# The Role of Mobile Health Application Platforms in Health Communication to Improve Public Digital Literacy Among Generation Z

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**Abstract.** The development of communication and information technology can give people insight into the development of the latest knowledge about media and tend to be more responsive to new media and technology. Generation z, known as the natives of the digital era, was born in a digital world that has complete technology, such as personal computers (PCs), cell phones, gaming devices, and the internet. This study aims to find out how Generation Z utilizes mobile health to improve their health literacy. This research method uses a systematic literature review (SLR) by identifying, reviewing, evaluating, and interpreting research results from various ASEAN countries. This study found that Generation Z rarely uses mobile health because their health literacy is already sufficient. Generation Z does not have to look for information about health, they already understand health science. Generation Z has extraordinary technological capabilities, but rarely uses mobile health applications to manage their health, this phenomenon is influenced by several variables. They said that social interaction with the surrounding environment is also high so they get enough health literacy without having to seek health information through social media or mobile health. In this study, it has not been extended to all corners of the world, the researcher limited the research to focus more on ASEAN countries, so that it can still allow differences if it is studied widely outside ASEAN.

**Keywords:** health communication, digital literacy, mobile health, Generation Z

## 1    Introduction

In the last decade, technological advancements have significantly changed how we interact and form social relationships. One manifestation of this change is the emergence of various health application platforms in the search for health information. Technological advances have made communication faster and easier for everyone, regardless of location or distance [1]. The development of communication and information technology can provide insights to the public regarding the development of the latest knowledge about the media and that people tend to be more responsive to new media and technology[2]. On the other hand, the development of new media and technology is not necessarily able to contribute well enough from the communication

perspective. Over time, the understanding of technological developments considers that the life of the digital generation actually experiences dependence, which causes it to be unable to be separated from the grasp of gadgets, especially in the younger generation of society [3]. Generation Z, known as the natives of the digital era, was born in a digital world that has complete technology such as personal computers (pc), cell phones, gaming devices, and the internet [4]. They spend their free time surfing the internet. Using gadgets will have an impact on reduced social interaction, becoming an unfocused person, and having very little social competence [5]. Gadgets have various functions, not only for entertainment but also for virtual interpersonal communication.

New media refers to a type of media that uses the internet, is flexible, and can function privately or publicly. New media refers to digital forms of communication that emerged from the development of information technology and the internet. It includes platforms and tools such as social media, blogs, podcasts, streaming video, and mobile applications. New media has changed the way we communicate, interact, and consume information, offering more interactive and dynamic engagement than traditional media.

New media has two main characteristics, namely, allowing users to communicate interactively and making it easy to use [6]. New media allows people to communicate actively without sacrificing distance and time. With the Video Call feature, people can talk face-to-face through new media connected to the internet network if the phone can connect to voice. New media is divided into four dimensions: (1) interpersonal communication media, such as email, telephone, and smartphones; (2) interactive media, such as computers and online games; (3) search engine media or information search portals; and (4) collective participation media, which involves the exchange of information through the internet and can cause emotional and affection to its users [7]. Lister (2006) explained that new media has characteristics, namely (1) digital, (2) interactive, (3) hypertextual, (4) virtual, (5) network, (6) and simulation.
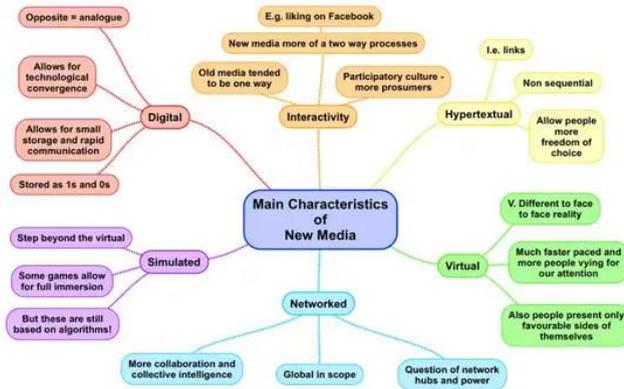


**Fig. 1.** Six key features of new media [8]

The digital world has revolutionized how we communicate, including building interpersonal relationships. Interpersonal communication in the cyber world, often known as online communication, presents a new space to interact and connect with others. Although connected virtually, online communication has the same purpose as face-to-face communication, which is to build relationships, understand each other, and exchange information, especially in the field of health. In the ever-evolving digital era, new media has played an important role in improving literacy and health communication. However, digital literacy in developing countries is still weak due to low technological access. Limited access to technology is the main cause of low digital health literacy. Based on research by the International Telecommunication Union (ITU) on 2023 found that only around 45% of the population in developing countries have access to the internet [9]. Several factors contribute to this limitation, including underdeveloped technology infrastructure, high costs for internet access, and unequal distribution of technology between urban and rural areas. It is difficult for people in developing countries to get health information available online if they do not have adequate access to digital technology.

The importance of digital literacy in terms of social inequality. Their study shows that not all social groups have access to or the ability to use digital technology. Age, education, income, and location can affect a person's digital literacy [10]. Digital literacy is the ability to use information and communication technologies (ICTs) effectively and, importantly, to search, evaluate, create, and communicate information. In this context, digital literacy includes not only the technical ability to use digital devices but also a deeper understanding of how information is managed and used in various digital platforms. Digital literacy includes not only the use of technology but also an understanding of how technology works and impacts society. In Paul Gilster's book Digital Literacy on 1997 he states that digital literacy includes the ability to understand and use information in various formats from various sources delivered through computers [11] . This competency is very important in supporting daily activities in today's digital era. The Digital Literacy Activist Network in 2018 suggests the formulation of digital literacy competencies [12], namely as follows; (1) Access, competence to operate digital media efficiently by understanding and understanding its various features; (2) Selection, able to select and sort information from various sources to meet needs; (3) Understand, able to understand information received from explicit and implied text; (4) Analysis, able to analyze information by dissecting messages to find out what is intended; (5) Verification, able to check carefully and carefully to ensure the truth of information or cross-confirm with similar information from various sources; (6) Evaluation, before distributing information, experts consider various risks by considering the platform used; (7) Distribution, Information is shared by considering who can access it; (8) Production, competence in the ability to compile and produce new information that is accurate, easy to understand, and considers relevant moral and legal standards; (9) Participation, being able to actively and ethically participate in sharing information through online communication activities; and (10) Collaborate, being able to take the initiative and distribute honest accurate and ethical information.

Low digital literacy may prevent people from finding jobs, getting healthcare, or participating in democratic life so that these inequalities can exacerbate social and

economic disparities. Platforms such as health apps, social media, and interactive websites have revolutionized the way health information is delivered and received by the public. These new media not only facilitate access to information but also strengthen interactions between patients, healthcare providers, and the healthcare community as a whole. Health apps are one of the most prominent elements of new media in health communication. Some of the features of these apps, such as health tracking, online consultations, and educational articles, help improve people's literacy about health. However, health literacy in developing countries has not been maximized due to cultural factors. This statement is also supported by the research of, who explain that cultural and social habits can influence the way a person seeks and uses health information [13]. Talking about health issues, especially those related to infectious diseases or reproductive health, is considered taboo in some societies, making people reluctant to seek health information openly, including by using digital sources. Another researcher , found that the adoption of mHealth apps is uneven among Generation Z due to the low trust in information delivery through mHealth digital health information platforms [14]. Research in Hungary on digital health literacy, found that there are differences in the *babyboomer, x, y, and z* generations in understanding health information even though eHealth usage is also high across all generations [15]. The baby boomer generation, when searching for information, often uses web-based internet while other generations use more health applications to find information about health. Their research, also found similarly that there are limitations to the use of eHealth due to lack of understanding in using eHealth applications, so they switch to using the internet as a search for information about health [16].

Telemedicine electronic medical records (EMR), mobile health applications, and internet-based health management systems are some examples of information and communication technologies (ICTs) that assist and improve health services. According to [17] in his book What is e-Health? mobile health not only refers to the development of technology but also includes changes in medical practices and health systems that are driven by technology. These include the use of digital diagnostic tools, the transmission of health data, and the interaction of patients and healthcare providers. mHealth applications are classified into three categories [18]; namely (1) Open Source; mHealth is an open source application whose source code can be freely used, changed and shared. Applications like this are applied in Indonesia made by communities or non-profit organizations that encourage cooperation and creativity, such as *halodoc, alodokter, riliv.co, klikdokter.com, meetdoctor* (2) Commercial; applications developed by private companies for commercial purposes such as telemedicine (doctor consultation). Moreover, (3) Research; mHealth Research applications are made for research purposes and are usually made by research institutions or academic institutions. They are used to collect data, test hypotheses, or evaluate health interventions, such as ResearchKit by Apple, which is used to conduct health studies.

Health applications have great potential to increase patient involvement in their health care [19]. These applications allow users to make better health decisions with information that is easy to access and understand. In addition, social media is also paying attention and also to support public literacy about health. Various health organization accounts on social media serve as a platform for health campaigns to create

a healthy society. Their research findings, show that social media can increase awareness about health, change health behavior, and form a supportive community[20]. Another study found a different point of view in their findings that health communication platforms also pose problems [21]. One of them is the fact that the information is valid. Not all online health information can be trusted, and the spread of misinformation can have serious consequences. Health misinformation on social media can have an impact on people's trust in vaccinations. Ultimately, this can lead to decreased vaccination rates and an increased risk of disease outbreaks. In addition, data privacy and security issues also arise. Digital platforms and health apps often collect user data, which can be misused if not managed properly. Research found how important strict security rules and procedures are to protect user data in health apps [22].

Health communication research in digital health literacy has been quite widely used by academics and non-academics. Various cases and phenomena that occur in the role of health application platforms in health communication to improve public literacy as described above. Based on these factors, there are still problems with the use of digital health, so it needs to be examined and analyzed by comparing with other research on digital health literacy.

## 2 Research method

This research uses the Systematic Literature Review (SLR) method, which is an approach that identifies, reviews, evaluates, and interprets research results from various ASEAN countries. Overall, SLR is a research design that synthesizes evidence from previous research systematically to answer research questions. In this study, the researcher conducted identification by collecting several articles through online journals that can be accessed through Google Scholar and indexed international journals with the keyword digital literacy, health communication, and mobile health communication within five years. Next, the research reviewed the findings in the articles, and evaluated the overall findings. Then the researcher interpreted the findings and analyzed them in accordance with the context of the problems in this study.

## 3 Results and Discussion

### 3.1 Results

The results of this published research data were analyzed and summarized based on the subject matter related to the keys of digital literacy, health communication, and mobile health communication. The results of the scientific article data are presented in Table 1.

**Table 1.** Previous research digital health communication on ASEAN

| Title | Authors and Year | Research results |
| --- | --- | --- |
| Adapted digital health literacy and health information seeking behavior among lower income groups in Malaysia during the COVID-19 pandemic | [23] | In his findings that health information in cyberspace 94% of Malaysians are very helpful with health information in all age groups from 18 - 84 years. While 7% were not helped by health information delivered through social media and mobile health. |
| Determinants of eHealth Literacy among Adults in China | [24] | It was found that e-health in China plays an important role in educating the public on health. Although, they have a tough challenge in selecting the health information provided. However, it was found that they understand the correct health information. |
| Demand for Mobile Health in Developing Countries During COVID-19: Vietnamese's Perspectives from Different Age Groups and Health Conditions | [25] | It was found that across generations x and y in Vietnam, interest in using mHealth apps is very high, but generation z demands products without having to search for health information on mobile health first. |
| Association of Generation and Group Size With the Usage of a Mobile Health App in Thailand: Secondary Analysis of the ThaiSook Cohort Study | [26] | He found that generation x and y people use mobile health applications more for their health screening. However, generation z rarely uses mobile health because health literacy among this generation is already quite fulfilling. |

### 3.2    Discussion

Improving healthcare accessibility, especially in remote or underserved areas, is one of the key advantages of mHealth. As part of mHealth, remote consultations with doctors can be done through telemedicine, which can reduce the need for travel and long waiting times. With one of the biggest cases being the pandemic two years ago,

this was especially helpful as face-to-face interactions had to be minimized to reduce the spread of the virus.

One of the most important innovations in healthcare is mobile health (mHealth), which refers to the use of mobile devices such as tablets, smartphones, and related applications to support and improve healthcare. The use of mobile health across generations is part of the means by which people need to self-check their health. This study further analyzes the use of mobile health among the younger generation.

Increased accessibility of healthcare services, especially in remote or underserved areas, is one of the main advantages of mHealth. As part of mHealth, remote consultations with doctors can be done through telemedicine, which can reduce the need for travel and long waiting times. With the pandemic two years ago, this was especially helpful as face-to-face interactions had to be minimized to reduce the spread of the virus.

The younger generation is very active in cyber or internet surfing; they are tech-savvy. Previous research has been reviewed by explaining that Generation Z, known as the natives of the digital era, was born in a digital world that has complete technology such as personal computers (PC), cell phones, gaming devices, and the internet. This is also supported by research in Malaysia that starting from the age of 18 people have used mobile health technology for their health interests[23]. From the findings, 94% of Malaysians are familiar with using mobile health. Previous research also supports this, explaining that cultural and social habits can influence the way a person seeks and uses health information [13]. However, the adoption of mobile health also faces a number of challenges. Not all cross-generational communities are engaged in using mobile health [25]. As researched by that generation z has little interest in using mobile health applications. In their findings various cross-generations x and y in Vietnam are interested in using mHealth applications are very high, but generation z demands products without first looking for health information on mobile health. Generation z believes more in consuming products to fulfill their health. However, they are aware of health information or campaigns on social media and health app platforms. One of the main reasons is that Generation Z lacks awareness and interest in health. They tend to feel healthy and do not require intensive medical monitoring, unlike older generations who may have more long-term health issues. Generation Z, despite growing up with digital technology, faces some limitations in the use of mobile health apps. One of the main limitations is their tendency to seek health information through browsing the internet rather than using specially designed health apps. Generation Z is adept at using technology, they tend to be skeptical of mobile health apps. They prefer faster and easier ways, such as browsing the internet, although this means they may not always get the most accurate or verified information. Generation Z is more likely to seek health information through the internet and social media than using mobile health apps, which are often perceived as less flexible and unable to provide instant answers [27] .

In addition, there is also the trust factor, where Generation Z often trusts information found on reputable websites or through recommendations from friends on social media more than health apps that may be less familiar. They tend to be skeptical of apps that require a lot of personal data access permissions or that do not have a clear reputation. According to research, Generation Z prioritizes entertainment and social media over

health apps. However, there are some previous studies in Thailand researched in their findings that generation x and y people use mobile health applications more for their health screening [26]. However, Generation Z rarely uses mobile health because health literacy among this generation is quite fulfilling. Generation z, without looking for information about health, is already quite aware of health knowledge. They said that social interaction with the surrounding environment is also high, so they get enough health literacy without having to look for health information through social media or mobile health. In addition, they consider the information conveyed through mobile health and the internet is also very much so that the information conveyed sometimes needs to be validated. This was also researched in their findings in China that Generation Z will be information conscious [24]. They feel that they have a tough challenge in selecting the health information provided because they do not really trust or doubt the validity of the health information presented through the mobile health application platform.

## 4    Conclusion

Digital literacy skills are an important component in supporting digital health literacy in today's digital era. Given that all generations need health information. The findings in this study are various kinds of problems related to health communication in mobile health. Generation X and Y in their findings dominate and have a high interest in using mobile health applications. In addition, there are several phenomena in generation z, which are influenced by a number of variables. As for the findings that generation Z has extraordinary technological capabilities, but they rarely use mobile health applications to manage their health, this phenomenon is influenced by a number of variables.

## References

1.  C. Ferdiana, E. H. Susanto, and S. Aulia, "Penggunaan Media Sosial Tinder dan Fenomena Pergaulan Bebas di Indonesia," *Koneksi*, vol. 4, no. 1, p. 112, 2020, doi: 10.24912/kn.v4i1.6622.
2.  A. Carlson and A. M. Isaacs, "Technological capital: an alternative to the digital divide," *J. Appl. Commun. Res.*, vol. 46, no. 2, pp. 243–265, 2018, doi: 10.1080/00909882.2018.1437279.
3.  F. de la Cruz Paragas and T. T. C. C. Lin, "Organizing and reframing technological determinism," *New Media Soc.*, vol. 18, no. 8, pp. 1528–1546, 2016, doi: 10.1177/1461444814562156.
4.  R. S. Qurniawati and Y. A. Nurohman, "eWOM pada generasi Z di media," *J. Ekon. Manaj. Sumber Daya*, vol. 20, no. 2, pp. 70–80, 2018.
5.  T. A. dos Reis, "Study on the alpha generation and the reflections of its behavior in the organizational environment," *Science (80-. ).*, vol. 6, no. 1, pp. 9–19, 2018, [Online]. Available: http://www.questjournals.org/jrhss/papers/vol6-issue1/C610919.pdf
6.  Mondry, *Pemahaman teori dan praktik jurnalistik*. 2020.
7.  D. McQuail, *McQuail's mass communication theory*. Sage publications, 2010.

8.  M. Lister, J. Dovey, S. Giddings, K. Kelly, and I. Grant, *Women & media: a critical introduction*, vol. 44, no. 04. 2006. doi: 10.5860/choice.44-1949.

9.  International Telecommunication Union (ITU), *Measuring Digital Development - The ICT Development Index 2023*. 2023.

10. E. Hargittai and M. Micheli, "Internet skills and why they matter," *Soc. internet How networks Inf. Commun. are Chang. our lives*, vol. 109, no. 2, pp. 109–124, 2019.

11. P. Gilster, *Digital Literacy*. Canada: John Wiley & Sons, Inc., 1997.

12. A. Siswantini, K. Novi, and Z. M. Z. Monggilo, *Lentera Literasi Digital Indonesia: Panduan Literasi Digital Kaum Muda Indonesia Timur*. Malang: Tiga Serenada, 2022.

13. A. Chib, M. H. Van Velthoven, and J. Car, "MHealth adoption in low-resource environments: A review of the use of mobile healthcare in developing countries," *J. Health Commun.*, vol. 20, no. 1, pp. 4–34, 2015, doi: 10.1080/10810730.2013.864735.

14. M. Z. Alam, W. Hu, M. A. Kaium, M. R. Hoque, and M. M. D. Alam, "Understanding the determinants of mHealth apps adoption in Bangladesh: A SEM-Neural network approach," *Technol. Soc.*, vol. 61, no. October 2019, p. 101255, 2020, doi: 10.1016/j.techsoc.2020.101255.

15. O. Papp-Zipernovszky, M. D. Horváth, P. J. Schulz, and M. Csabai, "Generation Gaps in Digital Health Literacy and Their Impact on Health Information Seeking Behavior and Health Empowerment in Hungary," *Front. Public Heal.*, vol. 9, no. May, pp. 1–12, 2021, doi: 10.3389/fpubh.2021.635943.

16. M. H. Algifari, L. Zachary, R. P. Yuliani, H. Aditama, and S. A. Kristina, "Digital Health Literacy and Its Associated Factors in General Population in Indonesia," *Indones. J. Pharm.*, vol. 35, no. 2, pp. 355–362, 2023, doi: 10.22146/ijp.5640.

17. G. Eysenbach, "What is e-health?," *J. Med. Internet Res.*, vol. 3, no. 2, pp. 1–5, 2001, doi: 10.2196/jmir.3.2.e20.

18. B. Martínez-Pérez, I. De La Torre-Díez, S. Candelas-Plasencia, and M. López-Coronado, "Development and evaluation of tools for measuring the quality of experience (QoE) in mHealth applications," *J. Med. Syst.*, vol. 37, no. 5, 2013, doi: 10.1007/s10916-013-9976-x.

19. P. Krebs and D. T. Duncan, "Health app use among US mobile phone owners: A national survey," *JMIR mHealth uHealth*, vol. 3, no. 4, 2015, doi: 10.2196/mhealth.4924.

20. S. A. Moorhead, D. E. Hazlett, L. Harrison, J. K. Carroll, A. Irwin, and C. Hoving, "A new dimension of health care: Systematic review of the uses, benefits, and limitations of social media for health communication," *J. Med. Internet Res.*, vol. 15, no. 4, pp. 1–17, 2013, doi: 10.2196/jmir.1933.

21. W. S. Chou *et al.*, "The Persistence and Peril of Misinformation," *Am. Sci.*, vol. 105, no. 6, p. 372, 2017, doi: 10.1511/2017.105.6.372.

22. T. Dehling, D. W. Inf, F. Gao, S. Schneider, and A. Sunyaev, "Exploring the far side of mobile health: Information security and privacy of mobile health apps on ios and android," *JMIR mHealth uHealth*, vol. 3, no. 1, 2015, doi: 10.2196/mhealth.3672.

23. R. R. Marzo *et al.*, "Adapted digital health literacy and health information seeking behavior among lower income groups in Malaysia during the COVID-19 pandemic," *Front. Public Heal.*, vol. 10, 2022, doi: 10.3389/fpubh.2022.998272.

24. M. O. Lwin, C. Panchapakesan, A. Sheldenkar, G. A. Calvert, L. K. S. Lim, and J. Lu, "Determinants of eHealth Literacy among Adults in China," *J. Health Commun.*, vol. 25, no. 5, pp. 385–393, 2020, doi: 10.1080/10810730.2020.1776422.

25. H. L. Nguyen, K. Tran, P. L. N. Doan, and T. Nguyen, "Demand for Mobile Health in Developing Countries During COVID-19: Vietnamese's Perspectives from Different Age

Groups and Health Conditions," *Patient Prefer. Adherence*, vol. 16, pp. 265–284, 2022, doi: 10.2147/PPA.S348790.

26. T. Inchusri *et al.*, "Association of Generation and Group Size With the Usage of a Mobile Health App in Thailand: Secondary Analysis of the ThaiSook Cohort Study," *J. Med. Internet Res.*, vol. 25, pp. 1–13, 2023, doi: 10.2196/45374.

27. J. E. Chung, N. Park, H. Wang, J. Fulk, and M. McLaughlin, "Age differences in perceptions of online community participation among non-users: An extension of the Technology Acceptance Model," *Comput. Human Behav.*, vol. 26, no. 6, pp. 1674–1684, 2010.