far more comparable and overlapping than generally given, despite the fact that the absence of a single, widely acknowledged definition has sometimes been an obstacle for action, particularly political engagement, within the health literacy sector. Before, disagreements on the debate around health literacy were driven by ambiguities, but today, common ground is emerging, suggesting that there are more uniting than dividing elements. It's crucial to note that this section aims to show how the definitions relate to health literacy as a single multifaceted, intricate, and diverse concept and how they often explain various facets of the concept (Sørensen & Pleasant, 2017).

Even though there are many publications on health literacy, only a small number of them (Massey et al., 2012; Zarcadoolas et al., 2005; Malloy-Weir et al., 2016; Sørensen et al., 2012; Bröder et al., 2017; Cadman, 2017) exclusively concentrate on the examination of definitions. Tøttrup et al., (2012) carried out the first comprehensive analysis of the models and definitions of health literacy in 2012. Last but not least, recent research included an investigation of health literacy concepts with relevance for adolescents and children (Bröder et al., 2017). The first study centered on the definitions and interpretations of health literacy, with consequences for policy initiatives.

The conceptual approach has been evolving over the past 20 years from an individual approach to one that accounts for health literacy embedded in a societal context, influencing how individuals socialize with societal services to improve and maintain their health (Popay et al., 2021). According to the Joint Committee on National Health Education Standards' definition from 1995, health literacy is the ability of people to obtain, interpret, and comprehend basic health information and services as well as the competence to use them in ways that improve health.

In this manner, Kickbusch et al. (2008) presented a context-driven definition of health literacy as the capacity to make wise health decisions within the context of daily living at home, in the community, within the market, at work, within the healthcare system, and within the political arena. It is an essential empowerment tactic to strengthen people's control over their health, capacity seeking information, and accountability.

Canadian researchers Kwan et al. (2006) provided a definition of health literacy that relates to the capacity of people to access, interpret, share and assess knowledge to converse with the demands of varied health settings to improve health throughout the life cycle. Furthermore, Kwan et al. (2006) emphasize the significance of including and empowering everyone

involved, including the patients, clinicians, educators of health, and laypeople in communication and decision-making about health. Similar to this, Nutbeam & Lloyd (2021) characterized health literacy as the wide spectrum of abilities and knowledge that individuals acquire to comprehend, evaluate, seek out, and utilize ideas and health facts to make well-informed judgments. A health literate individual is capable of applying health concepts and information to novel situations and participate in continous private and public and dialogues about health, scientific knowledge, medicine, and cultural beliefs.

According to Freedman et al. (2009), there should be a difference between individual and public health literacy when considering the medical viewpoint on the variables affecting people's health on a societal level. Freedman et al. (2009), explains that public health literacy exists when there is health literacy within a group or community. The European Health Literacy Consortium offered a comprehensive definition of health literacy to reduce the gap between the individual and societal perspectives, stating that "health literacy is closely linked to literacy and entails people's knowledge, motivation, and competencies to access, understand, appraise, and apply information to form judgments and to make decisions in everyday life concerning healthcare, disease prevention, and health promotion, to maintain and improve quality of life."

Dodson et al. (2015) emphasized the social component of health literacy, describing it as the individual traits and social resources required by people and communities to acquire, interpret, evaluate, along with applying information to make informed health choices. The ability to assert, express, and carry out these judgments is part of health literacy.

It is critical to differentiate between health literacy and general literacy. The United Nations Educational, Scientific, and Cultural Organization (UNESCO), the adjective "literate" has historically meant "familiar with literature" or "well educated, erudite." While it has

preserved its wider sense of knowledge or education in a particular subject, it has also evolved to refer to the ability to write and read text from the late nineteenth century. In past few years, literacy has been defined in four ways: 1) Literacy as a collection of independent abilities; 2) Literacy as performed, exercised, and established; 3) Literacy as a process of learning; and 4) Literacy as texts (Freedman et al., 2009).

In health literacy, a similar tendency may be discovered. For several years, health literacy was characterized as the capacity to manipulate numbers and text in a medical setting; however, the idea has since been broadened to incorporate the use of a more complicated and interrelated collection of talents, like comprehending and reacting on printed health data, conveying needs to health experts, and comprehending medical guidelines (Peerson & Saunders, 2009).

In the 1990s, American research pointed a connection between lower drug adherence and low literacy, disease awareness, and self-care management abilities (Alqahtani & Alqahtani, 2024). The 2003 National Assessment of Adult Literacy (NAAL), which measured English literacy among American adults (aged 16 and above), contained health-related questions, emphasizing the negative impacts of poor literacy on health and healthcare (Shah et al., 2024).

2.3.2 Health Literacy Definition

Health literacy relates to individuals' experience and capacities to meet modern society's complex health demands. Despite its expanding importance, regarding the notion of health literacy and its philosophical underpinnings, there is disagreement, limiting measurement and comparison options (Lee *et al.*, 2024).

According to Urstad et al., (2022), the World Health Organization (WHO) described health literacy as "the cognitive and social skills which determine the motivation and ability of

individuals to gain access to, understand, and use information in ways which promote and maintain good health," whereas the American Medical Association Ad Hoc Committee on Health Literacy described health literacy as a constellation of skills beginning in 1999. These skills comprise the ability to carry out fundamental reading and writing tasks. Accordingly, Healthy People (2010) described health literacy in the US as the level to which people have the ability to receive, comprehend, and process the fundamental health services and information required to make informed health choices (USDHHS, 2000).

In their definition of health literacy, Fok and Wong (2002) highlighted the significance of autonomy, stating that it is necessary to have a reasonable amount of autonomy to achieve complete physical, social, and mental well-being in order to "understand and act upon physical and psycho-social activities with appropriate standards, be able to interact with people and cope with necessary changes". According to the Institute of Medicine (Nielsen-Bohlman et al., 2004), societal and individual elements that interact with people's abilities and social system needs to produce health literacy are a shared role.

There are numerous definitions of health literacy that may be derived (Table 2.1). The criteria of the American Medical Association (Council on Scientific Affairs, 1999), the Institute of Medicine (2004), and the World Health Organization (Nutbeam, 1998) are the most often referenced in the eligible literature. All of these categories place a premium on individuals' capacity to obtain, analyze, and understand health services and information required to make sound health decisions. Recent views regarding the role of health literacy emphasized the need of seeing beyond the person and understanding health literacy as a balancing act between health system demands and human skills.

Table 2. 1 Health literacy definitions

No	Source	Definition
	Nutbeam, 1998	The social and cognitive characteristics that influence the drive and aptitude of a person to receive, analyze, and use knowledge in ways that promote and preserve health
	Council on Scientific Affairs, 1999	The set of abilities necessary to operate in the healthcare context, include the capacity to complete fundamental reading and arithmetic activities.
	Australian Bureau of Statistics, 2008	Understanding and applying knowledge on drugs and alcohol, illness treatment and prevention, protection and incident avoidance, first care, emergencies, and staying healthy.
	Yost et al. (2009)	Individuals' ability to read and grasp health-related written content, recognize and analyze graphically presented information (scatterplots, diagrams, and figures), and perform mathematical operations in order to make appropriate health-care decisions.
	Adams et al. (2009)	Understanding and interpreting the significance of health data in many ways such as spoken, written or digital form, and how this drives individuals to embrace or dismiss health-related behaviors
	Adkins & Corus (2009)	The capacity to gain meaning from multiple types of communication by integrating a range of competences in order to achieve health-related objectives.
	Freedman et al. (2009)	The ability of people and organizations to obtain absorbs, comprehend, analyze, and act on information required to make community-beneficial public health choices.
	Sørensen et al., 2021	Individuals' knowledge, inspiration, and qualifications in accessing, recognizing, assessing, and health literacy refers to the use of health info to make judgments and decisions regarding healthcare, preventing illness, and health education in order to sustain or enhance value of life throughout one's life.

The difference between public health literacy and healthcare is represented in the identification of numerous factors (Freedman et al., 2009). The Institute of Medicine (2004) defines health literacy as a set of individual competencies that encompasses conceptual and cultural understanding, listening, speaking, arithmetic, writing, and reading abilities. Speros (2005) feels that reading and numeracy abilities are essential, but he also argues that although numeracy skills are important, knowledge, the ability to use obtained health data in making true decision and good functioning in the position of medical care consumer are also important.

Kwon et al., (2006) differentiates health literacy from health literacy oral literacy, whereas He, Meyer & Brehm, (2021) separates listening, memory span, verbal fluency, and navigation. There are four interconnected parts, according to Lee, Arozullah, and Choc (2004): (1) illness and self-care information; (2) health risk behavior; (3) preventative care and physician visits; and (4) medication adherence. At the same time, the elements that define health literacy vary significantly, they all concern cognitive abilities, skills, and behavior's that characterize an individual's ability to function as a patient within the healthcare system.

There have been many health crises that have spread widely and rapidly around the world. The globe has started to understand that worldwide health problems are significant for every person, regardless of country, location, or status, as seen by answers to the danger of the pandemic flu and programs to halt HIV/AIDS transmission. The demands for global health remain unfulfilled, leaving the whole globe exposed to health crises despite gains in the world's collective capacity to combat illness through advancements in science and technology. Poor nations in particular continue to suffer disproportionately from insufficient public health systems and resources, making it harder for them to escape poverty (Okan et al., 2019).

The condition known as severe acute respiratory syndrome (SARS) has arisen and spread quickly around the globe (Pal et al., 2020). A new coronavirus (SARSCoV) has been identified as the disease's causal agent, and research indicates that it first appeared in southern China. Although early information suggests that this virus originated in an animal reservoir, the exact route it used to infect humans is yet unknown. A noteworthy aspect of this pandemic has been nosocomial transmission of the SARSCoV. Although a significant majority of patients exhibit a fast deterioration with respiratory distress towards the end of the second week of sickness, the clinical disease is comparable to many acute respiratory illnesses. The care every community acquired pneumonia follows similar general management concepts; however, infection control strategies are crucial. SARSCoV has no known effective antiviral. The SARS pandemic was most notable for how quickly the whole world community took synchronized action to stop it (Lussault, 2021).

A newly discovered human illness called severe acute respiratory syndrome (SARS) is connected to pneumonia. In China's Guangdong Province, this illness was initially identified in November 2002. After being discovered in Hong Kong in the middle of February 2003, the virus spread across more than 30 nations, infecting more than 8,000 people on five different continents. SARS was effectively suppressed in less than four months because to a major global response orchestrated by the World Health Organization (WHO). Since March 2003, a lot has been discovered about this condition, including that a novel coronavirus (SARSCoV) is responsible for it, although little is yet known about SARS coronavirus infection. The WHO cautions against complacency and notes that a SARS return is still a real danger (Vijayanand et al., 2004).

Another health crisis is H1N1, after the H1N1 pandemic was formally announced by the World Health Organization (WHO) in 2009, it was handled as a significant public health

problem for more than half a year by the majority of Council of Europe member nations. The H1N1 virus has never before linked to human diseases, according to the World Health Organization, until the current pandemic. The human seasonal H1N1 viruses that have been in broad circulation since 1977 have no relation to this virus and was discovered via genetic investigations to have descended from animal influenza viruses, which explains its popular name of "swine flu". Evidence suggests that seasonal H1N1 virus antibodies may not provide defense against the pandemic H1N1 virus. Other research, however, has shown that a sizable portion of those 65 and older do possess some protection against the pandemic virus. This implies that some people may have had a degree of cross protection against exposure to viruses that were prevalent in the distant past. In contrast to traditional seasonal flu trends in the northern hemisphere, the novel virus led to a large number of cases throughout the summer. Infections subsequently increased in activity throughout the colder months (Baker, 2010).

In this research, health literacy identifies as the level to which people can access COVID-19 information via social media and visual material, comprehend its real meaning, and assess it to make health decisions that benefit them.

2.3.3 COVID-19 Pandemic

In any emergency crisis, it is quite pertinent that the general public gets informed regarding the implications and consequences of the pandemic. Social media can be utilized to successfully, in this sense, provide health information to a broader audience. The infectious pandemic such as the COVID-19 nearly invariably results in increased public consumption and usage of all types of media for information. When COVID-19 was in full swing, which is still prevalent around the globe, physical interactions were almost non-existent due to the prevailing dangers of the spread of infection. The global lockdown halted physical meetings, which created significant physical communication. However, social media proved to be the

most efficient source of communication between people. Social media was found to be the vital link between governmental agencies and the general public in increasing awareness regarding the impacts and precautions of the coronavirus pandemic. Social media was quite effective in disseminating knowledge and awareness to health workers also (Gralinski and Menachery, 2020).

The changing spectrum of COVID-19-related cases and mortalities created a sense of responsibility among the general population to follow the social distancing precautions. More importantly, it became an effective source of communication between scientists, as well as public health officials and specialists who assisted in the collection of collective responses against the control and elimination of this deadly virus (Ippolito et al., 2020) which is an invaluable contribution. As a result, social media impacts individual's perceptions of sickness, decision-making, along with risk behaviors. Individuals make social media content that can be inaccurate or biased and usually consists of conspiracy and informative theories. As a result, accurate and timely information about new threats like COVID-19 is crucial.

When COVID-19 emerged, media channels, news, press, and social media pages gave critical paying heed to the effects of pandemics on human health. Generally, people might obtain up-to-date information about the pandemic from different social media networks. The role of graphic design is also valuable in creating awareness regarding the COVID-19 pandemic. It is particularly effective in creating positive reactions from the general public to challenging tasks. Perceived Visual Informativeness proved to be a powerful source of communication (Atasoy, 2021) and spreading the message from governmental and non-governmental organizations to the general population, which motivate them to follow the state guidelines to control the COVID-19 spread.

COVID-19 emerged as one of the most severe natural attacks in recent decades, which erupted in the activities of almost every field of life. It proved to be a critical public issue around the globe as it affected millions of human lives directly or indirectly (Duan & Zhu, 2020). It originally surfaced in Wuhan, China, towards the conclusion of 2019. It resulted in numerous deaths, prompting the World Health Organization to advise impacted localities to implement quarantine and lockdown measures (Wang et al., 2020).

Within a few months after its emergence, it affected millions of people worldwide (Haleem et al., 2020) and led to the demises of thousands of people. The WHO classified it a pandemic in March 2020, causing widespread worry worldwide (Al-Dmour et al., 2020). The Organization named this infectious illness coronavirus caused by SARS-CoV-2 is the name of the contagious virus that causes acute respiratory syndrome (SARS). The Covid-19 belongs to a group of a comprehensive family Flaviviridae that influences both people and animals. It is a rare case that the animal coronavirus can infect humans.

The recent wave of coronavirus pandemic is its prime example which has impacted humans in an unprecedented manner (Ismail et al., 2021). The lockdown that followed the COVID-19 and physical restrictions wholly altered the fabric of society (Saud et al., 2020). The people were abruptly faced with a challenge to change their lifestyles because of the limitations imposed by the coronavirus pandemic.

Most countries acknowledged the severity of the virus and reacted according to the standard operating procedures outlined by (WHO). These included social distancing, testing suspected individuals, staying home, and avoiding the Organization of events or gatherings (Chan et al., 2020).

Many researchers stated that virus control and prevention were contingent on the general populace taking substantial preventive steps to stop the virus from spreading. This involved,

among other things, keeping a safe distance, washing hands, and wearing masks. Indeed, public awareness was critical in halting the virus's spread. According to Ahmad and Murad (2020), inadequate awareness and knowledge of the pandemic virus resulted in low detection, which increased COVID-19's severe effects.

Occa et al. (2021) conducted research on perceived visual information and its impact on cancer information. The results indicated that the perceived visual information significantly affects people's acceptance of particular cancer treatment. Despite the seriousness of cancer, it does not constitute a deadly pandemic as it is in the case of Covid-19 pandemic.

When COVID-19 first emerged and grew outside of Mainland China, where people used social media to gather more information about it. In less than 24 hours, 19 million references to COVID-19 were found on Facebook and other social media sites around the world (Molla, 2020). People became entirely dependent on the media because of Covid-19 and the government's lockdown measures, and the media's power was unrivaled in any previous pandemic. As a result, determining the efficacy of the government's preventative initiatives and measuring and gauging the necessary intervention using social media platforms is crucial (Abuhashesh et al., 2021).

Also, most studies that analyze the issue related to social media and health did not deal with a specific pandemic or disease, such studies were conducted by (Zhou *et al*., 2017; Workie *et al*., 2021; Dudley *et al*., 2019), as these research did not focus on a specific pandemic, but rather dealt with human health in general. In addition to the existence of other studies such as (Ostic et al., 2021; Kircaburun *et al*., 2020) that dealt with the relationship of social media to the individual's well-being and mental health, this type of study is widely spread due to the multiple risks and negative impacts of social media. While few studies such as (King & Lazard, 2020) dealt with the subject of social media and the Covid-19 pandemic in general,

and visual information in particular, due to the novelty of this pandemic and its continuity so far.

The reason for choosing Covid-19 pandemic as the investigation's case study was due to several reasons, the most important of which are:

The negative effects of this pandemic affected all sectors and individuals economically, socially, materially and morally (Alsuhimat & Sawai, 2020). Therefore, studying this pandemic in all its aspects is an urgent necessity to reveal all the risks, effects and causes related to it.

The rapid spread of this pandemic led to all countries activating the ban and closure measures at all local and international levels, as the air, land and sea space was closed in all countries, in addition to preventing citizens from leaving their homes and this increased the demand for people to go to social media to fill their spare time and obtain information about this pandemic and ways to prevent it (King & Lazard, 2020). This confirms the significant relationship between social media sites and Covid-19 pandemic, so it is necessary to study this relationship and the nature of the impact between these two variables.

Despite the presence of many pandemics that have spread around the world, such as influenza, H1N1, SARS and other pandemics, the Covid-19 pandemic has exceeded all these pandemics with its seriousness due to its rapid spread throughout the world, whether at the level of infection or global interest with it.

The spread of this pandemic took place during a time which technology had advanced, as social media contributed significantly to the dissemination of information (true and wrong) about this pandemic, which led to the occurrence of many fallacies about the nature of this

pandemic, its causes, effects and ways to prevent it. Therefore, choosing this pandemic as a case study is an urgent necessity and of great importance at present.

2.4 Social Media

Today, social media is playing an increasingly essential part in our daily lives as well as throughout the world. As a result, there is an urgent need to develop a complete understanding of social media's long-term impacts on individual's health. This short evaluation focuses on the good and negative health impacts of social sites platforms. According to Tripathi et al. (2019), individuals use social sites to not only share their opinions or information, but also to engage in meaningful conversations about human health care. It serves as a conduit for communication between users and service providers. Given the great role that social media played in the light of the Covid-19 pandemic, unlike other pandemics, it is necessary to study this particular pandemic due to the level of spread of a lot of information about it on social media.

In recent times, rapid development in information technology (IT) has imparted positive impacts on various areas of real life, including the industrial, commercial, and administrative fields. Most importantly, the process of digitalization across the world is the most significant advancement that has altered the way humans live. An in-depth look at communication and IT demonstrates both change and consistency. defined the internet as an electronic network or networks that connect individuals and groups via the Internet and more smart gadgets, allowing for the transmission and retrieval of user information. Social media identify as a set of internet-oriented apps that allow users to publish their content based on the philosophical and technology foundations of Web 2.0 (Vermesan et al., 2022).

Moreover, Enke & Borchers (2021) defined social media as among the most well-known outcomes of the information and communication explosion which comprises a system of

online networks via the Internet allowing a subscriber to construct an entirely new site and then connect among other participants who have comparable interests and hobbies via an internet-connected social system. In simpler terms, it is referred to a collection of internet services that allow users to create, access, trade, and evaluate online content while fostering social relationships.

Social media has an expanding amount of literature and users on social media have gone from being passive content consumers to content creators, emphasizing the necessity of their participation. Social media operates as an information world power, dictating what sort of knowledge is provided to individuals and how they perceive particular topics (Shahbaznezhad, Dolan, & Rashidirad, 2021).

Social media has grown into an active technical tool and a news and communication medium for people globally. Access to mobile telephone has enabled information sharing as simple as a flick of the finger, especially among digitally informed adolescents. Social communication refers to various user applications and websites to interact and communicate and disseminate information through the global network using PC or mobile. It also pertains to any online communication platform that lets users share the content and spread information worldwide (Santos, 2022). In addition, social media sites such as X, Facebook, YouTube and Instagram enable a large number of people from various backgrounds to participate in the creation, modification, sharing, and debate of internet content (Tafesse, 2015).

Social media is one of the most critical and debated topics around the globe in the modern age. It can be described as interactive technologies and digital channels that help develop and transfer knowledge, ideas, information, and other expressions via virtual or online platforms and related networks (Obar & Wildman, 2015). The influence and presence of social media in today's modern community have become so strong and intense that it profoundly impacts

public opinion positively and negatively. In other words, just like any other technology, social media has its pros and cons. In this context, Merchant and Lurie (2020) claimed that, when used correctly, social media can be utilized to change individual's behavior and perceptions positively. Moreover, it can add to the well-being of people in the community. For example, by sending users to WHO websites, social media networking sites such as Facebook raise public health awareness among the general public (WHO). They also claimed that irresponsible usage of social media might have negative consequences for society, such as the spread of rumors, which can lead to disagreements and fighting.

The COVID-19 pandemic of late brought to light the significance of social media, which caused social isolation and interrupted physical connections. Social media networks like Twitter, Instagram, and Facebook keep the general public informed about the virus's health implications and threats, raising public awareness about its prevention and management. Social media has been the primary center of human interaction and communication during the pandemic without jeopardizing human safety and well-being. It provided a general and global platform for networking and discussions. The influence and benefits of social media have been clearly illustrated in the recent outbreak. Mageto (2019) suggested that social media significantly affected individuals who want to connect online to find information for themselves, their families, or their friends. However, it should be highlighted that improper social media usage might result in unanticipated and unwanted public reactions. For example, Depoux et al. (2020) stated that the broadcast of data from untrustworthy sources on social media has caused panic among tourists, resulting in a significantly larger response than expected. Nevertheless, social media should be employed to support public health reactions through accurate sources extensively. During any pandemic, it can be used to make people aware of the necessity of lockdown and social distancing, and the preventive measure to

contain the spread of disease. In terms of public and medical treatment, many past researchers have highlighted the importance of social media (Galiatsatos et al., 2016).

2.4.1 Social Media Engagement

Social media networks may include blogs, social media sites like Instagram, Facebook, as well as other forms of online content like YouTube, Flickr, and blogs. Social media's ability to facilitate brand interactions between consumers and businesses is a key component of client interaction. In particular, an internet community for brands develops whenever brands are active on social media networks and utilizes it to communicate with customers (Zaglia, 2013). This research centered around virtual brand communities integrated in social media as the medium of engagement due to the consumer-brand interactions that are promoted by social media (Brodie et al., 2013; Zaglia, 2013).

Researchers have conducted various studies on social media to gauge its impact on individuals. In one such study, Saud et al. (2020) looked at the activities mostly done in social media networks and found that they have a continuous influence on people's habits. Furthermore, because it is extensively used as an information source among the general public, social media has changed the style and pattern in which people connect (Lim, 2018). Social media allows individuals to contribute more than just facts and expertise and express their feelings and opinions on a given circumstance. Moreover, any online user is given the freedom to interact with the broader public outside. Marshall (2020) even argued that every social media user might play an essential role as an information distributor by becoming a social media activist. This fast change in communication patterns has forced many researchers to acknowledge that social media is among the major determinants in bringing extensive change in communication structure. Furthermore, it is one of the primary drivers of shifting from the traditional to the digital era (Ahmed et al., 2017).

Since consumer participation differs throughout online media as stated by (Geissinger & Laurell, 2016), social media interaction is a context-specific phenomenon worth taking into account (Brodie et al., 2013). Social media network is an enormous ecology with complex networks of connections, several social networks, and numerous degrees of involvement. They are characterized by academics as an assortment of web-based programs that expand on the technical and conceptual underpinnings of Web 2.0 and make the production possible and distribution of user-created content (Kaplan & Haenlein, 2010).

According to media scholars, audience interaction with media setting is a significant predicator of critical outcomes including use, emotion, and reactions to messages of communication (Calder, Malthouse & Schaedel, 2009). Engagement is crucial when using social media for communication. Engagement with social media accounts, particularly brand pages, automatically results in the development of meaningful connections since social media sites (SNSs) are relationship-centric and organically interactive. Customers may interact with a brand, for instance, by writing comments on it, expressing preferences such as dislikes and likes, and sharing the material with their social networks when brands communicate with them via wall postings on SNSs.

According to Muhammad et al., (2021), social media engagement is the process of being fully immersed in media based on one's sentiments and experiences with it. A high degree of comprehension of the material learned via the media can only be attained when one is actively participating in or immersed in it. High levels of media consumption were shown to be beneficial for advertising participation, message dependability, message attitudes, advertising attitudes, and recalls (Carlson et al., 2022).

Because advertisements would not have a communication effect if consumers are unable to be immersed in the media because they will not be able to be immersed in the advertisements

delivered through the media, engagement was first introduced as a qualitative concept to assess how deeply consumers understand, are satisfied with, and pay attention to the information exposed rather than simply meaning existing audience ratings that place value on the number of people exposed (Wang, Gohary, & Chan, 2024).

Media engagement is characterized by the fact that it is tightly linked to one's everyday life (Bengtsson et al 2021), which results in yet another experience, and is described as the sum of all media-related motivating experiences. The degree of commitment enhances the favor of information and the change of belief, according to the narrative persuasion effect. Social media use is directly tied to users' everyday lives because of how often two-way conversations take place there in real time. As a result, the effectiveness of communication via social media may be influenced by how often a person uses it in daily life (Okazaki et al., 2021).

According to the theoretical argumentation, social media engagement consists of three pillars: (1) online and offline interaction with companies, (2) stakeholders' sharing of experiences, needs, and advice to companies, and (3) stakeholders' active role in developing a brand community (Paine, 2011). Researchers have addressed various perspectives on social media engagement. However, crucial to the three pillars of social media engagement are the existence of a worthwhile customer-brand interaction and the brand's capacity to foresee consumer behavior via measurement (Paine, 2011). Couldry, Livingstone, and Markham (2010) and Agostino (2013) have also argued in favor of a fourth strategy in which businesses provide customers feedback right away.

Consumer engagement, as previously noted, refers to the emotional, cognitive, and behavioral activity customers participate in while interacting with businesses (Hollebeek, 2011). Engagement on social media emphasizes not only the cooperation between customers

but also the dialogue between consumers and companies. The growth of social media has made customers aware of the enormous potential and superior benefit of sharing experiences with one another, since this may result in improved buying selections (Guan at al., 2022).

In addition, experts contend that consumers go through an engagement process and that there are many degrees of social media participation (Guan at al., 2022; Muntinga, Moorman, & Smit, 2011; Schivinski, Christodoulides & Dabrowski, 2016). This engagement method encourages the customer to co-create and collaborate with the company rather than initially only absorbing social media and brand material, Guan et al., (2022) shows that the four building elements of consumption, curtain, production, and cooperation make up the social media engagement process.

In this study, social media engagement can be identified as the level to which people rely on social network sites (Facebook and Twitter) to obtain health information, whether general information or information related to the Covid-19 pandemic.

2.4.2 Social Media Engagement Dimensions

People are using social media more and more, particularly young people (Bozzola et al., 2022; Swart, 2021). Numerous social media networking sites appear to be utilized for information searching, despite the fact that their primary function is to enable social interactions (Olan et al., 2024; Afful-Dadzie & Egala 2023; Farsi, 2021; Chugh, Grose & Macht, 2021)

According to studies (Head & Eisenberg, 2009, 2010), certain social media sites are even employed as the sources of information in the academic setting while producing research studies. While there is numerous research on social media utilization, most of them (Dwivedi et al., 2021; Hyun, Thavisay & Lee, 2022; Cartwright, Liu & Raddats, 2021; Jamil et al.,

2022) concentrated on the utilization of social media for purposes of social media interaction or marketing.

The functions that social media perform as information sources have received little consideration. As of now, most recent research examining the informative value of social media seems to have caught broad patterns in use, but not individual variations (Head & Eisenberg, 2010).

In this study three dimensions were used to measure social media engagement, as follow:

Seeking Information: Particularly in light of Covid-19 pandemic, health remains one of the global major issues, numerous health issues may arise due to people lacking knowledge, misinterpretation, and incompleteness of the numerous sources of health information accessible to them (Prasanti, 2018). Social media, in the opinion of Jaafar et al., make it simple to get information on medicine and health (Jaafar et al., 2017). Therefore, social media allows for constant availability of health information in both text and more user-friendly formats like graphics and videos (Schroeer et al., 2021). Additionally, Neely, Eldredge & Sanders (2021) assert that social media is a useful instrument for providing people with health information and ask other users for guidance and assistance.

The advent of contemporary socio-technological advancements has significantly expanded the array of avenues available for individuals to engage in the process of finding and disseminating knowledge. Social media sites, such as X and Facebook, have gained significant popularity among younger generations (Duggan & Brenner, 2013). The rise in popularity of social media has prompted several research investigating individuals' uses of these platforms (Ali, Balta & Papadopoulos, 2023; Vandenbosch, Fardouly & Tiggemann, 2022; Liao, Widowati & Hsieh, 2021). The majority of the aforementioned research, however, primarily concentrated on examining the utilization of social media platforms for

socialization or advertising objectives (Ellison et al., 2007; Berthon et al., 2012), rather than for the goal of finding information, the latter is a potential domain for study on information literacy and information behavior, since initial data suggests that users often rely on social media platforms as a means of obtaining information. According to a study conducted by Head and Eisenberg (2009, 2010) and Pew (2012), around 50% of adolescents who utilize the internet, with over 80% of university students use social media platforms for both academic and personal research purposes. In light of the widespread use of these platforms, it is essential to comprehend the actions undertaken by people while using social media platforms for the objective of finding information, as well as the factors that influence such behavior.

Content Trust: Trust is a concept that pertains to the dynamic between a trust, who is the individual or entity placing trust in another entity, and a trustee, who is the entity being trusted. Within the realm of social media, trust serves as a determinant of the reliability of those with whom we may confidently exchange information and receive information from without the need for further verification (Kim & Jin, 2019). Trust plays a significant role in our cognitive processes, as it allows us to efficiently acquire information from trustworthy sources. This serves a dual purpose: firstly, it helps us avoid being overwhelmed by an excessive amount of information, thus mitigating information overload. Secondly, it ensures that the information we receive is credible, as we place trust in the providers of that information, thereby enhancing its credibility. Hence, the establishment of trust plays a pivotal role in facilitating the acquisition of pertinent and dependable information by users of social media platforms. Consequently, the examination of trust within the realm of social media has emerged as a subject of growing relevance in study, with notable practical implications (Chahal & Rani, 2017).

Furthermore, the concept of trust, as elucidated by McKnight et al. (2002), plays a pivotal role in influencing social conduct in both virtual and physical settings. Trust has significant value that goes beyond individual interactions, as it deeply influences and remains relevant in many aspects of social dynamics. Within the context of social media, the concept of trust has significant importance in influencing and molding social connections (Yoo & Hyan, 2016). Dependence on trust is crucial in navigating encounters, establishing connections, and cultivating relationships inside the digital realm, given the absence of tangible indications (Abbasi & Alghamdi, 2018). Trust, within the given context, exhibits a complex nature, embracing several dimensions such as trusting the platform, faith in the truth and dependability of shared material, and trust in the genuineness and intents of other users.

Behavior Change: Social media has become a well-known platform via which individuals get information. The media may be classified into two distinct categories, namely print media and non-print media. Social media platforms have the capacity to enable individuals to engage in communication and exchange information via various multimedia formats, such as photographs, videos, and audio, irrespective of geographical barriers. The utilization of social media platforms has seen an important surge throughout many societies, resulting in a substantial growth in the user base over the course of time. In contemporary society, individuals engage in the regular application of social media (SM) due to its multitude of advantageous outcomes and potential drawbacks (Dourish, 2001).

In contemporary times, using social media platforms has emerged as a mechanism via which individuals might engage with society and cultivate interpersonal connections (Nicole & Boyd, 2017). Social media, as its name suggests, has a social aspect that facilitates user interaction, hence fostering interpersonal ties and influencing the social behaviors of people on a global scale (Macnamara & Zerfass, 2012; Kaplan & Haenlein, 2010). Social behavior is

a fundamental aspect of human psychology that pertains to the regulation and response to behaviors that are deemed inappropriate within a given society. The focal point of this concept is to an individual's attitude, perception, response, and disposition towards others in their immediate social environment (Kaplan & Haenlein, 2010). Social behaviors may be categorized into both good and bad forms. Positive social behavior is considered acceptable because of individuals possessing positive attitudes and dispositions that are regarded favorably.

Negative social behavior may be characterized as exhibiting attitudes and dispositions that are contrary to good social behavior, hence resulting in unfavorable outcomes. Both of these phenomena have an impact on young individuals due to the fact that the majority of users belong to this demographic. According to Abdullah, Ellias, and Jegak (2009), contemporary kids are exposed to several detrimental impacts such as bullying, blackmail, engagement in fraudulent activities, and impersonation via popular digital platforms including Facebook, WhatsApp, and Google Classroom. Similarly, Al-Sharqi, Hashim, and Kutbi (2015) said that although social media has a positive role in society by facilitating integration, it also has negative implications, including its association with fraudulent activities, cybercrime, cyber bullying, and the erosion of face-to-face interactions. People are using social media more and more, particularly young people (Bozzola et al., 2022). Numerous social media sites appear to be utilized for searching information, even though their primary function is to enable social interactions (Olan et al., 2024; Afful-Dadzie & Egala 2023; Chugh, Grose & Macht, 2021)

According to studies (Head & Eisenberg, 2009, 2010), certain social media sites are even employed as information sources in the academic setting while producing research studies. While there is numerous research on social media application, the most of them (Dwivedi et

al., 2021; Hyun, Thavisay & Lee, 2022; Cartwright, Liu & Raddats, 2021; Jamil et al., 2022) concentrated on the utilization of social media for social media or marketing.

The functions that social media perform as information sources have received little consideration. As of now, the majority of current studies examining the informative Social media value appears to have caught broad patterns in use, but not individual variations (Head & Eisenberg, 2010).

2.5 Underlying Theories

This section explained the theories that used in this study to describe the study variables, two theories were selected social capital theory and social cognitive theory, the reason behind choosing these theories is because they are able to explain the relationship between the variables of the study, as this study explores the changes in the health behaviors of individuals as a result of the news and information they follow on social media, in addition to the impact of the quality of information spread (images, video, or texts) throughout their acceptance of integrating more into social media sites and following the information published on them. Therefore, this study is concerned with three main elements: individuals who use social media, the health behaviors of individuals, and the main information environment represented by social media sites.

Accordingly, social capital theory and social cognitive theory enable to explain the relationship between these variables, given that these theories are able to explain how individuals' behaviors change as a result of interaction with the environment around them, by focusing on three main elements personal, behavioral, and environmental.

2.5.1 Social Capital Theory

Social capital is identifying as characteristics of social life like traditions, networks, and trust that allow people to collaborate more effectively to achieve common goals (Putnam, 1995). According to Poecze & Strauss, (2020), Social capital is made up of resources that are inherent in person social network and may be analyzed and employed for instrumental or expressive returns like reciprocity, collaboration, and mutual support.

Putnam (2000) defined social capital as having two aspects: bonding and bridging, taking into account the multiple rules and networks in which it happens. The inclusive features of social engagement when individuals from different cultures connect through social media sites are referred to as bridging social capital. As a consequence, a variety of weak ties are commonly employed to overcome social capital deficits (Poecze & Strauss, 2020). This aspect broadens people's societal viewpoints while also allow them to find more sources and knowledge. Bonding social capital refers to the social and moral support that each person gets from their virtual communities, particularly close ties among family or friends.

Some writers have characterized social capital as facilitating the smooth operation of society and enabling contemporary economies to work effectively. These assertions may seem ambitious, but without social capital, people would be unable to collaborate. Social capital refers to the collective ideals, standards, trust, and sense of belonging that enable social interactions. Social capital is essential for the functioning of our society, economy, institutions, and political system. Social capital has been likened to glue. If social capital represents the productive advantages of social relationships, then anything may be considered a benefit of social capital advantages of living in society compared to living as a hermit (Poecze & Strauss, (2020).

Consequently, social capital is likely to be connected with higher levels of health literacy (Nabi et al., 2023). Indeed, Vainauskienė & Vaitkienė (2021) emphasized that contact creates new connections, resulting in access to and acquisition of new knowledge in a variety of domains, including health.

Social capital may have good or negative effects depending on the environment or viewpoint. Social capital is multifunctional, allowing it to have both good and negative aspects simultaneously. Some individuals find the word 'capital' to be frustrating or confusing, yet despite not being perfect, it is a widely accepted term in literature, so we must acknowledge it and proceed.

In this study we employed social capital theory because social capital is the interconnected network of contacts and interactions that people or organizations possess throughout society. It encompasses trust, common standards and values, and mutual give-and-take within these social networks. Strong social capital may lead to acquiring resources, favors, or valuable knowledge via a person's relationships with others.

Also, social capital is significant since it motivates individuals to interact with others and get collective advantages from being part of a bigger entity. Social capital theory, which posits that social connections may provide beneficial results for individuals or collectives, has been extensively researched and shown to promote communal development. Society functions better when trust, common identity, and values are present. Brands rely on social capital to understand how consumers interact with one other and with brand representatives. Brands may enhance consumer loyalty by cultivating connections with their audience.

Social Capital Theory suggests that social capital- networks and relations are a necessity for the achievement of individual and collective goals. From Julsrud, (2023), social capital refers to the glue that shapes cooperation within any society, including the norms, the network, and

trust. Its relevance to the field of health literacy may become evident when considering that, according to this theory, social media offers an opportunity to establish the connections that foster access to health resources (Nabi et al., 2023).

The ability to differentiate between bonding and bridging social capital allows better understanding of how social media participates in health literacy. Bridging social capital entails links in different clusters, thus implying that the number of health-related information and ideas got to be wider. This aspect is even more important when people come from different backgrounds spend time online interacting with each other, thus improving their perception of health challenges (Azzaakiyyah, 2023). On the other hand, bonding social capital refers to the restricted and tight knit network that offers emotional support and trust and creates coherent fabric of reinforcing health related behaviors in a given community.

Therefore, in the current study, it is important to explain how social capital can moderate the association between perceived visual informativeness and health literacy. In particular, high social capital can enhance the dissemination of visually informative post on social media platforms and improve population health literacy (Fischer-Preßler et al., 2023). Nonetheless, it is also necessary to appreciate the point that social capital could improve the framework and facilitate access to the information, but at the same time, it could 'amplify' a feedback loop of mis-and disinformation if the network does not critically engage the credible sources.

2.5.2 Social Cognitive Theory

Albert Bandura established Social Cognitive Theory (SCT) in the 1960s from Social Learning Theory (SLT). The SCT, which was renamed in 1986, stated that learning occurs in a socio-cultural setting, with a dynamic and reciprocating interaction between individuals, their surroundings, and behavior. The SCT is characterized by its emphasis on social impact

and externally and internally positive persuasion. It studies how people learn and remember activities and the social context in which they do so. The theory needs to consider a person's personal experiences, which impact whether or not they participate in the behavioral activity. These prior experiences have a consequence on reinforcing expectancies, and expectations, which all shape whether or not someone person will accomplish a task and why they always do so (Bandura, 1989). Rather than habit maintenance, several health-promotion theories concentrate on initiating conduct. This is unfortunate since behavior maintenance is a significant public health goal, unlike behavior initiation. The SCT attempts to describe how humans manage and encourage their behavior to achieve long-term, goal-directed behavior. The first five dimensions were created.

Social cognitive theory (SCT) posits that individuals may acquire information by watching others in social interactions, experiences, and media impacts. According to the idea, individuals learn by seeing a model do a behavior and its consequences and then utilize this knowledge to influence their own future behaviors. Observing a model may also trigger the viewer to exhibit behavior they have previously acquired. Put simply, human learning is not only about trial and error, but rather the continuation of mankind relies on imitating the behaviors of others. The observer's decision to imitate modeled behavior is influenced by the consequences of the behavior and whether rewards or punishments are involved. Media offers role models for a wide range of individuals across many contextual contexts (Bandura, 1989).

The SCT has many elements, including (Bandura, 1989):

1. SCT's central principle is reciprocal determinism. Individual (person with a set of behavioral memories), surroundings (outside social context), and behavior are all based on incremental and reciprocally (responses to stimuli to achieve objectives).

2. Behavioral capability - A person's ability to do an activity with the necessary skills and knowledge. An individual knows what to undertake and how to use it to accomplish a project. People realize via their actions and the effects they have on their environment.

3. According to observational learning, individuals can also check and observe another person's conduct and then repeat it. This is typically exhibited via "modeling" behavior. Following a successful presentation, individuals may complete a behavior.

4. The consequences of a man's actions can be extrinsic or intrinsic, which determines whether they will continue or quit doing it, referred to as reinforcements. Positive or negative Self-initiated reinforcements can also be affected by environmental factors. The SCT construct most closely resembles the reciprocal interplay of environment and behavior.

5. Expectations - This refers to what a person anticipates due to his activities. The outcome may or may not be mental well-being. People evaluate the consequences of their actions before engaging in behavior, and these thoughts may impact whether the activity is effective. Expectations are often influenced by prior experiences, and because they are based on previous encounters, they are unique to the individual and are reliant on how important the outcome is to them.

6. Self-efficacy is the assurance in person capacity to do a successful assignment. Self-efficacy is exclusive to SCT instead of other theories like the Planned Behavior theory. Individual capabilities, other human characteristics, and environmental circumstances have improved (barriers and facilitators).

In this study we employed social cognition theory posits that individuals acquire knowledge and skills via observation of others. These acquired behaviors might be fundamental to an individual's character. Social psychologists acknowledge that the upbringing environment influences behavior, but they also emphasize the significance of the individual person and their cognition. Individuals acquire knowledge via watching others, with the environment, behavior, and cognition playing key roles in affecting growth in a reciprocal triadic interaction. For instance, any seen behavior has the potential to alter an individual's cognitive processes. The environment in which one is reared may impact future behaviors, much as a father's perspective influences the upbringing of his children.

Observational learning is the other component of SCT in which people learn through observation of the observed behaviour and result (Mujahidah & Yusdiana, 2023). In the context of this study, this could be fringe into how users consume health related content that friends or popular personalities post on their social. By embracing this mechanism, it is easier to explain how perceived visual informativeness affects users' behaviour in terms of seeking and using health information. Furthermore, self-efficacy, defined as perceived behavioral capability in terms of a specific behavior, is a major antecedent to behavior and influences whether or not people will engage in health-related behaviors prompted by the health information they come across (Warner & Schwarzer, 2024). In the sense that users feel that they are able to comprehend and apply the content they follow on those social media which will lead to improvement in their health literacy. Therefore, this research examined the interaction between two major downstream variables, namely observational learning and self-efficacy, with regards to perceived visual informativeness in social media.

The theory's construct of self-efficacy rises to importance in attempts to measure health information users' perceptions of their capacity to assimilate and apply such information. To

this end, analyzing how people self-appraise their health literacy for visually communicated health information can help reveal the heath literacy acquisition process.

2.6 Hypothesis Development

2.6.1 Relationship Between Health Literacy and Perceived Visual Informativeness (PVI)

Health information may take numerous forms, involving disease prevention and health education, as well as information to assist treatment decisions or increase the efficacy of clinical care. Much health-related communication supports decisions such as whether to vaccinate a kid, whether to have surgery rather than an alternate route, or is procedural or instructional in nature, such as how to do exercises following an operation or how to use an inhaler. Best practices in typography and graphic communication are essential for effective health communication. An information design viewpoint prioritizes the reader/user and recognizes that visual presentation works in tandem with words to effectively communicate with a specific audience (Turchioe et al., 2019).

Previous evaluations of studies discovered that user-preferred features (e.g., familiarity and visual simplicity) really do not generate the generate desired outcome at times, that some visual elements that illustrate particular elements of risk measures might pump up risk perceptions, and that visual info characterizations just do not always outcompete text on threat results (Ancker et al., 2006). A different study discovered that visualizations of information for health-care workers is an area that has been understudied, and proposals for improving visualization techniques were perplexing given the current database (Lor et al., 2019).

According to Lipkus (2007), communicators should (1) choose shows for specific jobs, (2) value accurate risk magnitude judgments, (3) be aware of information processing algorithms associated with information placement/ height, (4) organization of cases into groups using icon arrays., and (5) provision contextual information that elaborates each display/ graph presented. Hundreds of researches on the impacts of certain data visualizations in specific settings, as well as innovative forms such as interactive visualizations (Abdelnabi, Hasan & Fritz, 2022), but few on infectious illnesses or related issues such as vaccines have been undertaken.

According to (Abdelnabi, Hasan & Fritz, 2022; Irwin, 2020), out-of-context pictures are adding to disinformation during the pandemic. The Brennen et al. (2020) disinformation sample had no cheap fakes or deep fakes, while there are instances of picture modifications which would most likely be categorized as cheap imitations (Mikkelson, 2022). Visual health communication research has just recently begun to address challenges such as visual misrepresentation and out-of-context graphics. In message design and development, a lot of attention is put to overall content selection and framing, while visual framing and picture selection might be an afterthought.

The recommendations and evidence used to guide the concepts and evidence used to guide the choice of illustrating visual elements are substantially less extensive than those utilized to assist in the selection of visual video elements. According to King et al. (2014), suggestions for choosing visuals, particularly for health information and messages, were frequently ambiguous (National Cancer Institute, 2007), like recommending "culturally appropriate and attractive" illustrations without stating what that entails or what proof supports the existing recommendation. Because risk and health communication must routinely reach a varied

audience, such recommendations are challenging to implement owing to potential distinctions in meaning, processing, and impact (Springston & Champion, 2004; Scheltema et al., 2018).

Significant study has been undertaken on visually content categories in text and multimedia health communication contexts, offering suggestions for why and how visuals are used, as well as data on the effects of different kinds of visually interactions (e.g., photographs, illustrations, intense imagery). Moreover, some academics have studied the function of various artistic elements of visualizations (Qinet al., 2020).

In television video content analysis, visual message components or aspects are also a major research area (Serafini & Reid, 2023; Schmälzle & Huskey, 2023; King, Koppenhafer & Madrigal, 2021). In mediated health communication, visual messages, regardless of medium, are commonly used.

Since few research have focused at visual influence in this specific context, there are few evidence-based suggestions that can be made with certainty when talking about infectious illnesses with graphics. There has been no evidence of visuals influencing results of interest in infectious illness themes in infectious disease research and visual material (McGlone et al., 2014).

Other comics examine healthcare practitioner experiences (Shapiro et al., 2022), patient experiences, or present visual tales of people helping out with their communicative aim (Strong & Shadden, 2020). A variety of cartoonists and illustrators have presented instances of how graphical material and sequential narrative content may be utilized to transmit vital data during a pandemic.

PVI has been demonstrated to forecast people's purpose to engage in health-related actions or behaviors, like self-examination of their skin. Increases in skin cancer knowledge have also

been connected to PVI positive results. PVI of an informational tool may therefore be particularly significant when choosing whether or not to take part in clinical research (King et al., 2015). The researcher hypothesized that PVI of information assistance favorably affected people's attitudes towards health information in light of this and the research that is currently available on the effects of people's perceptions of a platform's visual informativeness.

Table 2. 2 Studies about perceived visual information and health literacy

No	Author	Pandemic/Disease	Country	Types of visual information	Results
1	Cao & Xu, 2022	Anti-Prescription Opioid Campaigns	United States	visual exemplars and statistical information	A visual representation of the negative effects of prescription opioid misuse improved perceived sensitivity, psychological reactance,
2	King & Lazard, 2020	General health crises and literacy	Universal	Graphical (e.g., data visualizations) and illustrative (e.g., photos, illustrations, and content features) visuals	More systematic study into these visual health communication research topics will enhance public communication during future public health emergencies.
3	Occa et al., 2021	Cancer	United States	Information aids, message interactivity features, perceived visual informativeness, and cognitive absorption	Higher perceived visual informativeness (PVI) and cognitive absorption (CA) scores were obtained when the IA had both

					modality and message interaction elements. The model supports the moderating and mediating roles of PVI and cancer information overload (CIO).
4	Park & Tang, 2019	Skin cancer	United States	Color and visual complexity	Color and visual complexity were both major indicators of information a44ssessment in info graphics and should be used with caution in info graphic design.
5	Scheltema, Reay & Piper, 2018	General medical information	New Zealand	Color (Saturation Differentiation Modulation). Contextualization (setting of subject). Representation (degree of abstraction) Perspective Depth Illumination Brightness	Patients frequently chose images that displayed a higher quantity of information than specialists thought was essential, and all users selected the most realistic depictions of medical knowledge among the illustrations offered.
6	King, 2016	Skin cancer	United States	Visual Exemplification, Visual Persuasion	The findings imply that certain visual messaging tactics may have

					unexpected consequences when it comes to informing people about skin cancer. PVI is an intervening variable that must be considered.
7	King et al., 2014	Health literacy	United States	message quality, informativeness, and attractiveness	PVI is a first step in evaluating and examine visual messages in campaign and intervention sources that promote informed make decision and change behavior.

Based on the above discussion the following hypothesis has been proposed:

H1: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

2.6.2 Relationship Between Health Literacy and Social Media Engagement

Social media has changed people's connections dramatically during the last decade. Every new discovery, however, has both beneficial and bad consequences for society. Social media allows people to share their knowledge and communicate with people anywhere in the world, nevertheless, it may be a severe challenge if the information shared is incorrect, such as

misguided ideas about transmission of illness or cure. No experts spread such rumors on social media without adequate knowledge. As a result, it is critical to manage misinformation and proper transmission of health information by health agencies and other credible groups among individuals (Gomez Bravo et al., 2019).

Ever since the social media era began, numerous forms of social media have been utilized in the healthcare profession. Others use them for health information, while still others use them to treat ailments. The more people who use social media for news and psychological support, the more healthcare organizations utilize it to convey health-related information (Andersen et al., 2012).

Inflammatory disorders are bacteria cause illnesses, viruses, pathogens, and nematodes that can be transmitted from one person to the other explicitly or implicitly (World Health Organization, 2015). On January 30, 2020, the WHO designated the COVID-19 pandemic a worldwide public health emergency. Scholars rushed to explain the pandemic's features, including its propagation, fatality rate, and origin (Perlman, 2020).

The WHO and its disease monitoring and prevention departments maintain interactions through social media and website updating networks. During a public health crisis, providing real-time information to the general people while minimizing media exposure, which can cause traumatic stress reactions and infections, is critical. As certified social actors, health care personnel play a crucial role in communicating essential information to the ill and other members of society. Cleaning hands, using and discarding hankies for sneezing and coughing, sterilizing surfaces, and maintaining social distance are useful in keeping people safe from harmful germs and viruses and preventing other common illnesses like influenza (Garfin et al., 2020).

By monitoring social media channels related to infectious diseases, scholars can research media and uncover new trends in disease and infection pandemics, notably influenza. Other academics are interested in the new elaborate patterns of twitter language and style and its relevance to public health and, in particular, influenza forecasting (Broniatowski, Paul & Dredze, 2013). In addition, rich material may be used to discover local health update movements, making digital surveillance of infectious illnesses feasible (Yepes et al., 2015).

The optimal time to recognize a flare-up of an infectious illness is a delicate topic. It is for both the active start of public health intervention and monitoring operations and the best time to notify government agencies and big groups of people. Witnessing such disclosures may be costly; many nations' public health infrastructures cannot identify pandemics in their latter stages. Web networking is transforming the way pest control and pandemic intelligence are managed, and it offers a solution to both issues (Al-Surimi et al., 2016).

Younger people choose the Internet or social media sites for health information, whereas older people prefer newspapers. These choices would then be focused on various age groups via online selections. Nowadays, an alternative technique based on past social preference ratings is available. Most preliminary care preparation research involves individuals over 65; however, a new method is created to engage and educate younger people. Thus, they will be more be able to deal with these difficulties in their communities and families. One research looks at learners at US colleges and concludes that providing trustworthy information on pre-hospital care training to young people is an essential aspect of public health (Kavalieratos et al., 2015). Furthermore, more than half of United States adults of all ethnicities and ages utilize the Internet to get health products and information (Calixte et al., 2020).

According to Seymour (2018), companies could use coordinated social media. During a crisis, hash tags can provide specific information to the public (Lachlan et al., 2016). Users

might be led to connections and contact privately run health facilities and providers of precise geospatial information services. Examiners can analyze native agencies' hazard interaction operations using publicly available "big data" like local tweets. Public officials, for example, were capable of tracking people's reactions to the Zika virus outbreak by studying Yahoo! Answers. Widespread outrage as more information on virus prevention and treatment became available from the government (Zhang et al., 2020). To improve awareness of health issues, social media could promote exercise and a balanced diet (Wong et al., 2014).

Therefore, new information about health risks and relationships is given in public health awareness programs and these programs run for days, weeks, months and even years. Public awareness campaigns have exploded (ElGeed et al., 2023). It is argued that the main networks of relationship among individuals in the same communities are found to enhance these campaigns, as supported by Social Capital Theory. Information flow is improved where social capital is high and this is through a cohesion, trust, obligation and network which supports community health activities and dissemination of health information (Siddiqa, 2024; Amoah, 2024). That is, when members of a community are joined together and have confidence with each other then they are willing to take part in health promotion activities besides disseminating information on aspects of health risks.

Social media is therefore increasingly being used in the collection of data on the performance of hospitals and other medical centers based on patients' perception. Besides being an actual platform to share individual health stories, it can be a measure through which concerned norms in health behaviors can be set and maintained. This is in congruence with the Social Cognitive Theory which, for example, postulates that persons acquire behaviors through modeling within their social systems (Zhang et al., 2023). For instance, people are likely to follow other people's healthy behaviors or pass correct health information if they meet them on social networks.

In addition, social media has played a very important role in informing the public on affairs of current nature such as the corona virus (COVID-19) (Lerouge et al., 2023). It lets patients and surgeons obtain relevant health details in a hurry and enables support from like-minded members in emergencies. Because of the platform of social networking, this fosters social capital in that it brings about interaction and trust between and among people. Such combined efficacy can help enhance healthier results in public health as people agree to act based on the available knowledge and experiences. Consequently, the active dynamic motion of the Social Capital Theory and the Social Cognitive Theory, elucidates the significance of community participation as well as social relatedness in the promotion and access to sufficient public health awareness and compatriots' constructive reactions during crises. This places Social Capital Theory and Social Cognitive Theory perspective of health promotion awareness programs to the extent that social media plays a crucial part in sharing health information.

Table 2. 3 Studies about social media engagement and health literacy

No	Author	Objective	Country	Variables	Results
1	Htay et al., 2022	To examine the digital health literacy (DHL) level, information-seeking behavior, and satisfaction with information on COVID-19 among the university students in the East and South-East of Asia	East and South-East Asia	Digital health literacy (DHL) level, information-seeking behavior, satisfaction, COVID-19	Across the domains (i.e., adding self-generated content, determining relevance, evaluating reliability, and protecting privacy) higher DHL was connected with increased use of reliable resources.
2	Ostic et al., 2021	shedding light on the impact of social media use on psychological well-being	Mexico	Social Media and Psychological Well-Being	The findings indicate that social media use has an overall favorable indirect influence

					on psychological well-being, owing to the beneficial effect of connecting and bridging social capital.
3	Sleigh et al., 2021	To ascertain how visual risk communication was employed on Twitter to promote the World Health Organization's (WHO) recommended preventative behaviors, as well as how this communication	Switzerland	Visual risk communication and COVID-19	Messages used mostly photographs and images were found to be rich with information.
4	Niu, Willoughby & Zhou, 2021	Examine the associations between health literacy, health-related social media use, self-efficacy, and health behavioral intentions online	China	Health Literacy, Social Media Use, and Self-Efficacy with Health Information–Seeking Intentions	Self-efficacy mediated the effects of health literacy and social media use on health behavioral intentions on social media
5	Wu, He & Zahang, 2020	Examined the relationship between consumers' communication with doctors and their e-Health literacy and healthy behaviors	China	Doctors' social media accounts, reading doctors' posts, responding to doctors' posts, doctors' posts, and recommending doctors to other patients, E-Health literacy and healthy behaviors	doctors' accounts, responding to doctors' posts and recommending doctors to others were significantly associated with e-Health literacy, while following doctors' accounts, responding to doctors' post, favoring doctors' posts, and recommending doctors to others were significantly associated with healthy behaviors
6	Dudley et al., 2019	Understanding of the impacts of	Australia	Social Media Engagement and	There is impact of health-related social

		social media on young people's health and wellbeing.		Health literacy	media on the young health, wellbeing, and physical activity.
7	Tripathi et al., 2019	Examine the positive and negative effects of social networking sites on human health	India	Social Media Engagement and Health literacy	Rumors (misguiding concepts about disease spread or cure) are made viral on social media by non-experts without proper information.

Therefore, the study proposes the following research hypothesis:

H2: Social media engagement (Seeking Information, Content Trust, and Behavior Change) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

H3: Social media engagement (Seeking Information, Content Trust, and Behavior Change) mediating the relationship between Perceived Visual Informativeness and Health Literacy in the context of COVID-19 pandemic.

2.6.3 Relationship Between Social Media Engagement and Perceived Visual Informativeness

One of the key motivations for utilizing social media is knowledge seeking (Muntinga, Moorman, & Smit, 2011). Consumers' attention can be attracted by social media advertisements by giving them the information they're looking for about a product (Van-Tien

Dao et al., 2014). Consumer value will therefore be produced because of the impression of the importance of SMA information (Zeng, Huang, & Dou, 2009).

Social media has quickly infiltrated the daily lives of individuals, fast becoming one of the most important social platforms for computer-mediated communication (Boudjelal & Bendriss, 2023; Obinna, 2023; Schivinski & Dabrowski, 2016). Marketers are seeking ways to communicate with and influence their consumers in order to develop a marketing plan (Hoffman & Novak, 2012). According to Pew Research Center (2014), social media are used by 74% of internet adults in the United States, with Facebook being on top of the list. Common sense, (2015) explained that 94% of American social media users in 2013 had a Facebook account, and they used the platform for nine hours a day on average.

Social media was considered the best source for all the latest news and information. It has provided people with the opportunity to seek information and news regarding any issue or topic. Won (2019) reported that employing info graphics played a positive role in the user's ability to comprehend the news and information. Moreover, it also increased the acceptance of communication among the users. They argued that on-screen details and info are challenging to understand for the users in comparison to print media. Hence, info graphics increase the user's comprehension and understanding of the news. Visual representation increases the users' cognitive understanding and helps them comprehend the prevailing problem's nature. The use of graphic design has increased thanks to social media dramatically. It has brought many people close to each other, regardless of their backgrounds and culture, to modify, design, and share internet content (Tafesse, 2015).

In any social or commercial campaign, graphic design is a crucial component. Suhendra et al. (2020) aimed to evaluate the impact of graphic design on online political campaigns concerning social media. They found that imagery and illustrations play an important role in

visual communication and transferring the message to the public during such movements. They argued that graphic design should be significantly used in campaigns conducted on online platforms such as Instagram and Facebook.

Social media has been treated as a powerful instrument to develop the relationship between content providers and audiences. In other words, the relationship between social media and graphic designers has increased. It is worth noting that everyday people are becoming more and more involved in developing visual content on social media (Bruns & Schmidt, 2011). Therefore, the impact of graphic design on social media is becoming more prominent since people's attention is sought through visual sources of information.

Table 2. 4 Studies about Social Media Engagement and Perceived Visual Informativeness

No	Author	Objective	Country	Variables	Results
1	Zia et zl., 2022	Analyze those factors that will help the business grow in online market	India	Informativeness, Trendiness, Personalization, and Word of mouth, brand experience and customer-based brand equity	Informativeness, Personalization, Consumer Based Equity, and Word of Mouth have a considerable influence on Brand Experience, whilst Trendiness has a little impact on Brand Experience.
2	Karpenka et al., 2021	Look into a range of factors affecting the building of trust in brands among social media community groups	Lithuania	Visual content, emotional characteristics, and consumer engagement	The survey concluded that engagement with the brand-created content by social media community when examining customer confidence in a brand among consumer groups, groups can be seen as a proxy variable.
3	Sharma et al., 2021	To examine the relationship between the Social Media	India	Interactivity, Informativenes, Personalization, Trendiness,	Costumer brand relationship does have a positive and statistically

		Marketing Activities (SMMA) and customers motivate purchase intention		word of mouth, Purchase Intension, Satisfaction, and Commitment	significant impact on consumers' purchase intention through SM (Interactivity, Informativenes, Personalization, Trendiness, word of mouth).
4	Ahmed, 2020	This study examines the effect of social media advertising design components on customer purchase decisions.	UAE	color design typography Advertising image, and purchasing decision	Advertising picture (41.6%) has the greatest influence on purchase decisions, followed by typography (8%), design (4.8%), and color (2.6%).
5	Kujur & Singh, 2020	Proposes a theoretical model of how visual communications through consumer engagement on corporate Social Networking Sites pages influences the consumer-brand relationship. Structural	India	Visual Communication, Consumer-Brand, and Social Networking Sites	Consumer engagement mediating the relationship between independent (visual contents) and dependent variable (consumer-brand relationship) on Facebook.

H4: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on social media engagement (Seeking Information, Content Trust, and Behavior Change).

Table 2. 5 A summary of social media use for healthcare applications

General Categories	Research Focus	Source
The use of social media for health	Patient-patient and patient clinician communication	(Naslund et al., 2016; Setoyama et al., 2011; van Rensburg et al., 2016)
	Searching for, exchanging, and disseminating health	(Chretien & Kind, 2013; Fergie et al., 2016; Shaw & Johnson, 2011; Song et al., 2016;

information communication and knowledge sharing	information	Ventola, 2014)
	Management of	(Merolli et al., 2013c; Patel et al., 2015; Stellefson et al., 2013)
	Promotion, professional growth, and patient education are all important.	(DeAndrea & Vendemia, 2016; Househ, 2013; Stellefson et al., 2014)
Knowledge discovery and predictive modelling using social media analytics	Public health surveillance	(Davila et al., 2012; Jashinsky et al., 2014; Rosen et al., 2013; Fung et al., 2015; Kang et al., 2017; Paul et al., 2016; Thompson et al., 2015)
	Discovery of health-related information or knowledge	(Lu et al., 2013; Tuarob et al., 2014)
	Discovering adverse drug events	(Correia et al., 2016; Nguyen et al., 2017; Paul et al., 2016; Wu et al., 2013; Yang et al., 2015)
	Disease trend prediction	(Broniatowski et al., 2013; McGough et al., 2017; Nagar et al., 2014; Santos and Matos, 2014; Xu et al., 2017)
	Disease intervention	(Robinson et al., 2015; Tanner et al., 2016; Valimaki et al., 2016)

2.7 Theoretical Framework

Previous study evaluations discovered that a range of visuals utilized in messaging, such as pictures/illustrations (Amodu, & Otesile, 2023), data visualizations photographs (Gibson, 2013), and (Ancker et al., 2006), can increase interest in health-related issues. Attitudes, attention, memory, understanding, message perceptions, risk perceptions, risk estimations, physiological reactions, along with a range of behavioral expectations/intentions and health behaviors are some of the outcomes of interest. For many years, researchers studied visual material using an absence/presence method (King, 2016), but more recently, researchers have concentrated on analyzing diverse visual communication aspects for both static pictures and dynamic audiovisual information (Lazard & Mackert, 2016; Clayton et al., 2017).

Pictorial caution Labels on various consumer items have been the greatest visually dominating area of health communication research in recent years (Grummon & Hall, 2020;

Noar et al., 2016). Few graphic methods of connection provide health communicators with fresh perspectives. Instead, studies on visual health connection develops hypotheses, generates research questions, and selects outcomes using broader frameworks from communication such as exemplification theory explained by (Zillmann, 2006), psychology like fuzzy trace theory (Reyna, 2008), education like dual coding theory (Sadoski & Paivio, 2013) or such as health belief model (Carpenter, 2010). Outliers in persuasion/consumer research include visual persuasion theory (Messaris, 1997) and visual metaphor theorizing (Pradies et al., 2023).

According to one earlier assessment, visual health connection research might be split into two broad kinds of visual material: graphics such as data visualizations and illustrative (King, 2015).

Table 2. 6 Variable and dimensions of the study

Variable	Dimension	Source
Perceived Visual Informativeness	Perceived Message Quality	(King & Lazard, 2020; Occa et al., 2021)
	Perceived Informativeness	(King & Lazard, 2020; King et al., 2014)
	Perceived Attractiveness	(Scheltema, Reay & Piper, 2018; King et al., 2014)
	Perceived Effectiveness	(King & Lazard, 2020; King et al., 2014)
Health Literacy	Finding Information	(Sørensen et al., 2021)
	Understanding Information	(Tripathi et al., 2019; Workie et al., 2021)
	Evaluating Information	(Sørensen et al., 2021; Workie et al., 2021)
	Applying Information	(Sørensen et al., 2022; Al-Dmour et al., 2020)
Social Media Engagement	Seeking Information	(Ahmad & Murad, 2020; Al-Dmour et al., 2020)
	Content Trust	(Al-Dmour et al., 2020; Gomez Bravo et al., 2019)
	Behavior Change	(Ahmad & Murad, 2020; Depoux et al., 2020)

Based on what was discussed, and after referring to previous studies connected to the subject of the current study, such as (Sørensen et al., 2017; Tripathi et al., 2019; Workie et al., 2021)

studies of the health illiteracy variable), the studies (King & Lazard, 2020; Occa et al., 2021) of the perceived visual informativeness variable, and the study (Ahmad & Murad, 2020; Al-Dmour et al., 2020) of the variable of social media engagement. The following study model was developed:

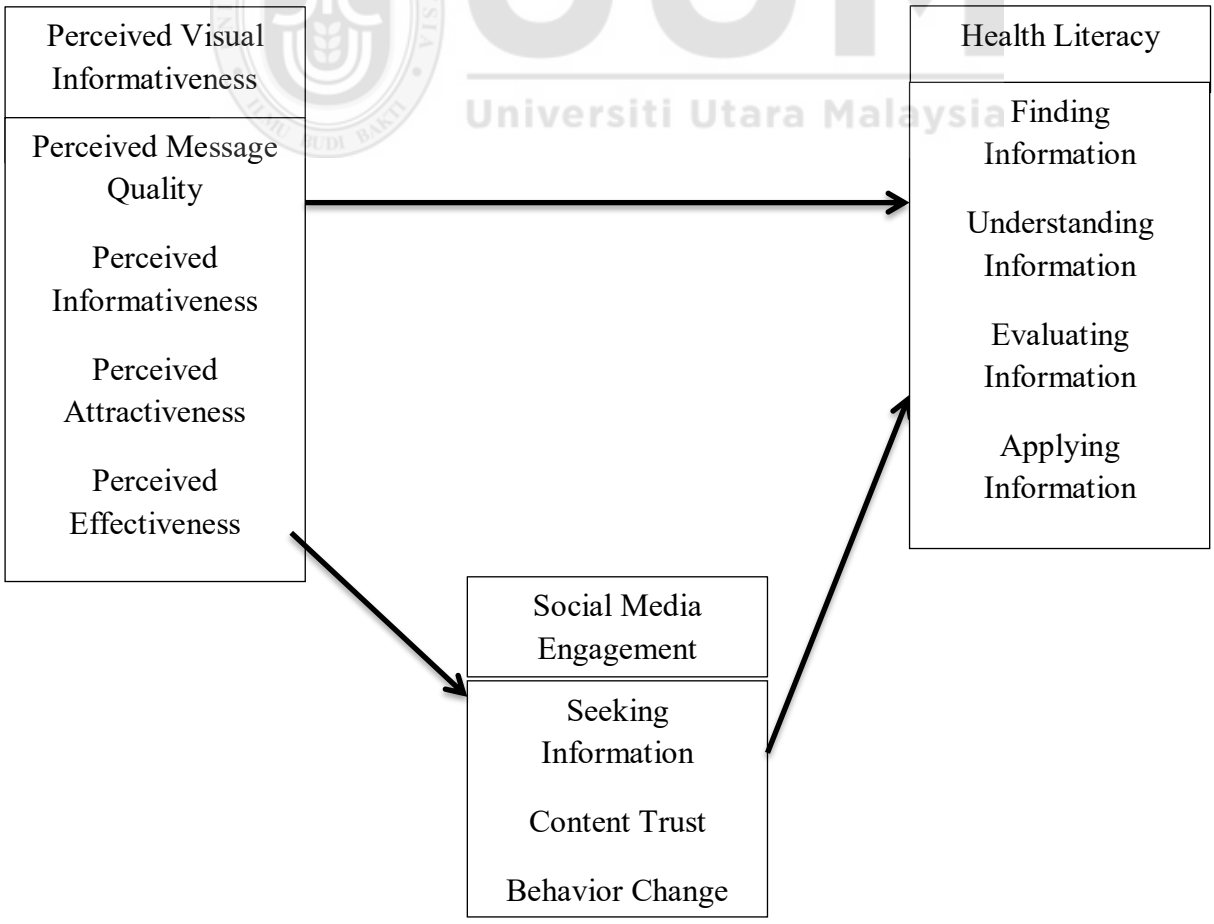

Figure 2. 1 The figure above shows each variable with its dimensions and source for each dimension.

2.8 Chapter Summary

The literature review of the research paper is presented in the second chapter focusing on the relationship between PVI, health literate, social media usage, and the situation of COVID 19 alike. This chapter provides a backdrop concerning how visual information featured on the SM affects health literacy, especially during Public Health Emergencies.

The chapter begins by defining the core variables of the study: PVI, health literacy and social media usage. He stresses the value of graphic information as a way to combine meaning and impact in communicating with people in the area of health. According to the authors, during the COVID-19 pandemic, social media became the key source for publishing and sharing health-related content, and therefore, it is important to investigate the effects of some components of such messages on people's reception and response, which is the goal of the present paper (Okan et al., 2020).

PVI is presented as an essential concept that captures and defines the ways through which people apprehend and make sense of what visually surrounds them. The authors note that, in this case, visual information can be of any form – an image, a video, a graph, or chart. Communication in terms of visuals is also considered from the view point of yearly of simplicity of the amount of data that is availed to people in pursuing their activities (Lazard et al., 2016). The chapter also covers the perception topic in relation to the cognitive analysis of visual cues and how this analysis can affect decisions related to health-related behaviors (King et al., 2014).

The literature review also identifies several dimensions of PVI: The messages need to be clear and attractive to the audiences, but they also need to be specific – this means they need

to address the audience's needs. The authors quote research finding suggesting that increased use of high-quality visual helps in increasing user attention and recall (Kujur & Singh, 2020). However, they also note that there could be misinterpretation of the visuals in case the design is simple, or even manipulative, in some sense (King et al., 2014).

Further in the chapter, the authors deepen the analysis of the described relationship and consider the use of social media engagement as a moderating variable between PVI and health literacy. Based on it, activating information and participating in the sharing of visual content or commenting, and discussing an article can improve the comprehension of health information (Lee et al., 2022). The authors note that while watching as a form of audience engagement may simply result in learning content without any further understanding, engagement as active participation enhances cognition use of knowledge.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will explain in detail how the research was conducted and explain the methods used to answer the research questions and meet the research objectives. The methods section for this stage also explains in detail the sampling method, questionnaire development, and the technique used to analyze the data. Also describes the procedures followed during the research. It introduces the proposed model to describe the approach, demographics, sample, instruments, and pilot research in-depth. It also explains how the study's conclusions of the study were statistically treated. Hence, this chapter discusses research design, research participants, research procedures, and analysis techniques for this study.

This covers the development of research instruments for study variables, as well as the procedures utilized to meet the study's goals. It then studies questionnaire responses before offering data analysis techniques utilizing SPSS and Amos software. As a result, the major goal of this chapter is to offer a comprehensive description of the research process and implementation in order to answer research questions.

3.2 Research Design

Quantitative research refers to the systematic search of social phenomena through statistical methods, or arithmetic. Quantitative research aims to develop and employ mathematical models, theories and questions related to phenomena. The measurement process is the focus of quantitative research because it is an effective link between empirical

observation and mathematical expression of quantitative relationships. Quantitative data are in digital form such as statistics, percentages, through specific and focused questions in order to collect respondents' answers in a computational manner, then analyzed data statistically to obtain unbiased results that can be further generalized to the study community (Sekaran, 2010).

The current study followed certain phases to achieve its objectives, where the design method of this study depend on the literature review in order to determine the suitable approach and instrument for such this study. Although, there are many instruments including: interview, questionnaire, and notes, but this study used questionnaire for data collecting because its better instrument, as Awang (2012) mentioned that the questionnaire is more popular data collection instruments, due to it is capable for gathering a large amount of information.

This chapter consists of four main phases and each phase has many activities as shown in the following diagram;

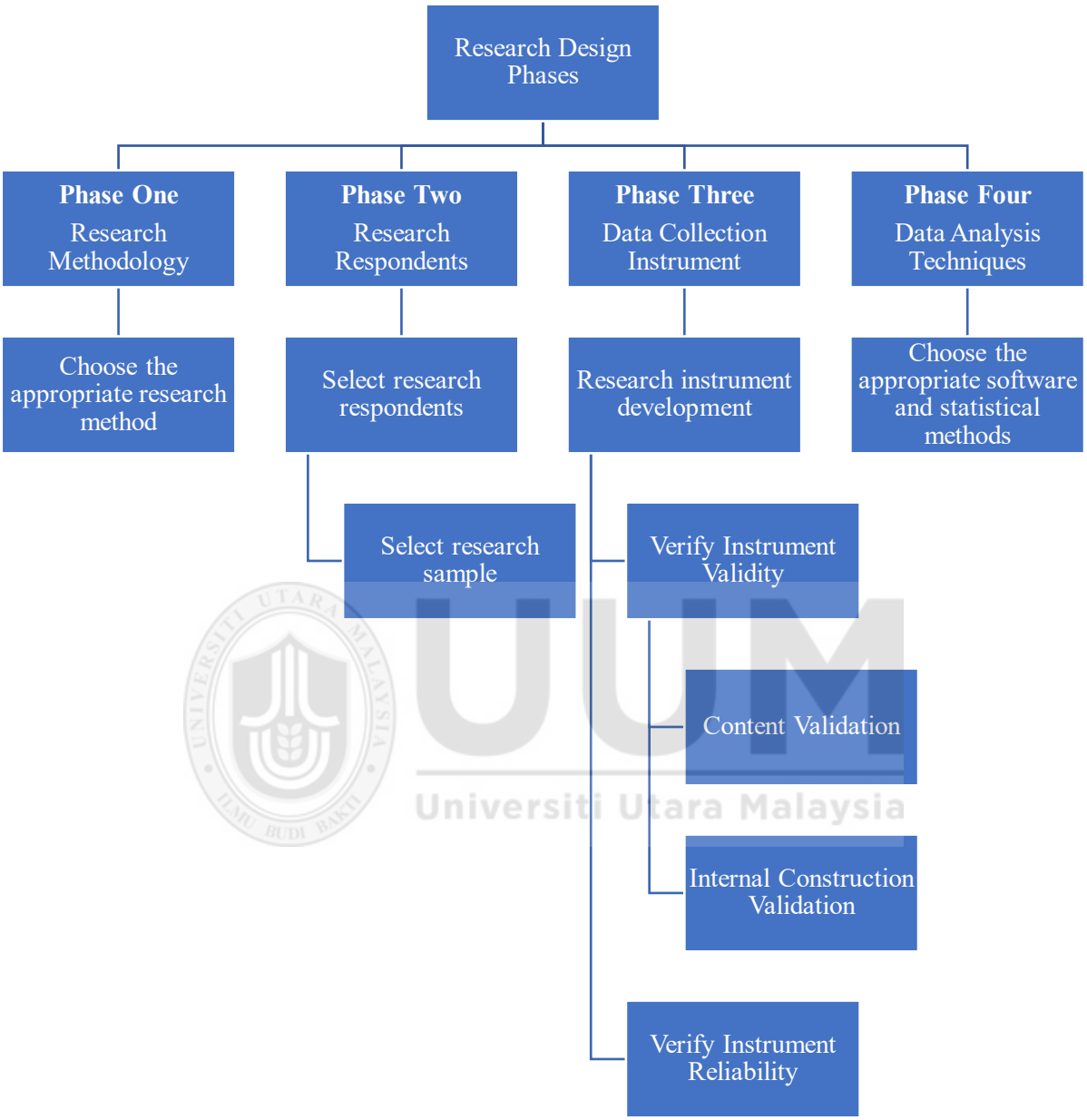

Figure 3. 1 Research Design

Each phase can be explained as follow:

3.3 Phase One Research Methodology

The quantitative approach is one of the approaches used in the implementation of scientific research, and it contains study tools through which it is possible to access a digital reality that has its meaning, and then the researcher finds himself in front of data or information that involves categorizing and examining significant results, through which he markets the recommendations and proposals of scientific research extracted at the end of the search.

In addition, it is an organized and coordinated way to collect and analyze data brought from various sources and requires the use of computer, statistical and mathematical tools to derive results. Quantitative research seeks to measure the problem and understand how it affects the search for measurable results on a larger number of individuals.

There are many differences between the quantitative and qualitative approaches, the study will review that in the following (Sekaran, 2010):

1. Objective: Obtaining significant figures regarding the problem of scientific research is the main motive for using the quantitative method, while social and human motives are the motive for using the qualitative or qualitative method.
2. Study samples: One of the most common types of samples used by the researcher in the quantitative approach is random samples. As for the qualitative method, regular samples are used.

3. Study tools: One of the most used study tools in the quantitative approach is questionnaire forms of all kinds, and among the most study tools that are used in the qualitative approach are interviews and observations.
4. Flexibility: The quantitative approach is less flexible than the qualitative or qualitative approach; For lack of so-called description in his steps.
5. The role assigned to the researcher: The role of the researcher in the qualitative approach becomes clear in one way or another, and its tangible effects appear in the study. As for the quantitative approach, the role of the researcher disappears or is separated from the research.
6. Scientific hypotheses: the quantitative approach is concerned with the hypotheses and the research variables they contain, and then that approach needs accurate scientific definitions of those variables and through that approach, the researcher can test and measure the relationships between the variables, whether independent or dependent, while the qualitative approach does not require hypotheses in a way expanded, and it can be in the form of one hypothesis at the most.
7. The final recommendations in the research: The recommendations differ in the qualitative approach that leads to final recommendations resulting from characteristics and descriptions, unlike the quantitative approach, which drives recommendations as a product of clear numbers.

3.3.1 Research Methodology

This study relied on the descriptive analytical approach, by referring to theoretical literature related to the subject of the current study, in addition to developing a questionnaire as a major tool to collect data from the study sample. The researcher used this approach because the analytical descriptive approach helps researchers collect information and data while finding different ways to interpret it. Through the descriptive-analytical approach, the researcher was able to link relationships by asking questions or making hypotheses. Through the descriptive-analytical approach, the researcher extracted the results according to various evidence and clues.

The importance of the descriptive-analytical method is shown in the following:

1. The descriptive approach has organized procedures that the researcher can follow, which helps him/her shorten the time and effort and away from using random methods.
2. The analytical descriptive approach contributes to the elaboration of social studies and natural studies.
3. The analytical descriptive approach helps researchers collect information and data while finding different ways to interpret it.
4. Through the descriptive-analytical approach, the researcher can link relationships by asking questions or making hypotheses.
5. Through the descriptive-analytical approach, the researcher can extract the results according to various evidence and clues.

6. The descriptive approach is characterized by reliance on objectivity in the procedures of the studies, with a complete departure from personal bias on the part of researchers.
7. The descriptive-analytical approach can be used in conjunction with many other scientific approaches, such as the quantitative approach, the inductive approach, the deductive approach...etc., in a manner that reduces the defects in that approach.

Depending on previous studies, the current study relied on analytical descriptive approach, by describing the studied phenomenon (the relationship of big data with competitive advantage), in addition to developing a questionnaire as a main tool for data collection. According to Zikmund et al. (2013), the descriptive-analytical approach was important for the following reasons: the descriptive approach had organized procedures that the researcher would follow, which helped shorten the time and effort and move away from using random methods; the analytical descriptive approach contributes to the elaboration of social studies and natural studies; and the analytical descriptive approach helps researchers collect information and data while finding differences, through the descriptive-analytical approach, the researcher can link the relationships; by asking questions or making hypotheses, the researcher can extract the results based on various evidence and clues, the descriptive approach is characterized by reliance on objectivity in study procedures, with a complete departure from personal bias on the part of researchers.

This study used quantitative approach to answer the research questions. Quantitative research, or number-crunching, references the actual appearance of social wonders through quantitative ways. Quantitative research points to creating and utilizing numerical models, speculations, and questions related to marvels. Because it serves as a vital bridge between practical experience and scientific expression of quantitative relationships, the estimating procedure is at the heart of quantitative research (Sekaran, 2010).

To gather data from the research sample, a descriptive-analytical technique was utilized, which included examining theoretical literature on the issue and developing a questionnaire as the major instrument. The quantitative method has various advantages, including the ability to provide a comprehensive and detailed description of the subject under investigation (Yilmaz, 2013).

3.4 Phase Two Research Respondents

The research population refers to all persons involved in the event being examined by the researcher and the entire group of people with whom the researcher hopes to generalize the results.

3.4.1 Select Research Respondents

The current respondents in this study are all Jordanians who use social media networks in the Kingdom, which have 7 million active monthly users in 2022 (according to the Ministry of Digital Economy and Entrepreneurship). This population was chosen due to the ability of its members to answer the questionnaire paragraphs because they have full knowledge and awareness about what big data is. In addition, the researcher examined the valuable data that may be gleaned from this group of 7 million users.

3.4.2 Sample Size

The determination of the sample size in the study is related to the structural equation modelling (SEM) approach chosen. Partial least squares SEM (AMOS-SEM) method was chosen. Sample size plays an important role in influencing various aspects of SEM such as statistical power, model fit, and parameter estimates (Shah et al.2011).

In this study, a sample selected according to Cavana et al. (2001), the required sample size for this investigation was 384 based on the sample size decision procedures published by Krejcie and Morgan (1970) according to Leveugle (2009), the study sample consisted of 410 participants with a 96 percent confidence level and a +/-6 percent margin of error in case of unsuitable data. The number of respondents' rate show in the following table.

Table: 3.1 Number of respondents' rate

Item	Number	Percentage
Distributed Questionnaires	410	100%
Revival Questionnaires	388	94.63%
Validate Questionnaires	377	91.95%

The data in the table above shows that the main sample in this study amounted to 410 respondents, where 410 questionnaires were distributed. In contrast, 388 questionnaires were retrieved, representing 94.63% of the total questionnaires distributed. After reviewing the questionnaires, it was found that 11 questionnaires were not valid for statistical analysis, meaning that the final number of questionnaires analyzed was 377.

3.4.3 Types of Sampling

There are two types of sampling in scientific research: probability (random) sampling and non-probability (non-random) sampling. Because every member of the population has an equal chance of being chosen, probability sampling is also known as representative sampling. To proceed with probability sampling, five stages are carried out progressively. It begins with establishing the study population, then moves on to designing the sampling frame, choosing the sampling strategy, deciding sample size, and ultimately implementing the sampling processes (Bougie & Sekaran, 2019).

On the other hand, non-probabilistic sampling is a sampling technique whereby it is not possible to count all the members of the population chosen for the sample. According to Peerson & Saunders et al. (2015) within technology adoption studies, improbability is more appropriate than probability sampling for the reason that the sampling frame cannot be specified. In addition to the incompatibility of other methods with this study, the probability of random sample is characterized by the difficulty of generalizing the results (Bougie & Sekaran, 2019). This technique is in line with previous literature (Khedmati et al., 2019). Hence, non-probabilistic sampling contributes to fewer errors compared to other techniques (Bell et al., 2018). Therefore, this study chose non-probability sampling.

On the other hand, non-probability sampling includes several techniques that need to be considered. Thus, snowball sampling appears to be most suitable for this research endeavor, especially in light of the latter's specificity connected to research work on social media platforms. Thus, snowball sampling with samples can be crucial to identifying and incorporating participants to reach goals in digital health communication studies when studies of hard-to-reach populations are necessary due to the large sample size required in such

studies. Based on the fact that it is quite complex to identify let alone sample a number of respondents across these social media platforms, the use of snowball sampling is most appropriate. This method uses chain referrals and develops the participant network over time by identifying social connections between other participants. In digital health communication research where an audience may be 'hidden' within several online groups Finally, convent sampling, this technique is based on selecting samples that are easiest to obtain (Zikmund et al., 2013).

In this study snowball technique was used to select the study sample, snowball sampling is a non-probability sampling technique in which more units are enlisted by existing units to be included in the sample. According to Dragan and Isaic-Maniu (2013) snowball sampling is a valuable method for doing research on individuals possessing special characteristics.

The table (3.1) below shows the respondents' characteristics which consist of gender, age, education level, and using Facebook.

The use of snowball sampling technique is justified in this study based on the following important considerations that make the technique suitable in line with the objectives of the current research regarding the effect of health literacy and engagement on social media. This sampling technique has been more recognized in digital communication research, especially when studying connected collections of online groups and health information sharing. The use of snowball sampling in social media research has been given a lot of support and acceptance by several scholars. The study by Rubbi et al. (2023) also highlighted that this approach is useful when exploring the dynamics of health information dissemination on social networks because it reflects information dissemination on social media. This alignment is essential because this way scholars can gain insights into the dynamics of how visual health information is shared across contingency of interconnected user bases of social media platforms.

Ease of getting access to varied participant populations is another strength of the technique. Akkas also used a form of sampling known as snowball sampling, and in his study, he showed that it is possible to reach participants in multiple websites, academic levels, and health literacy. This diversity is necessary for recognizing how the amount of visual informativeness, which is perceived by users influences different user categories, which will increase general understanding of health literacy through social media. In addition, by building on chain-referral, snowball sampling is also in harmony with the internal structure of social media. Another method discovered by Gierczyk et al., (2022) takes advantage of the current social links where researchers are able to study how the health information is processed and disseminated within actual networks. This seemingly natural progress contributes to the prevention of logical ecological confounds in assessing social media engagement's mediating role on health literacy.

Across health communication research, the method has been praised for its ability to reach out to even hard-to-reach populations. Also, Quinton et al. realized that snowball sampling was effective for reaching people who share or create other forms of Health-Related Visual Content and can be hard to reach with other methods. This advantage is significant in explaining the effects of perceived visual informativeness on health literacy among the users of the four variants. Furthermore, since snowball sampling is a consecutive process, this makes it easier to evaluate opinion leaders and information sharers in the health-related social media contexts. Snowball technique does successfully identify patterns of the health information dissemination and usage, which is crucial for the analysis of the connection between visuals and HS literacy.

Another advantage of the method is its ability to work well in different contexts that may change with the dynamics of social media. As pointed out by Ryan et al., (2023), such sampling technique can have potential in depicting how visual health information

disseminates through diverse platforms across the various user groups, which could help capture the constant evolution of communication on social media and influence on the health literacy of people. This sampling approach also enables looking into how visual health information is understood and disseminated across certain social networks, which provides better insights into the role of engagement on social media platforms. According to Weech (2023), while following and identifying participants for further sampling, snowball sampling is useful for understanding how visual health information is processed and relayed across social media networks; therefore, this study applies it to determine the triple composition with reference to visual informativeness and health literacy results.

Table 3. 2 Respondents' profile

No.	**Respondent profile**	**Frequency (N=377)**	**Percentage %**
1	**Gender**	**--**	--
	Male	182	48.3
	Female	195	51.7
2	**Age**	**--**	--
	18-25 year	58	5.615.5
	26-35 years	114	30.2.1
	36-45 years	152	35.540.3
	46 and more	53	11.314.0
3	**Education Level**	**--**	--

	Diploma and less	142	37.7
	BSc	156	41.4
	Master	65	17.2
	PhD	14	3.7
4	**Using Facebook**	**--**	--
	Yes	377	100
	No	0	0

3.5 Phase Three Data Collection and Instrument

Data collection aims to provide a baseline for studies or initiatives to fulfill their stated goals. As a result, the present investigation followed guidelines to gather the necessary findings. In this study, the researcher used data from two sources: Primary sources include: They are also known as fieldwork sources because they are specifically related to the study's subject. The study population at large data is gathered directly through questionnaire. Secondary Materials: The researcher gathered information from magazines, books, and reports, as well as master's doctoral dissertations, postdoctoral thesis, and other trustworthy sources.

3.5.1 Research Instrument Development

The main data collection instrument for the present study is questionnaire. The questionnaire consists of a series of questions related to one another so that the researcher achieves the research objectives. The phrasing and sequencing of the questions were carefully considered when constructing the instrument. In order to be effective, questionnaires must be brief,

direct, and straightforward to understand (Fraser & Lawley, 2000). To reduce eye strain, questions are also logically spaced and neatly organized. As stated by (Forza, 2002), the maximum number of words utilized in the majority of the questions did not surpass 20 words.

A questionnaire is also a search tool that consists of a series of questions and other information requests designed to elicit information from the persons in question. Structured questionnaires differ from the other search techniques in that they are affordable and take little work. They frequently have obvious replies that make acquiring and maintaining data simple (Forza, 2002).

The researcher follows the procedures suggested by (Hoinville & Jowell, 1978) to create the survey questionnaires, through choosing the information to be collected and determining the questionnaire's work goals regarding the study topic and problem, transform research goals into a series of questions and inquiries, select the survey questions and ensure that they are accurate and reliable, and create the final version of the questionnaire and ensure its psychometric properties are reliable and valid by using different techniques including content validity, internal construction validation, and instrument reliability.

The questionnaire was designed to gather demographic data of the respondents as well as the data on research variables to be tested. The following are the four key sections of the questionnaire:

The first Section is focused on the respondents' demographic information.

The second Section is concerned with the independent variable (Perceived Visual Informativeness), with all dimensions (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness), the researcher depends on the empirical review to develop this instrument. The following table (3.2) shows the items for each dimension of this variable.

Table 3. 3 Constructs of the Instrument of Perceived Visual Informativeness Variable

Dimensions	Items	Source
Perceived Message Quality	The information provided by social media pages is comprehensive.	(Occa et al., 2021; Deraz & Awuah, 2015; Occa et al., 2020; King et al., 2014)
	Information on social media pages is valuable.	
	Information on social media pages is trustworthy.	
	Information on social media pages is credible.	
Perceived Informativeness	Social media pages offer accurate information.	(King et al., 2014; Deraz & Awuah, 2015)
	Social media pages offer timely information.	
	Social media pages offer updated information.	
	Social media pages are a good source of information.	
Perceived Attractiveness	Information on social media pages is enjoyable for me.	(Scheltema, Reay & Piper, 2018; King et al., 2014; Mulyani, Najib & Guteres, 2021; Deraz & Awuah, 2015)
	Information on social media pages is interesting.	
	Social media pages are an easy way to interact with others.	
	Most information on social media pages is professional and well designed.	
Perceived Effectiveness	Social media pages enable me to share information with others.	(King et al., 2014; Deraz & Awuah, 2015; Occa et al., 2020)
	Discussion or exchange of opinion with others is possible through social media pages.	
	Easy delivery of my opinion through social	

	media pages.	
	Social media pages provide a smooth interactive experience.	
Total	16 items	

Third Section is concerned with the dependent variable (Health Literacy), with all dimensions (Finding Information, Understanding Information, Evaluating Information, and Applying Information), the researcher depends on the empirical review to develop this instrument. The following table (3.3) shows the items for each dimension of this variable.

Table 3. 4 Constructs of the Instrument of Health Literacy Variable

Dimensions	Items	Source
Finding Information	I found much information related to COVID-19 pandemic.	(Zhang, Peggy & Chung, 2021; Sørensen et al., 2012)
	It's easy to find sufficient information about the COVID-19 pandemic.	
	I have the ability to identify good information about COVID-19 pandemic.	
	There are many reliable sources of information about COVID-19 pandemic.	
	I find sufficient information about the COVID-19 vaccine.	
Understanding	I have the ability to understand the available information about COVID-19 pandemic.	(Zhang et al., 2020; Tripathi et al., 2019; Workie et al., 2021)
	I have a clear understanding about the usefulness	

Information	and importance of the COVID-19 vaccine.	
	I have a clear idea of the advantages and disadvantages of all COVID-19 vaccines.	
	I have a comprehensive knowledge of all the symptoms and effects of the Covid-19 pandemic.	
Evaluating Information	I have sufficient information about the COVID-19 pandemic I need to help me manage my health.	(Zhang et al., 2020; Sørensen et al., 2012; Workie et al., 2021)
	I am sure I have all the information I need about COVID-19 pandemic.	
	I compare COVID-19 information obtained from social networking sites with other sources of information.	
	I am constantly evaluating my knowledge about COVID-19 through my friends and colleagues.	
Applying Information	I make plans for what I need to do according to COVID-19 pandemic information.	(Zhang et al., 2020; Sørensen et al., 2012; Al-Dmour et al., 2020)
	I chose the type of COVID-19 vaccine based on the information I had about vaccines.	
	The information I have helps me take appropriate protective measures against COVID-19.	
	I take all precautionary measures (wearing a mask and washing hands) to avoid infection with Covid-19.	
Total	17 items	

Fourth Section is concerned with the mediating variable (i.e. Social Media Engagement) with all dimensions (Seeking Information, Content Trust, and Behavior Change), the researcher depends on the empirical review to develop this instrument. The following table (3.4) shows the items for each dimension of this variable.

Table 3. 5 Constructs of the Instrument of Social Media Engagement Variable

Dimensions	Items	Source
Seeking Information	Social media is a good source of information about COVID-19.	(Ahmad & Murad, 2020; Al-Dmour et al., 2020; Arora, 2020; Sharma et al., 2021)
	Social media is a good source of updated information related to COVID-19.	
	Social networking sites provide information related to COVID-19 pandemic.	
	Use social media sites to get detailed information about COVID-19 issue that interests me.	
	I use social media to search for recommendations and suggestions that help me make decisions about COVID-19 pandemic.	
Content Trust	I think the social media information, news and advertisements about COVID-19 are convincing.	(Arora, 2020; Al-Dmour et al., 2020; Gomez Bravo et al., 2019; Habibi et al., 2014, Hajli, 2014,
	I think everything posted on social media related to COVID-19 is believable	
	I think the content of social media pages that	

	related to COVID-19 is trustworthy	Yadav & Rahman, 2017)
	Social Media pages offer accurate information on COVID-19 topic.	
	The information provided by social media pages about COVID-19 are comprehensive and useful	
Behavior Change	Generally, I prefer news and information about COVID-19 from social media.	(Ahmad & Murad, 2020; Depoux et al., 2020; Arora, 2020; Sharma et al., 2021; Ahmed, 2020; Celli et al., 2017, Ceyhan, 2019)
	I behave as recommended by my friends on social media sites.	
	My actions are affected by information spread on social media about COVID-19.	
	Some of my decisions about COVID-19 were based on social media.	
	I feel like social media has changed a lot of my daily behavior during COVID-19 pandemic.	
Total	15 tems	

3.6 Content Validation

A group of experienced and specialized arbitrators (Faculty members in the faculties of design and media in Jordanian universities, who have experience in and published research in the field of social media and the impact of information published on it. These arbitrators have extensive experience, knowledge and information directly related to the subject of the current study, through their experience in the field of academic and research work throughout their years of work in Jordanian universities. Therefore, these arbitrators have the necessary

qualifications that qualify them to arbitrate the study questionnaire and express their observations and comments, as these comments represent great importance for improving the level of the study tool) were given the study instrument, and asked to comment on the paragraphs' comprehensiveness, field relevance, appropriate language conceptualization, and clarity, as well as adding, deleting, or modifying what they feel is right. The arbitrators' recommendation was to leave all of the paragraphs in place, with some of them being modified in the study tool. The following table (3.5) explains some arbitrators' recommendations.

Table 3. 6 Some of the arbitrators' recommendations

No.	Paragraph Before Content Validation	Paragraph After Content Validation
1.	Visual information on Facebook pages is valuable.	Visual information on Facebook pages is considered valuable.
2.	Facebook pages offer accurate visual information.	Facebook offers accurate visual information.
3.	Facebook pages are an easy way to interact with others.	Facebook pages help you to interact with others easily.
4.	I find sufficient visual information about the COVID-19 vaccine.	There is sufficient visual information about the COVID-19 vaccine.
5.	I am sure I have all the visual information I need about COVID-19 pandemic.	For sure I have all the visual information I need about the COVID-19 pandemic.
6.	Use Facebook sites to get detailed visual information about COVID-19	The Facebook site provides detailed visual information about the COVID-19 issue

	issue that interests me.	that interests me.
7.	Generally, I prefer news and visual information about COVID-19 from Facebook.	Generally, I prefer Facebook to get news and visual information about COVID-19.

3.6.1 Internal Construction Validation

The accuracy of the research instrument was confirmed using the authenticity of the internal construction. The tool applied to a representative selection of (50) individuals from within the study population and outside the study sample. The correlation coefficient between the individual's degree on the piece of items and its cumulative ranking on the tool calculated, the validity of the internal construction was used to confirm the tool's validity. The correlation coefficient was then calculated between each person's degree on the paragraph and its overall score.

3.6.2 The Research Instrument's Reliability

The reliability of the research instrument was assessed using Cronbach's Alpha equation and the coefficient of internal consistency. The internal consistency coefficient of the study instrument was determined by distributed it to randomly selected (50) respondents.

3.7 Data Analysis Techniques

For the study's analysis, data was evaluated using Statistical Packages for Social Sciences software (SPSS. 25) and Amos software (21). In Amos software, descriptive statistics are used (arithmetic mean, percentage, frequency, standard deviation, Exploratory Factor Analysis (EFA), Cronbach Alpha, and Structural Equation Modeling (SEM).

Thus, in order to test this hypothesis, the data were analysed using the Statistical Package for Social Science Version 25 (SPSS 25.0) and the AMOS program version 21.0 (AMOS 21).

The study used many statistical tests including Investigating Univariate Normality (Skewness and Kurtosis) (Hair et al., 2014; Gravetter & Wallnau, 2014). Descriptive statistics (Mean, Standard Deviation, Frequency, and Percentage) (George & Mallery, 2010). Pooled-CFA (RMSEA, TLI, CFI, and Chisq/df) to measure the study model (Awang, 2014; Hair et al., 2014). AVE, Composite Reliability, and Cronbach's Alpha to measure the Reliability of the study instrument (Fornell & Larcker, 1981; Hair et al., 2010). Construct Validity to measure the factor loading for each item in the study instrument (Hair et al., 2014). Standardised Estimate, and Bootstrapping Method to measure the mediating role of social media (Preacher & Hayes, 2008).

The statistical analysis methods used in this study are described in the table (3.6) below.

Statistical Analysis Methods in this Study

Table 3. 7 Statistical Analysis Methods in this Study

Issue	Purpose	Analysis Method	Source
Investigating Univariate Normality	To measure the normality of the instrument items	Skewness and Kurtosis using SPSS. 25 software	(Hair et al., 2014; Gravetter & Wallnau, 2014)
Descriptive statistics	To measure the opinion of the study sample and their characteristics	Mean, Standard Deviation, Frequency, and Percentage	(Ao & Gelman, 2011; George & Mallery, 2010)
Pooled-CFA	To measure the	RMSEA, TLI, CFI, and	(Awang,

	study model using Amos. 21 Software	Chisq/df	2014; Hair et al., 2014)
Study instrument reliability	To measure the Reliability of the study instrument	AVE, Composite Reliability, and Cronbach's Alpha	(Fornell & Larcker, 1981; Hair et al., 2010; Awang, 2015)
Construct Validity	To measure the factor loading for each item in the study instrument	Harman's Single Factor Test	(Hair et al., 2010; Hair et al., 2014)
Standardised Estimate	To measure the relationship between study variables	SEM (Beta and P values)	(Fornell & Larcker, 1981; Hair et al., 2010; Awang, 2015)
Mediating Effect	To measure the mediating role of social media	Standardised Estimate, and Bootstrapping Method	(Preacher & Hayes, 2008)

3.8 Chapter Summary

Chapter three of the document relates to Research Methodology, indicating the systematic procedure that was followed in doing the study. The first chapter commences with an introduction which sets out the rationale for describing the research methods in order to address particular research questions or fulfill certain research objectives. This chapter expands on research design, sampling techniques, questionnaire construction and data analysis especially by the aid of the SPSS and Amos package.

The section on Research Design notes that the role of the present work is to adopt a quantitative research method, which involves the collection and analysis of data using statistical instruments. It focuses on building mathematical models and theories to study social occurrences, hence the name sociology of knowledge. The work has a clear structure, built around phases, where each is provided with many activities needed for the proper conduct of the research. Questionnaire was chosen as the key source of data gathering because of its efficiency in collecting large volumes of data.

In part one, the quantitative methodology is presented as a method of gathering and analyzing figures since this can provide results that will be applicable to a broader study population. In the chapter, the author compares the quantitative and qualitative methods in terms of goals and purposes, the selection of the sample, methods employed, the amount of structure, and the position of the researcher. Recommended strategy Linked relationship and data interpretation is identified as requiring a descriptive-analytical approach.

In part two, the target population is research respondents; thus, the target population is Jordanians using the social media platform and who have adequate knowledge about big data. A numerical route into SEM is employed to estimate the sample size, which arrives at a

figure of 410 participants for the calculation to be statistically proper. The chapter also describes the sampling procedures; the study employs non-probability sampling since they are more suitable for technology adoption research.

Part three is actually the evaluation of the data collection methods that have been used. Primary data was collected using questionnaires while secondary data involved the collection of other published works such as articles and existing reports propagated in literature. The process of constructing the questionnaire is described in detail, and the choice of clear, concise questions stated in a natural order is stressed to help respondents to comprehend the questionnaire's content. Therefore, chapter Three outlines the research method used in the study as well as the role of each phase in attaining credibility and validity for big data and competitive advantage research questions.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the results of the data analysis, which was conducted to answer the research questions and to achieve research objectives using hypotheses testing., In this study, four hypotheses were tested:

H1: Perceived Visual Informativeness of has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

H2: Social media engagement has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

H3: Perceived Visual Informativeness has significant impact on Social media engagement (Seeking Information, Content Trust, and Behavior Change).

H4: Social media engagement mediating the relationship between Perceived Visual Informativeness and Health Literacy in the context of COVID-19 pandemic.

The following abbreviations are used to represent the study variables, as shown in the following table (4.1).

Table 4. 1 List of abbreviations used to represent the study variables

Variable	Abbreviation	Variable	Abbreviation
Perceived Visual Informativeness	PVI	Understanding Information	UI
Perceived Message Quality	PMQ	Evaluating Information	EI
Perceived Informativeness	PI	Applying Information	AI
Perceived Attractiveness	PA	Social Media Engagement	SME
Perceived Effectiveness	PE	Seeking Information	SI
Health Literacy	HL	Content Trust	CT
Finding Information	FI	Behaviour Change	BC

The findings were presented based on the analysis steps as follow:

4.2 Descriptive Statistics

This section provides a descriptive analysis of the construct addressed in the present study. In this study, The Minimum, Maximum, Mean, and Standard Deviation scores on the 48 items were obtained according to the study variables Perceived Visual Informativeness, Health Literacy, and Social Media Engagement, as follows.

4.2.1 Perceived Visual Informativenes

Table 4. 2 Descriptive analysis for perceived visual informativeness

Rank	No.	Dimensions	Min	Max	Mean	SD	Level
2	1	Perceived Message Quality	2.00	5.00	3.4715	.551	Moderate

1	2	Perceived Informativeness	2.00	5.00	3.6386	.572	Moderate
3	3	Perceived Attractiveness	2.00	5.00	3.4476	.527	Moderate
4	4	Perceived Effectiveness	2.00	5.00	3.4198	.576	Moderate
	Average mean Perceived Visual Informativeness				3.4944	.499	Moderate

Table 4.2 shows the results of the descriptive analysis for the Perceived Visual Informativeness variable; the respondents indicate a moderate level of agreement for Perceived Visual Informativeness with mean (3.49) and standard deviation (.499), while at the dimensions level the (Perceived Informativeness) came at first rank with mean (3.63) and at moderate level, followed by (Perceived Message Quality) with mean (3.47) and at moderate level, while (Perceived Attractiveness) came at third rank with mean (3.44) and at moderate level, and finally (Perceived Effectiveness) came at fourth rank with mean (3.41) and at moderate level.

Below is a detailed view of each dimension separately:

Table 4. 3 Descriptive analysis for perceived message quality

No.	Rank	Items	Min	Max	Mean	SD
1	4	PMQ1	2.00	5.00	3.4111	.646
2	2	PMQ2	2.00	5.00	3.4934	.672
3	1	PMQ3	2.00	5.00	3.5093	.699
4	3	PMQ4	2.00	5.00	3.4721	.680
Average mean score of Perceived Message Quality					**3.4715**	**.551**

Table 4.3 shows the results of the descriptive analysis for the Perceived Message Quality. This construct was measured with 5 points Likert scale, the respondents indicate a moderate level of agreement for all the items of Perceived Message Quality with mean values (3.47) and (SD= .551). Among the items, "PMQ3" has the highest level of agreement (Mean=3.50; SD = .699). Meanwhile, the item, "PMQ1" has the lowest level of agreement (Mean=3.41; SD =.646). Nevertheless, the result of the mean score for Perceived Message Quality shows that respondents agree that they have a moderate level of Perceived Message Quality. In addition, the values of standard deviation between (.551 to.699) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.2 Perceived Informativeness

Table 4. 4 Descriptive analysis for perceived informativeness

No.	Rank	Items	Min	Max	Mean	SD
1	2	PI1	2.00	5.00	3.6419	.719
2	1	PI2	2.00	5.00	3.7029	.737
3	3	PI3	2.00	5.00	3.6286	.718
4	4	PI4	2.00	5.00	3.5809	.706
Average mean score of Perceived Informativeness					**3.6386**	**.572**

Table 4.4 shows the descriptive analysis of the Perceived Informativeness was measured with nine items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Perceived Informativeness with mean and SD values (Mean=3.63; SD =.572). Among the items, "PI2" has the highest level of agreement (Mean=3.70; SD =.737). Meanwhile, the item, "PI4" has the lowest level of agreement (Mean=3.58; SD =.706). Nevertheless, the result of the mean score for Perceived Informativeness shows that respondents agree that they have a moderate level of Perceived

Informativeness. In addition, the values of standard deviation between (.572 to.737) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.3 Perceived Attractiveness

Table 4. 5 Descriptive analysis for perceived attractiveness

No.	Rank	Items	Min	Max	Mean	SD
1	2	PA1	2.00	5.00	3.5066	.676
2	1	PA2	2.00	5.00	3.5385	.675
3	4	PA3	2.00	5.00	3.3501	.609
4	3	PA4	2.00	5.00	3.3952	.640
Average mean score of Perceived Attractiveness					**3.4476**	**.527**

Table 4.5 shows the descriptive analysis of Perceived Attractiveness. This variable was measured with 5 points Likert scale. The respondents indicate a moderate level of agreement for all the items of Perceived Attractiveness with mean and SD values (Mean=3.44; SD =.527). Among the items, "PA2" has the highest level of agreement (Mean=3.53; SD =.675). Meanwhile, the item, "PA3" has the lowest level of agreement (Mean=3.35; SD =.609). Nevertheless, the results of the mean score for Perceived Attractiveness show that respondents agree that they have a moderate level of Perceived Attractiveness. In addition, the values of standard deviation between (.527 to.676) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.4 Perceived Effectiveness

Table 4. 6 Descriptive analysis for perceived effectiveness

No.	Rank	Items	Min	Max	Mean	SD
1	4	PE1	2.00	5.00	3.3740	.632
2	3	PE2	2.00	5.00	3.4164	.698
3	2	PE3	2.00	5.00	3.4324	.708
4	1	PE4	2.00	5.00	3.4562	.671
Average mean score of Perceived Effectiveness					**3.4198**	**.576**

Table 4.6 shows the descriptive analysis of the Perceived Effectiveness with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Perceived Effectiveness with values (mean= 3.41; SD=.576). Among the items, "PE4" has the highest level of agreement (Mean=3.45; SD =.671). Meanwhile, the item, "PE1" has the lowest level of agreement (Mean=3.37; SD =.632). Nevertheless, the results of the mean score for Perceived Effectiveness show that respondents agree that they have a moderate level of Perceived Effectiveness. In addition, the values of standard deviation between (.576 to.708) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.5 Health Literacy

Table 4. 7 Descriptive analysis for health literacy

Rank	No.	Dimensions		Min	Max	Mean	SD	Level
3	1	Finding information	Visual	2.00	5.00	3.4833	.536	Moderate
1	2	Understanding information	Visual	2.00	5.00	3.5431	.542	Moderate
2	3	Evaluating information	Visual	2.00	5.00	3.4980	.548	Moderate
4	4	Applying information	Visual	2.00	5.00	3.4668	.568	Moderate
	Average mean Health Literacy					3.4978	.457	Moderate

Table 4.7 shows the results of the descriptive analysis for the Health Literacy variable; the respondents indicate a moderate level of agreement for Health Literacy with mean (3.49) and standard deviation (.457), while at the dimensions level the (Understanding Visual information) came at first rank with mean (3.54) and at moderate level, followed by (Evaluating Visual information) with mean (3.49) and at moderate level, while (Finding Visual information) came at third rank with mean (3.48) and at moderate level, and finally (Applying Visual information) came at fourth rank with mean (3.46) and at moderate level.

Below is a detailed view of each dimension separately:

4.2.6 Finding Visual Information

Table 4. 8 Descriptive analysis for finding visual information

No.	Rank	Items	Min	Max	Mean	SD
1	2	FVI1	2.00	5.00	3.4987	.707
2	5	FVI2	2.00	5.00	3.4324	.665
3	4	FVI3	2.00	5.00	3.4615	.659
4	3	FVI4	2.00	5.00	3.4668	.643
5	1	FVI5	2.00	5.00	3.5570	.658
Average mean score of Finding Visual information					**3.4833**	**.536**

Table 4.8 shows the descriptive analysis of the Finding Visual information with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Finding Visual information with values (mean= 3.48; SD=.536). Among the items, "FVI5" has the highest level of agreement (Mean=3.55; SD =.658). Meanwhile, the item, "FVI2" has the lowest level of agreement (Mean=3.43; SD =.665). Nevertheless, the results of the mean score for Perceived Effectiveness show that respondents agree that they have a moderate level of Perceived Effectiveness. In addition, the values of standard deviation between (.536 to.707) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.7 Understanding Visual Information

Table 4. 9 Descriptive analysis for understanding visual information

No.	Rank	Items	Min	Max	Mean	SD
1	3	UVI1	2.00	5.00	3.5305	.676
2	1	UVI2	2.00	5.00	3.5995	.681
3	4	UVI3	2.00	5.00	3.5093	.680
4	2	UVI4	2.00	5.00	3.5332	.643
Average mean score of Understanding Visual information					**3.5431**	**.542**

Table 4.9 shows the descriptive analysis of the Understanding Visual information with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Understanding Visual information with values (mean= 3.54; SD=.542). Among the items, "UVI2" has the highest level of agreement (Mean=3.59; SD =.681). Meanwhile, the item, "UVI3" has the lowest level of agreement (Mean=3.50; SD =.680). Nevertheless, the results of the mean score for Understanding Visual information show that respondents agree that they have a moderate level of Understanding Visual information. In addition, the values of standard deviation between (.542 to.681) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.8 Evaluating Visual Information

Table 4. 10 Descriptive analysis for evaluating visual information

No.	Rank	Items	Min	Max	Mean	SD
1	4	EVI1	2.00	5.00	3.4377	.629
2	3	EVI2	2.00	5.00	3.4721	.648
3	1	EVI3	2.00	5.00	3.5517	.716
4	2	EVI4	2.00	5.00	3.5305	.736
Average mean score of Evaluating Visual information					**3.4980**	**.548**

Table 4.10 shows the descriptive analysis of the Evaluating Visual information with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Evaluating Visual information with values (mean= 3.49; SD=.548). Among the items, "EVI3" has the highest level of agreement (Mean=3.55; SD =.716). Meanwhile, the item, "EVI1" has the lowest level of agreement (Mean=3.43; SD =.629). Nevertheless, the results of the mean score for Evaluating Visual information show that respondents agree that they have a moderate level of Evaluating Visual information. In addition, the values of standard deviation between (.548 to.736) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.9 Applying Visual Information

Table 4. 11 Descriptive analysis for applying visual information

No.	Rank	Items	Min	Max	Mean	SD
1	1	AVI1	2.00	5.00	3.4987	.703
2	4	AVI2	2.00	5.00	3.3820	.658
3	2	AVI3	2.00	5.00	3.4960	.715
4	3	AVI4	2.00	5.00	3.4907	.703
Average mean score of Applying Visual information					**3.4668**	**.568**

Table 4.11 shows the descriptive analysis of the Applying Visual information with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Applying Visual information with values (mean= 3.46; SD=.568). Among the items, "AVI1" has the highest level of agreement (Mean=3.49; SD =.703). Meanwhile, the item, "AVI2" has the lowest level of agreement (Mean=3.38; SD =.658). Nevertheless, the results of the mean score for Applying Visual information show that respondents agree that they have a moderate level of Applying Visual information. In addition, the values of standard deviation between (.568 to.715) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.10 Social Media Engagement

Table 4. 12 Descriptive analysis for social media engagement

Rank	No.	Dimensions	Min	Max	Mean	SD	Level
1	1	Seeking Visual information	2.00	5.00	3.7093	.5751	High
2	2	Content Trust	2.00	5.00	3.7077	.6176	High
3	3	Behavior Change	2.00	5.00	3.6143	.5022	Moderate
		Average mean Social Media Engagement			3.6771	.461	Moderate

Table 4.12 shows the results of the descriptive analysis for the Social Media Engagement variable; the respondents indicate a moderate level of agreement for Social Media Engagement with mean (3.67) and standard deviation (.461), while at the dimensions level the (Seeking Visual information) came at first rank with mean (3.70) and at High level, followed by (Evaluating Visual information) with mean (3.70) and at High level, and finally (Behavior Change) came at fourth rank with mean (3.61) and at moderate level.

Below is a detailed view of each dimension separately:

4.2.11 Seeking Visual Information

Table 4. 13 Descriptive analysis for seeking visual information

No.	Rank	Items	Min	Max	Mean	SD
1	4	SVI1	2.00	5.00	3.6711	.773
2	5	SVI2	2.00	5.00	3.6074	.792
3	3	SVI3	2.00	5.00	3.7109	.794
4	1	SVI4	2.00	5.00	3.7958	.749
5	2	SVI5	2.00	5.00	3.7613	.765
Average mean score of Seeking Visual information					**3.7093**	**.575**

Table 4.13 shows the descriptive analysis of the Seeking Visual information with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Seeking Visual information with values (mean= 3.70; SD=.575). Among the items, "SVI4" has the highest level of agreement (Mean=3.79; SD =.749). Meanwhile, the item, "SVI2" has the lowest level of agreement (Mean=3.60; SD =.792). Nevertheless, the results of the mean score for Seeking Visual information show that respondents agree that they have a moderate level of Seeking Visual information. In addition, the values of standard deviation between (.575 to.794) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.12 Content Trust

Table 4. 14 Descriptive analysis for content trust

No.	Rank	Items	Min	Max	Mean	SD
1	1	CT1	2.00	5.00	3.7533	.795
2	2	CT2	2.00	5.00	3.7374	.783
3	3	CT3	2.00	5.00	3.7003	.716
4	4	CT4	2.00	5.00	3.6817	.798
5	5	CT5	2.00	5.00	3.6658	.792
Average mean score of Content Trust					**3.7077**	**.617**

Table 4.14 shows the descriptive analysis of the Content Trust with four items. This construct was measured with 5points Likert scale. The respondents indicate a high level of agreement for all the items of Content Trust with values (mean= 3.70; SD=.617). Among the items, "CT1" has the highest level of agreement (Mean=3.75; SD =.795). Meanwhile, the item, "CT5" has the lowest level of agreement (Mean=3.66; SD =.792). Nevertheless, the results of

the mean score for Content Trust show that respondents agree that they have a moderate level of Content Trust. In addition, the values of standard deviation between (.617 to.798) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.2.13 Behavior Change

Table 4. 15 Descriptive analysis for behavior change

No.	Rank	Items	Min	Max	Mean	SD
1	4	BC1	2.00	5.00	3.5756	.627
2	5	BC2	2.00	5.00	3.5650	.633
3	2	BC3	2.00	5.00	3.6446	.611
4	1	BC4	2.00	5.00	3.7003	.625
5	3	BC5	2.00	5.00	3.5862	.613
Average mean score of Behavior Change					**3.6143**	**.502**

The table above 4.15 shows the descriptive analysis of the behaviour Change with four items. This construct was measured with 5points Likert scale. The respondents indicate a moderate level of agreement for all the items of Behaviour Change with values (mean= 3.61; SD=.502). Among the items, “BC4” has the highest level of agreement (Mean=3.70; SD =.625). Meanwhile, the item, “BC2” has the lowest level of agreement (Mean=3.56; SD =.633). Nevertheless, the results of the mean score for Behaviour Change show that respondents agree that they have a moderate level of Behaviour Change. In addition, the values of standard deviation between (.502 to.633) indicate the degree of variation were under normal distribution as suggested by Burn and Bush (2014).

4.3 Internal Construction Validation

The accuracy of the research instrument was confirmed using the authenticity of the internal construction. The tool applied to a representative selection of (50) individuals from within the study population and outside the study sample. The correlation coefficient between the individual's degree on the piece of writing and its cumulative ranking on the tool calculated, the validity of the internal construction was used to confirm the tool's validity. The correlation coefficient was then calculated between each person's degree on the paragraph and its overall score, and the table below demonstrates that:

Table 4. 16 Coefficients of correlation between a person's score on a paragraph and their total score

Item No.	Correlation coefficient	Item No.	Correlation coefficient	Item No.	Correlation coefficient	Item No.	Correlation coefficient
1.	.476**	13.	.413*	25.	.399*	37.	.314*
2.	.434*	14.	.449*	26.	.462*	38.	.494*
3.	.542**	15.	.544**	27.	.348*	39.	.445**
4.	.465*	16.	.602**	28.	.568**	40.	.620**
5.	.604**	17.	.379*	29.	.593**	41.	.739*
6.	.375*	18.	.443*	30.	.611**	42.	.434*
7.	.456*	19.	.374*	31.	.436*	43.	.473*
8.	.567**	20.	.432*	32.	.387*	44.	.344*
9.	.423*	21.	.572**	33.	.349*	45.	.425**
10.	.385*	22.	.365*	34.	.465*	46.	.546*
11.	.376*	23.	.493*	35.	.579**	47.	.406**
12.	.568**	24.	.473*	36.	.542**	48.	.537*

* Means significant at the level (α≤0.05)
** means significant at the level (α≤0.01)

Table 4.16 shows coefficients of correlation between a person's score on a paragraph and their total score, according to (Hair et al., 2010; Awang, 2015) the study instrument appears to have attained the necessary scale indicators since correlation coefficients varied from (0.314 – 0.620), all of which are statistically significant at the level of 0.05.

4.4 Research Instrument Reliability

The reliability of the research method assessed using the Cronbach's Alpha equation and the coefficient of internal consistency. The internal consistency coefficient of the study instrument was determined by distributed it to randomly selecting (50) respondents. Table (4.17) shows the reliability coefficient of Cronbach Alpha for each dimension of the study variable.

Table 4. 17 Reliability of study instruments

Variable	Dimensions	Number of Items	Cronbach alpha coefficient
Perceived Visual Informativeness	Perceived Message Quality	4	0.82
	Perceived Informativeness	4	0.81
	Perceived Attractiveness	4	0.80
	Perceived Effectiveness	4	0.82
Health Literacy	Finding Visual information	5	0.81
	Understanding Visual information	4	0.79
	Evaluating Visual information	4	0.81
	Applying Visual information	4	0.80
Social Media Engagement	Seeking Visual information	5	0.78
	Content Trust	5	0.82
	Behavior Change	5	0.80

Table 4.17 indicated that the Cronbach's Alpha coefficients for the dimensions of the independent variable (Perceived Visual Informativeness) ranged between (0.80 - 0.82), while the Cronbach's Alpha coefficients for the dependent variable (Health Literacy) ranged between (0.79-0.81), and the Cronbach's Alpha coefficients for the mediation variable (Social Media Engagement) ranged between (0.78 - 0.82). According to Cronbach (1951) and Bonett and Wright (2014) these values are considered acceptable for the purposes of scientific research.

4.5 Assessment of Normality

Substantial skewness and kurtosis in a dataset unequivocally imply that the data does not follow a normal distribution. The usage of normally distributed data indicates the appropriate estimation technique to be used in the research. Additionally, it assists in determining the level of reliability of the estimates derived from commonly used methods (Gao et al., 2010; Hair et al., 2014). Nevertheless, achieving a normal distribution of data, whether it is univariate or multivariate, is very challenging for social sciences researchers. Therefore, it is necessary to evaluate skewness and kurtosis (Gao et al., 2010).

The most acceptable values for skewness and kurtosis should range between -1 to 1 (Hair at al., 2014). Nevertheless, many scholars claimed that the acceptable limits between -2 and +2 are considered acceptable to prove normal univariate distribution (Gravetter & Wallnau, 2014; Ao & Gelman, 2011; George & Mallery, 2010). Based on this recommendation the absolute values of the skewness in this study are within the range of -0.406 to 0.990, while kurtosis is within the range of -.680 to 1.094 which are within the acceptable range of -2 and +2 as shown in Appendix 4.

4.6 Common Method Variance (CMV)

Since the survey data was collected from a single respondent in the same survey, common methods variance (CMV) can be a problem. To ensure the avoidance of common method bias, procedural controls will be conducted. Procedural methods that can be used are as followed: Using respondents who have the highest level of relevant knowledge (Innes, & Mitchell,1995).

Adopting measurement items from the previous related studies to ensure the quality of the scales (Lindell & Whitney, 2001). Assuring respondents, of the confidentiality and anonymity of their responses Mixing of the ordering of all questions to avoid a possible common method variance (Chang et al., 2010).

A post hoc Herman's single factor test, as described by (Podsakoff et al., 2003), was performed to examine the level of common method bias present in the data by forcing all indicators to load on a single factor. According to Organ and Podsakoff (2005), common method bias is problematic if a single latent component accounts for more than 50% of the explained variation. The significance of R2 was employed as an indicator to anticipate the strength of the association between the firm's internal and external characteristics (independent variable) and its innovation performance (dependent variable). A greater R2 suggests that the block of independent factors has superior predictive potential on the dependent variables. Additionally, only when a significant t-value was observed, the beta value (β) was employed to indicate whether or not there is a positive link between the dependent and independent variables. From the methodological perspective, prior researchers have largely ignored the problem of common method bias in their research studies, which may lead to misinterpretation of research output. This study implemented marker variables to control the method bias to reduce the risk of common method bias. Researchers (Podsakoff et

al. 2009) found that the use of marker variables can control the effect of method bias. The concept of marker variable was proposed by Lindell et al. in 2001, which is a partial correlation technique. The marker variable was used to adjust the correlation between constructs, and this variable is theoretically unrelate the researcher implemented the Marker-Variable Technique. The method is based on the inclusion of a variable (i.e., marker variable) that is theoretically unrelated to at least one of the other variables in the study. The technique thus assesses CMV based on the correlation between these theoretical uncorrelated variables. High degrees of correlation indicate strong CMV problems. Apart from using Harman's single-factor test to detect CMV problems, this study also follows the research of Rönkkö et al (2011) to adopt Marker Variable to detect CMV problems.

In this study, all the 48 items comprised of (16 items in Perceived Visual Informativeness, 17 items in Health Literacy, 15 items in Social Media Engagement) were entered into SPSS file. All items were loaded into factor analysis, using unrotated PCA. Moreover, the results showed that when all 48 items were loaded into one general factor, the first unrotated factor captured only 36.84% of the variance in data. Thus, indicates that CMV likely did not affect the results (Podsakoff et al., 2003). Therefore, these results suggested that CMV not be an issue in this study as shown in Appendix 4.

4.7 Measurement Model

This study intends to validate the main construct namely perceived message quality (PMQ), Perceived Informativeness (PI), Perceived Attractiveness (PA), Perceived Effectiveness (PE), Finding Visual information (FVI), Understanding Visual information (UVI), Evaluating Visual information (EVI), Applying Visual information (AVI), Seeking Visual information (SVI), Content Trust (CT), Behaviour Change (BC) using pooled CFA procedure. The study decided to employ the Pooled-CFA since it is more efficient, thorough, and free from model

identification problem (Awang et al., 2015; Awang, 2014). Using this method, all constructs are pooled together and linked using the double-headed arrows to assess the correlation among the constructs as shown in Figure 4.1.

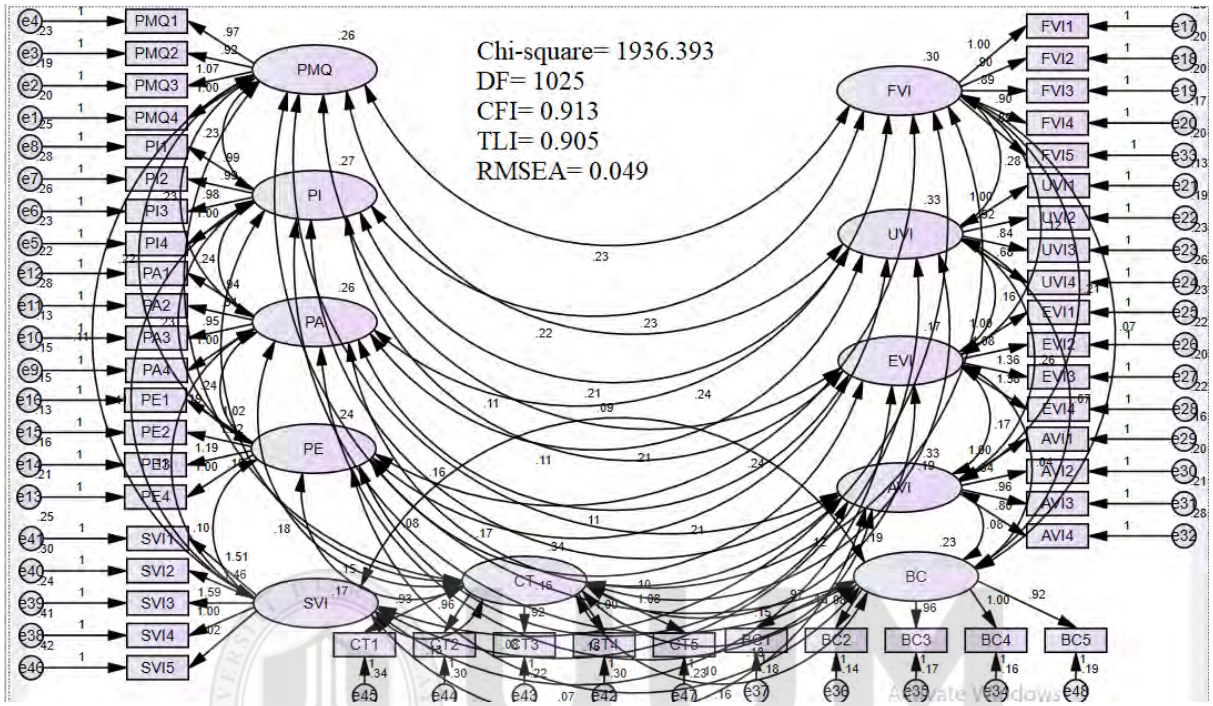

Figure 4. 1 Pooled Confirmatory Factor Analysis Measurement Model with 48 Items

The performances of fit indices are compared by considering effects of related factors. The Ratio Chi-square Test Statistic to Degree of Freedom, Root Mean Square Error of Approximation, and Comparative Fit Index are the least affected indices by estimation technique and sample size under multivariate normality, especially with large sample size. Modeling methods are employed for studying phenomena than require the utilization of complex variable set. Structural Equation Modeling (SEM) is preferred when studying the causal relations and the latent constructs among the variables is in question. The reason is it can be used to analyze complex theoretical models and its practice ability. The objective of

SEM is to explain the system of correlative dependent relations between one or more manifest variables and latent constructs simultaneously. It serves to determine how the theoretical model that denotes relevant systems is supported by sample data, i.e., estimation of relations between the main constructs. Because there is no single criterion for the theoretical model fit evaluation obtained as a result of SEM, a wide array of fit indices was developed (Schermelleh-Engel and Moosbrugger, 2003; Ding et al., 1995; Sugawara and Mac Callum, 1993). Meanwhile, fitness indexes (RMSEA, TLI, CFI, and Chisq/df) had achieved the required level. However, when examining the factor loading, it was found the factor loading for all items were above 0.6. Therefore, no items dropped (Awang et al., 2015).

4.7.1 Evaluating The Measurement Model Goodness-of-Fit

The assessment of model fit was made by comparing the fitness indexes of this structural model with the threshold indexes from the literature (Awang et al., 2015; Awang, 2014) is reported in the table below.

Table 4. 18 The assessment of Fit for the structural model

Name of category	Name of index	Fit Criteria	Level of acceptance	Comments
Absolute fit	RMSEA	≤0.08	0.049	Meet the required level ≤ 0.08
1. Incremental fit	CFI	0.90 or greater	0.913	Meet the required level ≥ 0.9
	TLI	0.90 or greater	0.905	Meet the required level ≥ 0.9
2. Parsimonious fit	Chisq/df	1.0≤ χ2 / df ≤5	1.889	Meet the required level ≤ 3.0

Table 4.20 shows that all indexes (RMSEA, TLI, CFI, and Chisq/df) had achieved the required level.

4.7.2 Unidimensionality Analysis

The findings in table 4.20 illustrated that the Unidimensionality requirements was achieved. As discussed earlier, the deletion should be made one item at a time with the lowest factor loadings to be deleted first. In this study, all items factor loading was significant and ranged from 0.60 to 0.96 as the highest factor loading. Therefore, there are no item deleted. In short, the unidimensionality for this study was verified and validated.

4.7.3 Reliability

Internal reliability refers to the extent to which the observable variables grow in conjunction with the conceptions they represent (Urbach & Ahlemann, 2010). Throughout the years, Cronbach's alpha has consistently been the favoured measuring technique. Composite dependability has been the favoured and recommended option in recent research, particularly for the SEM technique, as suggested by Urbach and Ahlemann (2010). Hair et al. (2016) suggests that the composite reliability should be reported instead of Cronbach's alpha since it takes into account the different factor loadings of the indicators, rather than assuming that all items are equally connected. Composite dependability (CR) is considered to be a more suitable measure for evaluating the internal consistency dependability, especially for users of SEM (Hair et al., 2020). Both assessments must above a threshold of 0.70. Composite reliability is beneficial for two reasons: it does not assume that indicator loadings are equal in the population, and it can handle indications with varying reliabilities (Hair et al., 2014). Composite dependability (CR) is considered more useful for evaluating internal consistency dependability, especially for users of SEM (Hair et al., 2020). Both assessments must above a criterion of 0.70 (Hair et al., 2020). Convergent validity, the first subcategory of validity,

pertains to the extent to which two measurements of a concept that should theoretically be associated are really associated (sometimes referred to as construct commonality). Hair et al. (2014) proposed the use of Fornell and Larcker's (1981) Average Variance Extracted (AVE) approach for assessing convergent validity. Fornell and Larcker (1981) provide a definition of the Average Variation Extracted (AVE) as a quantitative metric that assesses the proportion of variation explained by a construct in relation to the variance attributed to measurement error. Put simply, a greater value of AVE is a strong signal that the construct accurately represents what it is supposed to measure. The suggested threshold is AVE > 0.50, as stated by Hair et al. (2010).

AVE and Composite Reliability (CR) were used to assess the reliability of the measurement model. The AVE values exceeding 0.50 indicate the reliability of the measurement model in measuring the construct. The CR was achieved when all CR values exceeded 0.60. Table 4.21 presented reliability of the, Perceived Message Quality (PMQ), Perceived Informativeness (PI), Perceived Attractiveness (PA), Perceived Effectiveness (PE), Finding Visual information (FVI), Understanding Visual information (UVI), Evaluating Visual information (EVI), Applying Visual information (AVI), Seeking Visual information (SVI), Content Trust (CT), Behavior Change (BC) respectively.

Table 4. 19 Validity and reliability test of the measurement model

Variable	**AVE (MINIMUM 0.5)**	**CR (MINIMUM 0.7)**	**Cronbach's Alpha**
Perceived Message Quality (PMQ)	0.590	0.863	0.82
Perceived Informativeness (PI)	0.717	0.926	0.78

Perceived Attractiveness (PA)	0.539	0.744	0.85
Perceived Effectiveness (PE)	0.540	0.892	0.75
Finding Visual information (FVI)	0.540	0.796	0.81
Understanding Visual information (UVI)	0.597	0.868	0.82
Evaluating Visual information (EVI)	0.541	0.830	0.83
Applying Visual information (AVI)	0.508	0.874	0.79
Seeking Visual information (SVI)	0.539	0.744	0.80
Content Trust (CT)	0.541	0.830	0.81
Behavior Change (BC)	0.540	0.892	0.78

Table 4.21 shows that the results for assessment of the construct validity are acceptable as the standardized factor loading for all items are more than 0.5 (ranged from 0.553 to 0.882). Furthermore, the AVE for all items has exceeded the cut-off point of 0.5 (range from 0.540 to 0.717). The results also show that the composite reliability values are in range from 0.744 to 0.926, which exceed the recommended value of 0.6 (Hair et al, 2014). The Cronbach's Alpha shows values of above 0.72 and 0.9 which are considered good and excellent. The results indicate a good level of internal consistency or convergence among the items. Therefore, it can be concluded that the measurement model in this study is reliable and valid.

The Convergent Validity of the measurement model was achieved when all values of AVE exceed 0.50, where these values are considered appropriate according to (Fornell &Larcker, 1981; Hair et al., 2010).

Construct validity may be defined as the degree by which a test measures according to its claim. Based on the following statistical values indicating construct validity, the reflection on this study is as follows: AVE, CR and Cronbach's Alpha. All of the AVE values were above the minimum acceptable value of 0.5, they ranged from 0.508 to 0.717 of the observed variables by their related constructs (Fornell & Larcker, 1981). This is important in as much as it provides an affirmation that the research constructs are effectively operationalised as intended by the theoretical framework.

Likewise, the CR values also relate to construct validity since all the calculated values range between 0.744 and 0.926 and are all higher than the recommended value of 0.7 (Hair et al., 2016). Higher value of CR implies that the items loaded are good measures of the constructs that they are intended to measure. Furthermore, Cronbach's Alpha coefficients of higher than .72 show that there is good internal consistency of the items and provide evidence for the reliability of these constructs for measuring the proposed theoretical constructs.

Content validity in the context of developing and refining the research instruments was achieved through the expert review of the measurement item and the correspondence of the study measures to the theoretical context of social media engagement and health literacy. The selection of the experts also employed certain standards to capture their ability to assess the research instruments appropriately.

The panel of experts was eight experts; all the participants were chosen according to three general criteria. The first domain examined the criteria for selected individuals as key academic experts in health communication and related fields; all selected had a doctoral degree in relevant fields such as Health Communication, social media studies and Information Systems. These authors meet a criterion of at least 10 years of teaching experience in the university level, and research on technology adoption involving digital health communication and social media utilization.

The second selection criterion was the experience in using technologies for health communication. The selected experts were professionals who have been practicing for at least 8 years with a focus in the development and implementation of health communication in social media. These experts provided important perspectives on how the instruments would be applied in practice focusing on the dissemination of visual health information and user engagement on social media.

The third criterion was research experience, whereby the expert had to produce at least five peer-reviewed articles in the last five years in social media engagement, health literacy or visual communication. This criterion helped to make sure that the experts did know the current research methods and theories appropriate to the study.

The expert panel's composition was as follows:

Three scholars have more than fifteen years of teaching experience in the field of health communication and social media research.

Two academic staff at the rank of associate professor focusing on digital health literacy with over 12 years of research experience.

Two retired professionals in healthcare communication with proven track records in social media health campaigns currently, one research methodology expert specializes in the validation of instruments and developmental of measures.

The background of the experts was established according to their academic backgrounds, publication history, and achievements. Their combined expertise covered all crucial aspects of the study: social media, media control, health literacy, and research. Consequently, the use of this coverage made the content validity assessment cover several dimensions of the research constructs.

The participants were given a guided form to complete in relation to how relevant, clear and representative each item in the instruments was in measuring the intended constructs. The

participants were requested to complete the self-administered checklist in which they ranked each item on a 4-points Likert scale and added qualitative comments for enhancement. The cross-sectional evaluation was done in two phases given that after the first round of review, some aspects of the instruments might be modified before the second round of review to enhance on the identification of the components to be measured. The participation of scholars of different fields and practitioners contributed to the content validity assessment; the presented results have both an academic and pragmatic relevance. From the analysis of the results, they had gained a wide understanding in teaching, research, and professional practice to determine the effectiveness of the instruments in measuring the intended constructs.

4.8 Structural Model

Once the researcher has addressed the issues of uni-dimensionality, validity, and reliability of the latent constructs in the study, the next step is to model the construct into the structural analysis. To analyze the structural model, the researcher had set the AMOS to compute the values for the standardised regression weights (standardised estimate) and the regression weights (unstandardised estimate) for the model.

4.8.1 The Standardized Regression Weights (Standardized Estimate)

Figure 2 illustrates the relationship between overall PVI, HL, and SME. Firstly, the overall fit of the model was assessed through three categories of model fit, absolute fit (Chi-square, RMSEA and GFI), incremental fit (CFI) and parsimonious fit (Chi-square/df) to ensure that it was an adequate representation of the entire set of casual relationship.

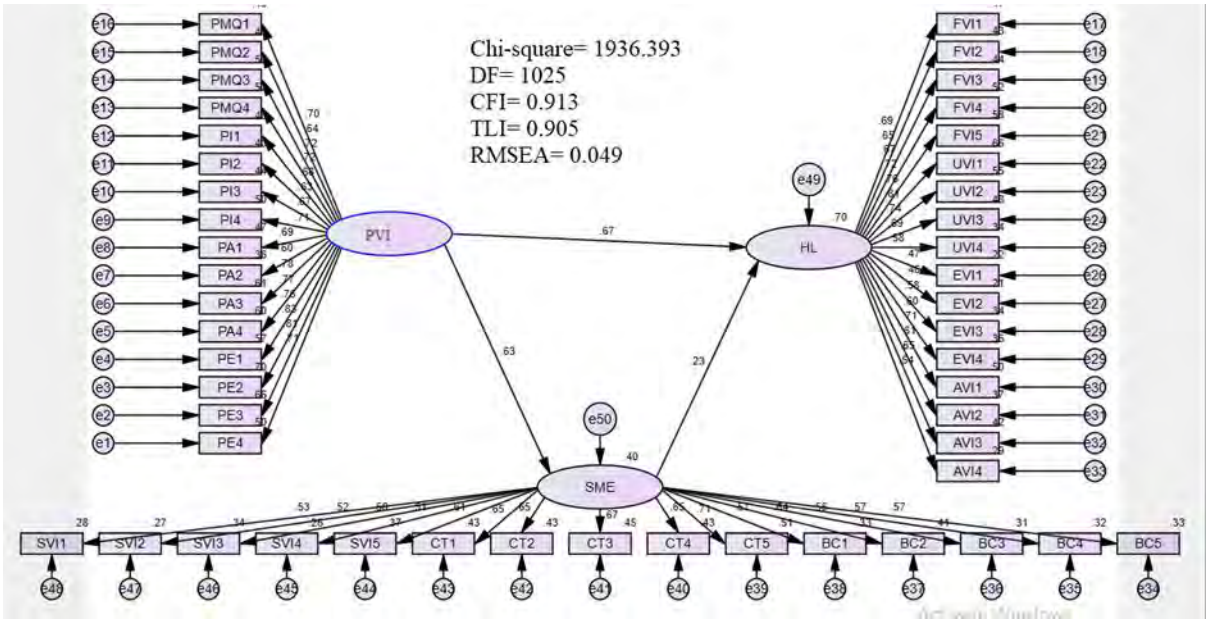

Figure 4. 2 The Standardized Path Coefficient between Constructs in Model

Table 4.22 depicts the results of the goodness-of-fit indices for the structural model. The fitness indices in the Table 4.22 suggested that the model achieved the acceptable level of goodness-of-fit.

Table 4. 20 Goodness of Fit Indices for structural model

Name of Category	**Name of Index**	**Level of Acceptance**	**Model**
Absolute fit	RMSEA	RMSEA≤0.08	0.049

Incremental Fit	CFI	CFI>0.90	0.913
	TLI	TLI>0.90	0.905
Parsimonious Fit	Chi-square/*df*	CMIN/*df* ≤5	1.889

The RMSEA value of 0.049, is below the threshold value of 0.08, and this indicates that the absolute fit for the model is good. The CFI and TLI are all above the threshold value of 0.9. For parsimonious fit, the Relative CMIN/*df* (1.889) is less than 5, which shows the good fit of the model according to Hair et al. (2014).

4.8.2 The Standardized Regression Weighs

Based on the assessment of fit for the structural model show in Figure 2, the study concluded that the proposed structural model met the required fitness level as shown in Table 4.23.

Table 4. 21 The regression path of the standardized regression weights of constructs

Structural Relationship			**Estimate (Actual Beta)**	**S.E.**	**C.R.**	**P-value**	**Result**
SME	<---	PVI	.469	.055	8.603	***	Significant
HL	<---	SME	.318	.071	4.490	***	Significant

HL	<---	PVI	.687	.070	9.876	***	Significant

Table 4.23 above indicates that some of the path to be significant at p<0.05, perceived visual Informativeness is significantly to social media engagement (Beta=0.469; p=0.000), social media engagement is significantly to health Literacy (Beta=0.318; p=0.000), and perceived visual Informativeness is significantly to health Literacy (Beta=0.687; p=0.000), while the other relations are not significant.

4.8.3 Hypothesis testing

In this study proposed four hypotheses, there are three direct hypotheses (H1, H2, and H3) and one indirect hypothesis (H4). Specifically, the study seeks to examine the following paths:

H1: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

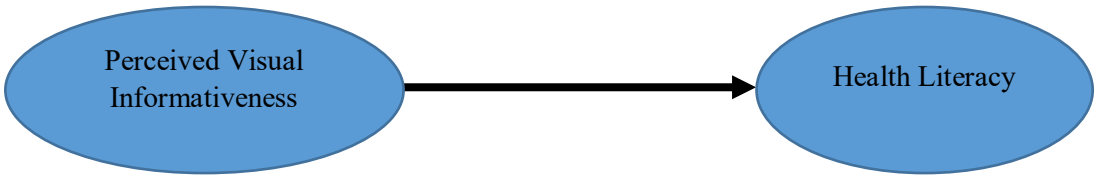

Figure 4. 3 Hypothesis 1

he first hypothesis stated that Based on the findings illustrated in Table 4.24, Perceived Visual Informativeness was found to have effect on Health Literacy (ß=0.687, p=0.000).

Table 4. 22 The Significant Effect of Perceived Visual Informativeness and Health Literacy

Construct	Path	Construct	Beta Estimate	Standard Error	Critical Region	P-Value	Result
HL	<---	PVI	.687	.070	9.876	***	Significant

H2: Social media engagement (Seeking Information, Content Trust, and Behavior Change) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).

Figure 4. 4 Hypotheses 2

The second hypothesis stated that this finding of this study shows that Social media engagement was found to have significant influence on Health Literacy (ß=-0.318, p=0.000), as presented in Table 4.25.

Table 4. 23 The Significant Effect of Social media engagement and Health Literacy

Construct	Path	Construct	Beta Estimate	Standard Error	Critical Region	P-Value	Result
HL	<---	SME	.318	.071	4.490	***	Significant

H3: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant

impact on Social media engagement (Seeking Information, Content Trust, and Behavior Change).

Figure 4. 5 Hypotheses 3

The third hypothesised stated that Perceived Visual Informativeness found to be positively related to social media engagement (ß=0.469, p=0. 000). According to the results, when Perceived Visual Informativeness went up by 1, Social media engagement went up by 0.469. Thus, the above research hypothesis is supported as presented in Table 4.26.

Table 4. 24 The Significant Effect of Perceived Visual Informativeness and Social media engagement

Construct	Path	Construct	Beta Estimate	Standard Error	Critical Region	P-Value	Result
SME	<---	PVI	.469	.055	8.603	***	Significant

4.9 Mediation Effects Using Bootstrap Approach

Bootstrapping is a statistical method that utilizes random resampling with replacement to estimate a population parameter. This technique samples from a given dataset to estimate a parameter when it would otherwise be impossible or impractical to do so (Preacher & Hayes, 2008). In this way, the dataset is treated as the population, and each random sample aims to replicate a potential score within the true population. The amount of samples varies, but usually falls between 1,000 and 10,000. One advantage of the bootstrap method is that it produces confidence intervals for your statisitcal estimate. This gives us valuable information

of the likely value of a parameter, whereas a p value simply gives us a single number that estimate the likelihood of our statistic assuming that the null is true (Hair et al, 2014).

This study applied Preacher & Hayes (2008) method of bootstrapping the indirect effect to determine the presence of mediation effect. As discussed earlier, mediation occurred when the lower bound (LB) and upper bound (UB) values of indirect effect do not straddle a 0 in between. Thus, the result of the analysis shows that, Perceived Visual Informativeness has a significant indirect relationship with Health Literacy through the mediating role of social media engagement, where the lower bound was 0.301 and the upper bound was 0.502 (both upper and lower bound are in a positive region), as presented in Table 4.27.

Table 4. 25 Effect Size of Mediator

Mediator	**Standardised Indirect Estimate**	**95% Confidence Interval (CI)**	
		Lower Bound (LB)	**Upper Bound (UB)**
PVI → SME → HL	0.594	0.000	0.181
	Standardised Direct Estimate		
PVI → SME → HL	0.165	0.301	0.502

4.10 Chapter Summary

Chapter four of the study focused on describing and analyzing data that was collected to confirm current hypothesis associated with perceived visual informativeness, health literacy, and social media use. The arrangement of this chapter was geared towards providing descriptive analysis, internal credibility of the research instrument, reliability coefficient and check of normality of the data.

The first part that identifies different descriptive statistics is the measure section where the researcher described the key variables in the study. This covariate test showed that respondents had a moderate level of perceived visual informativeness with a mean of 3.49. This variable was further broken down into four dimensions: observed organizational (mean = 3.63), clarity and message appeal (mean = 3.47), aesthetic appeal (mean = 3.44), and persuasiveness (mean = 3.41). All these dimensions also received a moderate level of agreement by the respondents in this study, which implied that there was still room for improvement in these aspects despite acknowledging the fact that visual content could support the conveyance of information.

Regarding perceived message quality respondents had a moderate level of agreement on all five items as represented by the mean score of 3.47 out of 5 on the Likert scale. More specifically, the highest level of agreement being 3.50 for item PMQ3 and the lowest being 3.41 for PMQ1. Also, the absolute values of the standard deviations show that the responses were normally distributed to a large extent and hence participants had a similar level of ratings on message quality.

The self-generated perceived informativeness follows the same pattern appearing with average mean of 3.63 on nine items. The overall mean of 59 respondents was found for item PI2 (mean=3.70), whereas the mean score for PI4 was 3.58. The result of standard deviation values also indicates normal distribution for all of them and this confirms the reliability of the above-mentioned findings.

As per perceived attractiveness, the global mean was 3.44 overall and the respondents were moderately agreeable towards it. When comparing the results on all measured items it was identified that PA2 had the highest mean of 3.53, meaning that learners are more interested in certain types of visual content rather than others. On the other hand, PA3 was the least favored (mean 3.35). The standard deviations indicate in this case again that there were no significant variations on responses to this dimension.

The perceived effectiveness subsection shows an average of 3.41 taken from four items on the questionnaire. Item generated the most positive response with a mean score of 3.45 while item PE1 generated the least positive response with a mean score of 3.37. This is a clear indication that although respondents have a moderate level of self-efficacy in using visual information; there exists specific domains where they may require assistance.

Lastly for health literacy, the respondents scored a mean of 3.49 on their understanding of health literacy exercises, of which understanding visual information had the highest mean of 3.54 closely followed by the ability to evaluate, find and apply visual information with a mean of 3.48 and 3.46 respectively. All the dimensions revealed moderate self-reported health literacy among the participants and the capacity to both navigate and apply health information.

Employment of social media was also examined, and it emerged that the participants are scoring a relatively higher mean of 3.67 on engagement with health content on social media

during the pandemic. These can be broken down into the following dimensions: The search for Visual stimuli and the assessment of such stimuli both of which stood at 3.70 The last of the dimension which conforms to this construct involved behaviour modification which scored higher than but only by a small margin to score 3.61.

In light of this, internal construction validation was done out with participants other than those that formed the population of this study. To estimate validity coefficients, the correlation ratios were determined regarding the individual results scored on various items and the total results scored from the completed questionnaires.

The reliability analysis applied Cronbach's Alpha coefficients for conducting internal consistency for items belonging to each dimension of the study variables. The results revealed an acceptable level of reliability and ranged from 0.80 - 0.82 for perceived visual informativeness, from 0.79-0.81 for health literacy and from 0.78 - 0.82 for social media engagement thus validating the research instrument for use in scientific research.

Finally, the check for normality was conducted as an important step in choosing the best statistical approach to treat data. In analyzing many of the datasets fitted into the models, values of skewness and kurtosis slightly exceeded the acceptable cut-off values, and this means that the results should be interpreted with caution.

Therefore, Chapter four explains how some psychological factors such as perceived visual informativeness and social media interaction affect health literacy in this era and particularly

during a pandemic like COVID 19. The elaborate data analyses offer understanding on how people think and engage with systemic information regarding health consensus concerning graphic designs as well as social media interfaces, suggesting areas where improvements to communication frameworks might be useful.

The summary of the findings from hypotheses testing in this study represented in Table 4.28. It shows that all research hypotheses are supported.

Hypothesis	Results
H1: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).	Supported
H2: Social media engagement (Seeking Information, Content Trust, and Behavior Change) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information).	Supported
H3: Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on Social media engagement (Seeking Information, Content Trust, and Behavior Change).	Supported

Table 4. 26 Summary of Hypotheses Testing

H4: Social media engagement (Seeking Information, Content Trust, and Behavior Change) mediates the relationship between Perceived Visual Informativeness and Health Literacy in the context of COVID-19 pandemic.	Supported

CHAPTER FIVE

DISCUSSION, IMPLICATIONS AND CONCLUSION

5.1 Introduction

The last chapter of this thesis starts with the recapitulation of the study and final model of the study. It then provides a detailed discussion about the findings of each of the four research hypotheses. It then follows contributions to academic literature and then practical implications. It then discusses the limitations of this study as well as the directions for future studies. The study is concluded at the end of this chapter.

5.2 Recapitulation of The Study

This study recognizes that information related to the health field is spreading rapidly among individuals, especially with the help of social media, which is the opportunity for all spectrums of society to spread countless quantities of health information regardless of their accuracy, which leads to an impact on the actions and behaviors of societies in dealing with diseases and health problems as it occurred during the spread of the Covid-19 pandemic.

Based on the importance of the topic of health literacy, the speed of the spread and transmission of information related to health crises among people, in addition to the presence of social media platforms that facilitated communication between individuals and the transmission of news among them followed by different research gaps, this study examined the relationship between Perceived Visual Informativeness (PVI) and Health Literacy (HL) in the light of COVID-19 pandemic and explain the role of social media engagement (SME) in the relationship between PVI and HL in the light of COVID-19 pandemic from the point of view of social media users from Jordan. The population size for study is estimated around 7

million (Ministry of Digital Economy and Entrepreneurship, 2022), from which 410 were chosen randomly chosen to answer the study questionnaire

These research objectives were achieved by performing a deductive study in which 4 research hypotheses were formulated based on the theoretical relationship established in Perceived Visual Informativeness, Health Literacy, and Social Media Engagement literature. The conceptual framework was comprised of three direct and one indirect (mediating) effect. It was developed based on Social Capital Theory and Social Cognitive Theory.

This basic research was designed on the Positivist research paradigm with Realist ontological belief followed by Etic epistemological approach. Using the simple random sampling technique, cross-sectional primary data was collected on a survey questionnaire in a non-contrived field study setting. The response rate was 91.95%. Research ethics such as anonymity and confidentiality were maintained throughout the data collection phase. Hypotheses were tested using technique.

The findings suggest that all three hypotheses of direct effects were supported. Similarly, social media engagement significantly mediated the relationship between PVI and HL. Figure 5.1 illustrates the final model showing the significant direct and mediating effects.

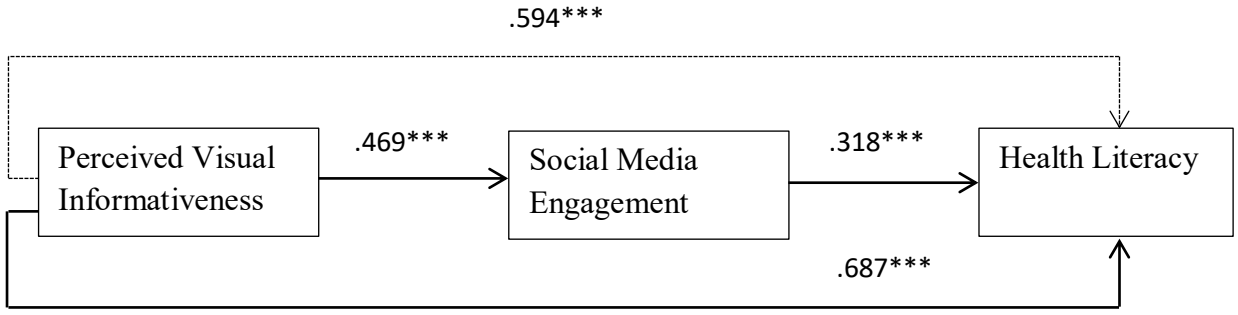

Figure 5.1 Final model of the study

5.3 Discussion

Health information may take several forms, such as incorporating illness prevention and health education, as well as information to help treatment choices or boost the effectiveness of clinical care. Many health-related choices are made based on health information which are communicated visually. This includes the choice among health procedures such as whether to vaccinate a child, whether to undergo surgery rather than another route, as well as health education, such as how to perform exercises after an operation or how to use an inhaler. Best practices in typography and visual communication are vital for successful health communication. An information design approach emphasizes the reader/user and acknowledges that visual presentation works in unison with words to successfully communicate with a particular audience (Turchioe et al., 2019).

Previous evaluations of studies found that user-preferred features (e.g., visual simplicity and familiarity) generally lead to the desired outcomes. For instance, some visual elements that illustrate particular elements of risk measures can pump up risk perceptions, and that visual info characterizations just do not always outcompete text on threat results (Ancker et al., 2006). Another research revealed that information visualizations for health-care personnel were understudied, and ideas for enhancing visualization methodologies were confusing given the available database (Lor et al., 2019).

PVI has shown efficacy in forecasting individuals' inclination to participate in health-related activities, such as doing self-examinations of their skin. Positive effects of PVI have been linked to increases in understanding about skin cancer. The perceived value of an informative tool is especially important when determining whether to take part in clinical study. Based on existing research on the impact of visual informativeness on people's views of a platform, we

propose that the PVI (Perceived Visual Informativeness) of information assistance had a positive influence on people's attitudes towards health information and improve their literacy.

On the other hand, the advent of social media has significantly transformed interpersonal interactions over the last decade, bringing both advantages and disadvantages to society. Social media enables individuals to disseminate their expertise and engage in global communication. However, it also poses significant issues when inaccurate information, such as misconceptions about disease transmission or treatment, is shared. Experts typically refrain from disseminating unsubstantiated rumors on social media without sufficient expertise. Therefore, it is essential for health authorities and reputable organizations to effectively control the dissemination of false information and ensure the accurate transmission of health-related information.

Younger individuals often prefer the Internet or social media platforms as their main source of health information, whereas older individuals tend to rely on traditional outlets such as newspapers or word-of-mouth. These preferences necessitate tailored approaches to information dissemination. While the majority of preliminary care preparation research focuses on those aged 65 and above, a novel approach has been developed to actively include and educate younger people. This approach, informed by previous social preference ratings, prepares students to address health challenges within their communities and families. A study conducted at US universities examines the impact of delivering reliable information about pre-hospital care training to young individuals, highlighting its importance as a crucial component of public health.

Consequently, annual public health awareness programs are established to disseminate updated information on health hazards and associations, with these efforts often spanning days to months. The prevalence of public awareness efforts has significantly increased

(National Health Observances, 2007). According to Shah and Robinson (2011), social media can gather information on the success of hospitals and medical treatments based on patient experiences and is also used in health research and development. Platforms like social media have been crucial in disseminating up-to-date news and information about current societal issues, including the COVID-19 pandemic. Khamis and Geng (2021) have provided vital information to increase awareness of COVID-19, demonstrating that individuals can utilize social media platforms to manage crises. The access to health-related information on these platforms can be explained using the Uses and Gratifications Theory (UGT) and the Health Belief Model (HBM).

5.3.1 Perceived Visual Informativeness (PVI) and Health Literacy (HL) in The Light of Covid-19 Pandemic

The first research objective was to examine the direct effect of PVI on HL. The study findings indicated that Perceived Visual Informativeness (Perceived Message Quality, Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information). This finding is consistent with Rudd et al., (2023) and Zakar et al., (2021), indicating that heightened Perceived Visual Informativeness (PVI) contributes to enhanced health literacy across different disease contexts among the general public.

PVI has been established to predict people's desire to participate in health-related actions, such self-examination of their skin. Increases in skin cancer knowledge have also been associated to PVI favorable outcomes (Rocholl et al., 2020). PVI of a piece of health-related message may thus be especially essential when determining whether to join in a clinical investigation. So, the PVI will favorably alter people's attitudes towards health information in

light of this and the research that is presently available on the effects of people's perceptions of a platform's visual informativeness.

Graphic design played a crucial role in conveying messages effectively through engaging, informative, and visually appealing means. This included various fields like information graphics, data visualization, and information architecture, all aimed at enhancing communication and understanding through visual mediums. This connection underscores the importance of visual informativeness (PVI) in health contexts, particularly during the COVID-19 pandemic.

Numerous studies (Scheltema et al., 2018; King et al., 2014; Cao & Xu, 2022; Occa et al., 2018) highlight that PVI significantly enhances individuals' comprehension of health-related messages. Visual aids such as shapes, pictures, and graphs expedite information delivery, aiding cognitive processes by making information easier to remember and understand. This cognitive benefit underscores the effectiveness of PVI in health communication, particularly in disseminating crucial information during health crises like COVID-19.

Moreover, research suggests that tailoring health messages to individual characteristics like health locus of control, demand for cognition, and monitoring style can enhance their effectiveness (Williams-Piehota et al., 2005). Personalizing messages based on factors such as ethnicity (Kreuter et al., 1999), stage of behavior change (Prochaska et al., 1993), and psychosocial traits (Kreuter et al., 1999) have shown to significantly improve their impact, particularly in fostering understanding and behavior change related to health practices during the COVID-19 pandemic.

Visual informativeness plays a crucial role not only in consumer decision-making but also in health communication strategies. In advertising, enhancing visual informativeness is employed to optimize economic returns and consolidate market presence. Similarly, in health

communication, effective use of visual elements can promote positive attitudes towards health-related behaviors and encourage proactive health management, akin to advertising's influence on consumer behavior. Thus, principles from advertising can be applied to health campaigns to promote healthier lifestyles and empower individuals to prioritize their health, especially pertinent during health crises like COVID-19.

Visual cues are extensively employed in health communication through mediums such as billboards, brochures, and television public service announcements. While visual messages serve to inform and alert about health issues, there remains a limited framework for systematically analyzing audience responses to these visuals, highlighting the need for effective integration of visual strategies in health communication efforts, as discussed earlier.

The debate over the efficacy of visual elements in health communication stems from inconsistent research findings and conflicting outcomes. While some studies suggest that visually appealing elements may not necessarily enhance message effectiveness (Stephenson & Witte, 1998), others indicate that vibrant visuals can significantly improve the impact of health warnings (Slater et al., 2002). Moreover, the presentation of statistical data through graphical representations can either enhance or hinder understanding, depending on the graph style used (Parrott et al., 2005). Given these findings, it is crucial to carefully select and integrate visual elements in health communication strategies, particularly during crises such as the COVID-19 pandemic, to optimize their effectiveness in conveying critical health information.

5.3.2 Perceived Visual Informativeness (PVI) and Social Media Engagement (SME) in The Light of Covid-19 Pandemic

The second research objective was to analyze the direct effect of PVI on SME. The study findings indicated that Perceived Visual Informativeness (Perceived Message Quality,

Perceived Informativeness, Perceived Attractiveness, and Perceived Effectiveness) has significant impact on social media engagement (Seeking Information, Content Trust, and Behavior Change). This result has been found consistent with Ahmed (2020) who pointed out those advertising pictures (41.6%) has the greatest influence on purchase decisions, followed by typography (8%), design (4.8%), and colour (2.6%). In addition, the result of the current study is consistent with the previous study (Abbasi et al., 2023; Aydin, 2020; Sreejesh et al., 2020) who found that the PVI has a significant impact on SME.

Social media platforms perceived as more useful and user-friendly align with the principles outlined in the uses and gratification theory, which suggests that individuals select media based on fulfilling specific needs. For instance, websites with high interactivity are valued for enabling effective comprehension and utilization of vast amounts of essential information (Islam, Jebarajakirthy, & Shankar, 2021). Users are more likely to promote and share information from interactive websites when their expectations about content and usability are met (Lee, Lee, & Lee-Geiller, 2020). These findings underscore how perceived utility and user-friendliness of social media platforms influence Perceived Visual Informativeness and Social Media Engagement in the context of the COVID-19 pandemic.

Previous research indicates that the impact of interactive personalized information assistance on information sharing may depend on users' perceptions of interactivity. Less experienced users and those with lower digital literacy may show less interest in interactive interfaces (Shneerson et al., 2013). Age, education, and income have been identified as significant factors influencing online experiences and digital literacy (Rafaeli & Ariel, 2007; Foster & Rosenzweig, 2010). Younger users typically demonstrate higher technological proficiency and more positive attitudes towards interactive websites compared to older users (Gao, Rau, & Salvendy, 2010; Foster & Rosenzweig, 2010). Similarly, individuals with higher education

and income levels tend to have better access to new technologies and derive more satisfaction from interactive web platforms (Gui & Argentin, 2011; Hargittai & Hinnant, 2008; Foster & Rosenzweig, 2010). These factors influence the interpretation of Perceived Visual Informativeness and its effects on Social Media Engagement during the COVID-19 pandemic.

The landscape of social media has undergone significant transformations, profoundly impacting individuals' behaviors. People increasingly use social media to disseminate crucial information, endorse products, and engage with entertainment content. Given that visual information tends to be retained longer and can enhance comprehension and motivation, visual stimuli such as photographs significantly influence individual actions. Understanding these dynamics is crucial in the context of Perceived Visual Informativeness and Social Media Engagement during the COVID-19 pandemic, where visual content plays a vital role in health communication and behavioral responses.

5.3.3 Social Media Engagement (SME) And Health Literacy (HL) in The Light of Covid-19 Pandemic

The third research objective was to determine the direct effect of SME on HL. The study findings indicated that social media engagement (Seeking Information, Content Trust, and Behavior Change) has significant impact on Health Literacy in the context of COVID-19 pandemic (Finding Information, Understanding Information, Evaluating Information, and Applying Information). This result has been found consistent with Ostic et al. (2021) study which indicates that social media use has an overall favorable indirect influence on psychological well-being, owing to the beneficial effect of connecting and bridging social capital.

Health literacy is a pressing concern during the COVID-19 pandemic due to the growing availability of health-related information online in digital formats (Paakkari & Okan, 2020). It is crucial for individuals to possess the skills to effectively navigate these information environments, as well as analyzes, filter, and organize data in order to make informed health decisions. DHL exhibits variability with regards to reading proficiency and socioeconomic background, as well as interests in health-related subjects, inclination to seek digital information, and familiarity with technology and technological gadgets.

The COVID-19 pandemic necessitated the implementation of curfews and social isolation measures, hence elevating social media platforms to the foremost and most dependable channels for accessing information and understanding about the outbreak. According to Yigitcanlar et al. (2020), social media analytics can be used during a pandemic to assist paramedical workers in comprehending the perspectives and expectations of the community. According to Gluskin et al. (2014), social media networks have a positive impact on both weather patterns and economic situations.

Social media has evolved into an interactive technological tool and a worldwide platform for news and communication. The availability of mobile phones has facilitated the easy exchange of information, particularly among technologically savvy teenagers. Social communication encompasses a range of user apps and websites that facilitate interaction, communication, and information sharing using technological tools including mobile devices and computers. It also applies to any online communication platform that enables users to exchange content and disseminate information globally.

Furthermore, social media is seen as a crucial medium of communication that facilitates the dissemination and exchange of information among people via the internet. Social news networks facilitate the dissemination of information on many topics or concerns, allowing

individuals and organizations, even those in the minority or without awareness of other means of communication, to voice their views. Likewise, in regions without medical experts and health authorities, health facts and viewpoints about their effects on human health are informally conveyed via social networking platforms.

The rapid rise of social media has had extensive consequences for healthcare practices and research. Social media is revolutionizing the management of health information by facilitating the discovery of new healthcare data and information, enhancing communication between healthcare professionals, and facilitating the exchange of well-being experiences and knowledge (Zhou et al., 2017; Brennen et al., 2020). The study on the association between social media and improved health is still in its nascent phases, despite some first findings (Krishna & Thompson, 2019).

Hence, researchers have the potential to have a significant influence on enhancing the field. Subsequently, the Internet has undergone significant transformations in tandem with the rapid development of modern media technologies, therefore offering consumers enhanced opportunities to access health-related information. Irrespective of its integrity, accuracy, and reliability, the Internet has given customers a more efficient method to search for digital health information that was previously not readily available to them.

5.3.4 Social Media Engagement (SME), Perceived Visual Informativeness (PVI), and Health Literacy (HL) in The Light of Covid-19 Pandemic

The fourth research objective was to examine the indirect effect of SME on the relationship between PVI and HL. The study findings indicated that Social media engagement (Seeking Information, Content Trust, and Behaviour Change) mediating the relationship between Perceived Visual Informativeness and Health Literacy in the context of COVID-19 pandemic.

Information sharing involves the distribution of information and experiences (De Bruyn & Lilien, 2008; Wang & Noe, 2010). The impacts of information sharing are extensive. Through the exchange of knowledge via online support networks, patients may get a more precise understanding of their conditions and make better choices (Moorhead, Hazlett, Harrison, Carroll, Irwin & Hoving, 2013; Wicks, et al., 2010). Moreover, people get social support for their treatment choices by expressing their experiences (Argan, 2012; Moorhead, et al., 2013; Peng, Occa, McFarlane & Morgan, 2018).

Regrettably, although precise information may aid in making well-informed judgments about research involvement, a lack of awareness of research participation within a patient's social network might have a detrimental effect on the decision-making process. If patients are unable to explain basic concepts such as randomization, the use of placebos, and the protection of patients in clinical trials, they may struggle to gain support from friends and family for their participation in studies (Krieger, 2014a; Krieger, 2014b; Krieger, et al., 2015; Krieger et al., 2017; Morgan et al., 2017; Morgan, Mouton, Occa, & Potter, 2016; Morgan, Occa, Mouton, & Potter, 2017; Morgan, Occa, Potter, Mouton, & Peter, 2017; Occa & Morgan, 2018; Occa, Morgan, & Potter, 2018). Hence, it is crucial to create a proficient instrument that not only equips patients for their involvement in clinical trials, but also facilitates the dissemination of clinical trial information to their acquaintances, relatives, and other patients who might potentially benefit from this knowledge.

Information aids align with some objectives of conventional decision aids, such as empowering patients in the decision-making process. However, they do not fulfill other requirements of genuine decision aids, such as providing probabilities or presenting all available treatment options (Elwyn, et al., 2012). Put simply, the information and assistance included in the majority of decision aids are centered on certain treatment choices for

particular illnesses. However, when it comes to recruiting participants for research, the main obstacle to participation is not the lack of awareness about specific illnesses and treatment alternatives, but rather the overall lack of understanding of clinical trials (Krieger, 2014a; Krieger, 2014b). In addition, patients are likely to decline a treatment option (such as participating in a clinical trial) when they do not fully understand fundamental yet challenging concepts, such as randomization, the use of placebos, and the protection provided to patients. This decision is particularly common when there is a need for immediate decision-making. (Krieger, et al., 2015; Cameron, Pond, Xu, Ellis & Goffin, 2013)

Hence, an information aid that condenses information using everyday language (Kraft, et al., 2016; Shneerson, Windle & Cox, 2013), employs uncomplicated design in the delivery of information (Shneerson, et al., 2013), and incorporates abundant visual cues (Kraft, et al., 2016; Shneerson, et al., 2013) is anticipated to be more efficacious in clinical trial communication.

Moreover, empirical research has shown that interactive decision-aid tools on the web are successful in fulfilling patients' expectations. Interactive technologies may provide customized information that meets the decision-making requirements of patients (Carpentera, Studts & Byrne, 2011). For instance, compared to a website that does not allow user interaction, a website that provides interactive decision-aid enhanced patients' knowledge, self-efficacy, confidence about their choice, and clarity of their values (Politi, Kuzemchak, Kaphingst, Perkins, Liu & Byrne, 2016). Nevertheless, it remains uncertain if the inclusion of interactivity in information aids also promotes information sharing behaviors.

Consequently, annual public health awareness programmes are established to disseminate updated information on health hazards and associations for a designated duration, which might span from days to months. The prevalence of public awareness efforts has significantly

increased (National Health Observances, 2019). According to Shah and Robinson (2011), social media has the ability to gather information on the success of hospitals and medical practices based on the experiences of their patients. Furthermore, it is used in the field of health research and development. Social media platforms have been disseminating up-to-date news and information pertaining to current affairs. The purpose of this study was to provide information about COVID-19 in order to increase public awareness (Khamis & Geng, 2021). Individuals may use social media platforms as a means of obtaining assistance in effectively managing crises among pandemics. Users acquire knowledge pertaining to health concerns via the application of the Uses and Gratifications Theory (UGT) and Health Belief Model (HBM).

5.4 Contribution to The Academic Literature

This study used Social Capital Theory (Putnam, 1995) to develop its conceptual framework supported by Social Cognitive Theory (Albert Bandura) in the 1960s. Based on multivariate empirical examination, this study suggested that social networking sites have contributed significantly to increasing the volume, speed, and spread of health information, through the widespread use of these sites among almost all individuals and the ease of disseminating health information without the need to verify its credibility, in addition to the ability of individuals to interact with these platforms and the information published on them, which has contributed it has a significant impact on the level of health literacy among individuals, whether positively or negatively.

The experimental study also showed that the quality of health information spread on social networking sites contributes significantly to increasing the spread of this information, as visual information is much better than regular texts, given that visual information can be

represented by pictures, video, and audio, which contributes significantly. Social media users are attracted to it, which in turn leads to its spread and sharing more widely.

This study proves the theoretical relationship between perceived visual information and health literacy, considering that health visual information can convey the content of the message better than just plain text, through the use of various elements in the message, such as pictures and video, capable of attracting individuals' attention to what this message contains from advice or information.

Moreover, this study proves that the rise in popularity of social media has led to the emergence of novel methods for sharing and distributing information and news. They possess remarkable speed and effectiveness, and they have the ability to disseminate both straightforward and deceptive messages. In order to effectively compete in the digital market, it is essential to develop marketing materials that are tailored to the specific demographic being targeted and disseminate them via appropriate social media platforms. Optimally crafted content is crucial for a brand's digital presence as it enhances social media exposure, interaction, and website traffic. The involvement of proficient graphic designers in communication is crucial for achieving impactful visual communication.

5.5 Practical Implications

Given the exponential expansion of social media use, this research has significant ramifications for healthcare professionals. A health behavioral intents framework was developed by integrating the components of the health literacy skills framework with the social-cognitive approach.

The degree of health literacy has a significant impact on both self-efficacy and intentions related to health behaviors, underscoring the necessity of having a high level of health

literacy. The notion of health literacy is not widely embraced, and there is considerable variation in the quality of medical care supplied in Jordan, depending on the geographical locations. Therefore, it is crucial to enhance the health literacy level in Jordan to empower individuals with the capacity to make informed and precise decisions about their health. Considering the influence of age, individuals in our study who are between 25 and 35 years old might benefit from tailored treatments that include well assessed digital components in order to enhance their self-efficacy in health management through health interventions.

The study found a positive correlation between increased utilization of social media for health-related purposes and greater levels of self-efficacy and intentions to engage in health behaviors. This suggests that social media plays a significant role in shaping individuals' intentions to adopt healthy behaviors. Given that good experiences with health-related social media enhance the relationship between social media usage and self-efficacy in health, it is important for health practitioners and researchers to strive to enhance users' experiences with health information on social media platforms.

These results are significant for health academics who are interested in comprehending the aspects that impact the intention to use health information on social media platforms. This research offers valuable data for health message designers seeking to develop impactful health campaigns and disseminate precise and trustworthy health information on social media platforms. Future research should focus on specifically examining strategies to enhance health literacy levels and optimize user engagement with social media platforms, such as via the development of targeted health literacy education initiatives.

5.6 Limitations and Directions for Future Studies

Typically, the frequent use of social media is linked to the need for knowledge or emotional support, career advancement, social standing, self-assertion, and social engagement. Due to a rising consciousness of health in the general population, an increasing proportion of individuals are using social media platforms to search for and exchange health-related information. Social media platforms provide many multimedia features that go beyond text, enabling the dissemination of health information. This may be particularly beneficial for people with little health literacy, since it enhances their comprehension of health-related content. Health literacy encompasses individuals' understanding, motivation, and ability to obtain, comprehend, evaluate, and use health-related information for the purpose of making informed choices and decisions on healthcare, illness prevention, and health promotion, with the aim of enhancing or maintaining their overall well-being.

Accordingly, this study attempted to understand the relationship between Perceived Visual Informativeness and health literacy, in addition to identifying the mediating role of social media engagement on the relationship between perceived visual informativeness and health literacy. The results of the study showed that there is an effect of social media engagement and perceived visual informativeness on health literacy, in addition to the existence of a mediating role for the social media engagement on the relationship between perceived visual informativeness and health literacy.

One should take into account the constraints of this research. Initially, we used a convenience sample derived from social media platforms. The service used for promoting the survey link purported to distribute the survey post in a random manner. However, individuals who expressed interest in this research may possess some common characteristics, such as belonging to a younger demographic or having an interest in the subject matter.

Consequently, the sample did not accurately reflect the whole population of social media users, hence potentially restricting its applicability to other groups. The sample we used exhibited a bias towards younger groups. In subsequent research, other methods might be used to disseminate the survey, so ensuring a broader and more heterogeneous sample.

Furthermore, while we inquired about individuals' willingness to act upon the health information, we are unable to verify or evaluate the possible reliability of the information that would be acquired. Subsequent research should also take into account the trustworthiness of the sources and information provided as part of the results, particularly in terms of whether acting upon this knowledge would be advantageous for one's health. This is especially important in the internet realm, where there is a high prevalence of health misinformation.

Ultimately, this research aimed to examine the potential of social media use in predicting health-related behavioral intentions. In this study, we did not examine the reinforcing spiral structure of social media usage, despite past research indicating that social media use may be impacted by cognition and behaviors. This paradigm suggests that the use of media may have an impact on attitudes and behaviors, which in turn can alter media use patterns. According to this concept, media use may be a consequence of psychological processing and behaviors, and it can also have an impact on psychological and behavioral outcomes. Subsequent research should examine how social media use improves the ability to anticipate health-related behavioral intentions on social media platforms.

Moreover, according to the study findings, the study suggests that health organizations, particularly the World Health Organization, should priorities social media and utilize it to share accurate and reliable health information. This is especially important during times of health crises, as misinformation can have detrimental effects on individuals' awareness, knowledge, behaviors, and attitudes.

Furthermore, health institutions of all types should utilize diverse social media platforms to effectively engage with individuals and disseminate reliable health information. This is crucial given the growing reliance of many individuals on social media platforms as their primary source of information, including health-related information.

The present study also advocates for the imperative of doing thorough investigation and research on the determinants influencing health literacy, as well as the underlying causes that push people to depend on social media platforms for acquiring such information. Furthermore, it examines how the quality and design of health information shared on social media platforms affect consumers' inclination to seek out health information.

5.7 Conclusion

The rapid progress of information technology (IT) in recent years has had a positive impact on several areas of society, such as commerce, industry, and administration. The advent of digitalization, namely the proliferation of social networking platforms, has had a profound impact on people's lifestyles.

The influence of social media on public opinion is now so substantial and widespread that it has both positive and negative impacts. Simply said, social media has both benefits and drawbacks, similar to any other technological innovation. In this scenario, social media may be used to effectively modify individuals' attitudes and behaviors in a favorable manner.

Moreover, it has the potential to enhance the overall well-being of all those living in the vicinity. Social media platforms such as Facebook enhance public health awareness by sending users to websites operated by the World Health Organization (WHO). Furthermore, they argued that irresponsible utilization of social media might have adverse consequences on society, such as the dissemination of false information that can incite disputes and aggression.

A like tendency may be seen in health literacy. Subsequently, the notion of health literacy has been broadened to include the use of a more intricate and interrelated array of abilities, such as reading and reacting to written health information, articulating one's requirements to healthcare professionals, and interpreting medical directives. Health literacy has traditionally been described as the capacity to comprehend and use numerical and textual information within a medical context.

Disseminating information on the consequences and impacts of the pandemic to the broader public is crucial in all emergency scenarios. Thus, social media may be used proficiently to provide health information to a broader demographic. During infectious pandemics such as H1N1 and COVID-19, there is often a significant increase in the public's use and consumption of various media types.

During infectious pandemics, the occurrence of physical contact is very rare due to the ongoing hazards of illness transmission. An example of this is how the global lockdown during the COVID-19 pandemic hindered in-person interactions, leading to a substantial rise in virtual communication. Nevertheless, social media has shown to be the most effective tool for intercultural communication. Social media has notably contributed to a substantial improvement in the general public's comprehension of the impacts and necessary safeguards regarding the coronavirus pandemic. In addition, social media has shown high efficacy in teaching and informing healthcare personnel.

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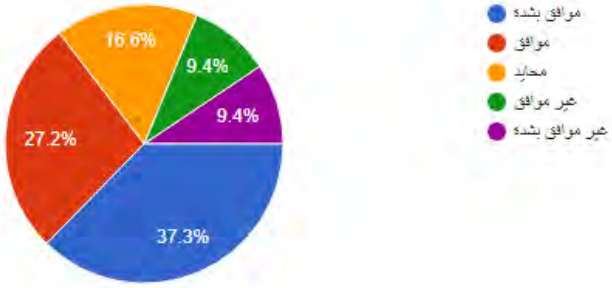
Appendixes

Appendix 1

Google Form

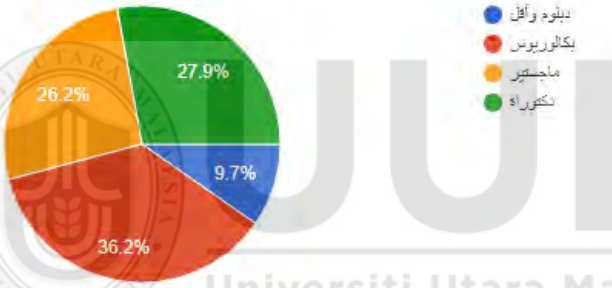
المعلومات المرئية على صفحات Facebook موثوقة.

415 ردًا



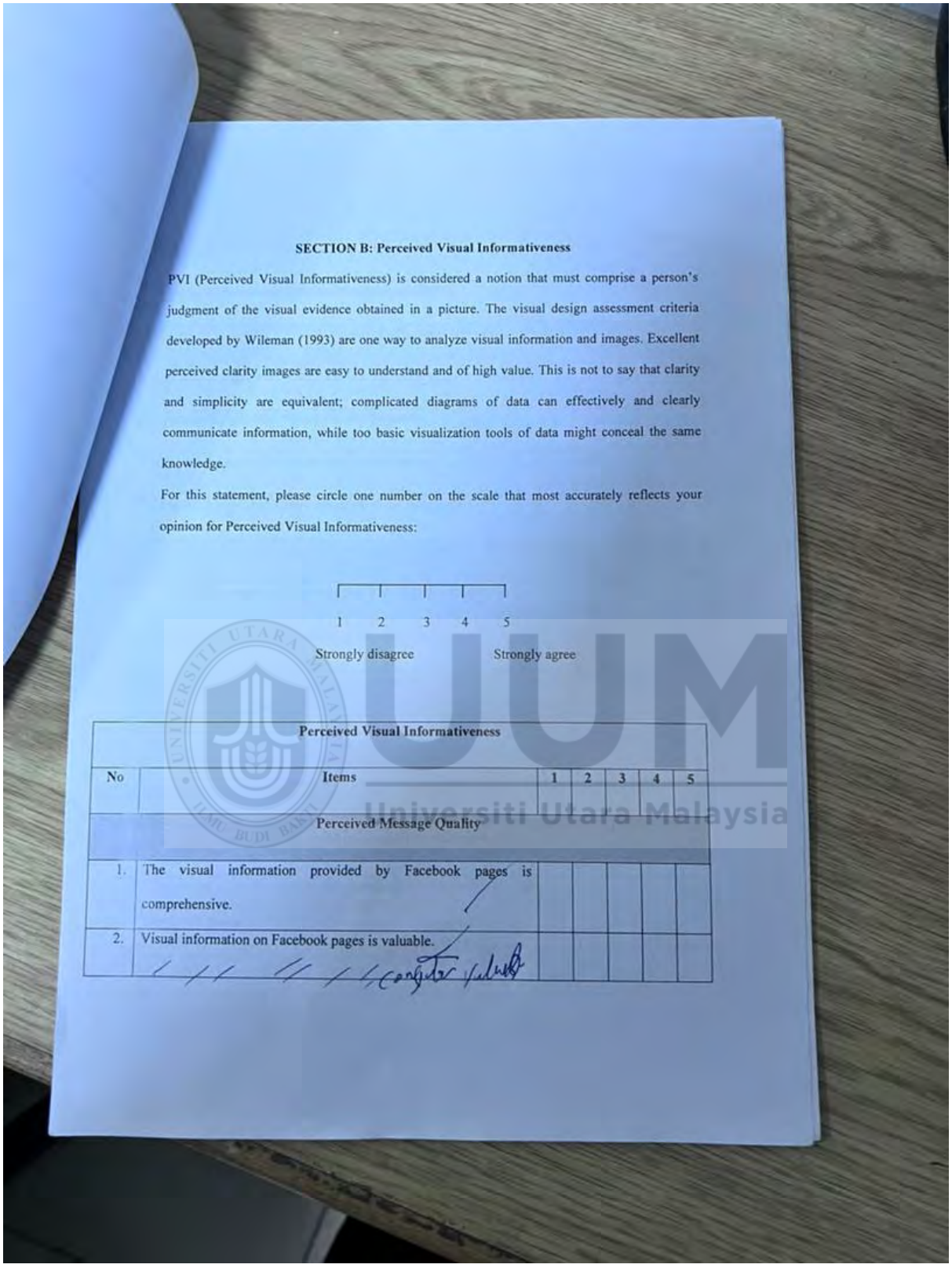
المستوى التعليمي

423 ردًا



Appendix 2

Content Validity



SECTION B: Perceived Visual Informativeness

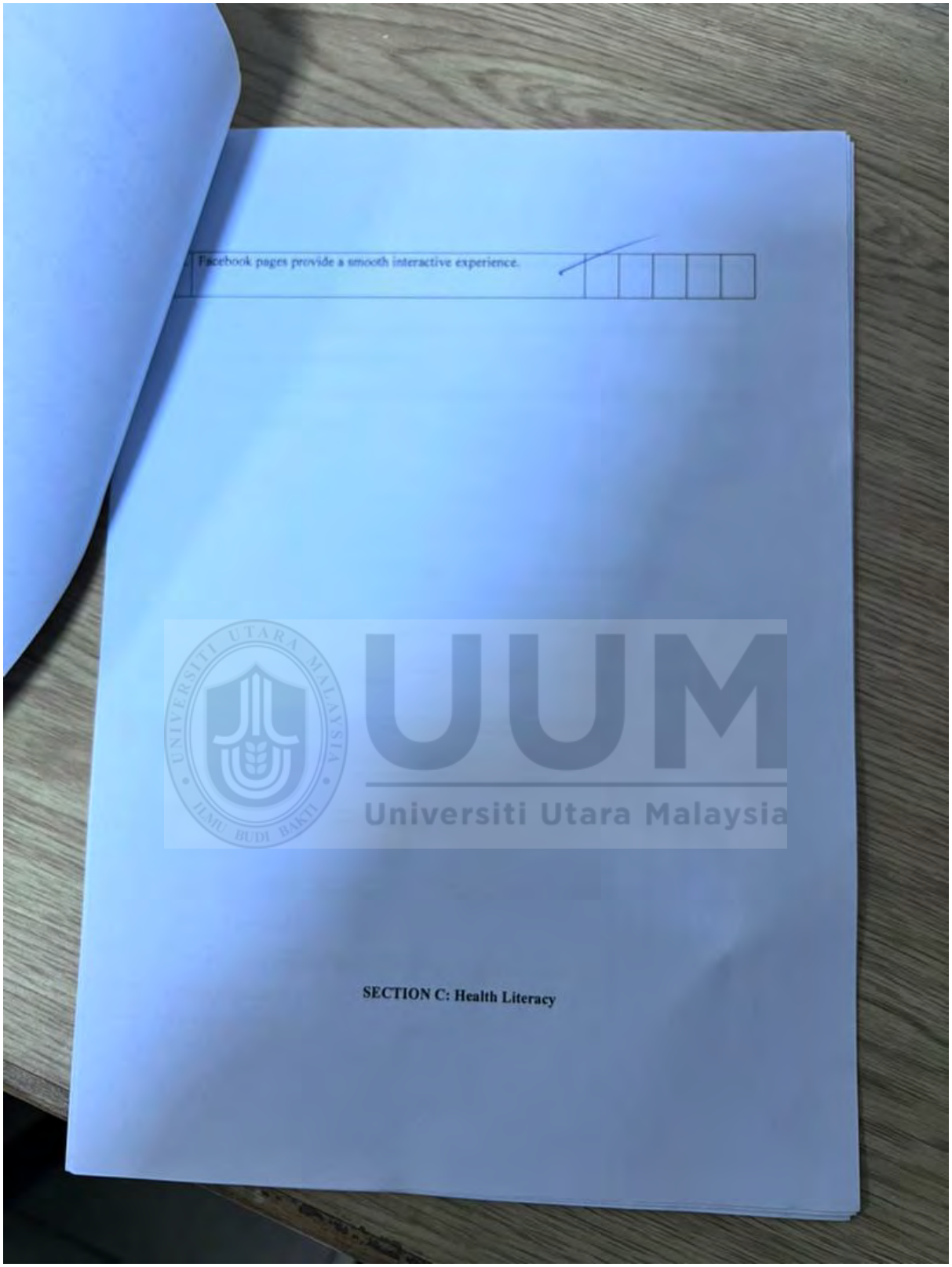
PVI (Perceived Visual Informativeness) is considered a notion that must comprise a person's judgment of the visual evidence obtained in a picture. The visual design assessment criteria developed by Wileman (1993) are one way to analyze visual information and images. Excellent perceived clarity images are easy to understand and of high value. This is not to say that clarity and simplicity are equivalent; complicated diagrams of data can effectively and clearly communicate information, while too basic visualization tools of data might conceal the same knowledge.

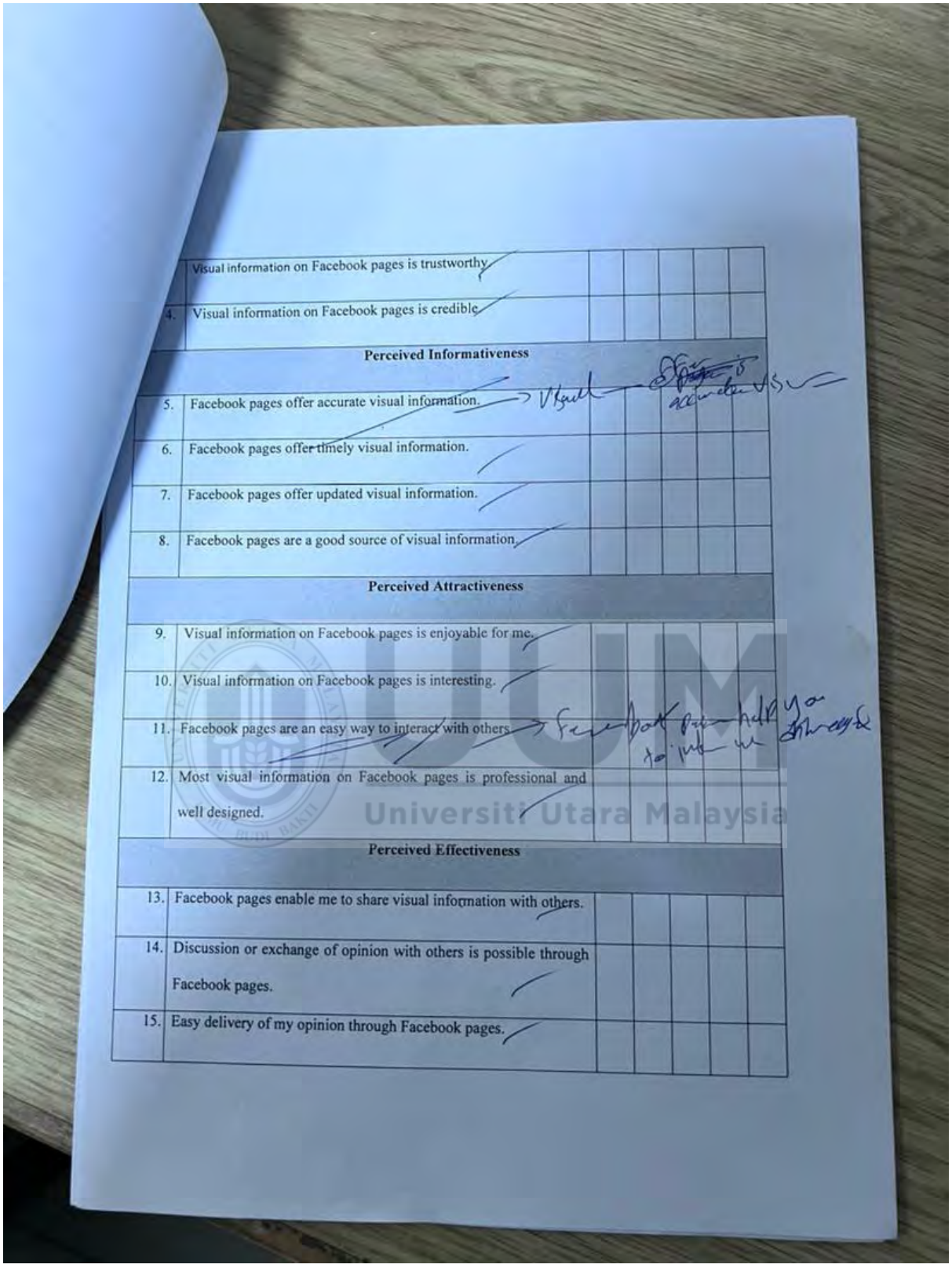
For this statement, please circle one number on the scale that most accurately reflects your opinion for Perceived Visual Informativeness:

1 2 3 4 5

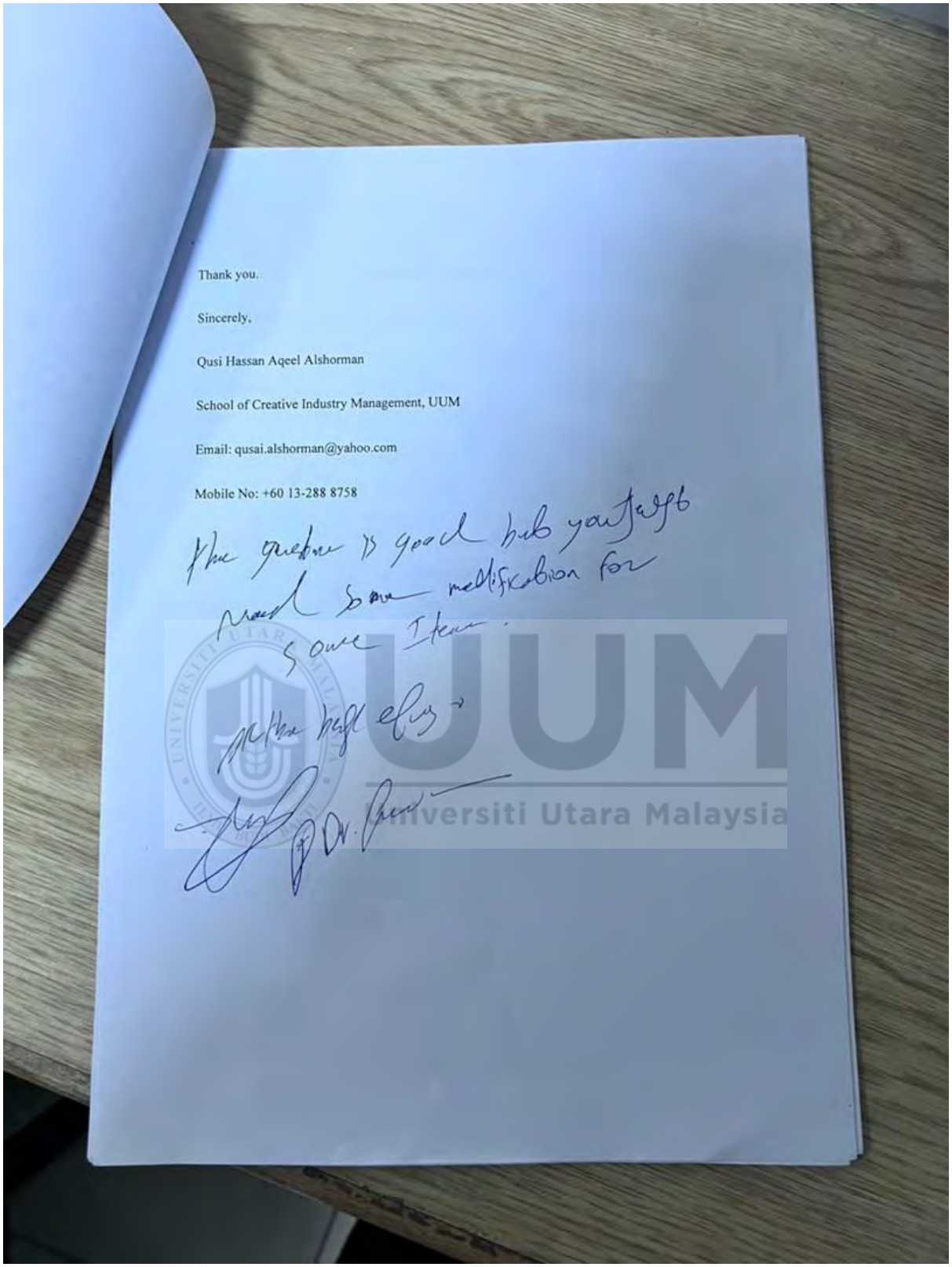
Strongly disagree Strongly agree

Perceived Visual Informativeness						
No	Items	1	2	3	4	5
	Perceived Message Quality					
1.	The visual information provided by Facebook pages is comprehensive.					
2.	Visual information on Facebook pages is valuable.					





3.	Visual information on Facebook pages is trustworthy.					
4.	Visual information on Facebook pages is credible.					
	Perceived Informativeness					
5.	Facebook pages offer accurate visual information.					
6.	Facebook pages offer timely visual information.					
7.	Facebook pages offer updated visual information.					
8.	Facebook pages are a good source of visual information.					
	Perceived Attractiveness					
9.	Visual information on Facebook pages is enjoyable for me.					
10.	Visual information on Facebook pages is interesting.					
11.	Facebook pages are an easy way to interact with others.					
12.	Most visual information on Facebook pages is professional and well designed.					
	Perceived Effectiveness					
13.	Facebook pages enable me to share visual information with others.					
14.	Discussion or exchange of opinion with others is possible through Facebook pages.					
15.	Easy delivery of my opinion through Facebook pages.					



Thank you.

Sincerely,

Qusi Hassan Aqeel Alshorman

School of Creative Industry Management, UUM

Email: qusai.alshorman@yahoo.com

Mobile No: +60 13-288 8758

The questions is good but you left
need some modification for
some Items.

All the best Dr.

TO WHOM IT MAY CONCERN

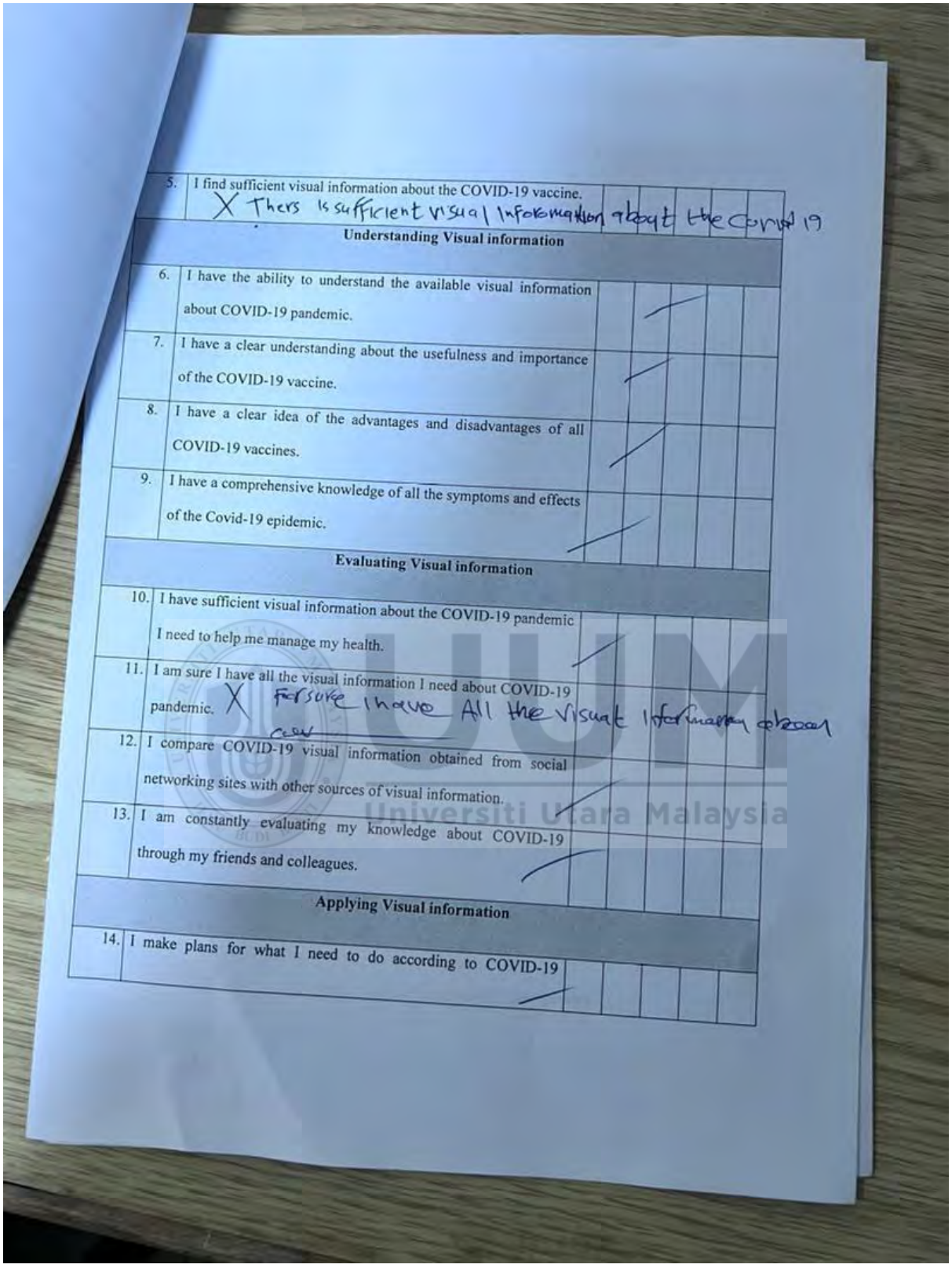
The Impact of Perceived Visual Informativeness on Health Literacy: The Role of Social MediaEngagement

Referring to the above matter, we would appreciate if you could help us in achieving our research endeavor.

I am a Ph.D candidate at the Universiti Utara Malaysia (UUM) and currently conducting a survey for my thesis entitled (The Impact of Perceived Visual Informativeness on Health Literacy: The Role of Social Media Engagement). This study aims to examine the role of Social Media engagement in explaining the relationship between perceived visual informativeness and Health literacy. The results of this study will contribute to understanding the relationship between perceived visual informativeness and health literacy, and the nature of the impact of perceived visual informativeness on increasing people's awareness about health crises such as the Covid-19 pandemic, in addition to that this study will contribute to understanding the impact of social media in general and Facebook in particular. On the relationship between perceived visual informativeness and health literacy.

I would appreciate if you could assist me by filling up this survey which includes four sections and 52 paragraphs, and requires 30-35 minutes to answer them.

Your kind cooperation in this matter is extremely important in making this research endeavor successful. The findings of the study would provide important insights and would be useful in planning strategic plan of actions that would help Jordanian Health Ministry and Health institutions around the world to take a suitable decision for using social media and visual informativeness.



5.	I find sufficient visual information about the COVID-19 vaccine. X Thers is sufficient visual information about the Covid 19					
	Understanding Visual information					
6.	I have the ability to understand the available visual information about COVID-19 pandemic.		✓			
7.	I have a clear understanding about the usefulness and importance of the COVID-19 vaccine.		✓			
8.	I have a clear idea of the advantages and disadvantages of all COVID-19 vaccines.		✓			
9.	I have a comprehensive knowledge of all the symptoms and effects of the Covid-19 epidemic.		✓			
	Evaluating Visual information					
10.	I have sufficient visual information about the COVID-19 pandemic I need to help me manage my health.		✓			
11.	I am sure I have all the visual information I need about COVID-19 pandemic. X Forsure I have All the visual information about cow					
12.	I compare COVID-19 visual information obtained from social networking sites with other sources of visual information.		✓			
13.	I am constantly evaluating my knowledge about COVID-19 through my friends and colleagues.		✓			
	Applying Visual information					
14.	I make plans for what I need to do according to COVID-19		✓			

TO WHOM IT MAY CONCERN

The Impact of Perceived Visual Informativeness on Health Literacy: The Role of Social MediaEngagement

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Appendix 3

The Study Instrument

TO WHOM IT MAY CONCERN

The Impact of Perceived Visual Informativeness on Health Literacy: The Role of Social Media Engagement

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I am a Ph.D. candidate at the University Utara Malaysia (UUM) and currently conducting a survey for my thesis entitled (The Impact of Perceived Visual Informativeness on Health Literacy: The Role of Social Media Engagement). This study aims to examine the role of Social Media engagement in explaining the relationship between perceived visual informativeness and Health literacy. The results of this study contributed to understanding the relationship between perceived visual informativeness and health literacy, and the nature of the impact of perceived visual informativeness on increasing people's awareness about health crises such as the Covid-19 pandemic, in addition to that this study contributed to understanding the impact of social media in general and Facebook in particular. On the relationship between perceived visual informativeness and health literacy.

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institutions around the world to take a suitable decision for using social media and visual informativeness.

Thank you.

Sincerely,

Qusi Hassan Aqeel Alshorman

School of Creative Industry Management, UUM

Email: qusai.alshorman@yahoo.com

Mobile No: +60 13-288 8758

SECTION A: DEMOGRAPHICS

Please fill in the blank or tick (✓) the appropriate response.

1 Gender: a) Male ( ) b) Female ( )

2 Age: ……..

3 Education Level:
a) Diploma and less ( )
b) Bachelor's ( )
c) Master ( )
d) PhD ( )

4 Do you use Facebook:
a) Yes ( )
b) No ( )

SECTION B: Perceived Visual Informativeness

PVI (Perceived Visual Informativeness) is considered a notion that must comprise a person's judgment of the visual evidence obtained in a picture. The visual design assessment criteria developed by Wileman (1993) are one way to analyze visual information and images. Excellent perceived clarity images are easy to understand and of high value. This is not to say that clarity and simplicity are equivalent; complicated diagrams of data can effectively and clearly communicate information, while too basic visualization tools of data might conceal the same knowledge.

For this statement, please circle one number on the scale that most accurately reflects your opinion for Perceived Visual Informativeness:

Perceived Visual Informativeness						
No	**Items**	**1**	**2**	**3**	**4**	**5**
Perceived Message Quality						
1.	The visual information provided by Facebook pages is comprehensive.					
2.	Visual information on Facebook pages is valuable.					
3.	Visual information on Facebook pages is trustworthy.					

4.	Visual information on Facebook pages is credible.					
Perceived Informativeness						
5.	Facebook pages offer accurate visual information.					
6.	Facebook pages offer timely visual information.					
7.	Facebook pages offer updated visual information.					
8.	Facebook pages are a good source of visual information.					
Perceived Attractiveness						
9.	Visual information on Facebook pages is enjoyable for me.					
10.	Visual information on Facebook pages is interesting.					
11.	Facebook pages are an easy way to interact with others.					
12.	Most visual information on Facebook pages is professional and well designed.					
Perceived Effectiveness						
13.	Facebook pages enable me to share visual information with others.					
14.	Discussion or exchange of opinion with others is possible through Facebook pages.					
15.	Easy delivery of my opinion through Facebook pages.					
16.	Facebook pages provide a smooth interactive experience.					

SECTION C: Health Literacy

Health literacy is an individual's ability to read and understand how healthcare information is used to make treatment decisions. Health literacy has several definitions; this is partly because healthy enlightenment includes both the context in which its requirements are made and the skills that people bring into those contexts.

For this statement, please circle one number on the scale that most accurately reflects your opinion for Health Literacy:

1 2 3 4 5

Strongly disagree Strongly agree

Health Literacy						
No	**Items**	**1**	**2**	**3**	**4**	**5**
Finding Visual information						
1.	I found much visual information related to COVID-19 pandemic.					
2.	It's easy to find sufficient visual information about the COVID-19 pandemic.					
3.	I have the ability to identify good visual information about COVID-19 pandemic.					
4.	There are many reliable sources of visual information about COVID-19 pandemic.					

5.	I find sufficient visual information about the COVID-19 vaccine.					
Understanding Visual information						
6.	I have the ability to understand the available visual information about COVID-19 pandemic.					
7.	I have a clear understanding about the usefulness and importance of the COVID-19 vaccine.					
8.	I have a clear idea of the advantages and disadvantages of all COVID-19 vaccines.					
9.	I have a comprehensive knowledge of all the symptoms and effects of the Covid-19 epidemic.					
Evaluating Visual information						
10.	I have sufficient visual information about the COVID-19 pandemic I need to help me manage my health.					
11.	I am sure I have all the visual information I need about COVID-19 pandemic.					
12.	I compare COVID-19 visual information obtained from social networking sites with other sources of visual information.					
13.	I am constantly evaluating my knowledge about COVID-19 through my friends and colleagues.					
Applying Visual information						
14.	I make plans for what I need to do according to COVID-19 pandemic visual information.					
15.	I chose the type of COVID-19 vaccine based on the visual					

	information I had about vaccines.					
16.	The visual information I have helps me take appropriate protective measures against COVID-19.					
17.	I take all precautionary measures (wearing a mask and washing hands) to avoid infection with Covid-19.					

SECTION D: Social Media Engagement

Social media is considered an essential means of connection that allows for the growth and transmission of data to individuals online. It is worth indicating that social news networks enable people and groups to share information about any issue or concern, even if they are a minority or unaware of other methods of expression.

For this statement, please circle one number on the scale that most accurately reflects your opinion for Facebook Engagement:

1 2 3 4 5

Strongly disagree Strongly agree

Social Media Engagement						
No	**Items**	**1**	**2**	**3**	**4**	**5**
Seeking Visual information						
1.	Facebook is a good source of visual information about COVID-19.					
2.	Facebook is a good source of updated visual information related to COVID-19.					
3.	Facebook site provides visual information related to COVID-19 pandemic.					
4.	Use Facebook sites to get detailed visual information about COVID-19 issue that interests me.					

5.	I use Facebook to search for recommendations and suggestions that help me make decisions about COVID-19 pandemic.					
	Content Trust					
6.	I think the Facebook visual information, news and advertisements about COVID-19 are convincing.					
7.	I think everything posted on Facebook related to COVID-19 is believable					
8.	I think the content of Facebook pages that related to COVID-19 is trustworthy					
9.	Facebook pages offer accurate visual information on COVID-19 topic.					
10.	The visual information provided by Facebook pages about COVID-19 are comprehensive and useful					
	Behavior Change					
11.	Generally, I prefer news and visual information about COVID-19 from Facebook.					
12.	I behave as recommended by my friends on Facebook sites.					
13.	My actions are affected by visual information spread on Facebook about COVID-19.					
14.	Some of my decisions about COVID-19 were based on Facebook.					
15.	I feel like Facebook has changed a lot of my daily behavior during COVID-19 pandemic.					

Appendix 4

Table 4. 27 Test of normality using skewness and Kurtosis of items

Variable	Dimensions	Items	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
Perceived Visual Informativeness	Perceived Message Quality	PMQ1	.838	.126	.239	.251
		PMQ2	.604	.126	-.185	.251
		PMQ3	.645	.126	-.261	.251
		PMQ4	.713	.126	-.094	.251
	Perceived Informativeness	PI1	.312	.126	-.551	.251
		PI2	.215	.126	-.644	.251
		PI3	.342	.126	-.540	.251
		PI4	.393	.126	-.430	.251

	Perceived Attractiveness	PA1	.467	.126	-.228	.251
		PA2	.198	.126	-.257	.251
		PA3	.979	.126	.677	.251
		PA4	.886	.126	.351	.251
	Perceived Effectiveness	PE1	.960	.126	.527	.251
		PE2	1.006	.126	.248	.251
		PE3	.964	.126	.126	.251
		PE4	.743	.126	-.015	.251
Health Literacy	Finding Visual information	FVI1	.707	.126	-.231	.251
		FVI2	.821	.126	.124	.251
		FVI3	.673	.126	-.055	.251

		FVI4	.575	.126	-.111	.251
		FVI5	.322	.126	-.328	.251
	Understanding Visual information	UVI1	.486	.126	-.299	.251
		UVI2	.295	.126	-.399	.251
		UVI3	.526	.126	-.240	.251
		UVI4	.327	.126	-.299	.251
	Evaluating Visual information	EVI1	.559	.126	-.037	.251
		EVI2	.516	.126	-.135	.251
		EVI3	.471	.126	-.394	.251
		EVI4	.437	.126	-.364	.251
	Applying Visual	AVI1	.557	.126	-.227	.251

	information	AVI2	.808	.126	.363	.251
		AVI3	.694	.126	-.232	.251
		AVI4	.677	.126	-.195	.251
Social Media Engagement	Seeking Visual information	SVI1	.090	.126	-.554	.251
		SVI2	.079	.126	-.512	.251
		SVI3	.054	.126	-.647	.251
		SVI4	.049	.126	-.664	.251
		SVI5	.042	.126	-.635	.251
	Content Trust	CT1	-.134	.126	-.490	.251
		CT2	-.201	.126	-.349	.251
		CT3	-.052	.126	-.287	.251

		CT4	.164	.126	-.712	.251
		CT5	.154	.126	-.652	.251
	Behavior Change	BC1	-.158	.126	-.187	.251
		BC2	-.151	.126	-.188	.251
		BC3	.171	.126	-.458	.251
		BC4	-.530	.126	.443	.251
		BC5	-.298	.126	-.139	.251

Table 4. 28 Total variance explained for Harman's single factor test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.685	36.844	36.844	17.685	36.844	36.844
2	3.603	7.506	44.350	3.603	7.506	44.350
3	2.993	6.235	50.586	2.993	6.235	50.586
4	1.662	3.463	54.049	1.662	3.463	54.049
5	1.404	2.926	56.975	1.404	2.926	56.975
6	1.141	2.377	59.352	1.141	2.377	59.352
7	1.047	2.181	61.533	1.047	2.181	61.533
8	1.000	2.084	63.617	1.000	2.084	63.617

9	.927	1.931	65.548			
10	.816	1.699	67.247			
11	.800	1.667	68.914			
12	.779	1.623	70.537			
13	.709	1.478	72.015			
14	.664	1.384	73.399			
15	.635	1.323	74.721			
16	.620	1.292	76.013			
17	.592	1.234	77.247			
18	.585	1.219	78.466			
19	.561	1.170	79.636			

20	.554	1.153	80.789			
21	.508	1.058	81.847			
22	.492	1.025	82.872			
23	.482	1.004	83.877			
24	.462	.962	84.839			
25	.461	.960	85.799			
26	.441	.918	86.717			
27	.432	.899	87.616			
28	.400	.833	88.449			
29	.389	.811	89.261			
30	.385	.801	90.062			

31	.369	.768	90.830			
32	.360	.750	91.579			
33	.341	.711	92.290			
34	.321	.668	92.958			
35	.317	.659	93.618			
36	.304	.634	94.251			
37	.298	.621	94.873			
38	.282	.587	95.460			
39	.270	.563	96.023			
40	.253	.527	96.550			
41	.246	.512	97.062			

42	.244	.509	97.570			
43	.228	.475	98.045			
44	.215	.448	98.493			
45	.198	.413	98.906			
46	.195	.405	99.312			
47	.174	.363	99.675			
48	.156	.325	100.000			
Extraction Method: Principal Component Analysis.						