Journal of Library and Information Studies 23:2 (December 2025) pp.85-118
https://doi.org/10.6182/jlis.202512_23(2).085

An Analysis of College Students' Behaviors Regarding Misinformation on Social Media During the Pandemic

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Abstract

During the past, COVID-19 pandemic has significantly impacted global development in various respects. The extent of its effects on individuals depends on the preventive and healthcare actions they take. Therefore, the quality of information they encounter plays a crucial role in navigating the pandemic. Misinformation about COVID-19 has permeated society, spreading through diverse social media. College students, who are common users of social media, are particularly vulnerable to misinformation. Consequently, students have a higher risk of exposure to misinformation. The purposes of this study were to examine how college students experienced and behaved in response to COVID-19 misinformation disseminated through social media and the effort needed for prevention. A survey approach was employed to collect data from 300 respondents. In addition, in-depth interviews of 10 college students and 3 infectious disease physicians in hospital were also conducted. From the results of the study, policies, training, and technology-based interventions were suggested to prevent misinformation. Joint efforts from society are needed to prevent the spread of health-related misinformation. College students also need to be aware of the sources of reliable resources to access health-related information, and need to develop appropriate health-information literacy, understand the nature of infectious diseases, and avoid the health risks caused by misinformation.

Keywords: COVID-19; Misinformation; Fake Information; Health Information literacy; Pandemic

1. Introduction

During the pandemic, uncertainty about the disease had a significant impact on society (Glasdam & Stjernswärd, 2020). The volume of COVID-19-related information increased, including the characteristics of COVID-19, its transmission patterns, vaccines, and digital information related to disease management (Balakrishnan et al., 2022). Social media were widely used as a means to seek medical information and obtain information regarding the coronavirus in diverse aspects. Government agencies also adopted social media to elucidate widely disseminated information for the purpose of communicating specific policies or intentions (Apuke & Omar, 2020). Compared to traditional media, the streamlining and dissemination process of social media platforms enables the rapid and wide spread of breaking news. Conversely, misinformation can also spread among wide populations within a very short period of time. Misinformation emerged amongst the increasing healthcare and medical information related to the pandemic (Zheng et al., 2022). The dissemination of misinformation has impacted various aspects of society (Nistor & Zadobrischi, 2022). The information of virus-related treatment

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or prevention was extensively and continuously provided by social media platforms (Glasdam & Stjernswärd, 2020). The lack of certainty regarding the sources of information caused much confusion among the general public. The health threats caused by misinformation about COVID-19 posed a challenge to worldwide public health.

College students are frequent users of various social media platforms due to the convenience of sharing messages on social media platforms where unverified information can easily disseminate among student communities (Bak et al., 2022). The rapid spread of information poses significant problems regarding the accuracy of knowledge content. College students, in particular, face a significant challenge when exposed to inaccurate information on social media platforms regarding issues related to information literacy (X. Chen et al., 2015). Given the importance of these issues, this study aimed to investigate the impact of COVID-19 misinformation on health-related information literacy among college students. Specifically, the following research questions were explored:

1. How did students experience COVID-19 misinformation through social media?
2. How were students engaged in social media regarding COVID-19-related information?
3. What behaviors did students exhibit in response to COVID-19 misinformation from social media?
4. What effort is needed for preventing COVID-19 misinformation in online communities?

2. Literature Review

Born in the information age, college students are very dependent on social media to access information. During the COVID-19 pandemic, many types of health-related information and medical information updated rapidly. On the other hand, misinformation also spread around diverse social media with exaggerated visual designs and misleading contents (Iwendi et al., 2022). In this era, health information literacy is critical to help college students to attending to the authenticity of information in order to cope with the pandemic. Issues related to students' experiences with COVID-19 misinformation through social media are discussed, including *College students' social media use*, *COVID-19 and misinformation*, *Health information literacy for college students*, and *Educating and preventing misinformation*.

2.1 College students' social media use

Among college students, the use of social media for sharing ideas and receiving information and experiences from others has become an important part of living and learning (Zhao, 2021). With the popularity of smartphone and diverse social media platforms around, they can immediately access information for different purposes, including preparing academic tasks and planning leisure activities (Kolhar et al., 2021). During the COVID-19 pandemic, Internet and social media are extensively used for communication with others. With limited physical and social activities outside their home, students rely heavily on social media to access diverse information. However, information shared and experiences circulated via social media might not always be reliable (Hong et al., 2021), since a great number of messages were produced and shared without regard to their authentic status.

Leeder (2019) pointed out that information sharing behaviors among community members is often influenced by psychological factors such as individuals' self-motivation, self-expression, and a sense of belonging. Youth in particular might prefer storytelling news. Due to this psychological aspect of information sharing, social media users are likely to believe information that mostly confirms their viewpoints, and they are more likely to be trapped in a close-information environment. The community reinforces shared ideas and beliefs, and deliberately excludes any information that might threaten consensus (Cinelli et al., 2021; Karimov et al., 2022; Lachlan et al., 2021; Villa et al., 2021). During the pandemic, this emotional aspect of self-expression accelerated the dissemination of information. The widespread sharing of various types of misinformation during the COVID-19 pandemic was also influenced by people's psychological needs for self-autonomy, self-motivation, and a sense of belonging (Balakrishnan et al., 2021; Talwar et al., 2019).

Hansson et al. (2021) argue that many college students rely on social media platforms as their primary source of information in the digital age. Their access to reliable scientific and medical information might be limited, leading to inadequate knowledge and inappropriate health decisions, which can increase their risk to disease infections.

2.2 COVID-19 and misinformation

During the COVID-19 pandemic, rapidly evolving information led to the spread of unverified contents. Numerous misinformation circulated online, causing turmoil and confusion around the world (Hansson et al., 2021). Due to the openness of using online spaces in social media, the dissemination of diverse information via these platforms might be unreliable, unverified, misleading, incorrect, or deliberate fabrications created for specific purposes (Musgrove et al., 2018). The impact of misinformation might be destructive to various aspects of public health, such as inappropriate protective measures and treatments during the COVID-19 pandemic (S. Chen et al., 2023).

From the past literature, misinformation has been frequently discussed using related different terms, including disinformation (deliberate misleading information), malinformation (information propagated to cause harm), and fake information (deliberately fabricated false information) (Balakrishnan et al., 2021; S. Chen et al., 2023). Specifically, misinformation refers to "false information that is without the intent to mislead" (S. Chen et al., 2023, p. 1). Regarding misinformation related to COVID-19 pandemic, various types of misinformation raise significant concerns about health risk, including false preventive measures, conspiracy theories, fabricated treatments, vaccine misinformation. During the early phrase of the disease, limited scientific research was available, including the characteristics of the virus, virus variants, and clinical features of the infection. The knowledge gaps in medical and healthcare create challenges to provide well-established evidence-based conclusions, leading to uncertainty and anxiety among professionals and the public (Escandón et al., 2021). Some politicians expressed prejudiced views contradicting with the healthcare authorities on social media. The information society was flooded with conspiracy theories and misinformation about preventions and cures

for COVID-19 throughout diverse social media platforms (Nowak et al., 2021). Some of these messages include unreliable home remedies, misleading advices, and wrong information about vaccines and medical treatments (Chavda et al., 2022). This kind of chaos cause confusion in the society, and distrust in the health policies set by authorities.

With the advances in social media and mobile technology, misinformation might spread quickly, leading to the emergence of panic, anxiety, and undesirable health-related decisions (Southwell et al., 2023). Although misinformation is not limited to deliberate fabrication or falsehoods, the negative impact of such information should not be overlooked due to individuals' perceptual processing biases (Freiling et al., 2021). Individuals attempt to refute information that challenges their established beliefs (Freiling et al., 2021; Scheufele et al., 2020). When encountering information that does not align with their pre-existing knowledge or beliefs, students might experience cognitive dissonance. This conflict status often influences individuals' ability to engage in critical thinking and can cause biased information processing (Iwendi et al., 2022; Musgrove et al., 2018).

To combat fake news, several solutions are emerged from technical interventions. For example, a tremendous amount of misleading information related to COVID-19 was removed from diverse social media platforms including Facebook, X (formerly known as Twitter), Google, YouTube, and so on (McGrew & Chinoy, 2022). In response to the worldwide impact of misinformation, international fact-checking organizations are devoted to monitoring and preventing the spread of misinformation. For example, the International Fact-Checking Network (IFCN, https://ifcncodeofprinciples.poynter.org) has issued international standards for fact-checking work, with 100 accredited members worldwide. The IFCN also provides fact-checking services to verify the authenticity of online information (Nieminen & Sankari, 2021; Rodríguez-Pérez et al., 2023; Tandoc, 2019). In line with the IFCN standards, the Taiwan Fact-Check Center (TFC, https://tfc-taiwan.org.tw/) also provides information verification services in Taiwan.

The lessons learned from COVID-19 misinformation underscore the importance of access to timely and accurate health-related information. How students access health-related information via social media and how they digest, absorb, process, and share it with others is worth further study.

2.3 Health information literacy for college students

Health information literacy is essential to protect individuals from the risk of disease and maintain a healthy life. During the pandemic, the society was flooded with information about COVID-19, whereas false clams and misinformation spreading through social media caused negative psychological impact among individuals (Liu et al., 2021). Due to lockdowns and physical distancing for preventing infections, face-to-face communications were restricted. Internet and social media were intensively used by college students as primary sources to learn, communicate, share information, and stay connected with others. Heavy reliance on virtual communications with limit access to reliable sources for verification also pose a threat to utilize

unreliable information (Harjule et al., 2023; Xia et al., 2021).

Throughout the COVID-19 pandemic, social media platforms are widely used to fulfill interpersonal interaction needs, and users at various levels can interpret and spread the information from their perspectives (Kaplan & Haenlein, 2010). Many non-expert individuals post health-related information based on personal interpretation, and constantly spread their own thoughts and posts to influence their followers (Katool, 2022). The variation in college students' health information literacy in evaluating and discerning online content is a matter of great concern (Hargittai et al., 2010). Misinformation spread rapidly via social media, which might overshadow the health information from experts and raise doubts about the quality of the information obtained by the public. This situation was termed an "infodemic" in a digital or physical environment, resulting in information confusion and distrust in authoritative institutions (Melki et al., 2021).

Past research on health information among college students has concluded that many of them use Facebook and Instagram as a means of information exchange, but have difficulty verifying the reliability of health information (Bak et al., 2022; Chesser et al., 2020; Vrdelja et al., 2021). Misuse of the online misinformation might cause various problems, such as uncertainty about responding to the disease, questioning appropriate actions or even engaging in inappropriate health behaviors for prevention and treatment (Greene & Murphy, 2021; Kim et al., 2021). McCaffery et al. (2020) pointed out that individuals with limited health literacy exhibited significant differences compared to those with sufficient health literacy in terms of understanding the symptoms and prevention of COVID-19 and skills to search for health information.

Since an increased level of online engagement in learning and other purposes of Internet activities among college students regarding the use of Internet technology and social media for communication, news, leisure, and learning, they are constantly expose themselves to a vast amount of unreliable information, and especially vulnerable to the rapid-spread of misinformation (Abdoh, 2022). Moreover, the algorithms on social media platforms often prioritize users' engagement in interactions for distributing information (Poleac & Gherguț-Babii, 2024). These situations amplify the spread of misinformation, which makes decision-making for using reliable information more challenging among students.

Vrdelja et al. (2021) reported that students with sufficient digital health literacy can utilize search engines to find trustworthy institutions for relevant COVID-19 information, while those with inadequate digital health literacy often rely on social media for health-related information. Also, users with different social media literacy influence their decision-making to combat the spread of fake news (Wei et al., 2023). Through social platforms, any individual can share information related to their own health experiences. If college students are incapable of attending to the authenticity of information, they are likely to misuse the information for different purposes. When starting their information search using biased reporting keywords, they might quickly rely on the information on the top of the search result list. However, these top search results are often

messages where misinformation is aggregated (McGrew & Chinoy, 2022).

Students' selection of desired health information was based on several criteria: free, easily accessible, understandable, and quickly updated (Bak et al., 2022; Basch et al., 2018). Social media fulfills the need for easy and quick access to information, which also accelerates the spread and circulation of misinformation (Apuke & Omar, 2020). Conversely, sharing erroneous information can lead to conceptual confusion and impact personal health and healthcare decision-making (Vrdelja et al., 2021). Therefore, it is particularly important to employ various mechanisms to address this issue (Lampos et al., 2021).

2.4 Educating and improving information literacy

The advocacy about monitoring mechanisms in prevention and education of misinformation is needed in the society. To prevent the spread of misinformation on social media platforms, many of them worked on the use of artificial intelligence (AI) technology to assess suspicious messages and assist with fact-checking mechanism. Through data mining and deep learning technology, the systems can detect misinformation, and use big data analysis and machine learning models to track the spread of misinformation (Bang et al., 2021; Wani et al., 2021). The use of AI technology to verify the intensive amount of misinformation on a daily basis highlights the impact of misinformation on the information society, while the current progress of AI technological advancements might not be able to achieve 100% accuracy for verification of misinformation. Instead of solely relying on the mechanism of social media platform to filter out misinformation, individuals' capabilities to decern doubtful information are needed. University students need to be well educated to obtain critical thinking skills to access information, as well as evaluate and avoid misinformation (Brodsky et al., 2021).

Since the use of the internet has become an essential part of students' lives for searching disease and healthcare related information, it is crucial to cultivate college students to develop health information literacy, providing more learning supports for searching and evaluating online information accurately and effectively. These supports include training of strong searching skills, recognizing biases in searching algorithms, and exploring multiple sources for verification (McGrew & Chinoy, 2022).

Thianthai and Tamdee (2024) suggested creating social awareness around issues of digital health literacy among university students in both their professional and social lives. Training students to effectively use accurate information is necessary to help them develop the literacies and skills for future professional and personal information management (Pragholapati, 2020). Furthermore, establishing relevant curricula to teach college students how to assess reliable information sources and understand digital health information is important (Patil et al., 2021). Musgrove et al. (2018) emphasized the development of a fact-checking mechanism for the stories and content shared on the Internet to avoid misinformation or fake news staying in individuals' memories to become their beliefs and hinder their ability to distinguish between facts and fiction.

Naeem et al. (2021) suggest that misinformation stories often contain recurring terms and patterns. Individuals must develop their own ability to identify doubtful information by critically evaluating the credibility, accuracy, and intent behind online content. In university education, students should be taught to decern misinformation and critically analyze the characteristics of information, by assessing both surface credibility (media interface, structure, and other visual elements) and message credibility (content, relevance, and accuracy) of information (Hargittai et al., 2010; McGowan-Kirsch & Quinlivan, 2024). Training in health information literacy must start with a pedagogical approach to implant its importance among students (Bak et al., 2022; Brodsky et al., 2021; Preston et al., 2021). The integration of class assignments and activities with real-life examples will help students learn to track information sources and seek additional content in order to obtain objective and more credible reports for problem-solving (Brodsky et al., 2021). These instructional methods focused on teaching students how to use a media literacy framework and a debunking strategy to address and counter widespread misinformation.

The problems arising from misinformation and the corresponding issues related to educating college students require further exploration. Efforts of higher education institutions to cultivate students' digital health literacy are therefore needed (Leeder, 2019; McGrew & Chinoy, 2022). The analysis of college students' experiences with COVID-19 misinformation in this research will contribute to future policies for the prevention and control of misinformation related to infectious diseases and healthcare.

3. Research Method

This study employed both survey and interview approaches to explore students' responses. Additionally, 3 experts were recruited by convenient sampling to provide guidance for prevention of misinformation. These experts were hospital physician in infectious diseases in New Taipei City, Taiwan, and each of them has over 15 years of medical experiences. During the pandemic, they served as physicians to treat and control COVID-19. In order to understand how physicians managed patients during the pandemic and their experiences with university student patients, they were invited for in-depth interviews to provide suggestions regarding health information literacy.

The structure of the survey questionnaire included sections on students' basic information and their level of agreement with several sets of statements regarding misinformation, measured on a 1-5 points Likert scale (Table 1). The items used in questionnaire were derived from the literature review. Adopted from X. Chen et al. (2015), Chesser et al. (2020), Head et al. (2019), and Hong et al. (2021), the items in Part II aim to reflect students' experiences with social media and their access to information related to COVID-19. Consulting the research works of Hong et al. (2021), Lachlan et al. (2021), Patil et al. (2021), students' engagement in online social communities for COVID-19-related experiences were collected in Part III to assess students' motive and interactions in the social communities. From the studies by Apuke & Omar (2020), Glasdam & Stjernswärd (2020), Villa et al. (2021), students' behaviors to cope with COVID-19

Table 1. Structure of the Survey Questionnaire

Category of items	Descriptions of the questionnaire items
Appreciation and introduction	Thank-you messages, brief introduction.
Part I. Basic information	Gender, age, their use of social media platforms, etc.
Part II. Obtaining COVID-19-related information from social media	Updated COVID-19 information, prevention advice, and treatment options, information received from diverse media channels, etc.
Part III. Engagement in online social communities	Motives and interactions in accessing pandemic updates, guidelines, government policies, etc.
Part IV. Behaviors in response to COVID-19 misinformation on social media	Questioning, raising concerns in the group, ignoring, forwarding to others unintentionally, searching for relevant information, etc.
Part V. Expectations for preventing COVID-19 misinformation	Courses and learning opportunities to discern misinformation, detection mechanisms by social media platforms, collaboration with medical experts, etc.
Part VI. Open-ended responses	Open-ended reactions to misinformation.

misinformation from social media were recapped and modified into questionnaire items in Part IV. Referring to the studies by Nieminen & Sankari (2021), Rodríguez-Pérez et al. (2023), preventive efforts for COVID-19 misinformation in online communities were identified and used questionnaire items in Part V.

In-depth interview guides were also derived from correspondent items in each part of questionnaire to triangulate the sources of data to support the research findings. In addition, interviews also aimed to provide additional insights not captured in the survey. For example, students' feelings and psychological reactions during the early phase of the pandemic, as well as their varying levels of health information literacy, could be revealed through interview questions about how they searched for health-related information. Experts' insightful viewpoints about education in health information literacy could also be assessed from interview. In-depth interviews questions are listed in Table 2 and Table 3. Sources of data collection gathered were summarized in Table 4. All of the procedures and items used for collecting research data were reviewed and approved by the Institutional Review Board (IRB).

To collect data from questionnaires, the invitation message was posted on diverse social media platforms (Facebook, IG, Line, etc.) among different university social groups in North, Central, and South Taiwan (New Taipei City, Taichung, and Kaohsiung) to invite students to complete the questionnaire and offer a small gift as a token for appreciation. In-depth interviews used convenient sampling to collect data from respondents. Students in diverse majors were included in the sample. The basic information about student and expert is listed in Table 5 and Table 6. Data collection process was conducted during the period from April 1, 2023

Table 2. In-depth Interview Guide for Students

Category	Question list
Basic information of the respondents	Participants' demographic information. Enrollment of university and their major.
Experience of obtaining COVID-19-related information and misinformation	What were the social media platforms you frequently used? What was your experience of searching for and using COVID-19-related information? In what conditions did you feel a need for COVID-19-related information? What experiences did you have of receiving misinformation from social media? Please explain.
Engagement in online social communities for COVID-19-related experiences	How did you engage in conversation with members in the social communities? Under what circumstances did you share and discuss COVID-19-related information in your social communities? How did you react to the COVID-19-related information that might be fake or misleading posted in social communities?
Behaviors in response to COVID-19 misinformation on social media	How did you verify COVID-19-related information you were doubtful about? What were the processes involved in selecting information from the list of search results for COVID-19? How did you evaluate the information you obtained? How did you react to COVID-19 misinformation posted by community members?
Expectations for preventing COVID-19 misinformation	What preventive policies for avoiding the spread of misinformation during the pandemic do you expect to be implemented? What should the university students understand to effectively deal with misinformation?

Table 3. In-depth Interview Guide for Experts

Category	Question list
Basic information	Experts' experiences with COVID-19 infected cases.
Experiences related to COVID-19 misinformation	What risk did COVID-19 misinformation pose to healthcare? What were the cases you experienced caused by COVID-19 misinformation? What knowledge and skills should students need to discern healthcare-related misinformation?
Suggestions for preventing COVID-19 misinformation	What courses should higher education provide to help students develop health literacy in the digital society? How can university students be motivated to acquire health-related knowledge?

Table 4. The Correspondence Between Research Questions and Sources of Data Collection

Research question	Data collection	References
How did students experience COVID-19 misinformation?	Questionnaire Part II Interviews with students	Chesser et al., 2020; Head et al., 2019; Hong et al., 2021
How were students engaged in social media?	Questionnaire Part III Interviews with students	Balakrishnan et al., 2021; Hong et al., 2021; Lachlan et al., 2021
What behaviors did students exhibit in response to COVID-19 misinformation?	Questionnaire Part IV Interviews with students	Apuke & Omar, 2020; Leeder, 2019; Rodríguez-Pérez et al., 2023; Villa et al., 2021
What effort is needed for preventing misinformation in online communities?	Questionnaire Part V/VI Interviews with students	Hansson et al., 2021; Leeder, 2019; McGrew & Chinoy, 2022; Melki et al., 2021

Table 5. Student Interviewees Background Information

#	Sex	University	Major	Time of interview	Lines number of interview data
A	F	Fu Jen Catholic University	Child and Family Study	Aug 17, 2023, 14:00	Student A: 1-212
B	F	Tamkang University	Banking and Finance	Aug 17, 2023, 15:00	Student B: 1-265
C	F	National United University	Taiwan Language and Communication	Aug 21, 2023, 13:30	Student C: 1-336
D	F	Chung Yuan Christian University	Department of Psychology	Aug 21, 2023, 14:30	Student D: 1-305
E	M	Taipei Medical University	School of Healthcare Administration	Aug 21, 2023, 15:30	Student E: 1-305
F	M	Lunghwa University of Science and Technology	Mechanical Engineering	Nov 29, 2023, 13:30	Student F: 1-396
G	F	Tamkang University	Department of English	Nov 29, 2023, 19:00	Student G: 1-225
H	F	Shih Hsin University	Social Psychology	Dec 6, 2023, 16:00	Student H: 1-308
I	F	Fu Jen Catholic University	Textiles and Clothing	Dec 7, 2023, 11:00	Student I: 1-269
J	F	Fu Jen Catholic University	Library and Information Science	Dec 13, 2023, 12:00	Student J: 1-425

Table 6. Expert Interviewees Background Information

#	Sex	Hospital	Department	Time of interview	Lines number of interview data
A	M	Fu Jen Catholic University Hospital	Infectious Disease	Nov 20, 2023, 16:00	Doctor A:1-337
B	M	Fu Jen Catholic University Hospital	Infectious Disease	Nov 20, 2023, 15:00	Doctor B:1-382
C	M	Fu Jen Catholic University Hospital	Infectious Disease	Dec 6, 2023, 9:00	Doctor C:1-241

to December 30, 2023. These interviews provide experience-based insights from interviewees, helping researchers, medical professionals, educators, and policy makers improve future pandemic preparedness.

To analyze the data, all of the interviews were recorded, transcribed and coded. To specify the data source, each respondent was labeled with an identification number alphabetically, followed by the line number of the verbatim transcription. For example, "Student A: 23-24" represents the data source of Student A, from Line 23 to 24, while "Doctor A: 10-12" stands for the data resource of Doctor A, from Line 10 to 12. Data analysis started with open coding. Key -words (-phrases) were given related to the questions raised and the contents of the responses. For example, a response from Student A, "*I used to get the updates of COVID-19 from friends' Instagram posts and rarely checked official website*" was coded as "trust in social media." Emergent categories resulting from content analysis of the coded data were organized. Multiple angles to interpret the meanings in the data were also provided for the analysis.

4. Research findings

4.1 Survey results

A total of 300 survey data responses were collected. Students' basic information was analyzed from Part I of the questionnaire. Among the students, 237 (79.00%) were female and 63 (21.00%) were male. In terms of their age distribution, 62 were 18 (20.67%), 38 were 19 (12.67%), 58 were 20 (19.33%), 71 were 21 (23.67%), 33 were 22 (11.00%), and 38 were older than 22 (12.66%). The majority of students (183, 61.00%) were infected with COVID-19 once in the past 5 years. Among the social media platforms, Line (291, 97.00%), Instagram (IG) (244, 81.30%), and Facebook (FB) (229, 76.30%) were the top 3 most frequently used (Table 7). The open options of written responses also included Weibo and Xiaohongshu (from China). Finally, the majority of students used social media several times a day (290, 96.67%).

Among the items in Part II of the questionnaire regarding *Experiences of Obtaining COVID-19 Information*, "I joined a medical health group as a COVID-19 case (either self or family) to access relevant information" was rated the highest (Mean = 3.62, *SD* = 1.25) and "I joined the

Table 7. Student Basic Information (*N* = 300)

Gender	Male			Female		
	63 (21.00%)			237 (79.00%)		
Age	18	19	20	21	22	> 22
	62 (20.67%)	38 (12.67%)	58 (19.33%)	71 (23.67%)	33 (11.00%)	38 (12.67%)
Number of infections	0	1	2	> 2		
	91 (30.33%)	183 (61.00%)	21 (7.00%)	5 (1.67%)		
Use of social media	Line		291 (97.00%)			
	IG (Instagram)		244 (81.33%)			
	Facebook (FB)		229 (76.33%)			
	X (Twitter)		23 (7.67%)			
	WeChat		17 (5.67%)			
	Podcasts		6 (2.00%)			
	WhatsApp		8 (2.67%)			
	vlogs		2 (0.67%)			
Frequency of social media use	Several times a day		Once a day		Once several days	
	290 (96.67%)		8 (2.67%)		2 (0.67%)	

CDC (Center for Disease Control) social group to obtain COVID-19-related information" was the second (Mean = 3.61, *SD* = 1.24; Appendix A). A great majority of students were infected with COVID-19 at least once (Table 7), joining the CDC social group could help them get quick access to COVID-19 treatment and related information. Among the items in Part III of the questionnaire regarding students' *Engagement in Social Media*, "When I or my family members tested positive for COVID-19, I searched for information related to care" was rated the highest (Mean = 4.13, *SD* = 0.89) and "I am interested in staying updated on COVID-19-related news" was the second (Mean = 4.09, *SD* = 0.83; Appendix B). The data reveal that students proactively seek disease-related information when they or their family members experienced illness during the severe pandemic. They also joined the social groups of the health authority for more updates on the disease. These behaviors highlight the personal needs of healthcare information during health-crisis that drive increase engagement with latest, trustworthy health and medical resources.

From the *Behaviors in Response to COVID-19 Misinformation* in Part IV of the questionnaire, "When encountering suspicious COVID-19 posts on social media, I would personally use keywords to search for relevant information on the Internet" was rated the highest (Mean = 3.70, *SD* = 1.02; Appendix C). The item "I might unintentionally forward erroneous COVID-19-related messages received from the social media group to others" (Mean = 2.02, *SD* = 1.10)

rated the lowest. The item "I used to request COVID-19 verification from healthcare-related groups in hospitals to confirm the accuracy of the information" scored below average (Mean = 2.89, *SD* = 1.26), suggesting that many students did not confirm the accuracy of the information regarding COVID-19 from reliable authorities. The item "For the suspicious Covid-19 posts, I would raise my concerns in the group" (Mean = 2.50, *SD* = 1.13) also rated relatively low. Even when students knew others posted incorrect COVID-19 information, few would correct it in the group. From the results, students relied more on keyword searches for suspicious information, and less frequently verified from authority and raised concerns for suspicious posts, having a tendency to accept or share unverified information. These behaviors suggested that most students took a passive role in dealing with misinformation about COVID-19. This phenomenon highlights a need for improving students' digital literacy and critical thinking in processing online information.

In Part V of the questionnaire, students response to the items related to *Prevention of Misinformation about COVID-19,* and most of the items were relatively high with score above 4.0. The highest-rated item was "It is expected that the government can integrate high-end technology for real-time tracking of COVID-19 misinformation" (Mean = 4.15, *SD* = 0.80; Appendix D). The items related to the use of social media platforms also rated relatively highly, such as "It is expected that social media platforms can provide ways to fact-check COVID-19 misinformation" (Mean = 4.11, *SD* = 0.81) and "It is necessary to urge group members not to spread messages of unknown origin" (Mean = 4.10, *SD* = 0.85). These reactions suggest the expectations for establishing regulatory policies, among which the most agreeable were the integration of high-end technology by the government, fact-check mechanism provided by the social media platform, and the avoidance of spreading unreliable messages from unknown origin. To cope with the challenges of misinformation, students anticipated technological detection systems. The findings also suggest that collaboration with content experts is necessary to fact-check the health-related information more effectively.

Pearson correlation analysis were used to further study the relationships among *Experience of Obtaining COVID-19 Information from Online Social Groups*, *Engagement in Social Media for COVID-19 Information-Related Experiences*, *Behaviors in Response to Misinformation about COVID-19 in Social Media*, and *Expectation for Prevention of Misinformation about COVID-19*. The analysis results indicate a high correlation between *Engagement in Social Media for COVID-19 Information-Related Experiences* and *Behaviors in Response to Misinformation about COVID-19 in Social Media* ($r = 0.88$). *Experience of Obtaining COVID-19 Information from Online Social Groups* is moderately correlated with *Engagement in Social Media for COVID-19 Information-Related Experiences* ($r = 0.51$), and *Behaviors in Response to Misinformation about COVID-19 in Social Media* ($r = 0.64$). A modest correlation is also found between *Experience of Obtaining COVID-19 Information from Online Social Groups* and *Expectation for Prevention of Misinformation about COVID-19* ($r = 0.29$) (Table 8).

Table 8. Pearson Correlation Analysis among Different Response Facets

	A	B	C	D
Experience of Obtaining COVID-19 Information from Online Social Groups	1	0.51***	0.64***	0.29***
Engagement in Social Media for COVID-19 Information-Related Experiences	0.51***	1	0.88***	0.39***
Behaviors in Response to Misinformation about COVID-19 in Social Media	0.64***	0.88***	1	0.42***
Expectation for Prevention of Misinformation about COVID-19	0.29***	0.39***	0.42***	1

*** $p < .001$.

4.2 Interview results

In-depth interviews conducted with 10 students and 3 physicians were processed via inductive analysis. Several categories are summarized, including *Uncertainty about the Disease*, *Diverse health Information Literacy, Psychological Impact of Misinformation,* and *Efforts Needed for Preventing COVID-19 Misinformation*. As experienced by the interviewees, the early stage of the COVID-19 pandemic which is new and deadly coupled with strong infection rate, caused widespread anxiety in society due to fear. This led to social isolation and distancing, as a result, students relied heavily on the Internet to interact with others and access healthcare related information. They reported experiences of misinformation during the pandemic, ranging from COVID-19 prevention and treatments to the recommended duration for quarantine, absurd stories, and misleading information about specific vaccines. The physicians also reported their experiences of dealing with COVID-19 infective cases, suggesting that insufficient health information literacy might lead to the use of misinformation. The descriptions about each category are listed as follows.

4.2.1 Uncertainty about the disease

The outbreak of COVID-19 had a great impact on society. During the early stage (end of 2019 to 2021), there were limited scientific data and knowledge about the new disease. At this time, medical and health experts had no available research evidence to support any arguments proposed by other physicians or claims from social media. As asked to recall their experiences, many students were aware of the threat of misinformation, and they joined the social media of the CDC to obtain more reliable and up-to-date news on a daily basis. Some students verified whether the disease-related information came from content experts or a physician. However, even when the information was claimed to originate from physicians, there might be a possibility that it was not accurate. Some doctors who were not infectious disease specialists (for treating COVID-19 cases) also responded to the media about their opinions without the support

of scientific data. Reactions by students and physicians are listed as follows:

> *(During the early outbreak of COVID-19 pandemic,) there were circulating social media rumors, one of which suggested that consuming alcohol can eliminate the virus*. (Student B: 107-108)
>
> *When watching news about health and medical information, I checked whether the suggestions provided were from a physician and determined their specialization. … However, even if the news reports came from a reliable physician, it might still turn out to be misinformation*. (Student D: 157-158; 160-161)
>
> *There were diverse messages claiming to be the cure of COVID-19 during the (early phase of) pandemic. However, no research was conducted to support their arguments*. (Doctor A: 68-69)
>
> *We started to learn about the disease (COVID-19) in 2020. We felt uncertain about it due to limited medical research worldwide. We could only follow the guidance provided by the CDC*. (Doctor B: 35-36)

As reflected from the interview data, at the early stage of the new pandemic, the state of uncertainty and fear was experienced among individuals. Limit scientific data was available to provide evidence-based claims during that time, with misinformation circulating via social media. With limit research and established scientific knowledge from medical, healthcare professional for the disease during this stage, the unpredictable disease created a sense of confusion and anxiety. College students experienced misinformation and uncertainty about the information obtained. Medical professionals could only look to authority for guidance. Inconsistent and conflicting messages also deepened the fear for the disease during this stage.

4.2.2 Different levels of health information literacy

All of the students interviewed had more than one social media account. When recalling the severe outbreak of pandemic, many students primarily relied on their friends and family members as sources for COVID-19-related information. Instead of obtaining updates from health authority, they turned to their social circles for insights. Some shared their personal stories on the "Dynamic Content" (the real-time sharing function provided by social media platforms) that they were infected with COVID-19. Based on regular interactions with their social groups, students tended to trust the health and disease information provided by the social platforms they frequently used, even including information about illness from COVID-19. They experienced misinformation forwarded by others.

> *My information sources for COVID-19 were mostly from classmates and family members... I used the "Dynamic Content" to post my personal story when I tested positive*. (Student F: 202; F: 225)
>
> *I trusted social media like PTT and Dcard because more individuals' experiences were provided. I found those genuine personal experiences were more trustworthy. … Someone online told me to take as many of this brand of throat lozenges as needed to help me recover.* (Student J: 47-48; 77-78)

The use of social media for communication and interactions was a part of students' life especially during the pandemic lockdown. Students tended to use the real-time features of their social platforms to share up-dated activities and experiences they encountered. This allowed them to maintain connectivity with their peers and friends. They also placed a high level of trust in the information and experiences shared by friends, considering those genuine personal experiences from social media groups were more trustworthy. As a consequence, they might rely more on these personal connections rather than verification of the message content. Moreover, they might accidently share misinformation about COVID-19 and fell victim to the spread of false information via social media.

From interview data, students demonstrated varying levels of health information literacy in how they accessed information when faced personal needs for COVID-19 information. Most students preferred quick access to needed information, and were not aware of the use of fact-check services for verifying uncertain information. Some students did not verify the authenticity or check the accuracy of questionable information. When receiving doubtful information from their friends, they often turned to the Internet to start searching. Many chose the first one on the list for quick access to information, without being aware that misinformation might appear at the top of the search results due to its widespread presence on the Internet. Those who were more sensitive to suspicious messages switched their search strategies to identify more reliable information sources. Personal health behaviors were also influenced by misinformation accessed regarding COVID-19, such as refusing specific brands of vaccines, and taking inappropriate actions without a physician's prescription. Reactions by students and physicians are listed as follows:

> *When verifying the information, I used Google for keyword searching… If the same information appeared in many sources, I would consider the fact to be true*. (Student I: 36; 39)

> *I only read the 1st or 2nd on the search list… If all of them were too exaggerated, I would switch the keywords to start another search*. (Student E: 150; 153-154)

> *Many students searched for online information about COVID-19 when they were infected. Some of them might experience sequelae after recovery from the disease. However, they did not consult a doctor about this problem. Instead, they accessed quick information from the Internet*. (Doctor A: 294-296)

> *If patients followed the online instructions instead of consulting with a medical doctor for treating COVID-19, more severe problems such as acute respiratory failure would occur due to inappropriate health actions. We had experience of treating this kind of patient*. (Doctor C: 49-51)

Based on responses from interviewee, individuals differed in how they accessed information while experiencing a personal need for COVID-19 details. Many students preferred easy and quick information, and searching from Internet. Students with a high level of health information literacy were able to critically evaluate the information and use more reliable

sources. When searching relevant information, these students cross-checked facts and verify information by browsing more resources from the list of search results. While students with a low level of health information literacy relied more on the access of personal connections from their friends. They used the information searched with high click-through rates rather than information from more reliable sources. In the case of treatment for COVID-19, anecdotal experiences were circulated on the Internet, where some misinformation might delay proper medical care and be harmful to health. Without consulting medical professionals, students with low level of health information literacy might experience life-threatening consequences. Students with different level of health information can significantly impact their decision-making in health and medical care.

4.2.3 Psychological impact of misinformation

Most students were frequent users of social media. During the severe outbreak of pandemic, many of them received misinformation from their elderly family members. The spread of misinformation regarding COVID-19 impacted students' lives in diverse ways. The false information received from diverse media reconstructed personal understanding, leading to misconceptions. Many individuals were confused and questioned the information they obtained related to treatments of the disease and the policies issued by the government (CDC). Students took actions and made decisions based on their own perceptions derived from misinformation or suggestions from unreliable sources. These decisions might have prevented them from taking appropriate procedures (such as vaccinations) to cope with the COVID-19 pandemic. Reactions by students and physicians are listed as follows:

> *Fake information used a strange language... For example, the descriptions about the origin of the virus, it was hard to tell whether the report was true or false. The circulated information formed our understanding.* (Student H: 141; 150-151)

> *There were many rumors about the disease. These rumors caused panic among the public, and negative feelings in our lives.* (Student G: 145-146)

> *As physicians, we had the capability and knowledge to evaluate the credibility of the health and disease related messages. However, college students or the general public learned and used the online information to help them understand and interpret it. Misconceptions and misunderstanding might result in inaccurate health decisions.* (Doctor B: 139-142)

> *If students received misinformation about the disease, it would hinder them from taking the appropriate actions to cope with their health problems.* (Doctor C: 33-34)

During the peak of the COVID-19 pandemic, students had limit access to physical information due to lockdown and isolation. Public health and pandemic-related information, including misinformation, was widely disseminated in diverse social media. Misinformation lead to confusion about proper prevention of the pandemic and the medical care necessary, as well as panic and uncertainty, making it difficult to trust medical professionals. The misinformation often integrated with exaggerated descriptions,

visuals and movie clips distributed via diverse social media to distort the facts. When circulated online, it reconstructed viewers' understanding of the diseases, and related policies and proper procedures for preventing the disease. When repeatedly exposed to misinformation, students had difficulties differentiating credible sources and false claims. Via social media, the issues claimed by misinformation caused emotional responses and might create chamber effects. This might reinforce the false beliefs among individuals, making them repeatedly exposed to information that align with their views. Especially for the individuals with low health information literacy, misconceptions and misunderstanding might result in long-term psychological consequences, including negative feelings, confirmation bias toward their false beliefs, and poor decision-making regarding personal health.

4.2.4 Effort needed for preventing COVID-19 misinformation

The outbreak of COVID-19 had a great impact on society and on university communities in particular. More news was spread on social media platforms than from the authorities. Consequently, students became vulnerable to misinformation about COVID-19. Lessons about teaching students to identify the patterns and modules used for creating fake news were suggested. Unlike other diseases, COVID-19 was relatively new, with limited knowledge available in the health and medical field. Compared with other diseases that have been studied for decades, more medical research effort is needed to provide knowledge and understanding of COVID-19. Both physicians and students reacted based on their own perspectives for the prevention of COVID-19 misinformation. Reactions by students and physicians are listed as follows:

> *Using easily comprehensible language when creating promotional videos might be an effective way to teach individuals how to identify misinformation*. (Student C: 290-292)

> *Exaggerated medical and health-related information might be potential misinformation and should be verified by authorities as quickly as possible*. (Student E: 310-311)

> *Warning messages for misinformation should be circulated via the social media platform, such as Dcard that is frequently used among college students*. (Student I: 187-188)

> *Courses for students to identify misinformation should be provided by the university. The courses should be designed to provide scenarios relevant to students' experiences to help students to learn to identify misinformation*. (Doctor B: 326-327)

> *Health and medical knowledge about COVID-19 should be taught to educate students about the characteristics, preventions, treatments, and possible sequelae after recovery. Many patients suffered from diverse chronic symptoms after recovery from COVID-19. These areas of research need to be explored by medical scientists*. (Doctor A:325-326)

COVID-19 pandemic was highly devastating. Facing with the widespread of misinformation, individuals experienced the threat of misleading healthcare information. Having personally witnessed the social unrest and fear brought by the pandemic and misinformation, physicians

and students shared their perspectives, urging the society and authority to take actions against misinformation. As reflected by interviewees, sufficient knowledge building among college students is needed. Many false messages were created with specific patterns and modules for their intended purposes, being generated and spread by social media with manipulated visualizations and exaggerated headlines. Students should be taught to be alert to the information that possesses these features. To enhance health information literacy as facing new disease, individuals should be educated to become knowledgeable about the disease by using clear and easy-to-understand instructions. Health and medical authorities should be engaged in distributing reliable information by using simplified language, visual aids, and accessible visual formats, such as graphics and videos, to provide explanations about scientific concepts and avoid confusions and misunderstanding derived from those false claims provided by social media. Courses and workshops are needed on how misinformation is created, spread, and believed, to provide a framework for evaluation of information and a quick access to reliable sources. Also, medical and health professionals should actively participate in discussions with individuals about the disease prevention, symptoms, and treatment to bridge knowledge gaps among students with diverse level of health information literacy.

5. Discussion

College students frequently used social media for acquiring needed information. Most students had more than two social media accounts. During the severe pandemic, the widespread nature of COVID-19 kept students away from all physical social activities. Instead, they relied heavily on digital technology to interact with others and access information. When students or their family members tested positive for COVID-19, most of them sought information on how to manage the illness. Heightened fear and anxiety often led to excessive and repetitive search for health-related information, driven by growing health concerns (Kurcer et al., 2022). Many students used keywords to search for relevant information on the Internet, however, some might not have been aware of the web-services from fact-checking to verify the accuracy of COVID-19-related posts. This situation might have influenced individuals by exposing them to risks and threats in using health and disease related information (Thianthai & Tamdee, 2024).

The survey results of the study indicated that most students joined the CDC and medical and health social groups to obtain COVID-19-related information during the severe outbreak of coronavirus, reacting strongly to searching for information related to care and government polices about COVID-19. The situation of confirmed cases among family members made students experience the anxiety-driven necessity of searching for information related to the disease. However, it is suggested that health-anxious people tended to have a negative response to trustworthy information sources, such as government health agencies, because factual information from these agencies might cause more anxiety for individuals who search for reassurance (Afful-Dadzie et al., 2023; McManus et al., 2014). Baumgartner and Hartmann (2011) also reported that individuals with high levels of

health anxiety encounter greater adverse outcomes when seeking information online. In our study, the interviews with physicians revealed that even COVID-19 medical and health experts were not able to support or refute many arguments proposed in diverse sources of information due to the uncertainty about the new disease during the early stage of the pandemic. While the unreliable information sources about COVID-19 spread through diverse social media platforms, health-anxious individuals might have been at risk for being trapped by health-related misinformation.

Dealing with complex health information requires adequate health literacy, and the ability to access, understand, process, evaluate, and use appropriate information to make health-related decisions (Patil et al., 2021). From our research findings (in both survey and interview), students used keywords to search for relevant information on the internet and relied heavily on the quick access of information from social media. However, easy access of information often means it is untrustworthy and can lead to misconceptions. From interview reactions, some students were unaware that top search results often contain aggregated misinformation. During the pandemic, personal health behaviors regarding care and treatment were influenced by misinformation about COVID-19. Motta et al. (2020) found that individuals with more exposure to COVID-19 tended to disapprove of official CDC guidelines, suggesting the negative effect on individuals' perceptions. McGrew and Chinoy (2022) also argued that if college students are incapable of attending to the authenticity of information, they are likely to misuse the information for different purposes.

From the survey results in the engagement of social media, most students took a more passive role in dealing with misinformation about COVID-19. They did not actively verify and confirm the accuracy of the information regarding COVID-19 from healthcare-related groups or doctors in hospitals. Even though they knew others may post incorrect COVID-19 information, few would correct it in the group. As noted by Duffy et al. (2020), members within a social group share news to maintain and enhance their friendships. The motive of sharing is to foster social cohesion by offering information to social members. Most members receiving fake news or misinformation might not want to expose the reality to damage that cohesion. Park et al. (2022) used cultivation theory to study social media and misinformation of COVID-19, arguing that individuals may be conditioned to perceive "mean" worlds of COVID-19-related truth, false, or other diverse information. They suggested using a supply of corrective sources which provide alternative and competing information to benefit individuals with exposure to diverse perspectives of interpersonal dialogues from a wide variety of information resources. To foster individuals to engage in handling healthcare-related information more effectively, educational initiatives are implemented in recent years after lesson from COVID-19 pandemic (Salles et al., 2025). Students also need to learn their responsibility for using social media to avoid the spread of unverified messages. They should also be trained to become a critical thinker to develop fact-checking habits, and develop the capabilities to evaluate and verify healthcare information obtained from social media. These efforts can help move students from being passive

consumers to active participants in verifying and refuting misinformation on social media.

Most of the items in the survey questionnaire showed a high level of agreement on the effort for preventing COVID-19 misinformation. The interview data also suggested multifaceted approaches for preventing COVID-19 misinformation, including law enforcement, using enhanced fact-check technology, and providing courses to skills needed by individuals to evaluate information critically. In the university, via the cases relevant to students' interest and discussion approach in the health-literacy course, students can comprehend the content about health information literacy and achieve their learning objectives more easily. Also, effort for the use of high-end technology to detect the sources of misinformation is needed. Fact-checking tools for misinformation developed by social media platforms are also suggested. To create a literate health-information society, collaboration among medical experts, universities, and government health organizations is essential in developing policies and actions to prevent health-related misinformation.

From the correlation analysis, high correlation between social media engagement and behaviors in response to misinformation of COVID-19 reflects that increase of engagement in social media for disease-related experiences is relevant to how they react to disease-related misinformation. There are also moderate relationships between students' experiences with obtaining disease-related information on social media, their level of engagement, and their reactions to COVID-19 misinformation. From students' basic information, 291 out of 300 students used social media several times a day. Since the majority of the students relied heavily on social media, the interrelated relationships among their experiences, engagement, behavioral responses, and expectations were observed. The exposures to social media might shape students' behaviors and perceptions toward disease-related knowledge and misinformation.

From the findings of the research, since students' use of social media has become an integral part of daily life, it is necessary to strengthen their health information literacy. The dissemination of misinformation on social media poses significant threats to public health. Efforts from various aspects are needed, including education about health information literacy, promoting fact-check and access of credible health information, collaborations with professionals in healthcare, and the use of innovative technology to detect misinformation and filter out suspicious messages from the web. In addition, social media need to implement strict policies, utilize AI detect algorithm to effectively identify related medical and healthcare misinformation to reduce the spread of false messages. Medical and healthcare professionals should also engage proactively in providing accurate and comprehensible health-related contents to counteract health- and disease-related misinformation, avoiding confusions and negative psychological impact caused by the disease.

Further to the discussion from the effort in combating misinformation, technological interventions for detecting misinformation have been documented in more recent literature to provide a better understanding about the disease and the use of technology preventing misinformation, compared with the earlier stage of COVID-19 pandemic. For example, AI, deep learning, and nature language process are

used on the web. Dynamic features of detecting misinformation have highlighted the importance of interdisciplinary cooperation in providing public with reliable information sources (Vishnupriya et al., 2024). Health and science professional also worked with media for the programs to mitigate the spread of misinformation, including education, literacy training, and teaching to increas individuals' knowledge and skills about misinformation and misconceptions in public health (Heley et al., 2025). However, the advances of technology also raise concerns about misuse. AI-generated media and media manipulation, such as deepfake and bot, on the other hand, also pose evolving challenges and impact people's perception of reality. The manipulated opinion poses significant threat on the integrity of information (Babaei et al., 2025). In the future, a stronger legislation must regulate and enforce fines or legal actions against the destructive producers. To counteract AI-generated misinformation, ongoing effort in the advancement of detecting tools for misinformation and the promotion of digital literacy are both needed.

6. Conclusion

From the end of 2019 to 2022, the world experienced the rapid spread of COVID-19, about which college students were exposed to misinformation due to frequent use of social media. This research studied students' behaviors regarding COVID-19 misinformation from social media, and summarized the findings from a survey and interviews conducted during post pandemic. Several themes regarding students' exposure were reflected and categorized from the interview data, including *Uncertainty about the Disease*, *Diverse Health Information Literacy, Psychological Impact of Misinformation,* and *Efforts Needed for Preventing COVID-19 Misinformation*. From both the survey and interview data, students strongly agreed on the suggestions related to policies, training, and technology-based interventions. Joint efforts from society are needed to prevent the spread of health-related misinformation. College students also need to be aware of reliable sources of health-related information and develop appropriate health-information literacy to understand the nature of infectious diseases. Courses that teach practical skills to handle misinformation and take more progressive actions against misinformation are needed to equip individuals with appropriate attitudes and literacies in the information society. The present study is preliminary and might have limitations, as it only assessed a limited population and used only descriptive analysis to report the quantitative results of students' responses in defined aspects. Also, there exists a time gap between the peak of the pandemic and the period when the research data was gathered. Further analysis for differences among diverse demographic variables might be used to study on variation in their responses. Future research could expand its scope or involve in-depth observation of students' information behaviors in handling health and disease related misinformation. Research and development on technology-based interventions in filtering misinformation might also provide potential contributions to information professionals.

Acknowledgement

This research was funded by the National Science and Technology Council (NSTC112-2410-H-030-004). Very appreciate the support of the NSTC.

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(Received: 2024/12/26; Accepted: 2025/5/12)

Appendix A

Experience of Obtaining COVID-19 Information from Online Social Groups (*N* = 300)

Experience (Agreement from 1 to 5 points)	Mean	*SD*
I have received COVID-19-related press releases passed over by friends.	3.23	1.04
I have been sent COVID-19 information from government sources through friends on social media.	3.52	1.05
I have been informed about COVID-19 infection updates that my friends have posted on social media.	3.32	1.08
I have received COVID-19 prevention advice through social media from friends.	3.31	1.08
I have been provided with information regarding COVID-19 treatment that was shared by friends on social media.	3.24	1.15
I have been given information about COVID-19 vaccines from friends on social media.	3.41	1.13
I joined the CDC social group to obtain COVID-19-related information.	3.61	1.24
I joined a hospital-based healthcare social group to acquire COVID-19 information.	3.24	1.31
I enlisted in a social group at my university with a focus on healthcare to access COVID-19-related information.	3.10	1.28
I joined a medical health group as a COVID-19 case (either self or family) to access relevant information.	3.62	1.25
I have encountered misinformation about COVID-19.	2.76	1.25
I have received the same COVID-19 misinformation on various social media platforms.	2.57	1.29
I had experiences of receiving conflicting information about COVID-19, and it's often confusing.	3.08	1.20
I once experienced cognitive confusion due to receiving incorrect information about COVID-19.	2.62	1.20
I feel that once incorrect concepts related to COVID-19 emerge, they are difficult to correct.	2.73	1.28

Appendix B

Engagement in Social Media for COVID-19-related Experiences (*N* = 300)

Engagement	Mean	*SD*
I engaged with my social media friends to obtain COVID-19 prevention information.	3.94	0.87
I am interested in staying updated on COVID-19-related news.	4.09	0.83
I am curious about the content of COVID-19-related posts in the community.	3.50	1.08
I am keen on gaining knowledge related to COVID-19.	3.92	0.87
When I or my family members tested positive for COVID-19, I searched for information related to care.	4.13	0.89
When confirmed positive for COVID-19, I intended to access COVID-19-related regulations and policies.	4.07	0.86
I am curious about hearing my friends' experiences with COVID-19.	3.89	0.91
I would respond to my friends' experiences with COVID-19.	3.52	1.10
I would respond to COVID-19-related information posted by friends on social media.	3.29	1.13
I enjoy sharing my knowledge about COVID-19 with my friends on social media.	3.41	1.10
I shared my experiences related to COVID -19 with others.	3.44	1.12
I repost important messages to friends in need.	3.63	1.15

Appendix C

Behaviors in Response to Misinformation about COVID-19 in Social Media (*N* = 300)

Reactions to misinformation	Mean	*SD*
I used to question the authenticity of the information related to COVID-19 shared in the social media group.	3.67	1.03
For the suspicious COVID-19 posts, I would raise my concerns in the group.	2.63	1.22
I used to ignore the COVID-19 messages in the social media group that I had doubts about.	3.10	1.13
I might unintentionally forward erroneous COVID-19-related messages received from the social media group to others.	2.02	1.10
When others post incorrect COVID-19 information, I will correct it in the group.	2.50	1.13
When encountering suspicious COVID-19 posts on social media, I would personally use keywords to search for relevant information on the Internet.	3.70	1.02
When encountering suspicious COVID-19 posts on social media, I would obtain confirmation of the information through the verification tools provided by the social media platform.	3.52	1.07
I know how to apply for services from fact-checking centers to verify the accuracy of COVID-19-related posts.	3.07	1.22
I used to request COVID-19 verification from healthcare-related groups in hospitals to confirm the accuracy of the information.	2.89	1.26
I used to consult hospital doctors to verify the accuracy of COVID-19 information posted on social media.	2.97	1.25
I used to ask other friends to inquire about the accuracy of COVID-19 information posted on social media.	3.27	1.13

Appendix D

Expectation for Prevention of Misinformation about COVID-19 (*N* = 300)

Prevention of the spread of misinformation	Mean	*SD*
Learning different approaches for discerning misinformation about the COVID-19 pandemic is needed.	3.89	0.86
It is expected that social media platforms can provide ways to fact-check COVID-19 misinformation.	4.11	0.81
It is expected that the process for fact-checking COVID-19 misinformation can be simplified.	4.02	0.89
It is expected that healthcare-related groups can always provide reminders about channels for fact-checking COVID-19 misinformation.	4.01	0.82
It is expected that there are courses for learning to fact-check COVID-19 misinformation.	3.92	0.92
Relevant courses guiding students on how to combine keywords for filtering misinformation are needed.	4.00	0.86
It is expected that the university will collaborate with medical experts to choose COVID-19-related information from websites for students.	4.01	0.81
Courses that use examples to teach students how to identify misinformation are needed.	4.01	0.85
Invited talks from COVID-19 experts are needed to prevent the spread of misinformation.	3.76	0.98
It is expected that the university library can collaborate with COVID-19 experts to provide necessary counseling information, helping students identify misinformation.	3.86	0.86
It is expected that the university library can integrate online platforms for fact-checking COVID-19 misinformation.	3.96	0.84
It is expected that the government can integrate high-end technology for real-time tracking of COVID-19 misinformation.	4.15	0.80
It is expected that the government can use technology for law enforcement and heavily penalize the sources of COVID-19 misinformation.	4.13	0.84
It is expected that social media platforms establish a mechanism to track posts for warning and report accounts that disseminate COVID-19 misinformation to law enforcement agencies.	4.09	0.81
It is necessary to urge group members not to spread messages of unknown origin.	4.10	0.85

圖書資訊學刊　第23卷第2期　（2025.12）　頁85-118
https://doi.org/10.6182/jlis.202512_23(2).085

疫情期間大學生由社群媒體接收錯誤訊息之資訊行為分析

An Analysis of College Students' Behaviors Regarding Misinformation on Social Media During the Pandemic

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摘　要

過去新冠（COVID-19）傳染病流行影響全世界各方面的發展。傳染病之預防有賴於個人所採取的健康行動，個人獲取資訊的品質對於疫情之防護極為重要。然而傳染病的錯誤資訊往往滲透並透過社群散佈，大學生作為社群媒體的重要使用族群，經常利用社群平台取得與分享資訊，有相當程度暴露於錯誤訊息的環境中。本研究分析大學生由社群媒體接收傳染病錯誤訊息之經驗與反應，透過問卷調查蒐集300位大學生反應資料，並深入訪談10位學生與3位感染科醫生。研究歸納：透過政策、課程訓練，以及科技創新研發等努力，可預防健康方面的錯誤訊息。另外，大學生亦必須以信賴的管道取得健康相關資訊，並培養健康資訊素養，了解傳染疾病的本質，杜絕錯誤訊息對健康的危害。

關鍵字：新冠病毒、錯誤訊息、假訊息、健康資訊素養、傳染病

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註：本中文摘要由作者提供。
以APA格式引用本文：ChanLin, L.-J. (2025). An analysis of college students' behaviors regarding misinformation on social media during the pandemic. *Journal of Library and Information Studies, 23*(2), 85-118. https://doi.org/10.6182/jlis.202512_23(2).085
以Chicago格式引用本文：ChanLin, Lih-Juan. "An Analysis of College Students' Behaviors Regarding Misinformation on Social Media During the Pandemic." *Journal of Library and Information Studies* 23, no. 2 (2025): 85-118. https://doi.org/10.6182/jlis.202512_23(2).085