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# Social Media

## Opportunities and Risks

*Edited by Shafizan Mohamed  
and Shazleen Mohamed*





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Edited by Shafizan Mohamed and Shazleen Mohamed

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# Meet the editors



Shafizan Mohamed is an Associate Professor of Media and Communications at the International Islamic University Malaysia. With a wealth of expertise in the field, she has dedicated her career to the study and teaching of media and communications. She holds a deep passion for exploring the intricate dynamics of media in contemporary society, examining its role in shaping cultures, opinions, and perceptions. Her research contributions have enriched academic discourse, covering a wide spectrum of topics, including the impact of social media, political communication, health communication, and media literacy. Her commitment to education extends beyond the classroom, as she nurtures the intellectual growth of future media professionals and scholars. Aside from teaching and research, she loves food, music, and exploring social media.



Shazleen Mohamed commenced her career in media and communication as an assistant producer at Radio Televisyen Malaysia (RTM) before progressing to producing multiple television programs for Malaysia's TV3. Recognizing the importance of education and sharing her expertise, Dr. Mohamed embarked on her journey as a dedicated full-time lecturer at the Faculty of Communication and Media Studies, Universiti Teknologi MARA (UiTM), Malaysia, in 2002. Over the past 21 years, she has ardently devoted herself to the field of education, inspiring and nurturing the next generation of communication and media professionals. Dr. Mohamed's areas of specialization include broadcasting, children and media, human communication, and corporate communication. Her comprehensive knowledge and passion for these disciplines have made her a respected authority in the academic community. Currently, she holds the esteemed position of Deputy Dean for Academic Affairs, reflecting her leadership and dedication to the academic institution and its mission of fostering excellence in communication and media studies.





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*by Elena Soto-Vega, Samia Gómez Gómez, María Fernanda Pérez-Zepeda  
and Genesis Marielle Salgado Solís Salgado*

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# Preface

In this era of technology, we find ourselves deeply intertwined in a vast network of digital connections. It's incredible how a few clicks can bring us access to a wealth of information while simultaneously exposing our lives to a global audience. At the core of this interconnected landscape lies social media, a phenomenon that has completely revolutionized our way of communication, business interactions, and navigation in the digital age. This book, *Social Media – Opportunities and Risks*, takes you on an exploration of this digital frontier—a guided expedition through the potential advantages and dangers that social media presents for individuals, businesses, and society.

Undoubtedly, the power wielded by social media is undeniable, as it offers unparalleled opportunities for individuals to connect with others and share their thoughts and experiences while amplifying their voices. As we embark on this journey within the pages of this book, we have divided it into two distinct sections—each representing the contesting nature inherent in social media: “Embracing Opportunities” and “Managing Risks.”

## **Embracing Opportunities**

The first section invites you to delve into the side of social media where innovation thrives and connections flourish. We kick off our exploration in Chapter 1 by delving into the world of small- and medium-sized enterprises (SMEs) as they embrace social media platforms for e-commerce purposes. Here you will see how the Internet has made it possible for even the smallest businesses to thrive thanks to platforms that have democratized commerce.

Next, in Chapter 2, we delve into the heart of Sub-Saharan Africa, where social media is reshaping lives, economies, and cultures. In this section you will come across an analysis of resilience and transformation. Social media has become a tool for community building, entrepreneurship, and driving social change.

But social media is not just about business and activism, it is also about personal expression and presentation. Chapter 3, explores the intricate dance of self-presentation on social media platforms and its profound impact on personal branding. We will unravel the art of projecting an image, balancing authenticity with the desire to present our best selves in the digital realm.

In the final chapter of this section, we step into the realm of digital education. Here, you will understand how social media is transforming learning and skill development. As you read further, you'll discover possibilities offered by digital platforms to democratize knowledge and create lifelong learning opportunities.

## **Managing Risks**

After exploring the sunny horizons of social media in the first section, it is equally important to acknowledge the potential dangers and risks that also exist in the digital realm.

The risks and the benefits associated with social media are examined in Chapter 5 in the context of COVID-19 and the war in Ukraine. The chapter offers insights into the intricate dynamics that control our digital connections and how they can have significant effects, both positive and negative.

Recent events during the COVID-19 pandemic have also emphasized the importance of understanding misinformation and disinformation. In Chapter 6, we dive into individuals' thoughts as they grapple with amounts of information, misinformation, and disinformation. It is a journey through the lens of people—a reminder of how we all share responsibility in this era of digital information.

The section concludes with a thought-provoking lesson on misinformation during the onset of COVID-19. Chapter 7, serves as a call to action urging readers to become consumers of information while promoting media literacy and fostering critical thinking skills.

As you begin this journey exploring the various aspects of social media, We encourage you to approach each chapter with an open mind, curiosity, and a critical perspective. Social media is not an entity; it reflects our society in all its complexities and contradictions. This book aims to provide you with the knowledge and insight needed to navigate the landscape wisely and thoughtfully.

We would like to express my gratitude to all the contributors and experts who have generously shared their valuable insights and experiences in making this book possible. Our hope is that the following pages serve as a resource for individuals looking to harness the potential of social media, businesses aiming to thrive in the digital era, and anyone seeking informed choices in a world where connectivity and information are readily available at our fingertips.

Thank you for joining us on this exploration of social media's intricate tapestry. Together let us navigate these currents with an understanding that although challenges may arise along the way there are limitless opportunities for growth, connection, and positive transformation.

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## Section 1

# Opportunities and Benefits





## Chapter 1

# Adoption of Web 2.0 Social Media eCommerce in SMEs: Conceptualising Theories and Factors for Zambia

*Alice P.S. Shemi*

### Abstract

The application of Web 2.0 social media in eCommerce and e-marketplaces (ECEMs) in developing countries has been on the increase in recent times especially during Covid19 and beyond. However, it is still unclear what theoretical foundations and factors guide ECEM in small and medium enterprises (SMEs) in emerging markets such as Zambia. Generally, the understanding of eCommerce using Web 2.0 social media applications (WSMAs) in SMEs has lacked rigour over time as focus has shifted to pressing issues such as Covid19. This paper purposes to investigate the theoretical foundations and factors influencing WSMA for new eCommerce era in developing countries with particular emphasis on SMEs in Zambia. The methodological research design employs a qualitative study approach using literature reviews, coupled with content analysis of purposively selected articles. Results show that theories such as TAM, TPB, UTAUT2, TOE, TTF, DIT, among others, have guided eCommerce research in SWMA. Behavioural, technological and organisational factors such as trust, ease of use, after-sales logistics, price flexibility have been prevalent, among others. The paper ends with recommendations and strategies for continued adoption of WSMA by SMEs with similar geographical contexts to Zambian context.

**Keywords:** web 2.0 eCommerce, SMEs, developing countries, theories, factors

## 1. Introduction

### 1.1 Background and context of study

Since the onset of Covid19 and its aftermath, many organisations and individuals alike have resorted to more indoor engagements, and as such, the application of social media technologies and eCommerce has been on the increase in business and government activities worldwide. Researchers assert that social media applications will have an increased role in the integration of eCommerce in organisations worldwide [1–3]. The features of the web, now commonly known as Web 2.0, include advanced Internet technology and applications, blogs, wikis, podcasting, RSS and social

networks [4] making it a compelling position for SMEs in developing countries and in the Southern African context. Small and medium enterprises (SMEs) globally are of particular interest due to the significant contribution they make to the economies of their countries.

The development of eCommerce in the SME fraternity, globally, is of particular interest to most economies in the world. For SMEs in developing countries, reaching external markets has been a serious challenge adding on to the already existing lack of ICT infrastructure and lack of ICT skills [5]. In this study, therefore, the rationale is to leverage the power of Web 2.0 social media applications (WSMAs). Particularly, [5] noted that WSMA can leverage consumer eCommerce experiences of SMEs in developing countries and other regions of the world that exhibit similar geographical characteristics.

Extant literature has discussed how the proliferation of social media can aid in spreading ideas, forming impressions and changing the purchasing intentions of the intended audience [6]. The definition of eCommerce is deemed as the sale and purchase of goods and services through the internet in exchange for money and data transfer to complete the transactions [6]. eCommerce is at the forefront of transforming marketing strategies, based on new technologies, and facilitates product information and improved decision-making [6]. Furthermore, eCommerce can be succinctly defined as ‘buying, selling and marketing on the Internet’ according to [6]. The context of this study extends the normal eCommerce into an advanced form that incorporates social media and Web 2.0 technology. This is usually referred to as social commerce or s-commerce [6, 7]. This study adopts a more accommodative definition of eCommerce that incorporates the use of social media when the SMEs engage with social media technologies in static as well as in mobile locations to facilitate their mobility, commonly known as mobile commerce [7].

Developing countries especially in Sub-Sahara Africa have in the recent years experienced technological growth and a rise in the use of eCommerce platforms, especially during the Covid19 pandemic. Social media platforms have been used to engage in various kinds of communication with the ease of providing more information and variations [8]. Common social media applications that are of interest in this study include Facebook, Whatsapp, Twitter, Youtube, LinkedIn, Instagram and Pinterest [7, 8]. It is argued that SMEs in developing countries could leverage their business position to improve eCommerce opportunities by employing social media applications. According to Kapoor *et al.*, [8], social media provides various interactions that can result in a rich social structure for the benefit of all its stakeholders. The versatility to engage in advanced Web 2.0 eCommerce may favour large companies as compared with small enterprises as noted by Rahayu and Day [9].

The context of this study is Zambia, a landlocked country located in Southern Africa. Neighbouring countries include Angola, the Democratic Republic of the Congo, Malawi, Mozambique, Namibia, Tanzania and Zimbabwe. The geography of the country is mostly high plateau with some mountains. The government system is a republic; the chief of state and head of government is the president. Zambia has a mixed economy in which there is a variety of private freedom, combined with centralised economic planning and government regulation. Zambia is a member of the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC) (<https://globaledge.msu.edu/countries/zambia>). Like many other developing and emerging economies, the Zambian government policies are becoming more and more favourable for SMEs who are the largest provider of employment and contributor to the nation’s Global Development Product



(GDP). There has been specific emphasis by the new government on SMEs' activities after a new political party took office in August 2021. There is a new ministry in charge of SMEs which implies that there is more hope to improve business activities of the SME sector.

SMEs generally walk a lonely terrain as there are several challenges that inhibit the growth of eCommerce. Generally, a perennial lack of finance has been experienced by many Zambian SMEs in rural and urban areas. For the majority of SMEs in Zambia, WSMA eCommerce is still in its infancy although there are few cases of progressive development in selected locations across the country. Some challenges inhibiting progress are similar to those described in previous studies and cited by Haji [10], such as the following: 1) limited physical infrastructure; 2) poor access to goods and services; 3) limited economic opportunities; 4) lack of human capital; 5) low population densities in the most remote and rural areas; 6) lack of financial inclusion and challenges for e-payment; and 7) lack of trust and e-commerce consumer protection. Ahuja and Khazanchi [11] have noted that social media can assist to alleviate peculiar challenges and close the gap between user interactions and channel preferences on a global perspective.

## **1.2 Problem statement and research questions**

Social media is arguably one of the best online marketing strategies due to its vast audience [8, 11] and possibly benefiting in popularity due to the Covid19 pandemic. According to Curzi et al., [12], the affirmation of social media platforms has radically changed customers purchasing habits and the way businesses develop their e-commerce sites. Indeed, e-vendors no longer invest money exclusively on advertisements on their eCommerce platforms; rather there is a fierce online competition among companies promoting their goods and services on social media channels [12]. In addition, it is believed that social media facilitates social interaction among customers, leading to increased *trust* and *intention to buy* [12]. Notably, researchers [12] have shown how social media influences the e-commerce decision making. However, the theoretical underpinning of Web 2.0 eCommerce applications in SMEs in developing countries and in Zambia is little understood and still unclear. Furthermore, it is not known whether theories and models have a strong position to enhance our understanding of Web 2.0 eCommerce adoption in SMEs, to follow in the argument of Idris [13]. Furthermore, there has been scattered information in the research literature regarding the advances of Web 2.0 eCommerce in SMEs especially pertaining to behavioural, technological, organisational issues affecting (WSMA) development in developing country SMEs. Given this background, the research questions (RQs) being posed therefore are the following:

RQ1: What theories and models of eCommerce adoption research enhance the understanding of Web 2.0 eCommerce in Zambian SMEs?

RQ2: What factors affect Web 2.0 eCommerce adoption in a developing country context such as SMEs?

In view of the above research questions, the objectives of this study are as follows:

- i. To determine the theories and models that have guided Web 2.0 eCommerce adoption research in SMEs.
- ii. To determine the factors that affect Web 2.0 eCommerce adoption in developing country SMEs.

In seeking to answer the above research questions, this study will follow the qualitative inquiry in WSMA as a way of extending and contributing to Information Systems research in a developing country context. Hence, the research questions intend to stimulate understanding that goes beyond the current literature but answers to the meaning of what social relationships are formed in the wake of Web 2.0 eCommerce adoption.

The rest of this paper is organised as follows. Section 2 presents a review of literature on the theoretical underpinnings in Web 2.0 eCommerce adoption in the global and developing country SMEs. Furthermore, specific applications of these theories and models are also discussed in this Section. Section 2 also provides a review of the factors that affect Web 2.0 eCommerce adoption in view of social media development. The research methodology is discussed in Section 3, whereas the results and findings are discussed in Section 4. The discussion of findings is presented in Section 5. The conclusion and recommendations of the study are presented in Section 6 to close this paper.

## **2. Review of related literature**

### **2.1 Theoretical foundations of WSMA**

#### *2.1.1 The technology acceptance model*

A key theory widely used in information technology adoption literature is the Technology Acceptance Model (TAM). TAM was developed by Davis [14] to explain the user adoption of technology in organisations. TAM posits that two factors, perceived usefulness and perceived ease of use, are the two main determinants of system usage in organisations [15]. Furthermore, it is asserted that the systems designer has some degree of control on these two factors. In TAM, *Perceived Usefulness (PU)* is defined as the degree to which an individual believes that using a particular system would enhance his or her job performance, whereas *Perceived Ease of Use (PEOU)* is the degree to which an individual believes that using a particular system would be free of physical and mental effort [15]. In the application of TAM in WSMA in eCommerce environments, Mou and Benyoucef [16] applied TAM in a meta-analytic study that investigated consumer behaviour in social commerce which is an aspect of eCommerce. The authors [16] compared different theoretical frameworks and found the variables from TAM, in combination with other models to be useful in determining eCommerce adoption. Therefore, TAM can be applied in developing country contexts in SMEs environment to provide insights to managers in the decision-making process.

#### *2.1.2 The theory of planned behaviour*

The Theory of Planned Behaviour (TPB) was proposed by Ajzen [17] from the social psychology background. TPB posits that there are three constructs that predict intention to use an innovation [17]. These are attitude, subjective norm and perceived behavioural control. Attitude is formed from cognitive beliefs and refers to ‘an individual’s positive or negative feeling (evaluative affect) about performing the target behaviour’ [18]. Subjective norm represents the social influences on behaviour and refers to the perception about whether others who are important to a person believe that he or she should engage in a particular behaviour [18]. Perceived behavioural

control represents the constraints on behaviour and refers to the 'perceived ease or difficulty of performing a behaviour' [18]. In application, Ghani et al. [19] studied cloud-based eCommerce services in Malaysian business owner-managers with the aim of understanding how their own behaviour could influence the usage intention. [19] investigated the influences of the Theory of Planned Behaviour (TPB) and Task-Technology Fit (TTF) towards textile cyberpreneur's intention to adopt cloud-based mobile retail application. It is reported that TTF and TPB constructs, attitude, subjective norm and perceived behavioural control have significant positive effects on textile cyberpreneur's behavioural intentions [19] of SMEs. Hence, TPB can be applied in developing country SMEs where Business-to-Business (B2B) eCommerce decisions-making processes are critical.

### *2.1.3 The unified theory of acceptance and use of technology*

Technology acceptance theories have been applied in a variety of areas to understand and predict user's behaviour and acceptance a particular technology. The Unified Theory of Acceptance and Use of Technology (UTAUT) model was developed by Venkatesh et al., [20] as an amalgam of seven models used to study technology acceptance in different fields. According to [20], the theory integrates models such as the theory of reasoned action (TRA), technology acceptance model (TAM), motivational model, theory of planned behaviour (TPB), model of personal computer utilisation, diffusion innovation theory (DIT) and the Social Cognitive Theory (SCT). The UTAUT model uses four main constructs to predict behavioural intentions and use behaviour of technology in an organisation [20]. The main constructs of the model include Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC). UTAUT was further improved to UTAUT2 by including other conditions or constructs. UTAUT2 postulates that the use of technology by individuals is underpinned by the effect of the three additional constructs, which are, hedonic motive, cost/perceived value, and habit, moderated by age, gender and experience [20].

The application of UTAUT2 was undertaken by Arpaci et al., [21], who studied the social sustainability of the Metaverse by integrating the UTAUT2 constructs and five personality traits to understand the social sustainability of the Metaverse. The model was tested by employing a hybrid covariance-based structural equation modelling (CB-SEM) and artificial neural network (ANN) approach based on collecting data from 446 Metaverse users. The CB-SEM results showed that performance expectancy, social influence, hedonic motivation, price value, habit, agreeableness, neuroticism and openness significantly impact the social sustainability of the Metaverse, while no significant effect is reported regarding effort expectancy, facilitating conditions, conscientiousness and extraversion. Drawing on these findings, the study offers several theoretical contributions and sheds light on several practical implications for developers, designers and decision-makers promoting the use of the Metaverse [21]. In another context, Shoeib et al., [22] applied UTAUT2 by extended the UTAUT2 with perceived value, trust and a restructured social commerce construct. The study [22] utilised 463 surveys distributed in Qatar and analysed the data using Structural Equation Model. It is reported by [22] that the results fully supported the proposed model, where *trust, perceived value, facilitating conditions and hedonic motivation* significantly predicted behavioural intentions with an R2 value equal to 72%. The UTAUT2 model supported the role of performance expectancy and social commerce constructs in predicting perceived value and the role of effort expectancy and habit in predicting hedonic motivation [22].

#### *2.1.4 The technology, organisation and environment framework*

The Technology, Organisation and Environment (TOE) framework suggested by Tornatzky and Fleischer [23] states that the process of technological innovations in organisations is influenced by three dimensions, namely: the organisation context, the technological context and the external task environment (industry). They thus argue that for any organisation to adopt and implement technological innovations, the decision-making process involves consideration of these three areas. The application of TOE in the SMEs environment has been applied in several studies in SME community. The TOE framework was applied by Qalati and Anwar [24] in Pakistan among SMEs in the utilisation of social media.

#### *2.1.5 The task-technology fit theory*

The Task-Technology Fit (TTF) theory was developed by Goodhue and Thompson [25] to explain aspects of information systems and the persons who use it. These are the utilisation of technology, the technology itself and the individual using the technology [25]. In the application of TTF that relates closer to the WSMA and the eCommerce SME environment, Aljukhadar et al. [26] applied it to examine the drivers and consequences of *successful task completion* by a user in an online context. The theory suggests that the fit between characteristics of the task and those of the website predicts user performance and behavioural intentions [26]. The hypotheses developed were tested using the input of two large-scale studies performed in 12 industries and involving 13,135 participants [26]. Their results, which were replicated in a proximate culture, provided support to the predictions of Task-Technology Fit theory. It is further reported that the site information quality and ease of use were the only technology factors that significantly drove the users to a successful completion of their information tasks, rather than the site's graphical attractiveness, interactivity, security and privacy factors [26]. The findings further suggested that focusing on the enhancement of site characteristics that have low fit with the task is not effective as it resulted in slowing the successful completion of the online task [26].

Meanwhile, some theories in extant studies have been combined to improve their strength and to test their robustness especially in dynamic environments. Ghani et al., [19] combined TTF theory with the Theory of Planned Behaviour and found it to contribute to the most influential factor towards WSMA eCommerce adoption intentions. This implies that SMEs in developing countries such as Zambia can apply TTF and combine it where applicable in B2B eCommerce decision-making intentions for competitive advantage.

#### *2.1.6 Diffusion of innovation theory*

The Diffusion of Innovation Theory (DIT), proposed by Rogers [27], is one of the key theories of adoption and diffusion in the field of information systems. DIT states the following:

- i. Diffusion is 'the process by which an innovation is communicated through various channels over time among the members of the social system [27]'
- ii. Adoption is 'a decision to make full use of an innovation as the best course of action [27]'

- iii. Innovation is 'an idea, practice or object that is perceived as new by an individual or other unit of adoption [27]'

According to DIT, an innovation will be communicated over time through channels of communication within a particular social system [27]. Individuals are seen as possessing different degrees of willingness to adopt innovations, and thus, it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time along an S-shaped curve [27].

Parker and Castleman [28] argue that DIT when applied with all its constructs has better explanatory power because it includes a component of social dimension of SMEs rather than a collection of mitigating barriers and drivers.

### *2.1.7 The perceived eReadiness model*

The Perceived e-Readiness Model (PERM) was developed by Molla & Licker [29, 30] specifically for developing countries context. The model considers some internal organisational factors, known as perceived organisational e-Readiness (POER), and external factors, identified as perceived external e-Readiness (PEER), as important for e-commerce adoption. The authors define POER to comprise the following:

1. The organisation's perception, comprehension and projection of e-commerce and its potential benefits and risks (innovation imperative attributes),
2. The commitment of its managers (managerial imperative attribute); and
3. key organisational components, such as its resources, processes and business infrastructure (organisational imperative attributes).

PEER represents an organisation's assessment and evaluation of relevant external environmental factors (environmental imperative attributes) such as Government e-Readiness, Market Forces e-Readiness and Support Industries e-Readiness [29, 30]. The authors further claim that PERM can assist organisations in developing countries to locate, measure and manage risks in e-commerce adoption activities. Despite the goodwill for PERM, there is little evidence to support the application for this model in Web 2.0 eCommerce SMEs context of developing countries. According to [28], PERM does not recognise the influence of individual factors in e-commerce adoption although it emphasises organisational characteristics as being critical to the advancement of e-commerce in the organisation. It is noted that PERM is unable to capture small firm characteristics [28] which may be critical for social commerce consideration.

### *2.1.8 The EBusiness satisfaction model*

The eCommerce business satisfaction model (EBS) [31, 32] was proposed to evaluate e-commerce success among SMEs from a business perspective. It is proposed that an EBS management model with 15 CSFs as a foundation was developed to assist SMEs' business managers in effectively adopting e-commerce systems or evaluating e-commerce success, which was categorised into five components including Marketing, Management Support and Customer Acceptance, Website Effectiveness and Cost, Managing Change and Knowledge and Skills [31, 32]. The EBS model

has well-defined organisational and eCommerce system structures as indicated in the critical success factor (CSF) [31, 32]. It's been reported to behave very well in Australia and China [31, 32], and it is yet to be tested in other regions, for example, Southern African countries such as Zambia. A drawback on the model is that it is unable to address certain characteristics of startup SMEs that do not have well-defined structures. Furthermore, the social media characteristics may not be fully embraced in the EBS model.

With respect to Trust, the EBS model [31, 32] defines it as 'trust in the interface design and information displayed on a website' which might be well suited for firms that are steps ahead in the eCommerce process. Hence, it might not capture the full spectrum of issues impacting SMEs in a developing country context, even as social commerce may just be in the foundation phase. To strengthen the application of EBS model in SMEs of developing countries, it might be useful to consider the whole spectrum of the social media application in use, in addition to the website design features.

## **2.2 Factors affecting SME web 2.0 eCommerce adoption**

Extant literature has reported that SMEs generally have had serious challenges to implement Web 2.0 B2B eCommerce integration. Several factors have been discussed to inhibit or motivate Web 2.0 B2B eCommerce integration, and these are discussed following TOE framework structure.

### *2.2.1 Individual factors*

Individual traits in a business manager or owner manager have been found to motivate SMEs in eCommerce adoption [29–34]. According to [34], Owner/manager factors relate to executive decisions that the SME owner/manager must make, what financial commitments to take relating to the overall direction of the firm, acquisition of new e-commerce infrastructure, whether the SME must consider e-commerce adoption or not, their appreciation or non-appreciation of ICT and new technological developments and the like. With the innovation of WSMA, an owner/manager should be a key champion to steer their firm in all decision-making processes. Furthermore, the ability of a manager to spearhead WSMA should be that which places great value on social factors [35] and innovativeness.

### *2.2.2 Behavioural factors*

A key factor for motivating B2B SMEs in Web 2.0 eCommerce is 'Trust'. Al-Adwan and Kokash [36] investigated the relationship between trust in social commerce and customers' purchase intentions by providing a mechanism to describe this relationship. Thus, a proposed model was developed based on three concepts: social presence, social commerce information seeking and familiarity with the platform [36]. A survey was designed and distributed to Facebook users. The findings demonstrated that 'trust' in a social networking site has positive influence on purchase intentions [36]. The researchers argue that trust encourages information seeking, which in turn improves purchase intentions [36], corroborating findings by Urena et al. [37]. Furthermore, both *social presence* and *familiarity* were found to enhance *trust* and *purchase intentions*. Furthermore, Urena et al., [37] studied *trust* and *reputation mechanisms* to provide a thorough understanding of new research challenges in WSMA in eCommerce communities. Similarly, a study by

Syuhada and Gambetta [38] in Indonesia found that *trust* is a significant component in the progression of eCommerce among SMEs.

In another context, Kanani and Glavee-Geo [39] took a focus on the problem of uncertainty in social commerce by investigating the influence of the number of positive review comments, seller popularity, customer service quality and return policy on seller uncertainty. Using a self-administered structured questionnaire for collecting data, the results of their analysis showed that the number of positive review comments, seller popularity and customer service quality had a negative influence on seller uncertainty [39]. Their study also concluded that a seller can offer a lenient return policy in addition to good customer service quality experiences lower levels of seller uncertainty than the seller that only offers good customer service [39].

In Thai context, Amornkitvikai et al., [40] noted that SMEs are still facing serious challenges in eCommerce development as compared with large enterprises. [30] examined the factors and barriers affecting the eCommerce sustainability of Thai retail and food and beverage (F&B) service SMEs in metropolitan Bangkok by applying the TOE framework. The findings by Amornkitvikai et al., [40] are that internal eCommerce tools (i.e. smartphones and websites) and external eCommerce platforms (i.e. social media, e-marketplaces and food delivery platforms) can enhance eCommerce sustainability. However, [40] found that the age of firms and owners (CEOs) affects eCommerce sustainability negatively. Additionally, [40] noted that Exports for B2B eCommerce and eCommerce experience can promote the eCommerce sustainability of Thai SMEs. However, they perceive that many consumers are still not literate in using eCommerce. According to [40], Thailand still has insufficient security to prevent hacking and malware, and SMEs' eCommerce literacy is insufficient to enhance their eCommerce sustainability. On the other hand, sustainable eCommerce can increase customer satisfaction, loyalty and trust through customer support, leading to more long-term online shopping [40].

### 2.2.3 Technological factors

The topic of Artificial Intelligence [AI] has become more prevalent in research studies. Keegan et al., [41] investigated the lack of empirical research on the adoption of AI in B2B marketing among business managers and engineers and academic experts in the field of AI. The researchers argued that AI adoption priorities and motives shape the power dynamics among the various network actors, including focal firms, AI suppliers and technology giant companies [41]. Their findings are that, in the context of AI adoption in B2B, both *technology and expertise* are key sources of power and that data create and perpetuate power negotiations and renegotiations in the network. Furthermore, [41] contributes to the power dependence theory (PDT) by showing that, through the adoption process, network actors' power is exchanged, exercised, counter-balanced and perpetuated, creating fluid network dynamics [41]. SMEs can leverage on the PDT [41] to extend their WSMA reach and strengthen their position in their specific eCommerce networks and industries.

By serving as a platform for open social interactions, popular social media technologies such as Facebook, Twitter, Instagram, Youtube, weChat, among others, have had an impact on the decision-making processes of organisations [41]. Social media can help close the gap between user interactions and channel preferences [41] that could provide more leverage for small firms that are struggling to improve their sales after a slump imposed by the Covid19 pandemic period. Notably, some factors that originated from social media may have triggered consumers' purchasing motivation

and developed a new consumption pattern online [42]. Furthermore, Appel et al., [43] assert that companies must be able to effectively understand and manage consumers via social media platforms. According to [3, 43], Twitter, which is one of the richest data resources on social media networks, can provide an avenue for analysing social media networks. Hence, this insight may be applied to SMEs in developing country contexts, including Zambia, who need to understand their consumers' purchase intentions.

In Poland, Chawla and Chodak [44] noted the increasing importance of social media in ecommerce development in small firms. The researchers designed and conducted an experiment on Facebook (FB) using a web-link in a real business environment, through the FB fanpage of a Polish eCommerce store [44]. The results show that a web-link placed in the comments of an FB post, instead of the caption, is more lucrative [44]. Furthermore, the researchers also showed that, based on the aims of the campaign, such metrics can give valuable information about the optimal time for posting and the interval between posts [44]. This aspect can be followed by SMEs in developing countries using any social media platform of their choice.

Another characteristic of eCommerce in recent years opens up aspects that deal with the mobility of the users as they engage in business transaction. According to [45], this concerns mobile commerce. Hence, [45] argue that SMEs in developing countries may leverage the power of mobile commerce (m-commerce) in the design and engagement with the electronic markets. The research established that consumers are inclined towards m-commerce services that would provide website coupons, provide ease and secure access to information and impact connectivity in a more efficient way. Based on these needs, [45] noted that the capabilities of mobile commerce (m-commerce) could be leveraged through the integration of such technologies as Internet of Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML), among others. However, most SMEs in Zambia lack technical knowledge of these technologies and applications. Furthermore, SMEs in general have limited time to experiment and try out new technologies in the digital space before implementing a strategy on a full scale.

In a study of SMEs in Hungary in a particular wine industry, [46] investigated how family businesses utilise social media tools, to determine what the purposes, benefits and challenges are and to discover competencies that are important in social networking and cooperation. The methodological design of their study used a case study with a qualitative content analysis. Their results showed that Facebook is the most popular social media tool that wineries use to increase brand awareness and reach new potential customers [46]. The researchers also provide a 'Social media roadmap' framework that could be applied by SMEs in other regions of the world, even developing countries. They summarise the application of social media in SMEs to comprise the following:

1. Strategy: clarifying and formulating the goals that align to business objectives, taking into account the following questions: a) Who will be responsible for conducting social media activity? b) What are the policies and regulations (like GDPR) to be followed? c) What percentage of marketing costs can be spent? d) What would be better, compiling an independent social media strategy or integrating the goals into the marketing strategy?
2. Social media: compiling a portfolio of social media tools (based on the target group, type of product or services, HR needs, etc.).



3. Content: creating creative, engaging content tailored to the target audience choosing texts, images or video, determining the frequency of distribution, the regularity and authorisation system.
4. Post: placing posts on social media devices in the form of text, image or video display (Blogger, Facebook, Instagram, YouTube, etc.) and defining short, easy-to-read text and eye-catching images to arouse interest.
5. Feedback: creating a real-time customer response after receiving a request/question, as quickly as possible, and using Facebook Messenger chatbot, which is a software running on messaging platforms that can simulate and imitate human conversation.
6. Connect: placing regular customer inquiries, advertisements and using influencer marketing.
7. Diversity: using at least three different social media tools at the same time to increase the effectiveness of marketing activities.
8. Measure: measuring the effectiveness of social media tools through several factors.

In other contexts, the electronic Word of Mouth (eWOM) is an approach being promoted for business discussions. Verma and Yadav [47] argue that there is a transition taking place in business scenario where the social media is the rock-bed for collaborations and sharing of information. They describe electronic word of mouth (eWOM) for consumer insight through text analytics, sentiment, hashtag analytics and other machine learning tools.

Lorenzo-Romero [48] undertook a study to analyse the omnichannel digital marketing strategies implemented by Spanish fashion and accessories companies with the aim of providing pleasant shopping experiences to their online consumers. The researchers undertook a qualitative analysis specifically consisting of in-depth interviews conducted with marketing managers who implement digital strategies in their businesses to improve the online experience of consumers in an omnichannel context. From a practical perspective, Lorenzo-Romero [48] argues that the Omnichannel concept can help inform companies' decision-making on how to best develop their consumers' omnichannel experience and, in consequence, improve consumers' behavioural responses such as personal participation, satisfaction and engagement with the firm. This approach is recommended for SMEs in developing countries such as Zambia.

#### 2.2.4 Organisational factors

Extant studies have developed conceptual models and frameworks to understand factors that affect SMEs' eCommerce adoption using WSMA. Braojos-Gomez et al., [49] proposed a conceptual model in which *social competitor pressure*, *IT infrastructure capability*, *two organisational capabilities (marketing management and innovation management)* and *firm size enable small firms to learn to develop a social media competence*. The researchers then tested their model using the partial least squares-based structural equation modelling technique employing a unique secondary data set on a sample composed of the 100 small US firms included in the 2013 Forbes America's Best Small Companies ranking [49]. Their empirical analysis suggests that *IT*

*infrastructure capability, social competitor pressure, marketing management and innovation management are key mechanisms through which small firms learn to develop a social media competence.* It is suggested that social media competence is more important for the smallest manufacturing firms even among a sample of small firms [49] which can give more impetus for SMEs in Zambia. The findings of [49] corroborate with the context of Southern African eCommerce SMEs such as Zambia.

According to Huria [2, 50], the development of eCommerce in recent years entails the need for organisations to plan on facilitations of trade and logistics for import and export. Some key areas worth consideration are (a) an undeveloped legal enabling environment; (b) a low level of readiness among border agencies to tackle e-commerce; (c) the need to improve national quality infrastructure; (d) poor integration of postal services with border agencies; (e) the need to improve air connectivity; (f) the poor reach of logistics and postal delivery in remote areas; and (g) the policy challenges created by exponentially advancing technologies in last mile logistics. It is imperative that SMEs in developing countries such as Zambia consider all aspects of eCommerce fulfilment even as they take up new markets and WSMA.

Entrepreneurship has also been incorporated in the eCommerce research in SMEs [5, 49, 51]. Park et al., [51] argue that social media platforms are an indispensable part of entrepreneurship practices, and as such they offer entrepreneurs a platform for business growth and brand development. Furthermore, [51] investigated factors such as prior knowledge, alertness and social media and found that they affected two aspects of opportunity which are the discovery and the creation of entrepreneurial opportunity.

In Saudi Arabia, Altayyar and Beaumont-Kerridge [52] found external factors affecting eCommerce adoption among SMEs. These are: government support, own postal addresses and delivery service, providing secure and trustworthy online payment options, low cost and high-speed internet connection, ICT-related educational programmes, supplier's willingness and readiness to participate or exert pressure, competitor's pressure, policy and regulations and business and national culture.

In the wake of WSMA in SMEs, Schmuck [53] introduces changes that may impact the business structure and operations due to the integration of social media, such as the application of *online business models*. Researchers [42, 53] and social marketing capabilities such as branding and innovation have been found to positively and significantly affect eCommerce.

### 2.2.5 Environmental factors

Environmental factors have been found to influence eCommerce adoption in extant studies. Government e-Readiness, market forces e-Readiness, systems and cyber security concerns and Support Industries e-Readiness [29–34]. SMEs in developing countries such as Zambia need assistance to understand and interpret business regulations in the environment at the local and global level. According to Cuellar-Fernandez and colleagues [54], SMEs can experience success in eCommerce entrepreneurship by adopting brick and click and internationalisation strategies.

### 2.2.6 Social and cultural factors

The role of culture in some instances has significantly played a key role in SME Web 2.0 eCommerce adoption in developing countries. In China, Miao et al. [55] describe the Guanxi culture which has been noted to boost entrepreneurship in

social commerce. In their case study, Miao et al. [55] developed a process model that described how customer entrepreneurs benefit from light entrepreneurship through acquiring knowledge and sharing knowledge within guanxi circles embedded in social media. Their study demonstrated that the roles of the mass entrepreneurship climate and the social commerce affordances in this benefit realisation process [55]. Certain group formations such as Agricultural and business cooperatives, enabled by social media interactions among SMEs in developing countries, are a great way to enhance Web 2.0 eCommerce adoption.

### *2.2.7 Other factors and natural causes*

A conducive environment and Peace are other key factors that would affect Web 2.0 SME ecommerce adoption. Conflicts of nationals might create war which might inhibit WSMA in SMEs from participating in eCommerce. Issues of climate such as floods may inhibit smooth operation for SMEs in Web 2.0 eCommerce adoption.

## **3. The research methodology**

The research approach of this study is qualitative in nature, aiming to respond to the research questions and to draw deeper understanding of the theories, models and factors of WSMA eCommerce adoption. The application of theories is therefore regarded as a lens for understanding eCommerce adoption in the SMEs and not as a way of drawing comparisons among the theories and models. The first and major part is the review of literature using content analysis. Data collection was by means of searching in scholarly journals such as Elsevier.com, emeraldinsight.com and similar types that were published in the recent years, since 2012. Articles that matched the WSMA in eCommerce adoption were selected for analysis, included 58 articles. The latter part of methodology includes analysis of each of the articles, drawing themes and insight into theories and factors of Web 2.0 eCommerce adoption in SMEs. The research draws distinction between eCommerce adoption studies in general and those of recent times that place emphasis on social media technologies. These issues assisted in the collection of the 58 articles that met these criteria.

## **4. Results and findings**

It is observed that Web 2.0 eCommerce adoption has received substantial attention in theoretical reasoning in extant studies. The application of theories has had a varying emphasis with respect to the context of application and the extent of use of technology in WSMA. **Table 1** shows the key theories and models that have been identified in the literature.

The results corroborate findings by Idris [13], who argued that no individual theory or model is able to present a rich view of eCommerce adoption. A combination of theories was able to provide a more definitive and explanatory power to the research questions and therefore was highly recommended by the respective authors, corroborating findings by Dospinescu et al., [56].

With respect to the factors, **Table 2** shows a summary of the factors identified from the literature.

<b>Theories and Frameworks</b>	<b>Articles</b>	<b>Insights/Lessons for WSMA eCommerce</b>
TAM	[14–16]	Applicable in WSMA
TPB	[17–19]	Applicable to Cyberpreneurs, A combination of TPB and TTF is used.
UTAUT and UTAUT2	[20–22]	Trust, perceived value, facilitating conditions, and hedonic motivation
TOE	[23, 24]	Applicable in Pakistan, in social media.
TTF	[25, 26]	Site information quality and ease of use positively influence adoption
DIT	[27, 28]	Social dimension of SMEs are applicable, also applied in various kinds of technological innovation.
PERM	[29, 30]	Tested in developing country context and verified in China.
EBS	[31, 32]	15 Verified critical success factors. Tested in Australia and China, and more studies are proposed.

**Table 1.**  
*Key theories and models.*

<b>Factors affecting SME Web 2.0 eCommerce Adoption</b>	<b>Articles</b>	<b>Insights/Lessons</b>
Individual	[29, 30, 31–35, 57]	Customer satisfaction, Loyalty, Trust through customer support, Online shopping, Innovativeness,
Behavioural	[36–40]	Social presence and familiarity, Trust, Purchase intentions, Reputation mechanisms
Technological	[41–48]	Knowledge and expertise in appropriate technology such as AI, eWOM, Social media technologies
Organisational	[42, 49–58]	Manager preferences and e-readiness, culture, IT and website infrastructure capability, Social competitor pressure, marketing management and innovation management. Entrepreneurship, Internationalisation, Business strategy, Interaction-based model, Trust in the eCommerce system interface
Environmental	[29–34]	Government policies, Legal issues, Government e-Readiness, market forces e-Readiness and Support Industries e-Readiness
Social and Cultural	[54]	Guanxi, Agricultural and business cooperatives, social media interactions and business networks
Natural causes	[34]	Floods, earthquakes and other natural disasters

**Table 2.**  
*Factors affecting SME web 2.0 eCommerce adoption.*

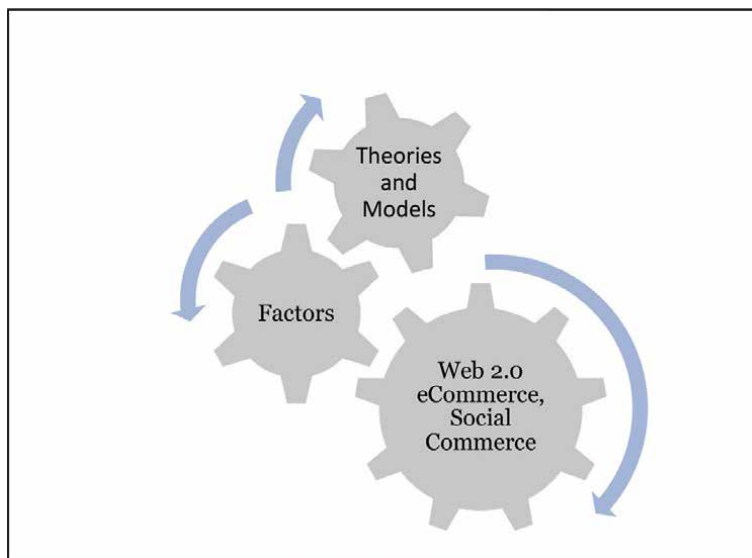
Dospinescu et al. [56] found that eCommerce satisfaction factors may impact the SMEs differently in various context, given that technological diffusion occurs at various stages in various regions and countries across the world. Meanwhile,

Depaoli et al. [57] argue for a nonlinear, interaction-based development model for SMEs which may be suitable for unpredictable environments for SMEs in Zambia.

## 5. Discussion of findings

This study set out to establish the theoretical foundations of Web 2.0 eCommerce applications in SMEs in developing countries. In the review of related literature on the matter, several theories have been discussed in their origin and how they were applied as technology was being adopted and used in the industry and in the SME context. The review briefly discussed the following theories, not listed in any particular importance: 1) Technology Acceptance Model, 2) Theory of Planned Behaviour, 3) UTAUT and UTAUT2, 4) TOE Framework, 5) Task-Technology Fit, 6) Diffusion of Innovation Theory, 7) PERM and 8) EBS model. The application of the discussed theories and models has been aligned to social media environment.

Among the various factors identified in extant studies, Trust was found by [58] to appear early and usually at the inception of eCommerce process in the enterprise. Several other factors are technological and reflect the advancing nature of the technologies at play, with AI, Machine learning, IoT and similar others featuring in the discussions and practice. The lack of management expertise, poor infrastructure, lack of finance, lack of ICT skills in SMEs are perpetual challenges among SMEs in developing countries [29, 30], and their uptake of web 2.0 eCommerce will require that they wean off from the current prevailing hurdles. Social media technologies such as Facebook, Twitter, Instagram, weChat, Youtube and other similar ones have contributed to the eCommerce adoption and integration factors. Despite the challenges, each enterprise manager is expected to find their place in the industry by continuously taking considerations and making decisions in favour of their enterprise.



**Figure 1.**  
*Interaction of the SME business environment.*

**Figure 1** shows three aspects that depict an interaction of the business context impacting on SMEs. These are 1. theories and models, 2. Factors, and 3. the Web 2.0 eCommerce technologies for adoption.

## **6. Conclusions and recommendations**

This chapter has discussed the theoretical foundations of Web 2.0 eCommerce applications in SMEs in developing countries. In the review of related literature on the matter, several theories have been discussed in their origin and how they were applied as technology were being adopted and used in the industry and in the SME context. The review discussed theories and models of web 2.0 eCommerce adoption for developing country SMES, namely TAM, TPB, UTAUT and UTAUT2, TTF, DIT, PERM and the EBS model. The chapter has discussed factors that affect Web 2.0 eCommerce adoption as the proliferation of social media advances in SMEs. The factors have been presented as individual, behavioural, technological, organisational, environmental, social and cultural and other natural causes. Details of each of these factors have been discussed to provide insight on how they have been encountered in SMEs.

This study does not present a one-size-fits-all model for SMEs in developing countries. As organisations are unique, so are their contexts and the managers who make decisions for their competitive position in the industry. Hence, it is recommended that SMEs adopt a process of continuous improvement as they resolve various challenges that impact their firms. As shown in **Figure 1**, the continuous gearing in the SME business context requires that managers become proactive in seeking better ways of engaging in Web 2.0 eCommerce adoption. SMEs could draw insight from this book chapter and various scenarios that have been presented and apply the lessons learnt to the specific conditions that prevail in their local context. To strengthen their position in the industry, SMEs in developing countries, and Zambia particularly, are encouraged to team around regional and global eCommerce value chains to enhance capacity and growth.


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## Chapter 2

# Perspective Chapter: The Use of Social Media in Sharing Information in Sub-Saharan Africa Region – The Types, Purpose, Benefits and Challenges

*Victor O. Idiedo and Bassil Ebiwolate Posigha*

### Abstract

This chapter discusses the use of social media in sharing information in the Sub-Sahara Africa region: The types, purpose, benefits, and challenges. However, the discussion on the above subject matter focused on Sub-Saharan Africa. Therefore, the paper exploited empirical and theoretical literature written about the region to support the discussion on the basic concept of social media, the various types, and purposes of using social media, the importance of social media, challenges prohibiting effective utilization of social and way of resolving the challenges in Sub-Sahara Africa. More importantly, the paper discussion revealed the increased use of social media on health, agriculture activities, politics, etc. with Nigeria and Ghana at the top. The discussion also exposed the various challenges (Poor power outage; Low level of technology development, Network hitches, High level of poverty, etc.) hindering the effective utilization of social media in the Sub-Saharan region of the world. Based on the challenges observed in the discussion, the paper outlined and discussed some ways of improving social media usage in the region.

**Keywords:** social media, social media usage, Sub-Sahara Africa, social networking, social sites, Web technologies

### 1. Introduction

The advent and advancement of Information and Communication Technologies (ICTs) does not only lead to the advancement of technology but, have also re-shaped the narrative and way people communicate with one another in the Sub-Saharan Africa region and other parts of the world. One of such widely used technologies that have re-shape the ways people communicate among themselves in our digital age is the social media platform. Today, social media network sites are known to be playing significant roles in communication and other services-oriented areas of life. That is the more reason why the usage and impacts of social media cannot be

overemphasized. In providing a clear understanding of the term social media, social media was described as a “web-based communication tool that enables people to easily interact with one another by sharing and consuming information, sharing information, interacting with friends and family members, and getting the latest information at accelerated speed [1].

Due to its importance in society, “social media usage has fast become a staple in the online world [2]. However, the usage is not limited to the developed nations, but also in Sub-Saharan Africa, and other under-developed countries in the world. Sub-Saharan Africa region with over forty eight countries, like any other part of the world, also need to speedily share accurate and current information, most especially information that is relevant to economic development, politics, social life, health-related issues, etc. within and outside the region. Today, we have several pieces of literature that affirmed social media networking sites as the most commonly used platform among youths and adults, in communicating in their comfort, particularly in their homes, institutions of learning, and offices, and as well as become part of their lifestyle. As a result, several individuals have resolved to deploy social media as a communication channel for sharing pictures, music, advertisement, and other vital information regarding health-related issues, politics, agriculture activities, etc.

However, despite the importance of social media in enhancing education, health institutions, and other sectors of mankind, observation shows that the increased usage of social media came with a series of challenges that are threatening human co-existence. These challenges are identified to include; fake news, the posting of nude pictures, propagation, and posting of hatred clips, defamation of people, and posting of false and misleading information [3]. Despite the challenges, social media remain the most popular and widely used networking site in Sub-Saharan Africa and the world in general. It is against this background that, this study opined that, the types, importance, purpose of usage, challenges of social media, etc. in Sub-Saharan Africa may differ significantly from other parts of the world due to the disadvantages such as inadequate education, inadequate technologies infrastructures, inadequate electricity and as well the under-development of the region. Therefore, this paper aims to review or explore empirical and theoretical works on social media, focusing on Sub-Saharan Africa to critically examine the types, usage, and purpose of usage, importance, challenges, and ways of improving social media in Sub-Saharan Africa.

## **2. Sub-Saharan Africa**

This section gives a brief of Sub-Saharan Africa. Sub-Saharan Africa is the continent of Africa that lies in the Sub-Saharan region. In other words, Sub-Saharan Africa refers to African countries and territories that are situated in the African region. The region straddles the equator, having almost equal south and north extent. It is the most tropical of all continents. The climate and vegetation range from the equatorial rainforest, tropical deserts, and savanna grassland to the Mediterranean. The Sahara Desert, the largest of its kind anywhere in the world, is over 10.4 million km<sup>2</sup> and the North to South is approximately 1800kms and East-West is 5600km” [2]. Forty-nine countries make up the sub-Sahara Africa namely: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Brazzaville), Congo (Democratic Republic), Côte d’Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana,

Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Western Sahara, Zambia, Zimbabwe (<https://www.loc.gov/rr/amed/guide/afr-countrylist.html>).

The region has some major cities such as Abuja, Lagos, Harare, Addis Ababa, Cape Town, etc., and several towns and villages. These individual countries have well-established higher institutions of learning, petroleum refineries, organized administrative institutions, etc. with large population sizes. According to available UNHCR global trends statistics, the region has a population of 1.1 billion with diverse religious groups (Christian, Islam, Traditional faiths, and others).

The continent has over 1,000 languages with a large number of the population living in rural communities that lacks basic social amenities (electricity, water, schools, etc.). The major occupation in the region is agriculture and mining because some of the countries are endowed with mineral resources. In addition, one other important characteristic that distinguished the Region from other parts of the world is the unique cultural heritage of the region. The region has several cultural organizations and festivals (Mombasa Carnival – Kenyan, Calabar Carnival – Nigeria, Abu Simbel Festival – Egypt, etc.) that portray the unique cultural heritage of the region. And some of these cultural activities are celebrated annually by people from all works of life within and outside the continent. The continent is also recognized for its high profile in tourism. The study could have discussed some of the countries one after the other but, because of the limited space for the chapter, only a brief of Nigeria is discussed.

Nigeria is one of the most popular countries on the continent. It is situated in the West Africa region and lies between longitudes 3 and 14 degrees, and latitudes 4 and 14 degrees. It has a land mass of 923,768 square kilometers. The country is made up of thirty-six states with its administrative headquarter in Abuja as the “Federal Territory”. Politically, the Federal Republic of Nigeria is divided into six geo-political zones. The population size of the country is over 180 million, with diverse cultural, and ethnic groups, and over 300 languages. And the major occupation of the population is agriculture and fish farming, very few numbers of the population work in government institutions, private industries, cooperative organizations, and small-scale businesses. In addition, the country is endowed with natural resources such as Petroleum, Gold, Coal, etc. which formed the major income of the country.

The petroleum resources are found in the Niger Delta area which is in the Southern part of the country. Administrative, economic, and health-wise, Nigeria has well organized political structure, economic sector, health institutions, etc. The country is proud of its diversity in religion, ethnicity, language, culture, etc. We have Christians, Muslims, and traditional faiths from different ethnic groups and languages living together in the various cities and villages. The country’s diversity is also reflected in our social-cultural activities. Notable among these cultural activities include the Egbesu festival, Calabar festival, New yam festival, etc. celebrated annually in the various parts of the country.

In Sub-Sahara Africa, experience shows that all categories of persons regardless of economic status, financial and educational status make use of social media for one purpose or the others, particularly, in academic institutions, cooperative organizations, agro-industries, government, etc. most importantly for the sharing information relating to research findings, products, and prices, policies, etc. the region.

### **3. The types of social media used in Sub-Saharan Africa**

We have many types of social media used in Sub-Saharan Africa and other parts of the world. Some authors in their research identified the various types of social media popularly use in Sub-Saharan Africa including Facebook, Instagram, LinkedIn, Zoom, Twitter, Skype, YouTube, WhatsApp, Google+, Blogs, ResearchGate, Pinterest, MS Teams, TikTok, Telegram, WeChat, Quora, SciHub, SciFinder, Gmail and Outlook [4, 5]. In Nigeria, Kutu and Kutu [4] attested that eight different types of social media networking sites are popularly used in Sub-Saharan Africa and as well in other parts of the world. Therefore, the authors outlined the eight social media networking sites to include:

1. Social networking sites such as Facebook, LinkedIn, Twitter, and Academia.
2. Discussion forums such as Quora, Digg, and Reddit.
3. Blogging and publishing networks such as WordPress, Tumblr, and Medium.
4. Cybernetic worlds such as Second Life and Open Sim.
5. Presentation sharing network tools such as Scribd, Slide Share, and Slide Rocket.
6. Video and audio sharing networks such as YouTube, Instagram, Flickr, and Livestream.
7. Writing and research collaboration tools such as PBworks, Wikispaces, and Wikipedia.
8. Meeting, project management, and collaboration tools such as Big-Blue Button, Skype, and Zoom

Similarly, in Tanzania, “apart from Facebook, Twitter, YouTube, LinkedIn, Blogs, WhatsApp and Instagram, local popular social media platforms such as Jamii Forum, Michuzi blog, Mabadiliko forum, Millard Ayo blog, Mpekuzi blog, Bongo 5, Bongo-Lob, and others have been deployed to be used in various activities. Other sites with added social media features include newspaper sites such as the Citizen, Daily News, Global Publishers, and This Day” Bennett [6] and Stelzner [7]. And it was also revealed that “Facebook 86.55% was ranked the highest used social media, followed by YouTube 7.14%, Twitter 2.76%, Instagram 1.7%, and Pinterest 1.56% respectively are the top popular social media used in Africa (<https://www.newsafrika.com>). Each month, across Sub-Saharan Africa more than 95 million people access Facebook, with 97% of them using their mobile phones (<https://facebook.com>). It was further reported that, by the end of 2020, Nigeria was the country in West Africa with the largest number of Facebook subscribers. About 31.6 million users have a Facebook account, followed by Ghana with almost 8 million users [8].

A critical examination of the various reports, regarding the different types of social media used in Sub-Saharan Africa and other parts of the world, the paper established that additional customized types of social media are also used in Sub-Saharan Africa.

#### **4. The purpose of social using media in Africa**

In Sub-Saharan Africa, like in any other part of the world, social media technologies are used for different purposes. Perhaps sharing of information is the major reason why many people widely embraced social media in both developed and developing countries. Sub-Saharan African countries are not industrial countries, so their major occupation is agriculture. Therefore, it is not out of place that social media are used in disseminating agricultural activities among the farmers and as well among buyers of farm products. Before the advent of social media technology, perhaps the inhabitants were solely depending on town hall meetings, cultural gatherings, community meetings, traditional rulers, and friends to gather information relating to fishing and farming activities. As of today, information relating to agricultural activities is shared at an accelerated speed with the aid of social media. There are different groups of users and, their purpose of usage differs from one group to another. In Africa, most users were confirmed using social media to keep in touch with friends or to measure the impact of services, build an audience, monitor trends, and stay informed. Others used them to read and watch online news, interact with colleagues, teach and learn, and do business [9]. In Nigeria, for example, it was discovered that librarians' purpose in using social media was to disseminate information and render services to library users. Similarly, in the education sector, African undergraduate and postgraduate students use social media for different academic purposes [10].

In South Africa, social media are used to develop online participation where people share, contribute and communicate knowledge and content on the Internet. The authors also revealed that the main academic purposes for which students used social media are learning, personal research/development, personal growth, and assignments [4]. In South Africa also, eNCA, SABC News, and Newsroom, Africa effectively employed Twitter to engage and keep their online audience abreast about the dangers, prevention measures, and containment of the coronavirus pandemic. Furthermore, the majority of rural-based youth who were active users of Twitter were always engaged and well-informed about the breaking news stories and spread of the Covid-19 pandemic [11]. The social media platform has become a site for the production and consumption of breaking news stories and a platform for the interaction between journalists and politicians". Recently, Twitter is the most used online platform by various news media organizations to disseminate news and timely information to the users" [11].

Similarly, the 23 anglophone Sub-Saharan African countries' national health ministries and infectious disease agencies disseminated COVID-19-related information through their social media accounts within the first three months after the declaration of COVID-19 as a pandemic by the World Health Organization. Over 86% of the African countries had a presence on social media; Facebook was the most popular, though Twitter contained more posts and information dissemination became more deliberate and increased significantly after the announcement of the first cases of COVID-19 in the countries under review. Awareness creation, updates, and news constituted the major categories of information that were disseminated, mostly in the form of derivative social media information before the announcement of the first COVID-19 case in the surveyed African countries" [12].

In the area of security, social media technologies used in Africa are a more or less double-edged sword. For example, the Government, particularly the security agencies used it to fight against crime and terrorist, and bandit activities while, in return, the terrorist and other criminal groups use the technology to advance crime and other

menaces in the continent. Some scholars in their various research affirmed these facts when they reported that “terrorists used Twitter, Facebook, YouTube, and other social media platforms to attract, train and communicate with followers and potential recruits. Al-Shabaab, Boko Haram, Islamic State of Iraq and the Levant (ISIL), and other violent extremist groups in Africa now use social media to share voice and video messages” [13]. It was stated that:

“Al-Shabaab uses social media to share propaganda, recruit followers, coordinate activities, and secure access to funding, particularly active on Twitter, YouTube, and its al-kataib news channel and also use Video communication to focus on recruiting foreign fighters and demonstrating military strength. In areas with limited Internet access, the group uses radio programming to engage with local communities. Boko Haram also uses social media purposely to share propaganda, attract recruitment and coordinate its activities. Similarly, the ISIL also uses a very wide range of social media. Today, reports revealed that ISIL has a preference for Twitter but recently shifted to Telegram in response to Twitter crackdowns ISILs emphasis on social media is linked to its far-reaching international support base” [13].

## **5. Importance of social media in Sub-Saharan Africa**

The importance of the use of social media in Africa cannot be overemphasized. In Sub-Sahara Africa, there is no aspect of human life that social media do not have an impact on. The importance of social media has been significantly reflected in our social life, economy, business transaction, education, etc. In “South Africa for example, it was affirmed that social media came with an important development in creating online participation, where people share, contribute and communicate knowledge and content on the Internet” [14–16]. Similarly, the importance of social media in human culture and values is that it deeply transforms humankind’s culture and values. In just a few decades, social media platforms managed to permeate the society and ultimately changed their lives and play an integral role in the daily habits of people” [17].

The platforms also give people the opportunity to air their views on the problems and progress of society in evaluating successive governments’ policies” [18]. And due to its ease of use, speed and reach, internet spread and connectivity are a vital component and a driver for e-governance. Not only does it provide a platform for dialogue and engagement among citizens, government and businesses but also offers citizens an opportunity to engage in governance, including demand for accountability” [19].

In education in Sub-Saharan Africa, “social media has demonstrated its strengths in connecting several stakeholders, including students to each other, teachers to themselves, students and teachers, all the entities in the university, as well as external actors” [20]. “Universities are not excluded from using social media to engage with their stakeholders. Unlike most other brands, universities do have a diverse range of stakeholders which inadvertently influences their communication strategies, suggesting the need to recognize and embrace the benefits and opportunities that social media can bring as a tool” [20]. Unfortunately, very few African universities have communication strategies and are present on social media, whereas Africa has one of the highest rates of social media use, given that young people are strongly represented. For many African institutions, social media is limited to entertainment and friendly exchanges. The strategic communication aspect is strongly neglected. Social media is exponentially invading many parts of African society, and education



is the most affected sector. This is because the majority of Internet users in Africa are mostly young, and this amount has doubled since 2010” [20].

Therefore, in conclusion, the review shows that social media network sites are very important to the region, particularly in areas of sharing health information, e-government, transforming culture and values, reporting news items and communicating knowledge.

## **6. The benefits of social media use in Sub-Saharan Africa**

Several researchers reported that several benefits of social media cut across all human endeavours of life in Sub-Saharan Africa continent. The most frequently cited advantages of the use of social media by students is their ability to aid collaborative learning and communication amongst their peers and others in academia.” In addition, social media technologies are notable with the capability to aid digital literacy and information distribution. Other than communication, “academics who used Twitter refer to “information distribution” as one of the main advantages of using the medium. Its use has proven popular, particularly in academic conferences” [21–23]. Some other benefits of the use of social media in education in Africa include the following:

1. Providing platforms that foster communication and lifelong learning and facilitates access to distance and open education;
2. Providing e-learning resources and e-libraries [24].
3. Lecturers who impart knowledge to students also benefit from the use of social media by sharing educational materials, exchanging ideas, reading through colleagues’ research, getting updated on research trends and, most significantly, establishing their professional networks [25].
4. Social media founded for educational audiences creates a distinct opportunity for the audiences to learn and create a robust academic discussion among themselves.
5. Social media encourage personal connections that can lead to the establishment of new information and knowledge.
6. Social media provides the potential to aid more rapid interactions between libraries and their users regardless of where the users are located or how they decide to learn or access the library services and resources [26].

In the economic sector, Writer [27] also identified ten potential benefits of social media usage in business in Sub-Saharan Africa including the following:

1. Increased Website traffic
2. Boosts customer engagement
3. Leverage Various Media Formats.

4. It's cheaper/decreased marketing costs
5. Identify target audience and reach out to new ones
6. New product/service introduction and education of target audience
7. More brand mentions/reach millions of customers with hashtags
8. Open communication (two-way communication)
9. It's faster
10. Showcase organizational culture and values

It is evident that “previous academic studies have explored social media in the context of marketing communication strategies by universities to reach prospective customers, social media for brand engagement and social media for teaching [20]. In addition, it was summarized the benefits of using social media are increasing social interaction; providing access to information sources; encouraging creativity among individuals and groups; creating a sense of belonging among users; providing more choices to promote engagement among individuals and groups; reducing barriers to group interaction and communications and increasing the technological competency levels of users” [28].

In the health sector, it was revealed that the use of social media reduced costs, create ways for the patient to access medical workers and patient to patient interactions, increased access to tailored consultations, and improved chronic disease management among others” [29].

In a summary, this paper concluded that Sub-Saharan Africa has benefited immensely from the users of social media networking sites, especially in the digital economy, e-learning, distance learning, e-libraries, marketing and digital literacy. Other areas of benefits include; creating awareness of health-related issues, promoting social-cultural activities, enhancing communication, etc. that equally improve the style of living, creation of wealth and the development of the entire continent.

## **7. Challenges of social media use in Sub-Saharan Africa**

In Africa, it is believed that the number of users of social media is on geometry increase but, there is still a very large population that is yet to use social media technologies due to one challenge or the other. The challenges may cut across all areas of life. In Africa, the common challenges prohibiting “the use of social media include the following: the high cost of subscription to Internet data bundles, high cost of social media enabled phones (smartphones), poor internet connectivity, low ICT literacy, low awareness of the social media for academic purposes, the apathy of friend to communicate academic issues, Poor knowledge of social media application software and sites” [4].

Similarly, other challenges were also identified militating against the successful integration of most social media for strategic communications in Africa. And these highlighted challenges are from the perspective of the university as they make effort to engage with their stakeholders” [20]. These challenges are:

1. The motivation to engage – “There appeared to be a lack of motivation by African universities to engage on social media. There are challenges with the content to be updated, the frequency, and the relevance of the content. Marketing to reach prospective students is often limited because the universities are oversubscribed. If universities, especially the public universities, do not market, they are guaranteed of recruiting their students” [20].
2. Content Creation – universities in the developed world showcase their facilities, campuses, and students having a good time around their campus. However, there is a challenge with African universities with regards to what they can showcase. There are funding challenges, and the facilities are often in a poor state which cannot be showcased. Research activities are limited [20].
3. The Technical Skills – [20, 30] reported the “lack of creative designs in African universities, highlighting the limited technical skills to adopt social media for effective communications with stakeholders”.
4. Internet Bandwidth – “Africa is still considered an emerging market, with the rate of Internet penetration still quite low as compared to her Western counterparts” (Wawira, 2017 as cited in [20]). “By June 2019, Internet World Stats estimates a 39.8% Internet penetration rate in Africa, contributing to only 11.9% of the world users” (IWS, 2019 as cited in [20]). This means that most people are still offline. While the universities are willing to engage, the challenges of Internet bandwidth inhibit the stakeholders, especially the prospective students who have limited access to the Internet.
5. Languages – Linguistic mismatch is another challenge in the process of strategic communications with stakeholders in Africa. In some regions of Tunisia and Algeria, students are taught in Arabic while some books are written in French instead of English, which is a universal language (Ndofirepi et al, Forthcoming). In the south of Africa, especially South Africa where the constitution recognizes official languages, the adopted language of communication can pose a challenge as they try to engage with stakeholders [20, 29].

It was revealed that the failure of healthcare institutions in Sub-Saharan Africa to adopt social media may be due to inadequate implementation policies, standards and frameworks among other factors [29].

Students in Nigeria and South Africa are facing the use of social media in education due to a lack of basic amenities, lack of conducive environment, lack of access to computers, the cost of Internet connectivity and a lack of enthusiasm on the part of instructors, lack of time, lack of access to the Internet, lack of interest in online groups, and the lack of the necessary skills required to use social media [31, 32].

In Ghana, it was reported that “social media sites are not monitored properly, there is the likelihood that some pornographic being accessed. Underage children could have access to such materials and this may lead to moral corruptibility in the children. Therefore, there is a need to intensify effects to restrict students to such sites by using passwords to prevent easy access. Furthermore, social media tends to make both students and teachers become social media addicts. Instructional hours are lost when teachers rather than teaching in the class are caught in social media milieu outside of the class” [33].

Similarly, in Tanzania, “the notable side effects of social media are, the posting of nude pictures, propagation and posting of hatred clips, defamation of people, posting of false and misleading information, just a few to mention” [3]. In a summary, this paper draw conclusion from the literature reviewed that, despite the increased use of social media platforms recorded in Sub-Saharan Africa, there are still a series of challenges prohibiting the integration, customization and effective utilization of social media in the various sectors of the continent.

## **8. Ways of improving the use of social media in Sub-Saharan Africa**

There is evidence of increasing use of social media in Sub-Saharan Africa but, considering the large numbers of population size that is in the rural areas without Internet and technology infrastructures, and the challenges reported across the continent, there is an urgent need to fashion out measures to take advantage of Web technologies and social media networking sites to improve on the level of usage in the region. Improving social media usage in this paper implies the need to explore the available opportunities to use social media to address every aspect of life, security, agriculture, politics and education in Africa. Therefore, improving the use of social media to address the challenges confronting the region is the responsibility of the government and as well private bodies. The government must endure that, it provides the required infrastructures, create awareness among the citizens, particularly on relevancy and areas social media can productively use to create wealth, and make appropriate policies to create enabling environment for wide and gainfully use of social media in both urban and rural areas in the region.

Certainly, professional development of employees and educators through a workshop, seminars, in-house training and re-training, and conferences among others are seen as a panacea/measure to improve the challenges of using social media networks to disseminate information to library users. And, the regulation of social media use in Africa through policy is a prerequisite to improving the usage of social media [3]. However, the clampdown on the use of social media cannot unnoticed, particularly by the government of Tanzania. Therefore, the Tanzania Communication Regulation Authority was established to curb the usage of social media in the country. In addition, in 2016 the Cyber Crime Act was also established to cement the control of the usage of social media in Tanzania [34].

## **9. Conclusion**

Sub-Saharan Africa, is an African continent situated in Sub-Saharan with a population of 1.1 billion. The continent has recorded a tremendous increase in usage of social media technologies since the advent of Web-based technology. The various definitions of the concept revealed that social media is a Web-based technology that allowed content creation, modification of content, dissemination and sharing of information, group discussion, etc. in accelerated speed globally. There are several types of social media (Wiki, Bloggs, Twitter, Facebook, etc. used for diverse purposes such as promoting library products and services, disseminating research outputs, sharing relevant agricultural information, exchanging ideas, etc. in society. The paper revealed several benefits of social media which include; decrease marking cost, accelerated sharing of ideas, easy identifying of target audience and reaching out to

new ones, showcasing of organizational culture and value, etc. Despite these benefits, several challenges (poor ICT infrastructure, lack of Internet connectivity, lack of access to technology devices, etc.) were identified to be hindering wider and more effective usage of social media in Sub-Sahara Africa.

Some ways to improve social media use in Sub-Sahara Africa were identified to include: the provision of adequate and workable Internet connectivity, the need to create more awareness programmes on the benefits of using the social media network in the library and other institutions, the need to organize conferences/workshops as regards the importance and relevance of social media in all sectors among others.

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## Chapter 3

# The Art of Pleasing

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### Abstract

This article explores the question of how heterosexual women and men present themselves on the dating platform Tinder in order to determine how their self-presentations differ, which social values they consider important and how they use creative techniques in order to stand out. Based on a combination of quantitative data and qualitative analysis, it can be stated that they use different motives and different creative strategies. For example, women rather show themselves in domestic and urban contexts and thus communicate mundanity and high demands, but also independence from men, while men present themselves as closer to nature, but also as conquerors of nature. In addition, women use oblique image cropping, filters, bokeh effects, etc. much more often than men and thus express creativity and playfulness, whereas men often post pictures that appear less creative, but more casual and thus demonstrate coolness. Overall, it becomes clear that men and women submit to assumed social desirability and reinforce stereotypes, but in doing so, they may also accomplish changes of perspective.

**Keywords:** social media, self-representation, social values, gender, social desirability

### 1. Introduction

The app Tinder is a social medium, launched in 2012 by InterActiveCorp and “perfectly suited to a mobile society [1], to a “world of radical individualism, multiple identities and dynamic relationships, unfettered markets and consumer capitalism” [2]. Tinder, whose most features are free, presents prominently pictures in portrait format to fit the typical cell phone’s screen. Each user can upload up to 10 photographs. Besides, their username appears, and they can indicate their age, their school or university and the place they live, as well as several hobbies out of a list. Furthermore, a short text with or without emoticons may be added. People from within a particular radius will be presented and based on a double opt-in system, they can match and after this communicate. The app’s focus is clearly on photographs, to the extent that several users make fun of it, writing ironical texts such as “finally, I am not reduced to my character”.

This article deals with the way people represent themselves through their photographs on Tinder. It is assumable that most people using the app hope for many and/or for suitable “likes”, be it to increase their self-esteem or to actually match and meet other users in real life with erotic or romantic intentions. In order to achieve this, people have to take and select suitable photographs referring to both motifs and

aesthetics. Therefore, an analysis of photographs posted on Tinder can be a useful approach to learn something about prevailing gender norms and expectations.

### **1.1 Photography as a means of self-presentation**

When considering self-presentations on Tinder, the following aspects are fundamental: it has long been acknowledged that photography is the “art of the person” and of their identity [3]. Photographs on dating platforms thus can convey not only the way people look, dress and pose, but also which activities and belongings are important to them and further, which aesthetics they pursue. In this context, the halo effect may also be taken into account: it is a cognitive bias in the formation of an impression and defined as a tendency “to assume that once a person possesses some good (or bad) characteristics, their other, unrelated and unknown characteristics are also likely to be consistent, that is, good or bad” [4]. Accordingly, someone who is pretty is also likely to also be seen as “beautiful on the inside” and someone who engages in wild sporting activities is likely to be thought of as adventurous, brave or cool in general. It can be assumed that the users, who are—considering their age group (see below)—probably experienced in social media, do not only more or less consciously orient their judgements to the halo effect, but also their self-presentations: they use attributes and activities as symbols.

In social media contexts in general, standards for images— aesthetics and motifs— may quickly establish themselves, as most people strive for positive feedback. On Tinder, however, heterosexual women only see profiles of heterosexual men and vice versa. While it is conceivable to occasionally change the settings of the app, for example out of curiosity, to get the other perspective, overall users probably have fewer insights that reveal anything about standards of self-presentation on Tinder. Accordingly, there should be a more general influence of social desirability, e.g. by looking at other social media.

All in all, these considerations make it likely that the staging and selection of photos on Tinder is based on a conscious or unconscious decision that is not only shaped by one’s own goals associated with online dating, but also by assumed social values: “Self-presentations provide rich data for an analysis of gender as it is constituted and produced performatively and discursively, through symbolic, repetitive, and normative expression” [5]. Consequently, the analysis of visual self-representation makes it possible to arrive at statements about a society. So this article aims to find out how heterosexual women and men present themselves, how their presentations differ and what the reasons for these differences might be.

### **1.2 State of research**

Online dating, or more specifically, Tinder has been analysed from various points of view, e.g. looking at self-esteem [6], impression management [7], the self-representation of migrants and refugees [8], hypermasculinity and misogyny [9], awareness of privacy issues [10], up to the focus on tourism [11]. In our context, gender representation [12, 13] is particularly interesting.

In addition, there is a large body of literature on (visual) representation. A telling starting point can be the mirror experience, in which the identification is first based on an image, as well as on alienation [14] and thus resembles the photographic experience: people see themselves from a new perspective, from the outside. In this context,

the indexicality of photography has to be considered and with it the connection between a person and their photograph, respectively a picture he or she has taken [3].

An interesting focus “falls on the narrative practices of users’ self-representations in social media” [15]. Self-representations often “proceed from a premise of agentic, conscious, and ‘authentic’ self-authorship. The tacit understanding at work in social media self-representations between viewers and viewed means that members of a networked public generally take a SNS personal profile as an indicator of someone’s self-chosen and ‘authentic’ identity, produced for personal use” [16]. Yet, the term authentic can be questioned—it may primarily be an authentic staging [17] in the sense of a staging which does not hide the fact that it is staged. Furthermore, the presentation may “authentically” tell something about the person, their aspirations, longing, wishes, perceptions, etc. but not necessarily reflect their authentic outer appearance and living conditions. In this context, the anticipated reactions of the audience such as envy, approval, empathy, etc. play an important role. Furthermore, photography nowadays does not only serve as described by Barthes as a chance to a capture a way of being, but to capture a body as it might [18]. Consequently, it may be interesting for people to present various ideas or ideals of the body rather than their authentic looks. Yet, it can be stated that due to their indexicality, people are (still) inclined to believe in photographs: “The epistemically special character of the photographs is revealed by this fact: we are inclined to trust them in a way we are not inclined to trust even the most accurate drawings or paintings” [19]. It also follows from these explicit or implicit truth claims that media representations have the power to “distort people’s sense of what there is to see in the social or political domains” [20].

Besides, in recent decades, the body has increasingly become the focus of scientific attention [21]: fluid social boundaries and the disappearance of traditional social classes can explain the increasing emphasis on the body, as it became necessary to differentiate oneself through deliberately and visually, developing an individual style, expressed by an active self-marketing [22]. In this process, media-mediated and reinforced body ideals move into the centre of interest. For Facebook, Gilbert Shang notices: “The dominant motif of photography [...] is the presentation of the ideal body/self. This ideal body follows, but sometimes deconstructs a repertoire of normalized social body etiquettes popularized by mainstream and showbiz cultures” [23].

Gender studies offer yet one more perspective. Feminist scholars have helped to understand “the crucial role that media perform in the reproduction of gender inequality” [24]. Just to give some examples: Viki Mayer analyses the history of telephone girls who “see themselves as uniquely qualified by virtue of their gender” [25] but have difficulty advancing or changing to another position. Sonia Livingston [26] look at gender differences in girls’ and boys’ experiences of risks in online communication such as exposure to pornography, bullying and sexual messaging. Teresa Lynch [27] found out that women appear much more seldom in video games playing central roles and that sexualized secondary female characters mostly remain passive. In our context, online misogyny [28] is interesting to look at. This mainly refers to sexual harassment and trolling and was attributed to the “crisis of masculinity”, as women and girls occupied traditionally male-dominated positions in education and job life, which has led men looking for new ways to express strength and domination. Consequently, it is useful to also look at research on masculinity. Social media are said to carry “notorious reputation for being home to hypersexual and toxic masculine expressions” [29]. So the question here is to what extent the research can confirm this assumption.

However, it has to be kept in mind that in our case, it is not about how men and women are represented, but how they represent themselves. We can assume a

“male gaze” [30] referring to the photographs of women, that the women themselves take into account when staging or selecting the pictures, but at the same time, men on Tinder may consider just the opposite—the way women would look at them. These considerations already show that social desirability plays an important role. Thus, they also indicate that self-representation on Tinder can tell something about social values.

## **2. Visual analysis**

The sample consists of 300 Tinder profiles of (presumably) heterosexual men and 300 (presumably) heterosexual women from the age of 25 to 45. The age group between 25 and 45 was selected because it covers, according to the global web index [31], more than half of the Tinder users and, unlike with younger users, it is assumable that people in the referred age group may be more mature than the 39% of very young (16–24-year-old) users. With regard to the location, the sample was taken in western Germany around the city of Cologne, a rather urban region, during the end of 2020 and the end of 2021, a time in which there were relatively strict Corona regulations, which apparently had led to an increase of the usage of the app even among people who usually would not fancy this way of meeting people [32]; therefore, it is assumable that the sample represents an even larger section of society than usual. The sample of photographs is partly based on a previous study that focused exclusively on the representation of men.

One note about “race”: as the sample was taken in Germany in an area, where there is a very high percentage of “white” population, it is not suitable to extent the argument to the self-representation of people of colour.

Looking at the ethical dimension of the research, it has to be stated that an informed consent was not possible due to the nature of the platform. However, people who do not want to show their photograph(s) and thus disclose their identities can also just use symbolic pictures or blurry photos on Tinder and those who present themselves will also be aware of the fact that not everyone who sees their profile shares the same intentions. Some users, e.g. only collect matches or primarily want to amuse themselves by the way others are portrayed, and several profile texts make it clear that the users are conscious of this. Therefore, I can assume that my research meets ethical standards.

After collecting the sample, the data were first categorized via visual analysis according to the criterion of what they (apparently) represent. In this context, it has to be mentioned that qualitative judgements always play a role when putting pictorial information into quantifiable data: “terms such as ‘qualitative’ and ‘quantitative’ are not simple distinctions. A category of image analysis such as ‘are they smiling?’ or ‘are they trying to look hot?’ or even ‘is this a selfie?’ implies that a qualitative judgement underlies the quantitative count. Unless it is taken in front of a mirror, you simply can’t be sure that this is a selfie (a self-taken image) even if the subject’s arm is outstretched in front of him or her” [33]. Another aspect is that categories usually include a certain variation of motifs: the category “portraits taken from a high angle” includes both very high and slightly elevated perspectives.

In the following, the photographs are sorted into categories according to their depicted content which will later be analysed with regard to their symbolic dimension. When comparing the profiles of heterosexual men and women, some differences and similarities stand out. Since mainly the differences will be discussed in the following, some similarities will be mentioned first: men and women show a

similar number of photographs in their profiles—women on average almost 5, men on average 4.2. Among the photos, portrait pictures are found most frequently. Photos of (presumably) the person themselves appear by far the most on Tinder, including both tighter-cropped portraits and half- or full-body shots. Mostly people look directly into the camera and the general tendency to present the left cheek rather than the right also slightly predominates in both samples [34, 35]. All in all, quite few photos in swimwear or partial or concealed nudes are seen among both women and men, which may be due to the season.

Considering the angle from which the portraits were taken, it is noticeable that in 10% of the cases, women choose a low angle, which tends to convey height and dominance, and in 19% of the cases a high angle, which is associated with cuteness [36]. For men, the picture is even clearer: almost 30% of their portraits use a low angle and only 10% a higher one.

Another aspect concerns sophisticated or creative photography: women use oblique cropping or special filters, which change the picture more significantly than a soft beauty retouching or an adjustment of contrast, in almost 10% of the cases, men in less than 1%.

Looking at the location, women are seen in nature settings in 24% of the photographs, of which 8% are beach pictures. Men are shown 39% in nature settings, among them 4% beach pictures. Urban settings are found in 15% of women's and in 8% of men's pictures. Interiors, which on the one hand could show the home, but also hotel rooms or similar, are seen in 16% of women's and in 8% of men's photographs. In both samples, job-related settings are very rare, just as job-related clothing.

About 8% of the photographs of men show presumably own property such as cars or motorbikes, whereas such motifs appear in less than 1% in the women's sample. 7% of the photos, partly overlapping with the just mentioned, show men driving cars or bikes, often the focus is rather on the person, but one can clearly see that he is sitting on the driver's seat, for women it is less than 1%. Pictures of presumably own children or pets are quite rare in both samples.

Probably homemade items such as cakes, own sketches or paintings also rarely appear, and it is often not identifiable whether the photos are closely related to the

	Women	Men
Number of photographs (300 profiles)	1461	1260
Low angle in portrait shots	10%	29%
High angle in portrait shots	19%	10%
Oblique cropping or special filters	10%	<1%
Same sex groups	4%	1%
Nature settings (among them beach)	24% (8%)	39% (4%)
Urban settings	15%	8%
Interior settings	16%	8%
With cars or motorbikes	<1%	8%
Driving cars or motorbikes	<1%	7%
Atmospheric photographs (landscapes)	6%	4%

**Table 1.**  
*Comparison of women's and men's photographs on Tinder.*

person and their skills, whether they are meant to show a preference of the person, or whether they are meant as atmospheric photos.

Finally, about 4% of the photographs in the women's sample and 6% of the photos in the men's sample clearly show atmospheric scenes, usually landscapes. It remains uncertain whether the person took the pictures themselves, but in most cases this seems rather unlikely, and some photos could even be clearly identified as stock photos with the help of Google reverse search. Atmospheric photos often appear as the penultimate or last picture and suggest a certain mood or character trait. Mostly, the landscapes appear romantic or wild (**Table 1**).

### **3. Communicating values with photographs**

The following step is to interpret the motives and read from them values that are perceived as socially relevant. Values “have profound, although partly unconscious, effects on people's behaviour. The goals we pursue, as well as our more general ideas about ‘the good life,’ are influenced by the values of the culture into which we happen to have been born or raised” [37]. So there are some general cultural tendencies in terms of values. It can be argued that photos on Tinder are to be interpreted in a similar way to advertising photos: within a usually very short viewing time, they have to attract attention and interest, thus making the best possible use of this time [38]. Visual aspects are also supposed to stand for qualities that are not directly obvious, such as friendliness, courage, caring, intelligence or creativity; i.e. a halo effect has to be taken into account and used for one's own purpose.

This raises the question of the user's motivation. Various motivations for using Tinder have been analysed, including entertainment [39], excitement [40], knowledge about the social world [40] and strengthening self-esteem. However, these motivations can also exist in parallel or change over time: “I heard from users who revealed a hope for finding love, after initially using it for entertainment or ego-boost” [41, 42]. Different motivations, one would think, would suggest the use of different photographs, which in turn would communicate different values—for example, someone who primarily wants a lot of likes should use photographs in which they look as good as possible in terms of assumed mainstream aesthetics. In any case, however, values are communicated, be they rather the values that one assumes according to social desirability or more likely one's very own, which are certainly also shaped by social expectations, by one's upbringing, education and networks.

The following aspects are not meant to be a self-contained presentation, but refer to particularly striking observations.

#### **3.1 Cute and tough**

As shown above, women present themselves in a way that is connected to typical feminine features such as beauty and cuteness, which reminds on advertisements, in which women “are reduced to how they stack up to various standards of beauty and sexuality. Ad messages seek to convince audiences that adhering to such ideals is desirable and necessary for young women compared to other priorities and accomplishments” [43]. More specifically than beauty, cuteness can be seen in the sample, which is emphasized by taking photos from a high angle and is typically associated with childhood and femininity [44]. Also other features, such as large eyes— emphasized by makeup and possibly enlarged by an editing app, also point in this direction. The

first scientific discussion of cuteness was described by the ethologist Konrad Lorenz, who coined the term “Kindchenschema”. The “Kindchenschema” can be observed in baby animals as well as in human infants and refers to features such as a big head, big eyes, etc. The reference to baby animals is even evident in some filters women use on their Tinder-portraits that give them the snout and ears of a puppy or a kitten.

In feminist thought, cuteness is considered an ambivalent phenomenon: it “is not just an aestheticization but an eroticization of powerlessness, evoking tenderness for ‘small things,’ but also, sometimes, a desire to belittle them or diminish them further” [45]. Thus, it is connected to vulnerability and sometimes even to the grotesque [46, 47]. Furthermore, it has been observed that “cute objects [...] often lack clear identities” [48]—the gender identity also remains unclear at times, as with a baby. In this sense, de-gendering takes place and sometimes even de-humanizing appears, if one looks at the above-mentioned photo filters.

At first glance, the tendency to emphasize cuteness contradicts the finding that “the idealized and desirable has shifted towards a tougher, shrewder, and more sexually assertive” [49] feminine performativity. However, this does not have to be inconsistent with the stress on cuteness: it can be used to appear sexually attractive and to express one’s own desire and idea of sexuality, since presenting oneself as cute can be interpreted as a playful and perhaps romantic form of sexuality.

For men, the picture looks quite different. One-third of men show themselves from a low perspective, suggesting height and dominance. Cute filters do not appear in the sample of men at all. In addition, one sees a significantly larger number of photos showing men behind the steering wheel, which may suggest ability and dominance, and matches the observation, that “car cultures referring to traditional role models are thus [...] manifestations of control, as they provide evidence of social and cultural stability, constancy, and the immutability of things” [50].

In traditional education, men are “not allowed to show any kind of emotional vulnerability, which is a rock-bottom requirement of traditional masculinity ideology” [51]. Toughness is the standard, even though there are cultural differences: white masculinity, according to Levant and Pryor, is characterized by restrictive emotionality, similar to many Asian cultures where “emotional toughness is one of the most central masculinity norms” [52] while Latino masculinity is based on *caballerismo*. Yet, Susan Bordo described how in the 1990s male clothing designers introduced “all sorts of forbidden ‘feminine’ qualities into mainstream conceptions of manliness” [53]. This has apparently not fundamentally changed the tendency towards differentiation in self-representations in the dating sector or at least not in a sustainable way.

### **3.2 A life of leisure**

In both samples, there are very few job-related photographs, even though it can be assumed that people from different professions and social classes can be found in the sample. This may also be surprising, since online dating has been described as a new rationalized and capitalized version of love [54] and that especially visual representations of men are often associated with their job life: it has been shown that men in stock photos are often depicted as working or “rational” in a broader sense [55]. As stock images are designed to circulate particularly heavily in the media, it is likely that they are both influenced by social norms and continue to shape the image of men. Also in advertisements, men “are often depicted in positions of strength, control, and accomplishment, as seen through their physicality or savviness in work” [43].

However, the emphasis on leisure instead of work life is consistent with the selection of photos for private photo albums: “The selection of photographs structures the memory of personal lives, and snapshots construct history and reality. This construction of personal history is characterised by exclusion. Only a few, if at all any snapshots depict the workplace and colleagues. It is a history of life as leisure” [56]. According to Jorgen Christensen, the pictures taken and selected are in the context of one’s own positive memories. Particularly among men, however, certain leisure activities seem to be largely excluded: both activities that tend to take place indoors and are not very physical, such as board or video games, which according to statistics are very popular within the age group [57], and urban activities such as shopping or museum visits appear rarely, as the next point will analyse.

The focus on leisure and the omission of job life may suggest that, in the context of dating, hobbies are more important and an emphasis on leisure is more likely to convey a fulfilling life than a job. It may also play a role to pursue hobbies together with the potential partner. Furthermore, one could conclude that many users do not identify much with their occupations. This may also be due to the fact that work life changes rapidly nowadays and is seen as a less stable characteristic than, for example, a passion. Other reasons are also conceivable, such as the fact that many jobs, for example jobs in the financial sector, cannot be comprehensively represented visually.

Wealth, nevertheless, is readily conveyed, even if it is usually directly connected with professional life. In both samples, one frequently encounters images that convey wealth, e.g., in the male sample images with (presumably) one’s own car and in the female sample images in (presumably) one’s own house or in fashionable shopping situations—so it is about the fruits of labour, not about professional life itself.

### **3.3 Culture and nature**

Women present themselves in indoor settings twice as often as men. At first glance, this seems to correspond to a very traditional image of women—that of the typical housewife. This observation matches the analysis of advertisement samples from 2006 and 2016: in 2006, women appeared less active, “girls and women were often reduced to their more submissive or passive roles—often in interior locations” [43]. In 2016, the authors found a bit more flexibility in gender roles; however, there were still clear tendencies.

However, it is important to consider the settings shown: in most cases, it is difficult to judge whether private flats, hotel rooms, exhibitions or the like are the subject, but it can be stated that indoor settings are often houses with particular furnishings and decorations, which can be interpreted on the one hand as an expression of wealth or of high demand, but also as an expression of the ability to make something look posh and/or cosy—which is related to housewifely qualities.

Furthermore, women appear twice as often in urban contexts such as shopping situations or posing at monuments. Choosing a city as setting can stand for mundanity and sophistication, but perhaps also for aspiration: the woman is not satisfied with the simple, but is used to go luxury shopping and enjoys the sophisticated, urban life. This indicates an expectation of the potential partner. On the other hand, one could also assume that she wants to show that she can also lead a good life independently of a man, since the corresponding photos were taken before the possible Tinder relationship.

Men, on the other hand, more often present pictures of themselves in nature and also use atmospheric pure nature photos more often. If we exclude the “beach”



location—here we see twice as many women than men—men show up twice as often in the landscape as women do, especially in potentially domestic landscapes, which therefore says little about financial means and travel experiences. This is in line with other studies: Katarina Filipovic’s content analysis of children’s books revealed clear gender patterns that include stereotyping such as depicting men as more out-going [58]. A study on outdoor activities in Sweden showed “that there is a gender difference in both participation and in representation of outdoor recreation. The observed gender difference is not only in line with the traditional heteronormativity but also suggests that new trends in outdoor recreation are further favouring traditionally masculine modes of engagement with nature” [59]. Consequently, one could interpret this as a traditional gender role distribution: the man is the one to leave the domestic nest. However, as already mentioned, women do show up outside the home quite often, only tending to do so more often in urban contexts or at the beach.

Here, the dichotomy “nature-culture” is recognizable: humans are creatures of nature, insofar as they are their (biological) bodies, and they are a creature of culture, insofar they (by socialization), have their bodies [60]—so people are always connected to both. However, in literature, it has frequently been pointed out to the dualism of woman-nature and man-culture that “is used as justification for exploitative attitudes and actions of men toward women” [61]. This was especially stressed by ecofeminists [62, 63]: for a long time, “in Western patriarchal culture, both women and nonhuman nature have been devalued alongside their assumed opposites—men and civilization/culture” [64, 65]. Consequently, ecofeminism raises “awareness about interconnections between women’s oppression and nature’s domination in the attempt to liberate women and nature from unjust subordinations” [66]. In the context of Tinder, the opposite is evident: men are more connected with the domain of nature, women rather with the cultivated.

One explanation may be that men want to appear less as creatures of nature, but as adventurers and conquerors of nature, for example when they are seen climbing mountains or mountain biking. However, such motifs only make up a smaller part of photos of men and nature. Showing people in nature can be related to transferring characteristics of nature to the person, such as the wild and untameable, which suggests sexual attractiveness. Nature as a mirror of the soul is an idea from the era of Romanticism, a counter-movement to Classicism, which focused on aesthetic clarity and is associated with the Enlightenment. Possibly a new romanticism can be discerned here, which in turn prioritizes feelings over reason [67].

Further, one could interpret that while men appear more in nature, women are more likely to show up in “cultivated” or culturally overformed settings—the city—or in such nature that is associated with something that comes from the cultivated modern era: holidays spent on the beach. Women thus appear to be more influenced by cultural techniques—one could also say: more subject to cultural techniques—which also fits with the observation that women use photo filters more often and post more creative or more thoughtfully composed photos.

### **3.4 Creativity and casualness**

The aforementioned foci on leisure and nature can also be linked to the fact that men are more likely to post pictures that look like they were taken casually and follow a snapshot aesthetic. This is remarkable, as “since 2006, there has been a noticeable rise in what has popularly been called the ‘metrosexual.’ This ‘new man’ is a young, urban, and heterosexual male who, ignoring previous, more ‘macho’ ideals for men,

is concerned about how his hair looks, what clothes he wears, and how nicely he is groomed” [43]. It has been concluded, that “acceptable notions of masculinity have shifted closer to more traditionally feminine concerns of sharp clothes and a well-groomed body” [43], so that there are overall more notions of masculinity, which the heterosexual male role can be shaped in more diverse ways.

Yet, even though one might initially think that beautifully staged and edited pictures are likely to be more successful, casual-looking photos can also communicate something desirable about the man portrayed: he is authentic and does not need any special effort—and this lack of investment into coolness is ultimately considered cool [68]. The man is self-confident enough to assume that he will please without any special effort.

With women, however, this phenomenon is much less noticeable. Here, one sees far more photographs that seem to have been taken ambitiously, for example, that work with effects such as depth of field, that have been subjected to beauty editing or that use special filters or unusual picture details. Here, we can distinguish between two overlapping aspects: on the one hand, there are pictures that have primarily been designed and edited to make the user look particularly pretty; on the other hand, pictures have been designed creatively. The former serve to emphasize the beauty of the woman—even if this is done at the expense of the aforementioned coolness or, if the editing is obvious, at the expense of credibility. The latter, on the other hand, emphasize another aspect: creativity. “Self-representations on SNSs are not conventionally understood or contextualized by their viewers as ‘art,’ as explicitly or intentionally creative [...] self-presentations” [69]. Nevertheless, the creative, playful or artistic-looking photos reveal something about the user, that this is someone who may possess these very qualities.

#### **4. Conclusion: reinforcing stereotypes or promoting empathy?**

The self-representations of heterosexual women and men on the social medium Tinder illustrate creative authorship: people show themselves as portraits, in different settings, with or without image manipulation and sometimes even express themselves only through images of objects or nature. So, with the exception of the format, the way of representation is not determined or completely uniform. Nevertheless, there are very clear tendencies—for example, almost exclusively rather physical leisure activities are shown, so that one can assume that those who do not spend their leisure time in this way are either less Tinder-savvy or do not present their leisure activities. The bodies depicted also appear quite homogeneous or, one could conclude by analogy: those who do not conform to a certain ideal—slim, trained, youthful-looking, rather mainstream than subcultural—apparently avoid corresponding photos or are altogether less represented on Tinder. From these observations, one can draw the conclusion that—typical for social media [70]—social desirability regarding looks plays an important role and may possibly be more significant than the search for a truly suitable partner.

Furthermore, there are clear differences in how heterosexual men and women present themselves. Analyses of such aspects have often been grounded on the assumption that “socially constructed gender roles can negatively impact on one’s individual life chances, especially in terms of one’s sense of self-worth, social perceptions of women and their career prospects” [71] and that “male-female differences in self-presentation parallel, and possibly intensify, gender norms offline” [72].

From the data of this study, one could indeed read traditional or reactionary tendencies: women tend to present themselves as cute, men as tough. Women seem to put more effort into their self-presentation, for example by using well-composed, filtered and creative photographs—although many men’s “wilful negligence” can also be understood as well-considered self-presentation. Thus, it may be hard to say who finally puts more effort into the photographs, but heterosexual men and women try in different ways, because they want to convey different values. It can be concluded that women want to be associated with cuteness, beauty and creativity, perhaps also with a certain aspiration for a good life, while men want to be associated with toughness and coolness. Women tend to communicate that they want to be perceived in a certain way, that they want to please, whereas men, on the other hand, demonstrate that they do not need to please—ironically, as it may sound—in order to please.

The stronger association of women with indoor and urban settings and of men with nature can be interpreted differently, but does not necessarily have to be seen as a connection between women and the domestic sphere, as was the case in the 1970s [24], since the mundane, the city or particularly elegant interiors in the sample also tend to have female connotations. In this sense, women appear rather as creatures of culture, men as creatures of nature—which has often been presented in reverse in the literature [73]. Overall, women present themselves more diversely than men, which—assuming that men are not generally less creative than women [74]—suggests that men choose their pictures less consciously or are more subject to the perceived social desirability of masculinity.

Thus, the data remain partly ambiguous with regard to their interpretation, but it becomes clear that heterosexual men and women choose different strategies of self-presentation and apparently assume that different attributes make them desirable to the opposite sex. The basis for self-presentation, however, is apparently—as the relative similarity among each sample reveals—grounded on the desire to conform to social desirability. Apparently, the Tinder helps to socially anchor ideas of femininity and masculinity.

On the other hand, it can be noted that, for a successful self-presentation, people of both sexes presumably perform a change of perspective, i.e. imagine how they will be perceived by the recipient. This change of perspective may promote empathy and thus may include positive aspects as well. In addition, the presentation on Tinder, such as on other social media [75] could lead to a greater engagement with one’s own identity, desires and goals.

## Author details

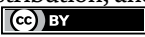
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## Chapter 4

# Perspective Chapter: The Impact of Digital Education on Modern Educational Institutions

*Sami M. Alshehri*

### Abstract

Over the years, technology has become increasingly dominant in every sector of the world, and the impact of digital technology on educational institutions has not been left behind. The concept of “digital education,” which entails using technological tools for both learning and teaching in a classroom context, has changed the traditional classroom environment for both teachers and students. In the present era of technological advancements, digital education is essential because it makes learning efficient through individualized learning, open access to an unlimited amount of information, flexible teaching methods, etc. Digital learning makes it possible for students to communicate and study with a greater variety of materials without having to rely solely on the limited resources available in a traditional classroom setting. Students can study and explore information more easily with the aid of basic digital skills and technology. A student’s academic performance and engagement in active learning both improve with a positive attitude and motivation. Digital education has various pros and cons in the teaching environment and its impact on different beneficiaries. Through a literature search, materials from public, educational, and expert sources were obtained. In this chapter, each of these will be explored and conclusions drawn.

**Keywords:** digital education, digital students, digital teachers, digital curriculum, digital classroom

### 1. Introduction

Digital education has become a global phenomenon and an integral part of the student’s life. It also has become a widely discussed topic in recent years. Digital education relies on technological devices that provide various ways of learning in this era. It contains instructional materials (e.g., course textbooks, research articles, videos, assessments, simulations, etc.) that are either licensed under an open copyright license or in the public domain. The Every Student Succeeds Act of 2015 (ESSA) served to require that technology is extremely vital in enhancing the students’ learning processes [1]. Technology has therefore been utilized as an effective teaching assistant that allows for the achievement of multiple educational purposes. This includes training and simulation which provide new types of experiences involving

different mental processes, such as the method of training, practice and individual tutoring, creativity, problem-solving, simulations and educational games [2].

Digital education is recently essential for countries that are undergoing digital development and transformation. It facilitates teaching and learning by integrating digital tools and cutting-edge technology in educational practices. While the concept of digital education is not new, its role in educational institutions has substantially increased, teachers today rely on technical methods to promote digital learning and teaching, and the impact has been transformative [3]. Most educational institutions are adopting digital education as a response to the ever-changing digital environment. It is considered the perfect alternative for replacing the conventional whiteboard teaching in classrooms. Also, governments are currently taking necessary actions to develop policies that will expand the market for digital education in many regions as well as strengthen the wide range of opportunities that are developing from it. The US government, for example, ranks among the biggest consumers of eLearning services [4]. Using the most recent data, it can be determined that the US government has spent more than \$2.5 billion on staff and student eLearning resources [5]. The UK has traditionally been a pioneer in the use of digital technologies in education [6]. Nearly £900 million is spent on digital education annually in schools all throughout the UK. An average school in UK spends about £400,000 on educational technology [7]. In 2020 a total investment of 6 billion euros from the German government was directed to digital education, which also allowed schools to offer digital services to underprivileged students. Additionally, France committed 300 million dollars to digital education nationwide in 2020 [8].

On the other hands, many questions have been raised as regards the extent of digital tools' impact on students' creative skills. Although educators have turned their attention to the different patterns of thinking, especially creativity, in the past decades, there is a significant downward fall in creativity scores since 1990, especially in the fields of mathematics and science [9]. For example, it was shown that numerous young children in United States, most of children between kindergarten years and sixth grade, experience the most serious decline. One reason that might be responsible for such decline is the mental distraction caused by the digital tools in the current school generations [3]. The purpose of this chapter is to make an in-depth examination of the digital education in teachers and students' life and it positively or negatively impacts in their school performance.

## **2. Methodology; extensive literature review of recent research work on digital education**

This study aims to provide insight on the impacts of digital education on contemporary educational institutions. In addition to demonstrating the benefits of digital education for students, teachers, and educational institutions, this research intends to highlight the prerequisites for its successful implementation as well as the distinctions between conventional education and twenty-first-century learning. It focuses on the ways that digital technologies can help and contribute to educational priorities, such as increasing achievement, addressing inequality and promoting inclusion, improving transitions into the modern workforce, increasing parental engagement, and enhancing the effectiveness of the educational system. Materials from academic, governmental, and professional sources were gathered through a literature research. The thematic significance of each of these was examined, as well as the quality of the supporting data, in order to obtain the presented information. After that, the most pertinent information

was compiled and evaluated to present the relationship that exists between digital education and teaching activities. Its pros and cons in the teaching environment and its impact on different beneficiaries such as students, parents, teachers, and the institution.

### **3. Definition of digital education**

Digital education, also referred to as Technology Enhanced Learning (TEL) or e-Learning, is the creative application of digital technologies and methodologies when teaching and learning. Exploring the use of digital technologies allows teachers to create interesting learning possibilities in their classes, which can be blended with or made to be completely online courses and programs [10]. Both teachers and students will benefit from this creative application of digital technology. This encourages participation and turns learning into an enjoyable activity because learning has become highly adaptable and productive [11]. In addition to being able to study whenever they choose, students can attend classes from anywhere.

Additionally, by mixing in-person engagement with online or digital learning, digital education promotes a thorough dialog between students and educators. Digital tools, material, and teacher curriculum are all perfectly combined in this program for effective learning [12, 13]. Students also gain a variety of benefits such as exposure to new opportunities, tailored instruction, high levels of engagement, overall development, and improved outcomes [14]. Conventional chalk and blackboard culture has completely changed as a result of digital education transforming educational institutions. A computer or tablet replaces pen and paper, and online lectures or video lectures replace face-to-face lectures [15, 16]. There are also online whiteboards for student interaction. As more schools and educational institutions choose to use this digital educational system, it will expand even further in the future [8].

There are two distinct yet related concepts of digital education:

- First, Utilizing a wide range of technologies to build a more comprehensive set of digital skills and using computational thinking to apply these tools in more profound, technical, creative, and innovative ways to speed up and increase learning [17]. As countries integrate the updated curriculum, which indicates a change to a more digital future in education, this interpretation of e-learning is becoming more widespread in many nations [18].
- Secondly, using digital technologies to upgrade personal skills and incorporate them into the current learning process. Digital learning is gradually replacing traditional teaching methods. The Internet and high-tech devices like smart-phones, laptops, tabs etc., are some of the personalized tools applied to facilitate effective digital education in the digital world [19]. But using technology in the learning environment takes more than just knowing how to use these tools, other factors including digital mindset, digital classroom, digital materials and more, are highly influential [20, 21].

### **4. Why is digital education important?**

In both our personal and professional life, digital platforms and technologies are becoming more and more essential. Education and knowledge are more widely

available thanks to digital learning, which also equips students with the mentality and skills necessary to succeed both today and in the future. Numerous studies show that simply giving students access to technology does not guarantee better results; instead, successful implementation of digital learning and active adoption of a digital mindset is required for it to improve the entire learning experience significantly [16, 22–24].

Appropriate digital education will be necessary for employment success in the near future. The growing digital transformation is increasing the value of IT skills in the classroom, business, and higher education. Furthermore, digital media is creating new chances for online learn in while modern technology facilitates more engaging and worthwhile learning experiences [12]. Digital teaching techniques have given classroom instruction a fresh look and made it interactive, such as PowerPoint presentations, video presentations, online training, etc. The students need to remain safe online is one of the major issues that has to be tackled by the educational administration. They must safeguard the students against numerous harmful threats while yet being effective and positive [25]. Digital learning has several advantages for changing a child's life, including higher academic achievement, enhanced decision-making, improved cultural awareness, and more. Numerous opportunities exist in digital education to engage students, customize learning opportunities, and increase accessibility [26].

The digital education has some features that make it a unique instructional system for learning. These futures are [27–29]:

1. **Personalization:** Learning resources can be personalized by changing their settings on the equipment used to access them when they are provided in digital formats. The student will find it simpler to access and utilize the information in a way that best supports their academic progress as a result of this. Many countries want to promote personalized learning, which has aided in the modernization of the classroom by allowing teachers to modify their methods and pace of instruction to better suit the requirements, preferences, and interests of their students. Students that were given personalized learning methodologies in the classroom showed considerable improvement in reading and math skills; additionally, the longer students were exposed to personalize learning, the more significantly their performance increased. With the help of digital learning, it is now possible to give each student a unique set of educational opportunities.
2. **Accessibility:** With the advent of digital education, students now have the freedom to choose their own study schedules and access information whenever and wherever they want. This could encourage lifelong learning. For example, by using text-to-speech software or screen readers. The availability of education to “non-traditional” students, such as those who reside far from a university campus or who have childcare or employment obligations, can also be improved through online and blended learning.
3. **Flexibility:** The flexibility to deliver learning content in several forms, modes, or languages and to engage synchronously and asynchronously with individuals around the world are only two examples of the affordances that digital technologies frequently offer that are not available in traditional formats.
4. **Authenticity:** Digital skills are now a crucial graduate attribute because they are necessary for the modern global citizen to use when interacting in the digital world. Fundamentally, by avoiding digital education, instructors and students

run the risk of falling behind in a world that is becoming more and more technologically interconnected.

5. Efficiency: Digital evaluations enable instructors and students to focus their efforts on areas where further comprehension is most needed by giving students quick feedback on their understanding. With the aid of adaptive hints, teachers can immediately clarify misconceptions and erroneous responses while also assisting students in real-time problem-solving. Additionally, quick assessments, visualizations, games, simulations, films, and annotation technology create a richer learning environment that helps students grasp concepts more completely.
6. It is less expensive than conventional education: Online learning is frequently less expensive than traditional classroom education. There are frequently many payment choices that allow you to pay in installments or per class. This makes it possible to manage budgets more effectively. The cost is typically low because there are many free course resources. Furthermore, there are many scholarships available today for digital education.

## **5. Digital education for the twenty-first century**

Online banking, social media, streaming services, as well as activities that are specialized to education or the workplace, such as email, PowerPoint presentations, and PDF handouts, are all examples of the invisible ways that digital technology is a part of the twenty-first century. However, adopting pedagogical approaches explicitly geared toward digital education or using more openly digital technology, such as the Virtual Learning Environment (VLE), can feel a little more challenging [30]. Students need constant access to internet tools and digital content to accomplish high-quality digital learning. Digital learning is global; as a result, students can connect from anywhere and have constant access to the vast amount of intellectual and educational resources available online. Technological advancement has influenced how knowledge is impacted and how it is shared. Therefore, in the twenty-first century, educators and school administrators must recognize that the traditional classroom is evolving, and conventional methods of learning and teaching have to be replaced with modern educational approaches to maximize the positive influence of technology on education [31, 32].

As a result of the learning environment being more dynamic than ever, students today are learning in a way that is significantly different from how the educational system was initially intended. With the development of technology and the popularity of online learning, education is being redefined in a variety of ways to meet the changing demands of today's digital students.

### **5.1 New approaches to education**

Both the way and the content of learning has changed thanks to digital education. Digital platforms, virtual or augmented environments, online libraries, webinars, and more all make a variety of digital teaching and learning methods accessible in educational settings, including colleges, universities, and training and development programs for businesses [33]. Digitizing conventional instructional materials is only one aspect of digital learning. Digital media in education will open up entirely new

channels for collaboration, networking, and communication [34]. Digital training is more adaptable, customized, and transportable than traditional learning modes since it is not restricted by time or location [35]. Course materials are now created, shared, and co-developed on the cloud in the digital age [34]. Students learn to take on more personal responsibility at a young age through digital learning, which also helps them communicate and work in teams better.

## **5.2 Education must adapt to industry 4.0**

There is currently a digital transformation. Digital proficiency is no longer just necessary for those working for startups; increasingly, industrial workers in factories, personnel in administrative roles, and a lot more also need to be proficient in this area [15]. The way we study and teach, as well as our educational system, must be modified for this digital age. All educational levels, from elementary school through universities and continuing education, are affected by this [36]. The ability to participate in social life in the future on their own terms will be made possible by digital education. A further benefit of digital education is that it will keep businesses competitive. In other words, education 4.0 requires industry 4.0. We have to fundamentally change what we learn as well as how we learn in order to keep up with the digital transformation. The reason for this is that, in addition to reading, writing, and math, digital abilities are now considered a fourth critical competency [5].

## **5.3 Integrating technological and educational advancements**

Despite all the changes brought about by the digital transformations, education still has the same objective; to help people grow as individuals and prepare them for responsible participation in social, political, and economic life [2]. For this reason, we require education that is current with modern technology, to match the level of technological transformation with the level of education advancement.

When using a teaching app to deliver online instruction, a digital teacher must become familiar with all of its technological features. Digital whiteboards, mobile online learning, screen capture, and other classroom management tools like automated attendance, automatic fee collection, and other supporting technologies are a few examples of excellent uses of technology in the classroom [13]. Online teaching systems also give teachers the freedom to create courses with a variety of material formats, including audio, video, images, text, and more. One of the methods used to improve participation and learning results in online classes is for the teacher to create a comprehensive material that incorporates a variety of media [24].

Students today are sometimes referred to as “digital-age learners” due to their proficiency with technology and independent learning style. These students of the digital age have access to resources and knowledge outside of the confines of conventional school systems and procedures thanks to phones, video games, social media accounts, and text messaging [8]. Schools have problems as they attempt to adapt to and embrace this fast-changing environment due to the changing student demographics as well as the greater use of technology and digital resources in education. Nevertheless, the digital learning period offers schools a fantastic opportunity to increase student learning and help them develop twenty-first century abilities like critical thinking, creative thinking, communicating, and collaborating [10].

Digital curriculum is a comprehensive, adaptable collection of materials aligned with learning standards and expectations. The fact that the resources are accessible to students outside of the classroom is a major component of the digital curriculum [34]. Teachers customize and individualize students' learning experiences by using digital resources. There are several different formats in which digital resources can be found, including video, images, audio, text, and interactive media.

A major aspect of digital curriculum is that the resources are also available to students outside the classroom. Teachers use digital resources to individualize and personalize student learning experiences. Digital teachers create digital documents, e-books, interactive lessons, and video tutorials to extend learning and add relevance to lessons [4]. A textbook can only get a student so far and is a static resource, gets easily outdated. Digital active curriculum assists students to go much deeper into understanding and assimilation [35].

The conventional definition of a digital classroom is one where the learning environment includes technological tools and software. When a physical classroom merges with the digital world, the result is a digital classroom. An online forum for reflective discussion can be a good way to address this. A digital classroom must have the capacity for collaboration or ongoing work outside of the classroom. In a digital classroom, it is simpler for teachers to highlight student work because technology enables quick access to learning resources and networks [22]. Students can also easily keep track of their progress.

Digital schools envelope the digital classroom as it can be described as a school that works virtually or runs online classes. Since the whole education system is now running digitally, the schools are also making themselves ready for the future [20]. There are a lot of benefits that digital schools put on the table.

- Improved Networking-Digital education also presents the students with the possibility to network with like-minded peers and teachers, across the globe. This more often than not leads to other chances or opportunities in line of partnership with their peers in the execution and completion of a project [12].
- Less Geographical Boundaries- A student often had to travel great distances to obtain knowledge; but with the development of improved technology and digital classrooms, this became less of a problem [9].

Digital transformation depends on developing new technological skills that can be applied in various fields. To produce new educational materials, teachers must adopt a digital perspective. According to psychologists, mentality is a style of thinking and viewing the world that influences our perceptions, behaviors, and emotions [17]. In order to succeed in an educational environment that is increasingly dominated by data-intensive and intelligent technologies, teachers and students need to develop a digital mindset, which is a set of attitudes and behaviors directed toward technological applications [25]. This mindset helps Teachers and students see how data, algorithms, and AI open up new possibilities. It takes work, but it's worthwhile to put in the effort to develop a digital attitude. According to studies, educators who follow these tips are more productive, more satisfied with their professions, and more likely to foster beneficial skills in their careers [21, 36].

The next stage of learning has started, and it includes a variety of technical tools like:

### *5.3.1 Digital textbooks*

Digital textbooks, also referred to as e-books, they offer students an interactive interface via which they may access multimedia information, including hyperlinks, and interactive presentations [34].

### *5.3.2 Online courses*

Online courses are created by unrivaled professionals in their field of expertise and may provide students with real-time learning experiences and information in the specific field [23].

### *5.3.3 Online exams*

With the advent of digitization in education came the online exam, which was more convenient for both teachers and students to assess the performance of students and even teachers in the digital environment [6].

### *5.3.4 Video presentations*

This is an engaging strategy that aids in students' learning. Students better understand the subject by being provided with a visual picture of it. Animation can be used to simplify the presentation of even the most complex subjects [23].

## **6. Attributes of digital education**

1. Use digital content to its full potential; educators must consider the advantages of e-books and internet resources in learning. Cost is the primary advantage in this context. Since electronic books and online texts are frequently less expensive than printed textbooks, any extra money can be used on other materials [24]. To give students the most current information, teachers can also regularly update the digital reading list. The ability for teachers to create their own textbooks is also offered by companies that aggregate online content [29].
2. Adopting a formative assessment philosophy; this will help teachers assess how well their students have understood the material being covered. When integrated with digital technologies, struggling students can be detected and helped before their grades start to fall [6].
3. Creating a Community through Mobile Learning and Social Media; these digital classroom concepts let students use their own devices to participate in the learning process. By extending the classroom borders and fostering a better feeling of community both within and outside of school, tablets, laptops, and cell phones are great tools for education [12].
4. Posting of online lectures; Even though it places a lot of responsibility on the students, allowing them to view the lecture section of the lesson plan on their own time allows for more collaborative work to be done in class. As a



result, the classroom's dynamic shifts from being teacher-focused to being student-focused [9].

5. **Prioritizing Communication and Clarity;** since the digital classroom promotes student autonomy and allows for greater self-regulation, it is crucial that teachers clearly express their objectives and grading criteria to students. Real-time feedback on tasks should be available to students, and they should be able to view their grades quickly. In order to better satisfy the teacher's expectations, students might monitor their own development in this way [29].
6. **Create Peer-Assisted Learning;** by utilizing online resources, teachers can promote peer-assisted learning in the classroom. Different students can view and share completed assignments, and they can also provide comments for improvement inside the documents themselves [21].
7. **Diversifying of Projects:** One advantage of the digital classroom is that it gives teachers the freedom to experiment with new and entertaining teaching methods outside of the traditional setting. Teachers can try students with a video summary instead of a book report? Have students produce their own podcasts as an alternative to essays. Teachers should use this fact to their advantage in order to make the classroom more engaging for digital students who are already familiar with these tools [13].

## **7. Types of digital education; techniques and methodology**

### **7.1 Computer managed learning (CML)**

In computer-managed learning (CML), often referred to as computer-managed instruction (CMI), learning processes are managed and evaluated by computers. Information databases are used to power computer-managed learning systems. These databases include informational varieties that the student must learn, along with a variety of rating criteria that allow the system to be customized to each student's preference [16]. A judgment can be made as to whether the student satisfactorily met their learning objectives thanks to two-way communication between the student and the computer. If this is the case, the procedures can be repeated until the learner has met their intended learning objectives. In order to save and retrieve information that helps with educational management, educational institutions also use computer-managed learning systems [8, 33]. Information like lecture notes, training manuals, grades, curriculum details, and enrollment details, among others, could be referred to here.

### **7.2 Computer assisted instruction (CAI)**

Another sort of digit education that combines technology with traditional instruction is known as computer-assisted instruction (CAI), also known as computer-assisted learning (CAL). The use of multimedia, including text, images, sound, and video, is a key component of computer-assisted training approaches. Through the use of numerous techniques, including quizzes and other computer-assisted teaching and assessment systems, and other forms of interactivity, students are able to become active rather than passive learners thanks to CAI [33]. Nowadays, the majority of

schools—both traditional and virtual use various forms of computer-assisted learning to help students acquire new skills and knowledge.

### **7.3 Synchronous online learning**

Multiple students can participate in a learning activity simultaneously, from any location in the world, with synchronous online learning. Online chats and videoconferencing are frequently used in real-time synchronous online learning because they allow students and teachers to ask and answer questions right away while still being able to talk to one another. Due to the rapid advancement of online learning technologies, this type of community-focused online learning is now possible. Authentic synchronous e-learning was almost unachievable to execute before computer networks were created in the 1960s. A lot of the traditional drawbacks of e-learning, such as social isolation and poor teacher-to-student and student-to-student relationships, are eliminated by synchronous e-learning, which is now thought to be highly favorable. One of the most used and rapidly expanding forms of online learning today is synchronous learning [9, 16].

### **7.4 Asynchronous online learning**

Asynchronous online learning involves individuals or small groups of students studying on their own at separate times and places from one another without engaging in real-time communication. Since they provide students more freedom than their synchronous counterparts, asynchronous e-learning approaches are frequently thought of as being more student-centered. Because it enables self-paced study, asynchronous online learning is frequently favored by students with rigid schedules. They are not compelled to learn at predetermined intervals with other students and can choose their own learning schedules [9].

### **7.5 Fixed E-learning**

According to the definition of “fixed” in this context, all students who are participating in this learning process receive the same information, and the course material is not altered from its initial form. Teachers predetermine the curriculum, which does not take student preferences into account.

Although this method of instruction has long been the norm in conventional classrooms, it is not the best for use in e-learning settings. This is so that fixed e-learning may avoid wasting the important real-time data that comes from student inputs. Better learning outcomes are achieved for all students when each student’s data is individually analyzed, and the curriculum is changed in accordance with this analysis [4].

### **7.6 Adaptive E-learning**

Adaptive e-learning is a brand-new, cutting-edge style of online education that enables Teacher to customize and restructure learning materials for every single user. Adaptive e-learning systems make education more personalized and student-centered than ever by considering various factors, including student performance, goals, abilities, skills, and traits. It is now possible to mathematically sequence student data using

laboratory-based adaptive educational strategies. This has the potential to usher in a new age for educational science if done properly. The potential value and effectiveness of this kind of e-learning are sometimes underestimated, despite the fact that it might be more challenging to develop and implement than conventional teaching approaches [17].

### **7.7 Linear E-learning**

When discussing human-computer interaction, the term “linear communication” refers to the unbroken flow of information from sender to receiver. This becomes a major barrier to e-learning since it prevents two-way contact between instructors and students. Even though it’s losing relevance over time, this kind of e-learning does have a place in the classroom. The distribution of educational content to pupils via radio and television broadcasts is a well-known example of linear e-learning [2].

### **7.8 Interactive online learning**

Interactive e-learning allows senders to become receivers and vice versa, effectively enabling a two-way communication channel between the parties involved. From the messages sent and received, the teachers and students can make changes to their teaching and learning methods. For this reason, interactive e-learning is considerably more popular than linear, as it allows teachers and students to communicate more freely with each other [12].

### **7.9 Individual online learning**

Individual learning, in this case, refers to how many students actively work toward the learning objectives rather than how student-centered the content is. For thousands of years, this kind of education has been the standard in conventional schools. When engaging in individual learning, students are expected to study the course materials alone and complete their learning objectives independently. As it primarily emphasizes individuals learning separately, without interacting with other students, this form of learning is not the best for helping students build communication skills and collaborative abilities. Consequently, a more contemporary strategy is required to replace the communicational gap [16].

### **7.10 Collaborative online learning**

Through the use of a contemporary learning technique called collaborative e-learning, a number of students can work together to accomplish their learning goals. To accomplish their shared learning objectives, students must cooperate and engage in cooperation. This is accomplished through the creation of strong groups in which every student must consider the advantages and disadvantages of every other student. This improves the students’ interpersonal and cooperative skills. The concept that information is best generated within a group of people where they may interact and learn from one another is expanded upon by collaborative e-learning. While traditional classrooms use this style of learning more frequently than online courses, it is nevertheless a genuine form of e-learning that, when done properly, can be quite effective [27].

## **8. Role of students in digital education**

Student's responsibilities in an online course frequently resemble those in a traditional classroom, despite some changes caused by the nature of the learning environment. These responsibilities include the following [3, 14, 21, 32]:

### **8.1 Become acquainted with the course and course materials**

Students should familiarize themselves with the module of the course. A module will contain important information applicable to the course as a whole. In an online course, this module may also contain assignments to complete as an orientation to the course.

### **8.2 Access to internet and computers**

It is the responsibility of the student to locate their internet connection. Modern educational institutions give students specialized spaces where they can find computers with Internet connectivity.

### **8.3 Purchase the required course materials**

For a digital class, teachers will choose books, websites, software, and other resources that are readily accessible to students. In most cases, the course curriculum contains information about these materials, including details on how to get them.

### **8.4 Attend class and participate in forums**

Even if it happens online, digital students still need to show up to class to receive lectures and communicate with their peers.

### **8.5 Communicate with teachers and staffs**

Classroom communication helps both students and teachers by better comprehending the subject matter, methods, and procedures for the course. In an online course, communication is especially crucial.

### **8.6 Abide by the guidelines and the online code of conduct for digital classrooms**

Students are responsible for adhering to all the standards and rules for online education established by the school administration. Even if classes are delivered online, students must maintain excellent ethics and appropriate behavior for an educational environment.

## **9. Administration's role in digital education**

As education is transforming and becoming more digitally inclined, school administrations also have to evolve with the times to manage all educational activities efficiently. They have a responsibility to the society, parents, Teachers and even

the students themselves to provide standard conducive learning environments while also protecting their interests [11]. Even in a digital context the students have to be guaranteed safety from any digital hazards. Applying instructional strategies that successfully confirm students' identities is the administrators' responsibility. The administration will introduce students to their online learning environment and explain how the course is organized within the learning management system, along with the learning objectives, expectations, and outcomes [27]. Effective communication is crucial, they must specify how and when students will communicate with and interact with the teacher, and students must receive frequent evaluations and comments from the administration on educational performances [24]. The administration has a duty to review all teacher curriculums and materials before they are sent to the students to ensure they uphold the standard and qualities of the institution [11].

A school administration applies various digital strategies to facilitate digital education. The following are a few examples of potential teaching strategies applied: holding online classes utilizing video displays, examining student writing samples from written assignments, routine communication with the student (through email, phone, and video), group projects, etc. A change in a student's behavior or academic performance, such as a sharp decline in performance, must be noticed by administrators because they have a responsibility to provide graduates who are equipped with the skillset to be productive in the twenty-first Century and have a positive impact on the fast transforming digital world [3].

## **10. Role of digital teachers in digital education**

Similarly to a traditional classroom, instructors and teachers have obligations to both students and administration to uphold all educational standards established by the school. Functions of teachers in digital education include [13, 23, 25]:

### **10.1 Provide adequate support and assistance to students**

Teachers must focus on their students and assist them in any way they can because not all students may have the same aptitude for technology as others. For students to correctly complete the course assessment, teachers can help and direct them on how to access, organize and utilize the required resources for proper course evaluation.

### **10.2 Promote learning**

Digital teachers have to use different tools to create more engaging lessons by encouraging students to use various reading materials, audiovisuals, gamification, and other hands-on activities that promote self-learning.

### **10.3 Server as a moderator between students**

Just as it is necessary to encourage participation, it is also necessary to moderate all discussions that are generated in group debates and forums to take advantage of collaborative learning among students?

#### **10.4 Monitor students' progress**

Teachers must keep an eye on students' development in a flexible, comfortable, and respectful atmosphere while accounting for student's forum involvement, content, connection times, frequency of logins, etc., and provide support as required.

#### **10.5 Evaluate students**

A teacher of a digital class will be in charge of planning the schedule, imparting knowledge, encouraging student participation, monitoring, responding to inquiries, and evaluating all student performances. The teacher will then be responsible for providing corrections and feedback in line with the activities that the students complete.

### **11. Quality of digital education**

The quality of an individual's life is based on the non-financial aspects of their lives relating to livelihood and life fulfillment. Quality of life in an individual's professional career refers to the work and time a person spends partaking in activities which give them the highest level of fulfillment. A person's level of productivity rises in direct proportion to their quality of life, the same is true for digital education. The better the digital education provided by an institution's administration, the more productive its students can be. The role of school administrations is significant in this context because they are in charge of giving every student and teacher access to the internet, new technology, high-quality digital textbooks, and online learning platforms, all of which are essential to high-quality digital education [12].

Five main pillars need to be considered to guarantee the end-to-end, systematic delivery of high-quality digital education [12, 18, 24]:

#### **11.1 Educational operations**

Following an analysis of the courses offered and the relevant course objectives, a complete implementation feasibility assessment at the course level, as well as a more in-depth examination of the course's objectives and learning outcomes, should be done. The analysis can be used to develop appropriate course material and objectives. This will include decisions about delivery method (synchronous, asynchronous, or hybrid) as well as the best techniques to stimulate simple interaction between teachers and students (social media, forums, and discussion boards). To avoid subjecting students to text-heavy material, digital classrooms can be utilized in conjunction with a variety of resources, including webinars, videos, podcasts etc. Experiential learning, which is frequently done in labs, field visits, legal clinics, and other settings, is an area that requires specific attention.

#### **11.2 Appraisal of teachers and students**

Evaluation outcomes and assessments must be in sync. Digital submissions, oral assessments, oral assessments using technology-driven AI, and submissions of handwritten responses shared in image format are the four main delivery options for online exams. The assessment design should be revised to reflect the targeted learning

outcomes and the realities of online delivery, but it can still incorporate continuous assessment, open-book exams, and class participation activities.

### **11.3 Extracurricular activities**

Digital administrations will facilitate online events like reading clubs, performing art e-collaborations, gaming get-togethers, and e-exercise classes to enable extracurricular activities and social networking. To encourage interactions between staff and students, mentorship programs and online office hours might be implemented.

### **11.4 Digital facilities**

The digital infrastructure of an institution serves as the basis for digital education. Institutions need to provide the resources that instructors and students need in terms of technology, software, internet access, electricity, and administrative tools. When designing educational settings, factors like costs, scalability, security, flexibility, and feasibility of implementation must all be taken into account.

### **11.5 Institutional protocols**

Effective digital education is built on a strong foundation of effective governance, which is characterized by the appropriate policies, procedures, and protocols. Grading, evaluation, attendance, code of conduct, faculty training and mentoring, mental health and emotional well-being, data protection, and class scheduling are the areas that must be covered. The administrative tasks of an institution, such as placements, internships, internationalization, student orientation, convocations, and scheduling, must be balanced with research.

## **12. Digital education and teaching mathematics**

Environments for digital mathematics education have been developed within currently available mathematical software (such as dynamic geometry, dynamic graphing, spreadsheets, or statistical software), or they may be integrated into webpages or applications. A common element of this environment is that the user (a learner or instructor) is required to alter a mathematical variant and watch the outcomes in order to create a more comprehensive grasp of how various mathematical concepts are dynamically related. It is known that individualized teaching and digital learning have increased students' overall proficiency in mathematics and their grasp of the subject [22].

### **12.1 Rationales for using digital tools in mathematics education**

1. Digital tools highlight, facilitate, and enable manipulation of relationships that are crucial for comprehending mathematics [22, 30, 36]. They can provide quick feedback to promote conceptual exploration and hypothesis, for instance with geometry, functions, or sets of data.
2. Algorithmic tasks can be delegated to digital tools, allowing users to concentrate more on other aspects of a task.

3. Digital tools have a lot to offer for honing mathematical abilities and gaining experience, including task diversity, randomization, automated and intelligent feedback. Also, tasks can be carried out in a private setting where one can safely make mistakes and learn from them. Students' broader careers, higher education, and personal demands require using digital technologies in mathematics education.
4. Since students are digitally recorded, this can provide insights into the evidence of students' thinking and practice, helping both formative and summative evaluation. Through the use of digital technology, blending traditional face-to-face teaching with online learning could provide the best of both worlds by combining the collaborative/3D responsive element with increased possibilities for reflection, both of which are beneficial for mathematical learning.
5. Digital tools are already playing a much larger part in new applications and are becoming more and more important in the construction of mathematical knowledge, which should have an impact on the curricula in schools.

### **12.2 Digital tools currently available for mathematics include the following in terms of general uses and overlapping categories**

1. The following are examples of general digital platforms for instructors that support mathematics digital education; e-mail, webinar applications, and VLEs [22, 30, 36]. They enable live instructions or teachings to be recorded, maybe with subtitles or even pre-recorded. In any case, events or resources are readily accessible for later review.
2. Tools for presentations, whether used in-person or virtually, can mimic a whiteboard or can be further developed with hyperlinks, embedded apps, etc. They can be created by teachers, downloaded for free from the internet, or purchased as part of a package or website. They can also be stand-alone presentation software for use in the classroom.
3. Calculators and statistical software are examples of computational tools/software that “outsource” the procedural parts of problems in order to focus more on the modeling, pattern-spotting, global behavior, invariants, etc.
4. Graphing software, the dynamic geometry package (Geogebra), CAS, and programming languages made especially for math (such Logo and Scratch) are examples of standalone mathematical software used for mathematical inquiry, concept development, or problem resolution. These can help in hypothesizing, finding important connections between various representations, developing algorithmic thinking, as well as outsourcing calculations or arguments.
5. MyMaths is an example of a software made to facilitate fundamental mathematics learning and also for assessing mathematics abilities. A “teaching” component may be included in these.
6. Another software is cornerstone mathematics which is an Interactive curriculum-specific software, that supports the development of certain (sets of) mathematical ideas.



### **13. Identity in digital education**

The identity is shaped by various perspectives. Understanding the relationship between human being and internal/external factors is a key to understand the identity correctly. There are five principal conceptions of identity that are commonly invoked and they are widely prominent in philosophical thinking. They are; identity as self, identity as narrative, identity as difference, identity as consciousness and identity as position. Each of these metaphors are associated with a distinctive endowment of desirable attributes and capacities and each sees identity as derived from different sources and as invested in different dimensions of human existence [20].

Identity as mind places literate practice as a tool for coming up with abstract concepts that some students who have evolved are in higher conscious levels and those who have not are in lower conscious level. Identity as narrative depicts those stories such as tales, myths places an individual in his own identity implying that people are constructed from the stories others tell about them and their experiences. Identity as difference situates literate practices as an artifact of the targeted difference. So that literacy itself is seen as differently practiced dependent on the race, ethnic, and cultural practices that a person is tied to. Identity as a position metaphor takes into account discourse and narrative. It provides that the social positioning of students via everyday discourse, text, or other media places them on their identities based on gender, race, and other sorts of subject. Identity as self-metaphor emphasizes more on how identities are different [13].

In the current order of the world, it is significant to get identified by one thing or another, for example, the name of user in social account. Identity of a person in social media determines the social positioning or location in a society where a person lives. However, getting the appropriate kind of identity can also be a challenge for people and groups such as race and the adolescents as a consequence of the obstacles confronted in the quest for developing identities. Because of identities such as race, gender, and minors, different forms of discriminations and privileges accompany the identities. Since the attributes describe identity, they can be used to determine the boundaries on what students are capable of becoming. Students can build the perceptions of them in social media as influencers, attractive, and vice versa [4, 10].

Each member of the educational community has a digital identity that serves as their representation. This includes not just the students, teachers, and full-time staff but also you are independent contractors, substitute teachers, parents, part-time employees, ad hoc faculty, partners, and others. This refers to anyone who supports education in any way, even if it's only as a back-end assistant. A list of characteristics that describe a person is included in each digital identification. Systems can recognize, safeguard, and service users thanks to digital identities, for example, by granting access to the applications that each person requires [10, 13].

Examples of informational pieces that can be used to create a digital identity include: username and password, purchasing behavior or history, date of birth, social security number, online search activities such as electronic transactions, and medical history. According to this viewpoint, a student's digital identity may develop as a result of their participation in online learning and the creation of digital environments. This participation, in turn, creates the pathway for students to acquire the digital tools that permit participation in and contribution to social practices (of teachers and students) and, subsequently, the pathway to becoming distinctive individuals and students. According to this perspective, students' involvement in both learning and designing digital environments can be considered as an active project to help them develop digitally [3].

## **14. Advantages of digital education**

The scope of how digital tools and services can be used for educational purposes is limitless, and it has incredible benefits for both students and Teachers [9, 23, 29].

### **14.1 Individualized learning experience**

Many students lose interest in their studies when they are unable to catch up with the rest of the class, which is a significant flaw in the traditional educational system. The modern digital format enables teachers to adapt the study material based on a student's learning style and aptitude. With the education system going digital, instructional activities are having a positive impact.

### **14.2 Students become smarter**

Students that are exposed to cutting-edge learning resources and technology get proficient in self-directed learning. Students can examine the information they need to know in order to look for and use online resources, thanks to the digital education system. It significantly enhances their productivity, learning capacity, and efficiency.

### **14.3 Unlimited information**

There is an abundance of information available on the internet, most of which is free to access. Students can now explore and exploit this knowledge vault because of the development of digital education. Before, students relied on a small number of information sources. Still, now that the digital education system is becoming more and more well-liked, the lack of the necessary information is no longer a barrier to learning.

### **14.4 High engagement learning**

While the digital education system gives a broad variety of options for learning, the traditional education system has limited scope for involvement. Higher levels of student engagement are achieved during the interactive and digital-based learning sessions.

### **14.5 Ease of sharing**

The modern digital education system is completely different from the old-fashioned old education system, which mainly relied on students keeping large, handwritten notebooks filled with knowledge that they learned from their teachers in class or through intensive research in the library. Students may now save a ton of time and effort by easily archiving and sharing material with just a click.

### **14.6 Accountability in students**

The digital education system includes system-generated performance reports and real-time evaluation, which improves assessment openness. It gives students the ability to assess their own performance and find the necessary answers. The modern educational system encourages students to come out of their shells and develop

autonomous thinkers who know what, when, and how to study. They are no longer reliant on having information spoon-fed to them by their parents and school.

#### **14.7 The learning process becomes more time efficient**

Teachers can better tailor instruction to meet the requirements of specific students.

Through digital learning, a digital mindset will enable students to continue adjusting to new technology for a very long time. Even when working remotely, learning can be accomplished.

### **15. Disadvantages of digital education**

Educators worldwide still recognize some major issues plaguing digital education and how it affects learning [2, 9, 29].

#### **15.1 Lacks social interaction**

Due to the lack of face-to-face interaction with teachers and classmates, e-learning is one of the factors contributing to social isolation. Very little or no interaction occurs.

#### **15.2 Inaccessible to others**

If you live in a place with a quick and reliable internet connection, consider yourself fortunate. Unfortunately, some people's access to the internet is quite constrained. It is really inconvenient for them that they have to use public Wi-Fi or go to internet cafes.

#### **15.3 Cheating is unavoidable**

Assessment is a part of e-learning, just like it is in a traditional classroom. However, no teachers or supervisors are present to keep an eye on students as they take their tests. Students will find it simple to share solutions since they know no one is looking.

#### **15.4 Requires self-motivation and proper time management**

In e-learning, students are essentially alone. Students must push themselves to focus on their studies, make notes, and learn more. Students will also need to learn how to balance studying with other activities like domestic chores or part-time employment as another aspect of time management.

#### **15.5 Digital education focuses more on theory than practical**

Students spend most of their time listening to podcasts, watching videos, and looking at slide presentations. There's no hand-on experience like conducting experiments.

## **16. Conclusion**

The modern educational system has been integrated with digital tools and techniques, which was introduced only a few years ago. With the application of digital tools in teaching activities, it is replacing traditional teaching methods across various institutions. There has been a lot of modern-day transformation to the classroom, and with it comes various changes like online lectures, examinations etc., which have aided in improving the quality of education across institutions and ensuring that the level of education matches the digital revolution of the twenty-first century. It has brought on new approaches to education with different roles for students, teachers, school administrations and even parents, enhancing participation in educational activities and more communication among all parties. Digital education has created several opportunities for teachers and students to advance their educational prowess. Mathematics is a clear example of a subject that digital education has simplified for students and teachers alike, making it more understandable and comprehensible with access to many supportive tools. Through various methods, including visual aids, individualized instruction, digital curriculum, and the provision of limitless information with comparatively easy access, digital education has introduced new experiences to the classroom and has raised the quality education. Creating a balance between the use of digital technology, educational application, and social interaction is the way to maximize the benefits of digital technology and minimize the limitations that come with it. So with this balance, digital technology can be applied to boost the educational standards of several institutions and groom more brilliant students that are productive to their community and better equipped to navigate through the modern digital world efficiently. Although a lot has been accomplished with digital education, there is still room for improvement to keep up with the ever-changing global technological advancements.


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Section 2

# Risks and Challenges

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# Perspective Chapter: The Risks and Opportunities Associated with Social Media during the COVID-19 Pandemic and the War in Ukraine

*Peter Krajčovič*

## Abstract

The popularity of social media has significantly contributed to its widespread use by different age groups of users, including children and seniors. In the online environment, especially on social media, users can encounter many threats, mainly fake news and disinformation. Although fake news and disinformation have been around for a long time in the Internet environment, the COVID-19 pandemic and the war in Ukraine, as well as other crises, have highlighted the dangers of their spread through the Internet, especially on social media, their impact on individuals, on the economy, and on society. This chapter discussed the main risks, but also the opportunities provided by social media during the last crises. It brings closer the change in media behavior and the use of social media during COVID-19 and the military conflict in Ukraine, the shift of paradigm in using social media, as well as the possible methods to fight disinformation.

**Keywords:** COVID-19, disinformation, fake news, media, social media, Ukraine

## 1. Introduction

The popularity of social media has significantly contributed to its massive use by different age groups of users. The overall rate of social penetration in 2020 reached a level of 49%. The highest rate was recorded in East Asian and North American countries at 71%. In the countries of Northern Europe, it reached a level of 67% [1]. The number of active users of social media in January 2022 reached 4.62 billion active users, which represents 58.4% of the world population. The most popular social media include Facebook (2910 million active users in January 2022), YouTube (2562 million active users in January 2022), WhatsApp (2000 million active users in January 2022) and Instagram (1478 million active users in January 2022). Recently, however, new social media, such as Tik-Tok (1000 million active users in January 2022) [2], are gaining more and more users.

The COVID-19 pandemic, and later the war in Ukraine, have largely highlighted the risks associated with the Internet and social media, especially in spreading fake

news and propaganda. Although both fake news and propaganda have been around for much longer than the events mentioned, it was during these crisis events that they began to spread more intensively than at any time before. This caused several negative aspects related to the use of social media and the need not only for a professional discussion about the possibilities of eliminating the spread of fake news, but also for the regulation of social media itself and the spread of content on the Internet.

On the other hand, the Internet and social media in times of crisis represent an important tool through which it is possible to inform the audience about current information, events, or measures. The use of social media thus presents opportunities as well as risks that must be known in order to be used as effectively as possible.

This chapter addresses the importance, role and status of social media during the COVID-19 pandemic and the war in Ukraine. It approximates the impact of these two crises (COVID-19 and the war in Ukraine) on the use of media in general, changes in social penetration and the way they are used. Special attention is paid to the change of paradigm and perception of social media by users and the phenomenon of the spread of fake news. In the context of the spread of fake news, it approximates the risks and opportunities associated with the use of social media, especially during a crisis. It focuses on the occurrence of fake news and the possibility of eliminating its spread, as well as current scientific knowledge about the impact of social media on critical thinking and the ability to identify fake news.

## **2. Methodology**

This chapter has been prepared based on a search of professional literature, scientific studies and research focused on the impact of the COVID-19 pandemic and the war in Ukraine on the use of social media and the spread of fake news. The author has processed extensive research and analysis of current studies and offers an overview of the latest knowledge about the opportunities and risks associated with the use of social media, as well as the results of his own scientific and research activities, focused on the use of media, the spread of fake news and their impact on recipients. In addition, it brings together important information from national surveys on media **behavior** and the spread of fake news, as well as framework documents of the European Union and institutions dedicated to the fight against disinformation.

## **3. The influence of the latest crises on media behavior and the use of social media**

The new type of coronavirus SARS-CoV-2, which appeared at the end of December 2019 in the Chinese city of Wuhan and subsequently spread to other countries, caused a global pandemic during the following months. The illness is characterized primarily by fever, dry cough, and fatigue and was named by the World Health Organization (WHO) as COVID-19.

By the end of 2020, the World Health Organization recorded 79 million cases of COVID-19 and 1.7 million deaths due to the new coronavirus. At the beginning of August 2022, there were already 578,142,444 cases of COVID-19 and more than 6.4 million deaths [3].

The new coronavirus pandemic also attracted considerable attention from the media, which provided up-to-date information daily concerning the number of active

cases, as well as the number of hospitalizations and deaths. The media reported on measures to prevent the spread of the new coronavirus, but also on the situation in neighboring countries and the entire world. In addition to news programs, the media also covered the topic in specialized journalistic programs. These were primarily discussion shows in traditional media and special editions of television or radio news programs. They alternated between guest experts in epidemiology and virology, but also focussed on the diagnosis and prevention of COVID-19.

Online media also paid a lot of attention to this topic, especially news portals, which set up separate sections on their pages dedicated to the coronavirus. As emphasized by Panasenko et al. [4], the media's increased interest in this topic was related on the one hand to the effort to inform the public about the current situation, on the other hand to the interest of the viewers, readers and listeners themselves and on the provision of current information.

According to the analysis prepared by the Faculty of Mass Media Communication at UCM in Trnava [5], more than 407,000 articles on the topic of "COVID-19" and "coronavirus" were published in the Slovak media in 2021. The highest number of contributions were published in online media (355,356), followed by print media (28,402) and agency news (13,199). 7835 contributions were broadcast on television and 2642 on the radio.

The COVID-19 pandemic also affected media behavior to a large extent, and above all, the time spent using certain media. Thanks to the audience's interest in current information, but also as a result of anti-pandemic measures, which included also restrictions on going out, there was a gradual increase in the time spent using individual media. According to research by the agency MEDIAN SK [6], over the period 16 March – 19 April 2020, compared to the period 01–29 February 2020, i.e., before and after the outbreak of the corona crisis in Slovakia, Slovaks spent 6 minutes and 35 seconds more time using mobile apps, 35 minutes more using the Internet and 6 minutes and 30 seconds more watching TV. On the contrary, there was a decrease in the case of radio broadcasting, namely by 11 minutes.

According to the Nielsen agency [7] during the height of the nationwide shelter-in-place orders across the U.S. amid the COVID-19 pandemic, weekly time spent watching connected TVs grew significantly, rising by more than 1 billion hours as the weeks passed. And while this rise in total media consumption was to be expected, the consistently high levels of CTV use across smart TVs, internet-connected devices, and game consoles suggests that life in the new normal includes a heavier dose of connected TV use than ever before (**Figure 1**).

Watching the media worldwide was not only related to spending free time, but also to obtaining information about the new coronavirus, current measures, or restrictions. The results of a global survey from March 2020 [8] showed that the coronavirus had a direct impact on media viewing around the world. The increase in the use of media was in several categories: watching more news coverage (+67%), watching more shows/films on streaming services (+51%), watching more TV on broadcast channels (+45%), spending longer on messaging services (+45%), spending longer on social media (+44%), spending more time on computer/video games (+36%), reading more books/listening to more audiobooks (+35%), listening to more streaming services (+35%), listening to more radio (+18%), reading more magazines (+16%), reading more newspapers (+14%), creating/uploading videos (+14%), listening to more podcasts (+12%).

A separate chapter presents social media through which users shared posts about the new coronavirus, but at the same time also commented on these posts, shared

Media consumption due to the coronavirus outbreak	Worldwide	Italy	Spain	France	Germany	China	USA	UK
Watching more news coverage	67%	67%	63%	50%	60%	77%	43%	50%
Watching more shows/films on streaming services (e.g. Netflix)	51%	53%	58%	31%	21%	63%	42%	32%
Watching more TV on broadcast channels	45%	55%	43%	53%	35%	46%	42%	32%
Spending longer on messaging services (e.g. WhatsApp, Facebook Messenger, etc)	45%	60%	61%	24%	22%	59%	17%	24%
Spending longer on social media (e.g. Facebook, Instagram, Twitter, etc)	44%	52%	49%	27%	21%	50%	32%	21%
Spending more time on computer/video games	36%	41%	48%	39%	21%	29%	29%	20%
Reading more books/listening to more audiobooks	35%	36%	42%	24%	19%	44%	25%	19%
Listening to more streaming services (e.g. Apple Music, Spotify, etc)	35%	25%	27%	14%	13%	49%	18%	14%
Listening to more radio	18%	29%	32%	23%	24%	16%	16%	17%
Reading more magazines	16%	23%	22%	14%	17%	14%	12%	15%
Reading more newspapers	14%	18%	14%	14%	10%	17%	12%	9%
Creating/uploading videos (e.g. on Tik Tok, YouTube, etc)	14%	10%	15%	7%	5%	17%	6%	6%
Listening to more podcasts	12%	8%	10%	6%	6%	13%	10%	11%

**Figure 1.** Public media behaviour due to the coronavirus pandemic and belongs to the results of a global survey from March 2020 [7].

them, and created their own content. The spread of unverified information, but also the operation of various entities in the social network environment, was a prerequisite for the spread of fake news and misinformation. The World Health Organization even declared that false information was spreading faster than the virus and called the situation “an infodemic of planetary proportions” [9].

The term “fake news” refers to the publication of information that imitates news and other journalistic formats, is intentionally and demonstrably false, and aims to manipulate, mislead, obtain financial profit or entertain the recipient [10]. It is the diversity of the form and content of fake news that causes problems in their identification by ordinary Internet users. They often copy the trend of journalistic posts with catchy headlines, perex, or emotional photos. Lazer et al. [11] emphasize that fake news overlaps with other information disorders, such as misinformation (false or misleading information) and disinformation (false information that is purposely spread to deceive people).

We can observe a similar situation in connection with the military conflict in Ukraine. Although fake news and propaganda about the political situation and political interests have been around for a long time in the Internet environment, the war in Ukraine, like COVID-19 and also other crises, have highlighted the dangers of the spread of fake news through the Internet and social media, their impact on individuals, on the economy, and on society, as well as the risks of social media themselves, issues of policy setting and possible options for eliminating harmful content.

#### **4. Social media and the COVID-19 pandemic**

In connection with the coronavirus, various hoaxes and fake news have appeared in the Internet environment. Most often, it was information related to the use of medicines, information about the origin of the coronavirus, news about the closure of places, information about various preventive measures and options to protect oneself from the virus, and news about the earlier opening of schools or the return of dolphins to Venice [12]. These messages were spread mainly in the environment of social media in the form of sharing in private groups, but also among friends in the form of sending private messages. Users discussed them, commented on their content, and often consciously or unconsciously spread them further.

In addition, enormous amounts of partially or often completely distorted, unverified, or completely fabricated information related to the coronavirus pandemic were released to the public [13]. In this context, Mičuda [14] adds that with the advent of the COVID-19 pandemic, new problems have come into focus, which, although they have been present in our society since time immemorial, always start to come to the surface during certain world events.

According to the Police Service’s Disinformation Report [15], the primary goal of the creators of disinformation was to cause chaos in society and undermine trust in the state, which was directly related to inciting hatred and distrust of state institutions. Disinformation has become a hybrid tool as a form of attack on the country’s interests and the security of its citizens.

A special group opened user accounts that outwardly presented themselves as accounts of individual activists, but were in reality a well-thought-out communication tool behind groups of people or organizations. The hiding of several concentrated groups behind one individual account of a specific person is one of the communication tactics of disinformation creators, as the public is more attracted to a specific person acting independently than to an anonymous group.

The spread of fake news and misinformation has also been facilitated by various chat applications that offer their users a higher degree of anonymity than public profiles and, based on the absence of any moderation tools, guarantee the free spread of extremist views promoting violence.

According to the results of a survey conducted by the author of this chapter between 29 March and 20 April 2020 on a sample of 429 respondents, almost 80% of respondents encountered hoaxes or fake news during the first wave of the pandemic. Respondents in all age categories encountered such types of information. An interesting finding is that only 52% of respondents were able to immediately identify hoaxes. Almost 38% did not know it was a hoax, but the content of the information was suspicious to them. The rest of the respondents (10%) could not identify that it was fake news and only realized it afterwards. Respondents in all age categories were able to identify hoaxes, although a surprising finding is that a relatively high percentage of young people (in the age group of 15–24 years) only realized that it was a hoax afterwards. Almost half of the respondents (47%) who encountered hoaxes in connection with information about the coronavirus caused concern. A fifth of the respondents (20.6%) even began to doubt the correctness of the steps taken by the competent authorities in the fight against the coronavirus due to hoaxes. This underlines the danger of such messages, and although the addressee may not believe them, they may undermine their confidence in the measures taken by the state or other authorities. Confidence in the measures taken and compliance with regulations can be key to eliminating risks or stopping the spread of a threat.

According to the final survey report on the prevalence of fake news in the global environment [16], 60% of UK 16–24-year-olds have used social media to search for information about the coronavirus, and 59% have come across fake news related to the topic. 30% of the population aged 15–18 in France also used social media as a primary source of information about the coronavirus. The global survey itself revealed that while the majority of social media users belonging to Gen Z and Millennials ignored or reported fake news they encountered while browsing social media, some of them shared the news further.

According to a study published by the Reuters Institute for Journalism Research [17], most misinformation about the disease COVID-19 includes various forms of so-called reconfiguration of information, in which existing and often true information is purposefully changed, modified, or distorted. Less misinformation was completely fabricated. The study also revealed that the amount of disinformation spread from top to bottom, through politicians, celebrities, or other prominent figures, was relatively small and represented a minority of the overall sample, but in the social network environment, it was recorded, on the contrary, as the majority. The largest categories of disinformation include misleading or false claims about the actions of public authorities, including governmental or international bodies such as the World Health Organization or the United Nations.

According to a report by the European Police Office (EUROPOL) [18], the spread of disinformation or fake news is a key element of the hybrid threat landscape. The impact of the COVID-19 pandemic on cybercrime was the most visible and significant compared to other crimes last year. Cybercrime fraudsters have been able to quickly adapt and exploit users' fears of various frauds and crimes. Criminal organizations, states, and state-sponsored entities seek to exploit public health crises to achieve or increase profits or to advance their geopolitical interests. According to EUROPOL [19], more and more misinformation and fake news are spreading around the world regarding COVID-19, which can have harmful consequences for public health and effective crisis communication.

In connection with the pandemic of the new coronavirus, fake news related to the offer of fake or non-standard personal protective equipment, disinfectants, as well as various tests or test kits for home use was most frequently encountered in the online environment on a pan-European scale. Vaccines, following their development, were



added later. However, according to Europol, with the increasing amount of time spent by minor users in the online environment, cyber-sexual violence has also increased.

During the crisis caused by the COVID-19 pandemic, the European Union also intensified work aimed at informing citizens about risks and strengthening cooperation with other international participants in the fight against disinformation. In the action plan against disinformation [20] from December 2018, it lists four pillars of the EU's fight against disinformation: 1. improving capabilities for detection, analysis, and detection of disinformation; 2. strengthening coordinated and joint responses, inter alia, through an early warning system; 3. mobilization of the private sector in the fight against misinformation and 4. raising awareness and improving the resilience of society. In June 2021, it subsequently presented a joint statement by the Commission and the High Representative [21], in which it intensifies these efforts.

## **5. Social media and the war in Ukraine**

With the attack of Russian troops on Ukraine in February 2022, disinformation and fake news related to Russian propaganda began to spread significantly in the environment of social media. According to the European Digital Media Observatory (EDMO) report [22], Ukraine-related disinformation in March 2022 was the biggest disinformation phenomenon ever recorded by the EDMO monthly briefs.

As stated by The Select Committee on Intelligence of the United States Senate [23], such messages have been circulating in the online environment for a long time. The severity of their impact, for example, resonated significantly in 2016 in the case of the US presidential elections. As further stated by Húsková [24], this was not the first case of destabilization of the domestic political situation of individual states by foreign participants using targeted disinformation. Back in 2007, Russia attacked Estonia with a combination of cyber-attacks and disinformation campaigns. An extensive disinformation campaign was also visible in the case of the Ukrainian crisis in 2014. A similar scenario was also repeated before the British referendum on withdrawal from the European Union in 2016 when Russian communication agencies such as Russia Today and Sputnik published several hundred anti – EU articles contributing to influencing public opinion through rhetoric and other methods.

Helmus et al. [25] pointed out, that Moscow blends attributed, affiliated and unattributed elements and exploits new realities of online and social media to conduct information warfare at a perhaps unprecedented scale and level of complexity. These information operations appear to be a growing priority within the Kremlin, which spent 1.1 billion US dollars on mass media in 2014 and increased its spending on foreign-focused media in 2015.

Russia's disinformation and propaganda ecosystems are described in the Global Engagement Center (GEC) report at the U.S. Department of State [26]. According to this report, these disinformation and propaganda ecosystems are a collection of official, proxy, and unattributed communication channels and platforms that Russia uses to create and amplify false narratives. The ecosystem consists of five main pillars: official government communications, state-funded global messaging, cultivation of proxy sources, weaponization of social media, and cyber-enabled disinformation.

According to a study requested by the European Parliament's Committee on Civil Liberties, Justice and Home Affairs [27] elements of disinformation and propaganda are such that information is designed to be wholly or partly false, manipulated or misleading; regards an issue of public interest; has the intention to generate insecurity; it

attempts to disrupt democratic processes; is disseminated and/or amplified through automated and aggressive techniques (such as social bots, artificial intelligence, micro-targeting or paid human ‘trolls’). Disinformation and propaganda often use unethical persuasion techniques, hostility or polarization and are often used to boost public visibility.

The main narratives detected in disinformation circulating in the EU after the beginning of the war in Ukraine and the four false stories with the widest circulation were: (1) Ukraine hosts secret US bio-labs; (2) Mariupol’s hospital was not bombed by Russia and the attack was staged by the Ukrainians forces; (3) Victims in the Ukraine war are actually actors; and (4) CNN is spreading false news about the war in Ukraine [28].

However, compared to previous decades, more sophisticated ways of spreading fake news can be observed, mainly thanks to technological development and artificial intelligence. As pointed out by Wooley and Howard [29] while some of these disinformation campaigns are carried out directly by individuals, most are waged by software, commonly known as bots, programmed to perform simple, repetitive, robotic tasks. Some social media bots collect and distribute legitimate information, while others communicate with and harass people, manipulate trending algorithms, and inundate systems with spam. Campaigns made up of bots, fake accounts, and trolls can be coordinated by one person, or a small group of people, to give the illusion of large-scale consensus.

Hodgson [30] in her study explains the use of bots on Twitter. This research has shown that viewers are more likely to believe the information they are consuming if multiple validating arguments support the same constantly repeated conclusion. In the example of Twitter, the author explains how the bots and their target audiences make social media easy to manipulate. She emphasizes that there exist also true believers, who really believe that the bot and its tweets are real. According to Hodgson, these users act as a humanized mouthpiece for an otherwise fake account whose only goal is large-scale content distribution. This is another risk of social media in connection with spreading fake news and disinformation.

## **6. Disinformation on social media and possibilities for its regulation**

The occurrence of fake news and hoaxes is regularly monitored by national and international institutions, such as the World Health Organization [31], which monitors false claims about COVID-19 on its website. It focuses on claims about the nature of the virus and potential treatment and prevention measures. The European External Action Service [32] provides regular information on current trends and insights into disinformation activities. A useful fact-checking tool is offered by Google [33] through its Fact Check Explorer. Various private companies, non-profit organizations, or social media themselves are also active in the fight against misinformation and fake news.

The largest social media, such as Facebook and Twitter, as well as Google, have begun to cooperate with the World Health Organization in the fight against the spread of misinformation. For example, Facebook removes posts flagged by global health organizations as violating their misinformation content policy [34]. Twitter started issuing warnings on messages containing misleading information about COVID-19 [35].

The European Union also fights against disinformation, and publishes an overview of the most common myths and half-truths in connection with the COVID-19 pandemic. According to the EU, more than 300 disinformation messages about the coronavirus have been reported, published, and updated so far [36].

scams and scam sites	96
coronavirus	71
testing	33
vaccination	28
mask/respirators	22
5G, radiation	19
measures against the coronavirus	12
medicines and medical devices	6
other	176
<b>SUM</b>	<b>463</b>

**Figure 2.**  
 The most frequent categories of posts shared via the page Hoaxes and frauds - Slovak Police on Facebook in the period March 1, 2020 – April 30, 2021 and its own processing.

According to the latest report published on June 1, 2022, by the European Commission [37] in March and April 2022 Twitter suspended 527 accounts and removed 6712 pieces of COVID-related content, TikTok removed 1026 videos with a COVID-19 tag and 2203 medical misinformation videos, Meta removed 78,000 COVID-related pieces of content from Facebook and 9800 on Instagram for violations of their misinformation policies. According to the Google Ads Safety Report [38], in March and April, 33,882,679 coronavirus-related ads have been blocked.

Despite these activities, there is still much fake news on social media [15–19, 22–28].

One of the most significant activities in the fight against the spread of fake news and hoaxes in Slovakia is carried out by the Police of the Slovak Republic. Through their profile page Hoaxes and Frauds - Slovak Police [39] regularly shares and explains fake profiles, pages, or information. The page had more than 122,000 fans at the end of 2021.

For the period from 1 March 2020 to 30 April 2021, 463 posts dealing with fake news and hoaxes were published via this page on Facebook. Posts dealing with scams and scam sites were most represented (96), followed by fake news and disinformation about the coronavirus (71). **Figure 2** shows more detailed results.

A team of experts dedicated to monitoring disinformation identified a total of 189 hoaxes in 2021, with 151 of them only related to the pandemic, while the variety of hoaxes spread in connection with this topic increased compared to the previous year. Disinformation affected all areas directly or indirectly related to the ongoing pandemic. The intensity of the spread of hoaxes corresponded to the curve from 2020 - online disinformation occurred primarily in spring and autumn, that is, during the second and third waves of the pandemic. The calmest period was again during the summer months [15].

The main disinformation narratives for 2021 featured the following themes:

- vaccination is harmful, ineffective, unnecessary, and/or health/life threatening
- false deaths as a result of vaccination (abuse of deaths of specific persons)
- medical personnel killing patients (e.g. on pulmonary ventilation)
- the situation is not serious, state institutions are exaggerating

- the situation is much better abroad (concealment of the number of people vaccinated there)
- the pandemic is a secret plan by the powerful to control/exterminate humanity

According to the report by the Police Force [15], the intensity, cadence, reach and mass of disinformation, the organization of its creators, the effective use of social media unable to monitor dangerous content, and new communication methods have created a significant security threat from disinformation. The power of the influence of disinformation was shown not only on the vaccination rate of the population but also resulted in verbal and physical attacks against rank-and-file representatives of state institutions (healthcare workers, police officers, hygienists, vaccination teams, etc.).

## **7. Discussion**

The popularity of social media has significantly contributed to its massive use by different age groups of users. Almost 62% of seniors over 65 who actively use the Internet also use Facebook. In the 50–64 age group, it is up to 72%. The largest number of users is naturally within the younger generation. About 88% of people aged 18–29 who actively use the Internet also use Facebook. In the 30–49 age group, it is 84% [40]. The mentioned age structure of social network users proves that even the most vulnerable groups of users can encounter fake news. It is seniors who are learning to work with the Internet and whose digital skills are not developed enough to be able to face the attacks of fake news and hoaxes.

The phenomenon of fake news is also becoming relevant in the context of the development of the so-called “groundswell”, which represents a way of using various technologies, including social media, to obtain information from their users themselves instead of using official sources [41]. It is precisely in the environment of social media that fake news is created very often and quickly, the authors of which are often their regular users who need to publicly express their often-unqualified opinions. The groundswell phenomenon is also characterized by the fact that users of social media also use them as a source of information [42, 43]. Li and Bernoff [41] define the groundswell as a social trend where people use technology to achieve what they need from each other rather than from traditional institutions such as businesses. Through the mentioned technologies, we understand precisely social media, blogs, applications, or other tools that permit obtaining the necessary information or sharing it.

According to Westerman [42], social media is increasingly used as an information source, including information about risks and crises. Sutter [43] points out that social media have also been used, for example, to find information on important topics, such as spreading current information about cholera outbreaks in Haiti and identifying sources of clean water during this outbreak. This way, they can encounter fake news much sooner than ever before, especially when they are looking for answers to their questions.

In the context of the use of social media as a source of information, several specific questions arise that affect not only the acquisition of information, but also its relevance, and at the same time bring a range of changes in the field of the basic communication process and the relationship between the sender of the message and its recipient. Due to these factors, the established paradigm of passively receiving

information is changing and an active approach in the field of search and subsequent dissemination of information is beginning to prevail.

Another significant change related to technological interference is the gradual development of communication platforms and the possibility of social engagement of individual users. Based on this principle, several social media were created, which, however, gradually became for many users not only a place for social interaction, but also an active exchange of opinions, sharing experiences, and also searching for information. On the other hand, it was social media that made it possible to quickly inform about the risks of fake news that spread through them.

The algorithm for displaying messages based on “likes” or other emoticons, as well as sharing itself, creates the assumption of an effective intervention of a wide user group. The speed of identifying fake news and the subsequent sharing of a warning can thus be one of the tools to combat disinformation in the environment in which it spreads most often and fastest. However, as we stated in the previous chapter, despite the efforts of social media providers to remove content for violations of their misinformation policies, there is still much fake news on social media.

According to the latest survey of MEDIAN [44], more than 10% of the respondents declare that vaccination is used to microchip the population. Theories about chemtrails are believed by a fifth of the adult population, and the theory about the ordering of the attacks on the WTC by the US government is believed by a quarter. At least two of the investigated alternative theories are trusted by 21% of the population. Compared to the general population and those who do not tend to trust alternative theories, we can find people who tend to trust alternative theories more often among those aged 30–59, but also among people with lower levels of education. People who tend to believe in alternative theories are more often found among the unemployed compared to the general population, but also compared to those who do not believe in these theories. On the contrary, only a minimum can be found among students. The direct impact of misinformation can be seen, for example, in the other findings from this study, according to which people who tend to believe in alternative theories are significantly more likely not to be vaccinated than those who do not believe in such theories.

Another survey of MEDIAN [45] shows the influence of propaganda spread through social media. According to the findings, almost 12% of the inhabitants of the Slovak Republic consider the theory that Russia came to liberate Ukraine from the fascists through an attack to be true. According to 9% of respondents, there is no Russian war in Ukraine and it is a lie invented by the USA. A third of the population of the Slovak Republic declares that the media exaggerates the situation in Ukraine.

As Kačínová further points out [46], the current phenomenon of massive dissemination of alarm messages and the search for social tools to immunize the individual against their influence in a wider social context re-actualizes the topics of media education and its necessity. The need for a critical view of information mediated by the media is also pointed out by Hossová [47], who emphasizes that media literacy and the ability to critically approach published media content is a basic prerequisite for combating the pitfalls associated with information overload and the spread of false or distorted information. Critical thinking is also pointed to as an important factor by Graca [48], who states that with insufficient critical thinking, young people are often subject to manipulation by various interest groups, which not only hurts them, but is also detrimental to our society.

Systematic and purposeful dissemination of disinformation is one of the main tools used in hybrid operations. Defense and prevention against the effects of subversive information operations are strategic communication and active building of

the population's resilience through the development of media education and critical thinking [49].

Another important aspect in protecting against misinformation is more rigorous control of the content by social media providers. Due to recent significant technological progress and the development of artificial intelligence, we can expect increasingly frequent occurrences of more sophisticated fake news, which we will be able to distinguish only with great difficulty. On the other hand, this progress also presents opportunities for the development of tools capable of identifying fake news and preventing it from appearing directly in the social media environment.

## **8. Conclusion**

This chapter addressed the impact of the latest crises (COVID-19 and the war in Ukraine) on the use of social media and the main risks associated with their use, mainly regarding the spread of fake news and misinformation.

The author described the main changes in media **behavior** and the use of social media during these crises. The new coronavirus pandemic and the war in Ukraine attracted considerable attention not only from the audience but also from the media, which provided up-to-date information daily. The most visible change in media **behavior** is that people spent more time with the media, especially online media (within social media) and used them for actively searching for information about the pandemic or military conflict. For this reason, they have encountered fake news and misinformation that appeared especially on social media.

Disinformation has become a hybrid tool as a form of attack on the country's interests and the security of its citizens. Thus, the author focused on the occurrence of fake news and the possibility of eliminating its spread, as well as current scientific knowledge about the impact of social media on critical thinking and the ability to identify fake news. This chapter provided some examples of the most shared fake news and its characteristic features. The author also described the main activities of social media providers and national institutions in fighting disinformation and eliminating its spread. Despite these activities, there is still much fake news on social media. For this reason, media education is very important in the process of an effective fight against disinformation and social media literacy. It is necessary to educate students, adults and elderly people about the risks of using social media, learn how to **recognize** fake news and develop more sophisticated tools to prevent its spread.

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## Chapter 6

# People's Perspectives on Covid 19, Fake News and the Vaccination Drive in South Africa

*Oluyinka Osunkunle*

### Abstract

This Chapter seeks to look at people's perspectives on Covid 19, Fake news and the vaccination drive in South Africa. The Chapter looks at the advent of Covid 19 and the various government initiatives to combat the spread in South Africa. The Chapter will also seek to look at fake news and its impact on the populace as citizens try to make informed choices towards vaccinating against Covid 19 infections. The chapter will thus look at the information warfare and its attempt to influence or derail public action. Comments from study participants will be looked at as conclusions and recommendations are drawn.

**Keywords:** people's perspectives, Covid 19, fake news, vaccination, social media

### 1. Introduction

With the advent of the Coronavirus disease pandemic in 2019, which was later referred to as COVID-19, great fear of the unknown gripped the whole world as the World Health Organisation (WHO) broke the news globally. It was therefore important for people and nations around the world to get the needed information on what the disease is all about and how to stay protected from it considering its potent deadly nature. However, it was quickly established that getting credible information was challenge world over. What aggravated the global fear was the fact that the virus is new, spreading at a fast rate from one country to another and also killing people in the process. To make matter worse, scientists and doctors were also having a difficult time to understand the nature of the virus and its ability to spread from person to another and from one country to another [1–4]. Within a short period of its existence, the impact of Covid-19 was felt globally as the disease was able to spread rapidly across the world, which brought about great fear and a sudden period of uncertainties among people and governments of the world. Even as the World Health Organisation (WHO) and health professionals globally try to understand the nature of this novel virus and how to stop its spread, people globally started to give various meanings and interpretation to the nature and spread of this virus. Considering the effect that this could have on the world, WHO decided to declare a “massive infodemic” on February 2, 2020 [5, 6].

On February 2nd, the World Health Organisation declared a “massive infodemic”, noting that there is an over-abundance of reported information on COVID-19, which are harmful to the people that come in contact with these kind of information. The reason for the declaration of “massive infodemic” is that the over abundant amount of information that exist are both accurate and false about COVID-19 [6]. This in some ways also make it hard for people around the world rely on or trust the available sources of information on the growing pandemic and the danger that it poses to humanity. The world was then faced with challenges on how to get the needed and right information on how to avoid contacting the deadly virus and at the same time prevent its spread. Apart from the efforts of WHO, it must be noted that the governments of countries around the world also moved with speed to deal with issues around infodemic, educate their citizens on the pandemic and thus stop the spread of COVID-19 [7]. In addition, as COVID-19 infections continue to increase around the world, many countries and governments responded with the famous ‘lockdowns’ by shutting down places like workplaces, schools and international borders and airports in order to contain the spread of the virus.

For example, in South Africa, the government through the Minister of Health continuously caution and educate the citizens on the dangers of spreading fake and misleading information about the virus. It must be noted that the South African President, Mr. Cyril Ramaphosa was also very active in the fight against COVID-19 as he regularly communicates with the citizens through his famous televised national address tagged as “Family Meeting” [8]. The aim of the President’s “Family Meeting” was to update the citizens on the global, national and regional state of the pandemic, make them to be aware of government efforts to curb the spread of the pandemic and also sensitise the citizens on the need to avoid the spread of fake and misleading news about COVID-19 [9]. This was very important to avoid hindrances to government efforts and the works of health workers towards containing the spread of the virus. This chapter therefore seeks to look at people’s perspectives on COVID-19, the effects of fake news during the pandemic and the various efforts of the South African government towards curbing the spread of COVID-19. The Chapter begins by looking at the advent and global spread of COVID-19, the Spread of COVID-19 in South Africa, fake news and people’s perspectives on COVID-19, dealing with the myths around COVID-19 vaccines, COVID-19 Misinformation, Vaccine Hesitancy and Anti-Vaccine, the theoretical framework, methodology, data analysis, discussion and conclusion.

## **2. The advent and global spread of COVID-19**

COVID-19 or “Novel Coronavirus” was first identified or emerged in Wuhan, China, in December 2019. As noted by the World Health Organisation (WHO), there were reported cases of pneumonia of unknown cause in Wuhan City, China [6]. The WHO added that after careful observations by the Chinese authorities, a novel coronavirus was subsequently identified as the cause on 7 January 2020 and the virus was temporarily named “2019-nCoV” [6, 10]. As further noted by the WHO [11], coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. WHO added that a novel coronavirus (nCoV) is a new strain that has not been previously identified in humans and the new virus was subsequently named the “COVID-19 virus” [6, 12]. In view of the potential deadly nature of this COVID-19 virus, on 30 January 2020, the World Health Organisation

(WHO), through its Director-General, Dr. Tedros Adhanom Ghebreyesus, declared the novel coronavirus outbreak a public health emergency of international concern (PHEIC). At that time and according to WHO, there were 98 cases and no deaths in 18 countries outside China [6].

The COVID-19 virus appears to be very dangerous and with the capability to continue to spread across countries of the world at an alarming rate and as at 11 March 2020, there were increased reports of rapid increase in the number of cases outside China. This led the WHO Director-General to state that the outbreak could be declared as a pandemic with more than 118,000 cases reported in 114 countries, and 4291 deaths recorded as well. Statistics also revealed that by mid-March 2020, the European Region of the World Health Organisation (WHO) had become the epicentre of the epidemic, with over 40% of globally confirmed cases reported [11]. The virus quickly spread to 213 countries, areas or territories around the globe, and nearly 144,683 deaths were recorded worldwide as at 18 April 2020. Statistics also revealed that as of 28 April 2020, 63% of global mortality from the virus was from the European Region. It must however be noted that since the first cases of COVID-19 were reported, WHO has relentlessly worked hard to support countries and governments to prepare and respond to the pandemic through its transparent knowledge-sharing and tailored support on the ground [6].

Looking at the confirmed cases and statistics and how the number of infection rose astronomically showed that in November 2020, the WHO notes that the United States became the first country to have at least ten million confirmed cases. As at December 2020, India became the second country to have at least ten million confirmed cases of COVID-19. Brazil became the third country to have at least ten million confirmed cases In February 2021, while the United Kingdom became the fourth country to have at least ten million confirmed cases in November 2021 [13]. Statistics also showed that Russia became the fifth country to have at least ten million confirmed cases as at December 2021, while at the beginning of 2022, the number of confirmed cases of COVID-19 in France, Italy and Turkey also stood at around ten million. Statistics also revealed that at the beginning of February 2022, Germany and Spain also joined the list of countries with at least ten million cases [13]. The number of confirmed cases continue to grow even in the year 2022 as South Korea joined the list of countries with at least ten million confirmed cases in March 2022, Vietnam in April 2022 and Japan in July 2022. Summarily, 13 countries have at least ten million confirmed cases as at August 2022. Globally, as at October 6, 2022, there are 616,951,418 confirmed cases of COVID-19 and 6,530,281 confirmed death [13].

### **3. The spread of COVID-19 in South Africa**

The first confirmed case of COVID-19 was recorded in South Africa on March 1, 2020, when a man later confirmed to have the virus returned with his wife and 8 others from an international trip to Milan, Italy. The confirmed patient travelled via Dubai, to O. R. Tambo International Airport in Kempton Park, Johannesburg and then to King Shaka International Airport in Durban. It was reported on March 3, 2020 that the patient reported sick with symptoms of the virus at a private general practitioner in Durban and was asked to isolate himself while the medical doctor that attended to him also isolated herself as well. This made the Minister of Health, Dr. Zweli Mkhize, to subsequently officially announce the first confirmed case of COVID-19 in South Africa and on March 15, 2020, the President of South Africa,

Mr. Cyril Ramaphosa, declared a national state of disaster [9, 14]. New cases started to emerge and it was later announced on March 7, 2020 that a woman from the same travel group from Milan, Italy has also tested positive. The virus slowly started to spread across the country and on November 11, 2020, President Ramaphosa addressed the nation to give an update on the available statistics and government's efforts towards curbing the spread of the virus. Considering the gradual spread of the virus, the President announced the extension of the state of disaster by another month until 15 December 2020. As at November 2020, there were 64,552 new cases, which made the total number of confirmed cases to rise to 790,004 while the death toll rose to 21,535. Statistics at that time also showed that the number of recovered patients was 731,242, with 37,227 active cases at the end of the month [9, 15].

The second wave of COVID-19 was from December 2020 to April 2021 as the President addressed the nation on December 3, 2020 and noted that there has been a resurgence of COVID-19 in some districts of the Eastern and Western Cape provinces, with restrictions tightened for this area. This made the government to extend the national state of disaster until January 15, 2021. The third wave of COVID-19 infections was from May 2021 to October 2021 while the fourth wave was from December 2021 to April 2022 [16]. On midnight of April 4, 2022, the National State of Disaster was ended although the government still kept some transitional provisions in place for a period of 30 days. As the spread and infection of COVID-19 subsided, the South African government on June 22, 2022, through the Minister of Health, Dr. Joe Phaahla, in a notification published in the Government Gazette, repealed the country's Covid-19 laws, which abolished Covid restrictions such as the use of face masks. As at the first week of October 2022, there have been 4,024,553 COVID-19 infections, 102,246 Coronavirus-related deaths and 3,912,506 recoveries reported in the country since the pandemic began [16, 17].

#### **4. Fake news and people's perspectives on COVID-19**

The impact of COVID-19 has been huge globally as the illness affected millions of people with numerous deaths, which made the world to live in fear. As noted earlier on in this chapter, countries and governments across the globe immediately put in measures such as restricting local and international travel as local and international borders were closed in most cases. Additionally, most countries resort to various levels of regional and national lockdown by ordering their citizens to stay indoors to reduce the spread and impact of the pandemic [18, 19]. There were fears, frustrations, and speculations among South Africans just like in other parts of the world, more so as there was a growing level of mistrust around the source of the virus, the likelihood of a cure and the rising death toll globally. This made people around the world to initiate their own communication to alert and update each other about the realities of the pandemic and also suggestion a likely cure too, even though they are not tested. It was interesting to see how people embraced the digital media platforms to source for information on COVID-19 and content producers also took advantage of this to increase the content production and uploading thousands of texts, images, audio and visuals [1, 20].

There are various reasons attributed to the spread of fake news and misleading information during a pandemic. Some scholarly views note that some individuals decide to spread fake news in an attempt to fill in information gaps about an issue while some do it for mischievous or malicious purposes [21–24]. Also, during a



pandemic, individuals or citizens may not be well informed to be able to distinguish between misleading or fake information and the truth, which would be helpful to them. This is usually the case considering that it is always a time of great uncertainties and fear for everyone. It is even worse nowadays with the use and effect of various forms of social media, which gives people the platform and opportunity to create and upload contents for public consumption. This made the world to witness the creation and circulation of huge amount of fake and misleading information on COVID-19 [25, 26].

Various digital platforms and online sources have therefore witnessed a great explosion of true and false information about COVID-19, its origin, possible effect on humans and possible cures available or that could be tried. While some information noted that COVID-19 was a biological weapon with a patented vaccine, other information noted that it aimed at wiping out a considerable size of the human race as a form of world population control mechanism [27]. There was also misleading information about African genetics being resistant to the COVID-19 virus and likewise various misleading information from Africa and some other parts of the world on untested cures and treatments for the virus [28, 29]. Various digital platforms like YouTube, WhatsApp, Facebook, TikTok and Instagram among others were buzzing with texts, images, audio-visual recordings that were being uploaded continuously as people around the world were very active with issues around the virus and possibilities of stopping its spread.

Even though the digital media has served as a platform for disseminating a lot of fake and misleading information on COVID-19, one can still enumerate many personal and professional benefits of using digital media. There is a high usage of Facebook, Twitter and other social media outlets for accessing news and all forms of information and this was the case even during the pandemic as people try to get every necessary information that could assist them to keep safe and healthy. This attests to the benefits of using social media and the gratification gleaned from it by the users as South African were also very active digital media users during the pandemic [1]. As noted by Malinga [30], the growth in internet access in South Africa has brought about an increase in social media usage as the number of social media users grew from 25 million (41.9%) in 2020, to almost 30 million in 2021. Presently, there is an estimated 48.8% (30 million) of South Africans being active on social media platforms, such as Facebook, Twitter, Instagram, YouTube, LinkedIn and TikTok [30].

## **5. Dealing with the myths around COVID-19 vaccines**

The information warfare was huge as COVID-19 spreads globally and its attempt to influence or derail public action will not be easily forgotten as WHO and governments battled to keep the situation under control. There was excessive amount of information on COVID-19, which were positive and negative and this made it difficult for people to know what to believe and what not to believe and most importantly, knowing how to navigate through the troubled waters of COVID-19 era [1, 31]. The infodemic had serious effect on public health globally, more so as nations around the world introduced various levels of national, regional and community lockdowns, which restricted people's movements. Staying at home made people to spend more time on social media as platforms such as WhatsApp, Instagram, Facebook etc. became sources of information and news with lots of texts and videos circulated continuously [32].

People around the world then had to deal with this massive amount of medical misinformation, rumour, myths and different kinds of conspiracy theories often disseminated through social media platforms and other media outlets. In South Africa, the government, through the numerous President's 'Family Meeting' speeches and other Ministerial Briefings moved with speed to quash the effects of the various myths and misinformation [9]. For instance, the President in his speeches quelled the various COVID-19 vaccine myths and facts such as the one that says that 'vaccines are unsafe and normal safety protocols have been circumvented to fast track their authorisation for use'. The South African government on its website also debunked this myth by noting that the fast development and approval of vaccines is a great human feat worthy as the world has learnt over many decades how to make and test vaccines, which has helped to produce a vaccine much quicker. The website also noted that no step in the development, testing or ratification of the COVID-19 vaccines has been skipped. As noted by the President and also documented on the South African government website, the world was able to develop vaccines fast because scientists and governments around the world collaborated and pooled resources and information together to achieve this laudable feat [33].

Other myth that states that the vaccine will change people's DNA was also rejected as the government noted that vaccines work by stimulating the body the same way the virus would if someone were infected. The government notes that the vaccine releases certain chemicals that start a chain reaction to make immune cells that can fight the real virus and that the vaccine does not work on people's DNA [34]. Another myth that became scary was the one that stated that vaccines contain a form of microchip that will be used to track and control individuals [35]. This myth also caused panic globally and it made many people to be sceptical about taking the vaccine. The government however moved to dispel this by noting that the vaccine does not contain any microchip and that receiving a vaccine will not allow people to be tracked or have their personal information entered into a database. There is also the myth that governments around the world are complicit with big businesses in pushing vaccines despite the risks involved. People felt that the governments are pushing the vaccine drive because monetary rewards that will accrue to them but the WHO and governments around the world were quick to say that the commitment is to save lives and livelihoods [11, 36]. The South African government also added that the fastest way to ensure that life is back to normal is through ensuring that the majority of the population are fully vaccinated and thus protected from the virus. Another myth noted that the vaccines have the mark of the Beast – 666 but this was also quickly refuted as WHO clarified that the vaccines have no connection with any religious organisations and beliefs and cannot therefore be infused with spirits, demons or other abstract ingredients [11].

## **6. COVID-19 misinformation, vaccine hesitancy and anti-vaccine**

The emergence of COVID-19 myths and the talk around the production and availability of vaccines have in some ways led to the theory of vaccine hesitancy and anti-vaccine globally, with South Africa also having its own share of debates and decisions. Vaccine hesitancy is the reluctance or hesitance to accept to be vaccinated or an individual's refusal to use the vaccination services [37]. There has always been the issue of vaccine hesitancy throughout medical history and various factors such as lack of confidence in the vaccine, complacency, the convenience of accepting and taking

the available vaccine have always influenced people's decision [35, 37]. Apart from the challenges around vaccine hesitancy, there was also the issue of anti-vaccine, which came up strongly during the peak of the spread of COVID-19 and the global drive towards vaccination. South African media generally and most importantly the various social media outlets such as Instagram, Facebook, WhatsApp and YouTube among other were filled with related print and audio-visual information on COVID-19 [38].

As noted by MacDonald [37] and Shen and Dubey [39], there is a difference between being vaccine-hesitant and anti-vaccine. These scholars noted that with vaccine hesitancy, there is still a possibility that people in such category could possibly or eventually proceed to use or accept a specific vaccine. They added that with anti-vaccination, people in such group or with such belief are firmly against considering or accepting the benefits of or taking the developed vaccine. Additionally, it has been noted that the anti-vaccine advocates will also campaign against and seek public support against the use of vaccines [39]. The likely dangers associated with the various myths that emerged as well as personal individual decisions have all played some parts to influence people's decision to accept and take the vaccine, and to either belong to the vaccine hesitancy group or anti-vaccine group [20].

There are also concerns around the possible side effects of the COVID-19 vaccine, while citizens around the world also have a kind of mistrust against their governments and the vaccination drive. In South Africa, just like in some other parts of the world, it turned out to be very interesting when some health workers also became vaccine-hesitant and this also made some citizens to become cautious about taking the vaccine. People also began to question the decision of this group of health workers as they are the most vulnerable to COVID-19 infection considering their exposure to potential carriers of the virus [40]. It therefore became very important for the World Health Organisation (WHO) and governments of nations around the world to speedily dispel the myths and misinformation around the COVID-19 vaccine and educate people on the need to be vaccinated and thus reduce the spread of the virus. For instance, the South African government through the President's 'Family Meeting' speeches and other Ministerial briefings made sure that citizens were well informed about the available vaccines as well as their safety and effectiveness so that people are able to make informed choices on whether or not to take the vaccine.

## **7. Theoretical framework: social media as a digital public sphere**

This study and chapter is underpinned by the digital public sphere theory. It is important to note from the onset that the public sphere refers to an imagined space that exists between the state and civil society. This space normally provides a platform for rational and diverse debates among citizens on issues that are of common interest to them [19]. The public sphere therefore serves provides opportunities for discursive interaction, which could at times be very critical of the state or any critical occurrence in the society, such as the advent and spread of COVID-19 as in the context of this chapter. Fraser [41], while critiquing Habermans' bourgeois public sphere theory, notes that various competing and intertwined forces exist within the public sphere. The view here is that while some factions such as the elites support the views of the state on social welfare democracy, other factions such as the peasants, women and working class are of the view that the public sphere does not portray the views of general public opinion. The understanding here is that public sphere represents more of the interests of the influential and some private individuals. The views and arguments

of these competing groups or factions therefore give rise to counter-public sphere(s), with their activities and opinions prominent on internet-driven social media, and which counters the public sphere generated by the mass media [19].

Over the years, and especially with the advent of COVID-19, social media has proven to be an ideal place to assess various forms of public opinion, with numerous topics and discourses being engaged with on different social media platforms. It must be noted that social media has been a good platform for political discourses and also for bringing citizens together to fight against repressive rules and also for mobilising citizens to vote during an election. It was therefore not a surprise that social media has been at the forefront of health communication and mobilisation. Social media should therefore not just be seen as mere technology or platform but be looked at considering its unique forms and shapes that the society takes when social media is used, which in turn makes the society to be technologized [19]. According to Papacharissi [42] and Mutanga et al. [19], the internet invigorates the public sphere as it brings to life a virtual sphere that does not manifest physically but at the same time bring people together to deliberate, be informed and also achieve their goals. Papacharissi [42] further notes that in light of this, the internet and the emergent online media in a way creates a public space for all these engagements and not necessarily a public sphere [19].

In the context of this chapter, it is therefore important to note the ability of the online media and the platform that it provides for private individuals and groups to challenge the public agenda and have discourses around the emergence of COVID-19, its rapid spread and possibilities of a cure and possible treatments. It is also more about having a platform to look at and challenge official statistics of COVID-19 mortality and illnesses, debate the challenges around the various levels of lockdowns and self-isolation measures introduced by most governments worldwide [18, 19, 24]. It must however be noted that social media allows for anonymity, as the identity of content producers or online contributors are sometimes hidden or fake identity used. This therefore gives room for uninhibited public opinions and the liberty to post or upload fake news and messages on COVID-19. Citizens are however then exposed to different forms of information, both fake and true in the public/virtual sphere as they engage with government communication as well as various contents produced and circulated by individuals who have access to upload contents online. Social media is therefore an ideal space to gauge public opinions and sentiments in the context of the COVID-19 pandemic [19].

## **8. Research question**

What are people's perspectives on COVID-19, Fake news and the vaccination drive in South Africa.

## **9. Methodology**

This study adopts a qualitative approach and this was important for the study to get a very good understanding of the phenomenon being investigated. Non-probability sampling and convenience sampling was used to select the fifty (50) participants and the focus area was Alice and Fort Beaufort in the Amathole Municipal District Area in the Eastern Cape Province, South Africa. Data was

analysed using thematic analysis by paying careful attention to the emerging themes. In addition, content analysis was also carried out on fake news or comments on News 24, a South Africa online newspapers and also the South African government official website. Content analysis is very useful in helping to analyse peoples' comments on certain issues and thus know the views of the participants [43]. The contents analysed were picked in line with the research questions that guided this study. Key words like "COVID-19" and "fake news" were looked out for as online newspaper articles and social media messages were analysed focusing on issues related to this study. Data was subsequently analysed qualitatively using thematic analysis.

## 10. Data analysis

### 10.1 Exposure to COVID-19 information, fake news and misinformation

The participants interviewed confirmed that they were exposed to many fake news and misinformation as the COVID-19 started and continued to spread in South Africa. They noted that they were daily exposed to or bombarded with different kinds of information, fake news and misinformation. Below are some of the views of the participants:

*"We wake up every morning to new information on COVID-19. Some information looked correct, some are fake and make us to have wrong information on COVID. Many times we got wrong information about the national lockdown being extended but they were lies"*

*(Alice Interview Participant 2)*

*"Every day, there was too much information on COVID-19. For me, it was a mixture of the good and information"*

*(Fort Beaufort Interview Participant 1)*

*"We get exposed to so much information on COVID-19 every day and everywhere. It was just too much information to cope with"*

*(Alice Interview Participant 4)*

*"We couldn't control the volume of true and fake information on COVID that came our way every day and from different angles. There was one that said that landlords should not collect rents during lockdown but it was a lie"*

*(Fort Beaufort Interview Participant 2)*

*"We were exposed to bad and good information on COVID-19. Some are good and helpful to us. Some are bad and wrong information"*

*(Alice Interview Participant 7)*

*"COVID-19 dominated and affected our lives too much. We do expect to receive information on it so that we know what to do ..... but then it was too much information that we got and some of them were not true..... like the kind of food or fruits to eat or medications or local herbs to take to avoid being infected by the virus"*

*(Fort Beaufort Interview Participant 10)*

*“For me, it was information overload on COVID-19. Left, right and centre, we get exposed to all forms of COVID-19 messages. It was too much to cope with”*

*(Alice Interview Participant 12)*

*“I have never been exposed to so much messages and information in my life as people pass around too much information on COVID-19. Yhoo, it was that bad. There was a time when we heard that we will need permits to enter shops or move around but it was fake”*

*(Fort Beaufort Interview Participant 6)*

*“The high volume of bad or fake COVID-19 messages that we receive every day from different sources made life difficult for us”*

*(Alice Interview Participant 25)*

News 24, a South African media house through its online platform was able to debunk some of these fake news through its caption: CORONAVIRUS LIES | Debunking the hoaxes around Covid-19 (March 15, 2020).

News 24 notes that as the novel coronavirus continues to spread around the globe, so does misinformation, fear, fake cures, fake news and malicious hoaxes. Here we debunk that news. The newspaper listed a lot of fake news and debunked them. Some of the fake news include” Extending lockdown, government funding for only black-owned businesses, pets and hand sanitisers, Ibuprofen fake news, Department rubbishes letter claiming landlords cannot collect rent from tenants, Helicopter fake news – that helicopters are not going to fly around South Africa spraying chemicals to stop the virus. In addition, the South African government on its official website also continuously debunked all these fake news [44–46].

The views of the participants stated above are echoed by some scholars who noted that the advent of COVID-19 ushered in a period synonymous with high volume of fake news circulation [18, 19]. Balakrishnan et al. [21] also noted that COVID-19 and its nature afforded various content producers the opportunity to create different kinds of fake messages that were widely circulated on different platforms. No doubt, online content producers took advantage of the challenges and uncertainties around COVID-19 to come up with some scary and untrue messages to catch people’s attention and misinform the populace.

## **10.2 Social media platforms used as sources of fake news and misinformation**

The participants interviewed confirmed that various social media platforms or outlets were used to propagate or circulate COVID-19 fake news and misinformation. They noted that the common channels used include WhatsApp, Facebook, YouTube, TikTok among others as they get exposed every day to various kinds of information, fake news and misinformation. Below are some of the views of the participants:

*“Different channels of communication were used to circulate the latest information on COVID-19. I belong to some group chats and do get exposed to so much information that are helpful and some other information were scary and fake”*

*(Alice Interview Participant 20)*

*"I only have access to WhatsApp and you won't believe the amount of COVID-19 information that are circulated every day"*  
(Fort Beaufort Interview Participant 10)

*"I am more on Facebook and there are countless messages on Facebook that focus on COVID-19. Some of these messages are fake as they talk about unreasonable things"*  
(Alice Interview Participant 17)

*"I use most of the social media platforms and do get exposed to lies about COVID-19 on WhatsApp, Facebook and even YouTube"*  
(Alice Interview Participant 25)

*"We get various COVID-19 messages everyday..... on Radio and Television and the messages are useful and true. But the messages we get on social media platforms are dangerous and not truthful most of the time"*  
(Fort Beaufort Interview Participant 16)

*"We were exposed to bad and good information on COVID-19. Some are good and helpful to us. Some are bad and with wrong information"*  
(Alice Interview Participant 17)

*"COVID-19 messages were on television, radio and online platforms. I do access my information on WhatsApp, TikTok and television."*  
(Fort Beaufort Interview Participant 25)

*"I got various COVID-19 fake messages on Facebook, WhatsApp, TikTok and YouTube. Various messages were posted one after the other"*  
(Alice Interview Participant 12)

*"Fake news was everywhere as COVID spread ..... on Facebook, Instagram, WhatsApp, YouTube etc. It was just everywhere in the media and it was bad for our survival"*  
(Alice Interview Participant 14)

Looking at the above, there is a general consensus among the participants to show that content producers used various media outlets to circulate fake messages as COVID-19 spreads. Chari and Akpojivi [1], Fernández-Torres et al. [25] and Greene and Murphy [36] all noted that social media platforms such as WhatsApp, Facebook among others were filled with various fake messages and misinformation that were circulated consistently. The fact that most people globally now spend some hours or minutes on social media makes such people to be vulnerable as they are exposed to such untrue messages.

### **10.3 Effect of fake news and misinformation on people**

Most participants believed that listening to or hearing COVID-19 fake messages has affected them in some ways, physically and emotionally, more so as they exposed to texts, audio and video messages. They further noted that some of these messages affected their thoughts and action when trying to make some decisions around COVID-19. Below after some of the views of the participants:

*“Fake news made me to be fearful of COVID-19. Some news indicated that everyone will eventually be infected with the virus and die”*

*(Alice Interview Participant 20)*

*“The fake news on how wearing a mask could suffocate and kill was scary, more so as we are also told to wear our mask to avoid being infected”*

*(Fort Beaufort Interview Participant 10)*

*“The fake news on the dangers of taking the vaccines affected me most as I was planning to be vaccinated and protect myself. But hearing that taking vaccines is dangerous and that it could kill made me to initially change my mind, although I later on got vaccinated”*

*(Alice Interview Participant 17)*

*“The fake news on the available vaccines and that one is better than the other or that one kills while one is safe with the other ..... this really affected me and many people too. It makes me to initially refuse to be vaccinated although I changed my mind after seeing people close to me that got vaccinated and were fine”.*

*(Fort Beaufort Interview Participant 22)*

*“The government told us that masks must be put on when we go out and around places, but then, the news that wearing of mask is not healthy was bad as some people decided to do without the masks, which could harm their health. Other fake news were circulated too”*

*(Alice Interview Participant 15)*

*“These online texts and video circulated contained true and untrue messages on COVID-19. While we gained from the true ones, the untrue messages really affected our decisions and what to do to be safe during the pandemic”*

*(Fort Beaufort Interview Participant 18)*

*“Various COVID-19 fake messages were continuously circulated on Facebook, WhatsApp, Tik Tok and YouTube and believing some of them was also harmful as some people made wrong choices ad decision towards managing COVID-19. It was bad”.*

*(Alice Interview Participant 12)*

*“The news on various untested COVID-19 treatments was bad for people’s health and recovery as it stopped some people from going to the hospital to get proper medical attention”.*

*(Fort Beaufort Interview Participant 11)*

*“There were many scary messages on COVID-19 that do not make sense but that we were made to consume and some of these messages affected our thinking and actions as we try to keep safe during the pandemic”.*

*(Alice Interview Participant 14)*



Indeed, the effect of fake news and misinformation was huge as COVID-19 spreads globally. The fear of the unknown, anxieties, fear and wrong portrayal of some COVID-19 related messages affected a lot of people around the world. Hartley and Khuong [23], Balakrishnan et al. [21], Carrion-Alvarez and Tijerina-Salina [22] and Rocha et al. [24] all attest to the fear associated with fake news and misinformation on COVID-19. It must be noted that people need the right message and every needed information as they navigate through the troubled waters of COVID-19 and it therefore becomes a problem when people have to contend with fake messages that could be detrimental to their health and survival.

## **11. Discussion**

The emergence of the COVID-19 pandemic came with various challenges for nations of the world, international organisations and agencies and individuals to cope with. As the virus continued to spread at an alarming rate, many countries around the world began to look for ways to halt its spread through revised health policies and action, which made them to work round the clock to reduce infection rates and thus flatten the infection and death curves. It was also important for citizens to be well informed on how to keep safe during the pandemic. While the World Health Organisation (WHO) and governments responded well in this regard, the influx of high volumes of fake news and misinformation became a threat to people's coping strategies to keep safe and avoid being infected by the virus. This chapter has found out from various literature and responses of the participants that were part of this study that social media was flooded with fake news and misinformation related to the virus and its origins, which social media users consumed every day. Other misinformation that were circulated includes various suggestions on possible remedies and cures for the virus, such as foods to eat and other things to do to avoid catching the virus or be treated if infected. Unfortunately, most of these suggestions are not tested or clinically proven and thus labelled as risky by the WHO. People's perspectives and engagement with fake news and misinformation was therefore critical for a safe navigation through the turbulent waters of the pandemic.

The Chapter or this study has found out that people got exposed to different kinds of COVID-19 information, fake news and misinformation on a daily basis. The fact that most people now spend a considerable part of their time on social media also makes them to be more vulnerable to these barrage of information. The fact that South Africa, like most countries was under national lockdown, made or force people to stay indoors and also spend more time on social media. Social media content producers also capitalised on this scenario by creating and circulating different kinds of COVID-19 related information for people's consumption. Some scholars have noted that the advent of COVID-19 witnessed a very high circulation of fake news and misinformation as content producers target vulnerable people that have been 'trapped' at home during the lockdown [1, 19]. As noted by Ghosh et al., [18] and Orso et al. [35], many online content producers capitalised on the fear, anxieties and uncertainties around the nature of COVID-19 to create different kinds of fake messages that were widely circulated on different platforms. While some messages accurately inform consumers, some messages were aimed at misinforming the people as content producers sought to profit from scary and untrue messages that will catch people's attention

and misinform the populace. The participants in this study noted unanimously that they were daily exposed to a mixture of true and untrue COVID-19 messages, which impacted on their daily live during the pandemic. As noted by Mutanga et al. [19], social media as a digital public sphere is therefore an ideal space to gauge public opinions and sentiments in the context of the COVID-19 pandemic.

The Chapter also established that various social media platforms or outlets were digital public sphere used to circulate these fake news and misinformation. This was motivated by the fact that people nowadays spend a considerable part of their time on social media platforms such as Instagram, WhatsApp, Facebook, YouTube, TikTok among others. The regular usage of these platforms therefore make the people to be exposed every day to various kinds of information, fake news and misinformation. Looking at the above, there is a general consensus among the participants that various social media platforms or outlets were used by different online content producers to circulate fake messages and misinformation as COVID-19 spreads. Mutanga et al. [19], Fernández-Torres et al. [25] and Greene and Murphy [36] all noted that social media platforms such as Instagram, WhatsApp, Facebook among others were flooded with various fake messages that were circulated consistently. The fact that most people globally are social media ‘addicts’ makes such people to be easily available to see and consume many untrue messages, which could impact on them in some ways.

Lastly, this chapter has found out that the global inflow of fake news and misinformation during the COVID-19 pandemic had varying effects on people. The Chapter noted that listening to or hearing COVID-19 fake messages has affected many people physically and emotionally as they engaged with the texts, audio and video messages that they were exposed to. These messages affected people’s thoughts and action when trying to make some decisions around COVID-19 and how to cope with it. This shows the power and effect of fake news as it plays on people’s mind. Also, the fear of the unknown, anxieties and wrong portrayal of some COVID-19 related messages affected a lot of people around the world. Hartley and Khuong [23], Balakrishnan et al. [21], Carrion-Alvarez and Tijerina-Salina [22] and Rocha et al. [24] all attest to the fear associated with fake news and misinformation on COVID-19, which made people not to be sure of what to do. Having to deal with huge volumes of fake news during a pandemic complicated things and made life unbearable for the general public also detrimental to their health and survival. This is because people need the right and helpful messages as they navigate through the troubled waters of COVID-19.

## **12. Conclusion**

The advent and spread of COVID-19 has brought untold hardships on individuals, families, organisations, nations and governments around the world. This was evident in the extremely high number of hospitalisation and deaths that were recorded around the world. Countries have also felt the devastating economic impact of the pandemic as various sectors of the economy were severely crippled as the virus spread uncontrollably. While some countries were able to move with speed to contain the spread of the virus, some countries struggled to halt its spread. Availability and effective use of financial and human resources also played a big role in this process as countries around the world sought to keep their citizens safe. Another big challenge that the world faced as the virus spread was the need to counter and mitigate the rapid spread of infodemic. This Chapter has discussed and noted the impact of fake news and misinformation as the pandemic ravaged through the world. The role and

use of various social media platforms in propagating the infodemic is also prominent as some individuals and organisations too advantage of the panic and uncertainties around the world regarding the virus to create unverified media contents that posed a threat to the end of COVID-19. Individuals around the world also attested to the impact of fake news and misinformation as they navigate their safety and other decisions on how to cope during the pandemic and whether to be vaccinated or not. The speedy and continuous intervention of the World Health Organisation (WHO), governments and organisations around the world helped in many ways to educate the public about the COVID-19 infodemic and also contain the spread pf the virus.

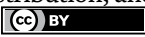
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## Chapter 7

# Lesson on Misinformation in the COVID-19 Era

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María Fernanda Pérez-Zepeda  
and Genesis Marielle Salgado Solís Salgado*

### Abstract

The COVID-19 pandemic has been accompanied by a massive infodemic, that was exacerbated by the global scale of the emergency. The word infodemic derives from information and epidemic, the term was first used to refer to an abundance of information on a certain topic, displayed in a very short period of time and regardless of the information's quality. During the last 2 years, scientific journals were under tremendous pressure to publish information on COVID-19 as quickly as possible, releasing articles that had not been peer-reviewed, which led to an overabundance of information that was propagated rapidly and ultimately retracted after further investigation. The consequences of this infodemic are unprecedented, they went from mistrusting treatments and intervention measures to consuming toxic substances that led to severe intoxication. Misinformation caused individuals to manifest panic attacks and other psychiatric illnesses, or even generated political crises encouraged by public discord promoted by fake news. The following work reviews the impact of misinformation so far through the COVID-19 pandemic.

**Keywords:** infodemic, COVID-19, fake news, pandemic, misinformation

### 1. Introduction

In December 2019, the mass media spoke about a new virus that caused atypical pneumonia, and on January 30, 2020, the World Health Organization (WHO) declared an international emergency state. The disease had spread throughout the world creating a need for information never seen, the COVID-19 pandemic, was the first in history where technology and social media were used to help people to stay safe, informed, productive, and connected, at the same time, this technology enables a large volume of information associated with the disease was shared very quickly. The misinformation and rumors appeared, the manipulation of information with doubtful intent [1]. The infodemic problem was so serious during the first months of the pandemic that Tedros Adhanom Ghebreyesus, WHO general director declared "We are not just fighting with a pandemic, we are fighting an infodemic".

It was estimated that prior to the pandemic approximately 4.5% of the total searches made on Google worldwide were related to health issues [2], the search for

health-related information intensified, especially in the month of March 2020, when, according to Google Trends page, searches for the term COVID alone accounted for 89% of all Internet searches in the United States [3].

We live in an information technology era, and technology allows us to collect data in unimaginable amounts. One assumption about information is that it is true. The most important difference between information, misinformation, and disinformation is the truth, misinformation, and disinformation are untrue. Misinformation denotes “wrong or misleading information” Disinformation is wrong information, and it is known falsehood. Disinformation is “the dissemination of deliberately false information”.

In 2017, only 19% of Mexicans had plenty of trust in newspapers, 18% trusted in radio news, and 17% in television news. In other words, 80% of the Mexican population distrust these sources of information. In economically developed countries, such as the United States, where trust indexes in the media reached over 70% during the 70s, there has also been a significant decrease in the last two decades. Between 1999 and 2015, notes a Gallup poll, the trust index of Americans regarding their information media has decreased from 55 to 32%. And more indicative, the same Gallup survey reveals that among the population between 18 and 40 years of age, which are daily users of electronic networks, only 26% indicate to have confidence in the information media such as newspapers, radio, or television [4]. The data are worrying, among other things, they indicate the imminent disappearance of fundamental institutions for an active and socially informed political life, as well as for a broad and well-founded public debate which is necessary for adequate public health. In an exceptional situation, such as the pandemic, this trend is even worse.

In a pandemic context where social media and networks are the main sources of information and communication among individuals and communities, the efficiency of such conversation has to be questioned. Undoubtedly, networks presuppose connectivity, but not all connectivity presupposes successful communication. With social media, the general population becomes an information disseminator. The publication of information is no longer exclusive to professional media institutions, in this context, the information available is very unequal. Exposure to different media and information sources will lead to totally different outcomes in terms of behavioral decisions. For example, in China, in information dissemination, “who says” is more important than “say what” for the Chinese public’s trust judgment [5].

## **2. Effects of media on the pandemic**

There is a correlation between media use and public health behavior during health emergencies. During the COVID-19 pandemic, the mass media (newspapers, radio, and television) have had a positive effect on public health protection behaviors (e.g., washing hands, wearing face masks, and isolating health care). Objective, accurate, and timely news reports can reduce risk perceptions. Social media, on the other hand, provided new sources of information and platforms for public expression which facilitates access to knowledge and misinformation.

### **2.1 Positive effect**

The information was shared through social media faster than during the pandemic. The health workers could quickly share data regardless of geographic location. The treatment update system was very efficient, according to the evidence that

appeared it was changed. The health workers could discuss the treatment and their results with colleagues from all over the world. Finally, thanks to social media, it was possibly better management of crises by harnessing social media tools.

For the general population, it was an easy way to obtain government announcements and instructions in the management of crises. Many infographics with key points were developed and distributed via social media.

## **2.2 Negative effect**

The health workers received a big volume of information that becomes overwhelming, the information they received was associated with their beliefs, and they received a lot of misinformation and disinformation.

The general population received false information of manipulated content, a lot of propaganda, and not verified data, there was a panic transmission [6].

## **2.3 COVID-19 infodemic**

The COVID-19 pandemic was closely associated with technology and the use of social media. For a few months, many countries established quarantine periods, social life stopped, schools were closed, and employees were forced to do home office and stay connected through the use of the network. In those first months more than ever in Internet history, humanity used it not only to work, and stay in touch with their loved ones but also to stay informed, consequently, social networks have become the scenario in which social life was maintained, and was there where the infodemic has spread and remained. The use of social networks increased by between 20 and 87% worldwide during the pandemic [7].

The word infodemic derives from information and epidemic [8], the term was first used by Eysenbach to refer to an abundance of information on a certain topic, in a very short period of time and regardless of the information's quality, the information may be true or false, and just like the disease, it spreads worldwide. According to the WHO, an infodemic is an overabundance of information, online or in other formats, including deliberate attempts to spread misinformation to undermine the public health response and promote other interests of certain groups or individuals [2, 9]. The misinformation bases its credibility on the use of scientific language.

## **2.4 Infodemic contribute to misinformation**

Misinformation associated with health issues is not a phenomenon unique to COVID-19, also occurred, in the case of vaccination, where the anti-vaccine groups played a fundamental role in the resurgence of preventable diseases that were practically eradicated, like the case of measles and polio, making them a public health problem once again.

Misinformation is extremely risky as it calls to question the credibility of health institutions and programs, creating confusion and mistrust. The misinformation generated by the infodemic puts human health at risk due to: the distorted communication of facts with weak scientific evidence; and the spread of pseudoscientific theories [10]. Some media have filled their pages with unscientific recommendations and instructions, rumors, manipulated information, and conspiracy theories. The topics that have generated the most controversy is the origin of the virus, its transmission mechanisms, its clinical picture, treatment, and epidemic statistics.

Health misinformation may have effects on health-related behaviors, attitudes, and knowledge, but more importantly, misinformation coil creates the impression that no consensus exists on a topic or that official sources of information are not credible.

During the pandemic beginning there were poor sources of information but a large volume of it, conferences, webinars, and articles, making it hard to find information of quality.

Global access to cell phones with an internet connection has led to the exponential production of information, suddenly, digital health, and related concepts appeared in every conversation regarding the health system's response to the pandemic. Despite being technical concepts, the current situation has brought them to the forefront of all discussions and decisions about the pandemic response [11]. It is important to understand that Information and even more health information, has an intrinsic power to generate an influential impact on consumers. During the COVID-19 infodemic, the generation of information had increased exponentially, but the quality of the information was highly variable and, in some cases, the information presented was false, or reliable scientific data were distorted, leading to disinformation.

The main issues of low-quality information are that is promoted without restrictions, without involving peer reviews, does not require any verification by professionals, and because of the type of language it uses, it is ideal for dissemination on social networks. It is precisely on these sites where it self-amplifies, and moments of crisis such as the COVID-19 pandemic become ideal for socially spreading false ideas, including conspiracy theories. Population beliefs are greatly impacted by public culture and public figures, with reference to COVID-19, much has been said, such as the source of the infection, misleading and inaccurate statistics, infectivity and infection patterns, clinical presentation, diagnosis, preventive measures, treatment, and immunity are some of the topics which have been addressed. Political leaders had shared messages on social media platforms, creating an environment of ambiguity and concern through the influence they represent. For example, in the early stages of the pandemic, President Jair Bolsonaro of Brazil described COVID-19 as a simple cold [12]. Similarly, Donald Trump, at the time President of the USA, told the American public to “not fear Covid-19” [13]. In fact, it has been found that initial government announcements concerning the COVID-19 pandemic only briefly raised public attention [14]. In this sense, it is important to clarify that the trivializing comments of public figures and authorities have the potential to further increase the dangers caused by the infodemic.

A study analyzed the content related to COVID-19 on Tiktok, where 85.5% of the videos were uploaded by consumers and only 14.5% were from the WHO. The main topics of the videos uploaded by consumers were anxiety (14.5%), quarantine (10.3%), and less than 10% of the total content covered topics such as viral transmission and symptoms. According to the Center for Health informatics at the University of Illinois, in March 2020 around 550 million tweets included the terms coronavirus, covid19, covid-19, covid\_19, or pandemic [15].

In some countries, health workers were attacked as a result of misinformation distributed on social networks, such as the supposed extraction of fluid from the knees of patients with COVID-19 to sell it, neuron-killing thermometers, and fingerprint-stealing oximeters, among many other rumors, these sorts of rumors complicated the management of health and pandemic prevention programs.

A great percentage of the fake news and misinformation was generated and shared by common users. According to a study by the Center for Health Informatics at the University of Illinois, in the month of March 2020 some 550 million tweets included the

terms coronavirus, corona virus, co-vid19, covid-19, covid\_19, and pandemic. This was a worldwide phenomenon, at the beginning of the confinement period in Italy, there was an exponential increase in the volume of tweets, which peaked around the day the United States declared that the pandemic had become a national emergency. Of the total number of tweets, 35% came from the United States, 7% from the United Kingdom, 6% from Brazil, 5% from Spain, and 4% from India. The gender distribution was almost equal, although men tweeted slightly more (55%). With respect to age, 70% of all tweets were produced by people over 35 years of age; this was followed by the children and adolescents (under 17 years of age) group, with 20%. By March 2020, 361,000,000 videos were uploaded on YouTube in the categories of “covid-19” and “covid 19” [11].

## **2.5 Infodemic and science**

During the first-year scientific journals were under great pressure to publish COVID-19 information as quickly as possible, releasing articles that had not been peer-reviewed, which became a two-edged sword, since at that moment physicians and researchers were just learning about the virus in a dynamic process in which knowledge was adjusting as more information about the virus and its chameleon-like clinical manifestations was generated. The knowledge generated about the pandemic by the world's health and sciences sector had political repercussions in the decision-making process of governments, so that in the race to publish during the pandemic, results have been misinterpreted and false conclusions were reached in the studies. By accelerating the time of publication, the required quality goals in the health area were not being met. Such was the case of the studies on the therapeutic use of hydroxychloroquine, a drug that was withdrawn from the treatment protocols for COVID-19 after a group of researchers wrote to the *Lancet* pointing out several anomalies in an article previously published in the journal, in which it was concluded that patients treated with this drug had an increased risk of dying and experiencing cardiac arrhythmias. Among the irregularities reported, there was the use of data not obtained legitimately, the data was from a company called Surgisphere, which, refused to release the data requested by a group of scientists to validate the published study. The *Lancet*, which is perhaps the most prestigious medical journals, retracted the paper [16]. The authors that were not linked to the Surgisphere company wrote that they could not guarantee the veracity of the primary data sources. Surgisphere did not agree to release the requested data, arguing that it would violate the confidentiality of its clients. Days later, WHO restarted the hydroxychloroquine protocols [17].

The misinformation generated around COVID-19 had a profound impact on many areas, for example, the National Institute of Public Health in Japan published an article in which the author reviewed the features of successful information and communication technologies approaches against COVID-19 and categorized them into the patient registry, clinical decision support, telemedicine, contact tracing, and digital quarantine. They found that tracking patients and their contacts were imperative to public health in the fight against infectious diseases. Johns Hopkins University Department of Public Health, Baltimore, Maryland, USA, developed an interactive geographical information service to display the number of confirmed cases of and deaths caused by COVID-19 on a map and make it easier to visualize and act into controlling the spread.

## **2.6 The infodemiology of misinformation**

As evidence of the information excess surrounding COVID-19, we did a simple example; Google is the most widely used tool search worldwide, a search using the

terms COVID-19 was performed, as a result, Google showed more than 13.7 billion results, and when the term SARS-CoV-2 was used, 619 million results were shown. If the search was performed using Google Scholar tool, which is a search engine specialized in information from the world of education and science, and whose results come from trustworthy information sources that are selected by means of an algorithm that allows the platform to verify their quality, the term COVID-19 showed 4,850,000 results, while the term SARS-CoV-2 showed 222,000. Using PubMed, which is a search engine that allows the content of the MEDLINE database to be consulted, the most important database for medical literature in the world, associated with the National Library of Medicine of the United States, the term COVID-19 showed 126,607 results and the term SARS-CoV-2 showed 64,649. It was interesting to compare this search with another disease, also viral, which has affected the entire world for 30 years, acquired immunodeficiency syndrome (AIDS). The amount of information generated in just a few months about COVID-19 makes clear the magnitude of the infodemic we are facing, and its impact in terms of the quality of the information generated (**Table 1**) [18].

The speed at which information was being generated is unprecedented, but the quality of the information is worrying. When using a non-specialized tool such as Google, the term COVID-19 shows 30 times more results than the term AIDS; Google Scholar shows a similar number of links for COVID-19 and AIDS, and using a very specialized search engine such as PubMed, the number of links for the term AIDS is 3.5 times greater than the term COVID-19; this is associated to the people who perform the search and their level of knowledge and, therefore, to the information quality [18].

Disinformation in terms of science, technology, and health is not unique to COVID-19, what is characteristically unique to the COVID-19 pandemic is the role that social networks played in transmitting disinformation on an unprecedented social scale. Far from being beneficial, the volume and type of information that circulated around this virus generated pernicious social responses and attitudes. As the population was kept in quarantine or isolation with the latent risk of contracting COVID-19, individuals began to experience psychosocial stress and various health effects, thus generating interest in knowing and learning about the disease, however, general population is not educated to perform quality searches on the Internet, as a consequence, they search for information using basic tools such as Google or Yahoo, which exposed them to false news, rumors, etc.

Vosoughi et al. analyzed the differential diffusion of all of the verified true and false news stories distributed on Twitter from 2006 to 2017, 126,000 stories were tweeted by 3 million people more than 4.5 million times. They observed that falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information, interestingly the effects were more pronounced for false political news than for false news about terrorism, natural disasters, science, urban

	COVID-19	SARS-CoV-2	AIDS	HIV
Google	13,740,000,000	619,000,000	1,650,000,000	1,420,000,000
Google Scholar	4,850,000	222,000	4,540,000	3,220,000
PubMed	126,607	64,649	11,742	17,321

**Table 1.** Number of links displayed by search tools using the terms COVID-19, SARS-CoV-2, AIDS, and HIV. (Search conducted on October 20, 2022.)

legends, or financial information, the fake news diffused significantly faster and deeper than trustworthy information [19].

Disinformation can be classified into three main groups, the most common being misleading content, which represents 29% of the total information, which contains some true information, but in which the details have been rephrased and recontextualized in such a way that they become false or misleading. The second form of misinformation is the use of videos or images of events that are labeled as something new or different. Finally, there is disinformation where the content is totally invented. Public figures play an enormous role in disinformation dissemination; therefore, some platforms have vetoed them for this reason. Especially when these public figures are politicians, there is the risk of disinformation spreading through other media such as television or radio [20].

To understand the individual characteristics of those who share and consume fake news, many studies have been carried out, in demographic terms, age seems to be important, in the case of COVID-19 it was found that the adult group shared and believed less in fake news compared to young people, except in Mexico, where the adult group is more likely to share false information, either for political gain or social consensus [21–23]. Another factor was education level, those individuals who have developed analytical thinking, numerical ability, or reflexive versus intuitive thinking, detect fake news better and shared them in a lower proportion [24–26]. People who believe in COVID-19 conspiracy theories generally rejected information coming from scientists, and thus do not respect the health guidelines established to contain the pandemic [27]. Several authors agree with this and found as a common denominator that people or groups that disseminate disinformation have less trust in science, scientists, journalists, and governments, and are generally linked to a socially conservative tendency [28].

## **2.7 Misinformation and its outcomes**

It has been shown that disinformation causes significant abnormal behaviors, for example, in India, a father decided to commit suicide after being diagnosed with COVID-19 in order not to infect his children [29]. The rumors of a national shutdown in the US caused people panic, crowding stores and supermarkets, and viciously buying huge quantities of toilet paper. The images on the news created a heightened sense of insecurity. In Mexico, people began to receive via WhatsApp messages about government support in cards granted by the welfare Secretary and the treasury secretary, in these messages the recipient was asked to send personal information with the supposed purpose of opening a bank account that would be used to deposit the resources. In this way, many people were swindled by obtaining loans in their names. Messages were also sent about the total closure of supermarkets, causing people to take to the streets, desperate to buy food, generating panic, and anxiety in those who were in quarantine.

Disinformation was also used to sell toxic products, such as chlorine dioxide, which was already sold to “treat” illnesses such as malaria, diabetes, asthma, autism, or cancer, and during the pandemic, it was marketed as a substance capable of preventing infection by the virus, despite the fact that no health institution in the world recognized it as a treatment. Chlorine dioxide is a disinfectant used to clean medical equipment and treat wastewater [30], however, at high concentrations and non-physiological pH, it inhibits microbial and viral activity [31]. Studies have shown that exposure to high doses of chlorine dioxide causes thyroid suppression,

DNA damage, and neurotoxicity in several animal models [32–35]. It is therefore understood that chlorine dioxide is not safe for human consumption. In fact, the Food and Drug Administration (FDA) issued a paper on the adverse health effects due to the ingestion of this substance; however, without considering the lack of scientifically based information on its use in cases of COVID-19, the government of La Paz, Bolivia, authorized in September the treatment of people infected with COVID-19 with chlorine dioxide. In Mexico, this substance is freely offered and sold on social networks and there is no data on the number of people who use it [4]. Other conspiracy theory that stand out where that the 5G network was the means of transmission of COVID-19, which led to the burning of signal antennas in the UK, or that the virus was created by Bill Gates to introduce a microchip in the vaccine and obtain control over the population. On the other hand, there were those who propose that it was a virus conceived as a biological weapon in a laboratory. According to a group of American experts who evaluate trends on the Internet, about 30% of Americans supported this theory, while others preferred to hold on to the theory that the whole pandemic was a lie of the government to rob citizens of their freedom, and that in the best of cases it was a common flu [36]. These types of phenomena had an impact on health, nutrition, and, obviously, on the psychosocial aspect of populations. All these rumors, reduce the legitimacy of scientific findings by creating a social stigma around COVID-19, which compromises quarantine and isolation measures, risks, and jeopardizes the worldwide vaccination campaign.

To understand the success of misinformation it is necessary to understand that individual needs coherence between his beliefs and the information he receives, if a new idea fits properly with the previous ones, it tends to be accepted; but if not, it is likely to be rejected [37]. It is also important to consider emotions since they influence the acceptance or rejection of beliefs.

## **2.8 Infodemic management**

Eysenbach should be considered the first infodemiologist in the world since he began to study this field two decades ago, he proposed a graphical wedding cake model, to describe how the information is generated during the pandemic, the cake had 4 different actors that he represented in cake layers as follows: (1) Science, (2) policy and practice, (3) news media, and (4) social media. The layer size is proportional to the amount of information generated by each actor.

Science is the smallest layer and it contains rigorous and selective information, during the pandemic some articles were retracted as we have mentioned before, but these do not represent more than 0.1% of the published articles during the first pandemic year. Social media is the largest cake layer, due to the large quantity of unfiltered and uncontrolled information generated or amplified (**Figure 1**) [2, 38, 39].

Eysenbach proposes that misinformation must be handled based on the following pillars:

1. Information monitoring (invigilance) and data analysis and information patterns on the internet (infodemiology) [38, 39].
2. Building eHealth literacy and science literacy capacity of all stakeholders.
3. Encouraging knowledge refinement and quality improvement processes such as fact-checking and peer-review [40].





**Figure 1.**  
*Each layer represents the proportion of information that is generated and the number of users that use it.*

4. Facilitate, accurate and timely knowledge translation, minimizing distorting factors such as political or commercial influences [41].

## 2.9 Where do we go from here?

By October 2022, the pandemic has been somewhat controlled, but definitely not eradicated, the death number by the third week of October exceeds 6.5 million. Health misinformation on social media, requires greater action from those working in public health research and practice.

Internet users tend to look for information closer to their views, ignoring that which is discordant with their ideology, and from polarized groups. Social media companies and governments put on a great effort to remove false information about COVID-19, but the measures taken in this regard are only reactions that occur when the information is already circulating. Sources of disinformation should be identified and, if not blocked, they should be marked as false or dubious without being censored since, it is clear that guaranteeing freedom of expression is very complicated when disinformation is disclosed.

The WHO has made agreements with social media companies such as Facebook, Google, LinkedIn, Microsoft, Reddit, Twitter, and YouTube in order to detect misinformation and present updates from official agencies, to this end, some companies have already implemented algorithms to detect disinformation and quickly remove it from their platforms [42].

Due to a large amount of misinformation during the COVID-19 pandemic, the WHO proposes seven measures to flatten the curve of the infodemic.

1. Evaluate the source, and check the veracity of the information. It even proposes some reverse search engine tools to corroborate that the source is trustworthy.

2. Go beyond the headlines, as these can be misleading to get large amounts of views.
3. Identify the author.
4. Check the date.
5. Examining the evidence, since reliable sources support the information with citations, statistics, studies, etc.
6. Evaluate our own trends, that is, identify the reasons that make us feel attracted to an article, and what is our interpretation.
7. Verify that the information is true [21].

Very few authors have dared to recommend legal measures against the publication of false or manipulated health information, for several jurists, the criminalization of intentionally sharing health misinformation acknowledges the wrongful violation of the right to life and liberty. On the other hand, for anti-criminalization supporters, creating policies controlling health misinformation and disinformation goes against freedom of speech and a free flow of information. Countermeasures that would suit both points of view can be awareness campaigns for patients and health-care professionals, the creation and dissemination of easy-to-navigate platforms with evidence-based data, the improvement of health-related content in the mass media by using high-quality scientific evidence, the increase of high-quality online health information and improved of media literacy [43].

There is an increase in information consumption and communicative virality, so the verification of information is elementary in all areas, the “fast checking,” which is defined as “an operation that applies techniques of data journalism to unmask mistakes, ambiguities, lies, lack of rigor or inaccuracies of some content published in the media” [44]. This term has gained importance due to the large amount of false information disseminated, which is promoted in the context of digitization, so there has been a need to develop specialized platforms to clarify and expose inappropriate or false information. The International Fact-Checking Network, is a non-profit organization dedicated to the fight against misinformation [26], and during the pandemic appear the #CoronaVirusFacts Alliance, work is looking for reliable primary sources, to analyze published information, and confirm or deny its veracity and quality, about the covid-19 pandemic. On his website users can access a database that detects false information published about covid-19, filters the results by country, classifies articles as “False,” “MISLEADING,” “MISSING CONTEXT,” “No evidence,” and “Partly false,” and the organization that published it.

### **3. Conclusions**

We summarize the most significant downsides of misinformation in the COVID-19 era in **Table 2**.

As it has been repeatedly shown, social networks have become a problem in the midst of the pandemic, since individuals seek information on these platforms to make sense of their situation. Unfortunately, this is where users find miracle prescriptions against COVID-19, the sale of diagnostic tests, and fake vaccines. It is through these

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1. Increased mistrust of treatments such as vaccines
2. Promoted discord among the population generating political crisis
3. Generated collective hysteria
4. Generated panic, stress, and mental disorders in individuals
5. Association with poor distribution of resources
6. Increased of the creation of poor-quality content
7. Government intervention measures not accepted by society

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**Table 2.**  
*Negative effects generated by misinformation on health decisions during a pandemic.*

networks that, for political purposes, epidemiological data are modified or misinterpreted creating a feeling of unease among citizens. Also, these rumors generate pressure on governments to make decisions on, for example, when to remove obligatory mask usage or whether to privilege economics over health.

Ironically, information and communication technologies have also helped to counter COVID-19-related misinformation, the WHO and other health organizations of many countries have ensured that accurate information is published. They have also blocked misinformation shared on social media and guided public information. Social media platforms also banned many accounts that propagated conspiracies related to COVID-19.

On that note, it is of the utmost importance that the population is educated on how to make quality searches for scientific information. As well as developing superior judgment on the information that they are receiving from different platforms. It is imperative that there is clear communication of the public health risks associated with disinformation. It is important to work on disinformation because of the consequences that affect health management and what that can mean in times of crisis, especially in countries such as Mexico, which is the second largest consumer of false news after Turkey, according to analyses of information made on social networks, and where the influence that disinformation can have on the behavior and decision making of individuals can be very significant.

Promoting and disseminating trustworthy health information is crucial for governments, health authorities, researchers, and clinicians to outweigh false or misleading health information disseminated in social media. Citizens, government, scientists, and physicians all need to be involved in the discussion about how information-heavy platforms should be monitored in order to be able, to counteract false promises and other forms of information alteration and abuse. Managing the COVID-19 pandemic and related infodemic requires efficient, regulated, and coordinated action from multiple sectors of society and government. Knowledge and pertinent information that people can use, adapted to their context, will continue to be crucial to fighting misinformation and saving lives as the pandemic evolves. Partnerships between social media companies and other agencies can offer opportunities to counter misinformation, for example, Facebook created a partnership with WHO and health ministries to promote links to verified content in their news sections [16], Facebook has also partnered with third-party fact-checkers to refute misinformation about the virus. These collaborations and initiatives have been promoted by the UN Special Rapporteur on freedom of expression and access to information, regional rapporteurs, and others [45].

## **Conflict of interest**

The authors declare no conflict of interest.

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*Edited by Shafizan Mohamed  
and Shazleen Mohamed*

Embark on a journey into the digital realm with *Social Media - Opportunities and Risks*, an intriguing collection that uncovers the diverse world of social media and its profound impact on our lives. Within these pages we delve into the heart of the Internet where small- and medium-sized businesses (SMEs) utilize social media to revolutionize e-commerce, democratizing entrepreneurship like never before. We explore Sub-Saharan Africa, a region where social media is driving change, fostering innovation, and reshaping society. In the realm of presentation, we examine the intricacies of building authentic yet captivating digital identities. Our exploration also takes us to the forefront of education, where social media is reshaping learning and providing access to knowledge. At the same time, we don't shy away from acknowledging the darker aspects of this interconnected world. We navigate through the challenges posed by misinformation and disinformation by examining perspectives on fake news during the COVID-19 pandemic and offering valuable insights into combating falsehoods through media literacy and critical thinking. *Social Media - Opportunities and Risks* serves as your guiding tool for mastering opportunities while effectively managing the inherent risks in today's digital era. Whether you are a business owner looking to tap into the possibilities of the Internet marketplace, an educator aiming to transform education, or an individual trying to navigate through the amount of information available, this collection of writings serves as your indispensable companion for navigating the dynamic world of social media.

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