# Requirement Specification to Develop Digital Health Promotion Platform for Millenial and Post-Millenial Generations in Surabaya Indonesia

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**Abstract**

**Background:** Surabaya is facing various urban problems that are increasingly complex. Therefore, innovative solutions are needed such as digital health promotion for millenial and post-millenial as the largest segment of internet users. The aim of this study is to identify the requirement specification to develop digital health promotion platform for millenial and post millenial generations in Surabaya.

**Methods:** This research used qualitative methods with case study approach. This study used purposeful sampling on 24 informants, consists of several related parties who met the criteria. Data collection technique was carried out through in-depth interview and documents review.

**Results:** The requirement specifications were classified into 4 domains (functional, technical, interface, performance requirements). Functional requirements consist of procedures, menus, features, content, data, information, control mechanism, and parties involved. Technical requirements include programs, networks, size, and types of digital devices. Interface requirements consist of visual display related to user interface and operating system. Performance requirements include several aspects such as speed, accuracy, efficiency, effectiveness, security, etc.

**Conclusion:** Digital health promotion platform requirement specification must be tailored to the needs of millenial and post-millenial generations. If these requirements can be met, the target will be easier to accept and use digital health promotion platform.

***Key words:*** *Requirement specification, health promotion, digital platform, millenial, post-millenial*

## Introduction

Currently, more than half of the world's population live in urban areas, so cities have to bear the impact of urbanization which has implications for the emergence of various health problems. Cities also have a lot of potential as a place for 85% of science and technology innovation, so there is a great opportunity to develop solutions that are relevant to the challenges of the city today and future.[1] The rapid development of information and communication technology has also brought the world into a new era, from the conventional to the digital era. The digital era has also had a major influence in the field of health promotion. Digital platforms become a new means for health promotion and public communication, including health communication.[2]

Indonesia has many problems and issues related to development, including urbanization. In 2015, 59.35% of Indonesia's population lived in cities and it is predicted to be 82.37% by 2045.[3] On the other hand, Indonesia is one of the countries with the largest internet users in the world, reaching 143.26 million users in 2017. More than 120 million of them are mobile phone users who are

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active on social media. The number of users also shows an increasing trend. 72.41% users are in urban areas. 66.2% internet users in Indonesia are in the age range of 13-34 years who are included in the millennial and post-millennial generation groups.[4]

Surabaya as one of the largest metropolitan cities in Indonesia also faced various health problems, especially non-communicable diseases, smoking-related diseases, alcohol and drugs consumption, traffic accidents, universal health coverage, pollution, etc.[5] If these problems are addressed only by using conventional solutions, they will not be handled properly. Therefore, innovative solutions are needed to overcome them. One of the innovative solutions with great potential to be developed is digital health promotion for millennial and post-millennial generations as the largest segment of internet users in Surabaya.

Before developing a digital health promotion platform, it is necessary to identify the requirements so that its utilization can be more optimal and right on target according to the needs of millennial and post-millennial generations. This study aims to identify requirement specification to develop digital-based health promotion platform for millennial and post-millennial generations in the city of Surabaya. In this study, we will focus on determining the functional, technical, interface, and performance requirements that the targets really need.

## Materials and Methods

This research used qualitative methods with case study approach. This study used purposeful sampling on 24 informants, consists of several related parties who met the criteria. Data collection technique was carried out through in-depth interview and documents review. The informants in this study were classified into key informants, main informants, and supporting informants.

**Table 1 Informant classification and eligibility criteria.**

| Informant Status | Criteria |
|---|---|
| **Key Informants** | |
| Party from Surabaya City Health Office (Dinkes) | The current head of health promotion section or the party in charge of health promotion in Surabaya City Health Office. |
| Parties from health startup | Currently running a health startup within the scope of Surabaya or wider. |
| **Main Informants** | |
| Millenial generation | Born in 1981-1994, have an ID cards (KTP) as a resident of Surabaya, domiciled in Surabaya, as well as being involved in activities or organizations like youth clubs (karang taruna) and other community organizations or health cadres. |
| Post-millenial generation | Born in 1995 and thereafter, have an ID cards (KTP) as a resident of Surabaya, domiciled in Surabaya, as well as being involved in activities or organizations like youth clubs (karang taruna) and other community organizations or health cadres. |
| **Supporting Informants** | |
| Health promotion officer | Currently working as a person in charge or health promotor under the auspices of Surabaya City Health Office. |

The key informants consist of several parties who have met the criteria in table 1, considered to understand and have the basic necessary information about the development of digital health promotion in Surabaya. The key informants in this study included party from Surabaya City Health Office, to be precise, the current Head of Health Promotion Section. The informants were determined according to the recommendation from The Head of Surabaya City Health Office. In addition, other key informants are 3 health startup players in the scope of Surabaya or wider, which are recommendations from Surabaya Communication, Informatics, and Public Relations Office.

The main informants in this study are certainly the millennial and post-millennial generations, according to the criteria specified in table 1. The informants included in these criteria were taken from the work areas of several public health centres (*Puskesmas*) in Surabaya after getting a recommendation from Surabaya City Health Office. Based on data obtained by researcher, there are 62 public health centres in Surabaya which are divided into 5 regions: Central Surabaya, West Surabaya, North Surabaya, East Surabaya, and South Surabaya. Informants who meet the criteria for millennial and post-millennial generations are taken from the working area of *Puskesmas* in these 5 regions. The selection of informants was based on recommendations of the person in charge or health promotor at the local public health centres by still referring to the eligibility criteria.

The number of informants considered sufficient if it has reached the level of redundancy. In-depth interviews with informants who are millennial generation achieved redundancy on 5th informant, but researchers still continued the interview until 8th informant. So that after adding 3 informants, the data obtained was completely saturated. Furthermore, interview with informants who are post-millennial generation were sufficient on 6th informant because they have achieved redundancy. The total number of main informants in this study were 14 people, taken from 14 working areas of *Puskesmas* in 5 regions of Surabaya. The 14 informants consisted of 8 informants from millennial generations group and 6 informants from post-millennial generations group.

In addition, interviews were also conducted with supporting informants, namely health promotion officers who were also taken from the working areas of several *Puskesmas* in Central Surabaya, West Surabaya, North Surabaya, East Surabaya and South Surabaya regions. The work area of *Puskesmas* that selected as the location for data collection of supporting informants were different from the previous *Puskesmas* work area which were designated as the location for data collection of main informants (millennial and post-millennial generations). While the determination of informants who work as person in charge or health promotor was based on the recommendation from head of the local *Puskesmas*. In-depth interviews with the supporting informants were sufficient on 6th informant because no new information was found anymore.

The total number of informants in this study were 24 people (4 key informants, 14 main informants, and 6 supporting informants). Informants identity is kept confidential in this study. Each informant who is directly interviewed by the researcher has an identity code that is known only to the researcher as well as the interviewer. This identity code is used in data processing and report writing. Informed consent was preceded by providing sufficient information regarding this research. If prospective informants agreed, they were asked to sign an informed consent form as a proof of willingness to be interviewed.

## Results and Discussion

This study showed that digital health promotion platform requirement specification must be tailored to the needs of millenial and post-millenial generations. The requirement specifications were classified into 4 domains: functional, technical, interface, and performance requirements.

### Functional requirements

These requirements consist of procedures that should be running, menus, features, content, data, information, control mechanism, and various parties involved.

#### 1. Procedures

Regarding the required digital-based health promotion development procedures, there are several aspects that must exist, namely as follows.

a. Basic procedure for navigating digital platform.
b. Digital platform operation guide.
c. Liaison between users and the development team or customer care.
d. Setting and searching.
e. Procedures for assessing user's health status so that a platform can provide direction or service recommendations that most suitable with their health profile.
f. Payment procedures for paid health promotion services as well as payment procedures that can be integrated with BPJS via mobile JKN or other payment platforms.
g. Different procedures, but integrated between open access and closed access digital system.
h. Appropriate evaluation procedure of each digital-based health promotion services, including instruments and indicators to measure efficiency and effectiveness.

**2. Menus and features**

These requirements are quite diverse, including the following.

a. Virtual health communication, information, and education.
b. Social media functions with chatroom and timeline.
c. Nutrition and physical activity calculator.
d. Digital growth chart or digital *KMS (Kartu Menuju Sehat)*.
e. Digital health calendar.
f. Digital advocacy, such as online petition and suggestion box.
g. Geolocation or GPS navigation.
h. Digital financing for health promotion programs, especially for community empowerment activities. For example, latrine social gathering (*arisan jamban*) by adopting "Arisan Mapan" system initiated by go-pay.
i. Digital collaboration and partnership, particularly the development of crowdfunding into crowd-sourcing.
j. Other supporting menus and features, such as digital guiding for meditation and various healthy activities.

One of the most important things needed to accommodate the entire menus and features is the support of a qualified algorithm system, so that a platform can work automatically to select contents, features or services according to users preference and their health profile.[6] In addition, all features must be designed based on target characteristics, behavior of the digital device used and the issues raised. Furthermore, digital platform must also be supported by the propagation of issues via various social media channels.[7] This is important so that millennial and post-millennial generations are increasingly exposed to digital health promotion efforts.

**3. Content**

Millennial and post-millennial generations in Surabaya need content that covers the following topics.

a. Clean and healthy living behavior
b. Dengue fever and its prevention
c. Maternal and child health
d. Acute respiratory infection
e. Non-communicable disease and its prevention
f. Infectious disease and its prevention
g. Mental health
h. Adolescent health, especially adolescent reproductive health and nutrition
i. National health insurance

These various topics can be narrowed down based on data from Surabaya City Health Office regarding the top 10 health problems in this city.[8] The health problem is acute respiratory infection which includes as respiratory disease in the top rank of most common health problems (24.93%). Furthermore, dengue fever, which is included in the classification of infectious disease in the 4th rank of most common health problems in Surabaya (6.29%). In addition, non-communicable diseases and nutrition problems are in the 8th rank of most common health problems (2.575) in 2018. Meanwhile, many other health problems are also related to clean and healthy living behavior aspects, so these aspects should also be prioritized.

**4. Data and information**

One of the most important aspects needed to develop digital health promotion is basic data input by users

in the process of registration. In addition, integration and synchronization with available data banks is also required. For example, data related to population or other big data such as medical records and so on, according to the objectives and focus of each digital health promotion platform. Other data and information that also needed is the latest data regarding the description and magnitude of health problems in Surabaya, so that millennial and post-millennial generations increasingly understand the urgency of health promotion. Valid and reliable data and information are also needed to add value for the digital health promotion system that is developed to become a smarter system. This means that the digital platform being developed should be able to record and store data in a much tidier manner, so it can interpret the data into valuable information that can be used further. Digital technology is not only an enabler, but also a driver to improve public health.

### 5. Parties involved

The development of digital-based health promotion for millennial and post-millennial generations in Surabaya certainly requires the involvement of various parties. Internal parties involved include developers, UI/UX designers, platform managers, content creators with copywriting skills, graphic designers, data analysts, etc. While the external parties involved are stakeholders in the government (health office, population and civil registration office, communication and informatics office, etc), private sector, telecommunications providers, joint ventures, NGOs, communities, health workers, health professional organizations, religious leaders, community leaders include youth organizations, cadres, influencers, and also users. Collaboration and synergy among these various parties will determine the success of digital-based health promotion efforts.[9]

### 6. Control mechanism

Control mechanism needed in developing digital-based health promotion include the following.

a. In the internal system, it is necessary to have some parties that responsible for quality control in each division within their respective scope, such as in the content, media, program development, etc.

b. In a larger scope, it is necessary to have a team of experts known as BoA (Board of Advisors) who are responsible for conducting audits and quality control at a higher level.

c. Control mechanism through the flow built into the digital system. For example, in the consultation feature, experts or health workers who become consultants must be certified according to certain standards, go through a selection and curation process, then their account must be verified to be displayed on the homepage of a platform along with its profile. In addition, you can display ratings, reviews, and classifications of consultants based on their expertise.

d. From external elements, stakeholders and government authorities can be involved at a higher level, such as related to regulation and protection from macro threats like hackers and so on.

e. If social media is used as a tools, then each platform must have implemented a control mechanism in its digital system, such as Instagram and Twitter with a blue check mark indicating an account is verified.

f. Another form of control mechanism that actively carried out by the community as users. For example, to ensure the authenticity of an account, there are several parameters such as the number of followers, interactions, and comments on each post.

**Technical requirements**

Technical requirements include programs, networks, size, and types of digital devices.

1. Programs

Programs are closely related with menus or features that are functional requirements. This requirement is also related to 5 means of health promotion action based on the Ottawa Charter.[10]

a. Healthy public policy, can be realized through digital advocacy programs with kind of services such as digital suggestion boxes, online petitions, and digital-based recording and reporting.

b. Create partnership and supportive environment, can be realized through digital partnership programs such as implementing crowdsourcing practices.

c. Reorient health services, can be realized through digital community empowerment programs. For example, the maternal and child health programs in the form of online classes for pregnant women, mothers of babies or toddlers, pre-wedding classes

for couples who are getting married, digital bootcamp for capacity building, refreshing, and upgrading health cadres, etc.

d. Increase individual skills, can be realized in various programs such as virtual classes with serial thematic health education videos, promotive-preventive online consultations, digital public service advertisements, or other forms of health education, both audio, visual and audio-visual.

e. Strenghthen community action, can be realized through programs such as digital mentoring and features that are able to guide people in practicing a healthy lifestyle. For example, self-tracking feature, a healthy diet and meditation guide, etc.

2. Networks

Includes the availability of digital infrastructure which also determines the quality of internet signals, wifi networks and other digital systems. It is also necessary to increase the quantity and improve the quality of wifi hotspots or wifi corners at various points, especially public facilities in Surabaya. Moreover, millennial and post-millennial generations also need features that can be accessed both online and offline as well as the realization of quota-free services that can be achieved through collaboration with several internet providers.

As practiced today by several digital health platforms such as Halodoc and Alodokter in collaboration with Telkomsel. These digital applications make it easier for users to enjoy remote health services with medical and health professionals. Users also get free access up to 500 MB which can be used to access services at Halodoc and Alodokter such as chatbots, chat or consultation with doctors, purchasing medicines and medical devices, scheduling appointments with doctors, health education, and others.[11]

3. Types of digital devices

The type of hardware that most widely used by millennial and post-millennial generations in Surabaya to access digital health promotion services is smartphones. In addition, they also use laptops or PCs, although its use is not as often as smartphones. Based on data released by APJII (2017), 59.31% of users in urban areas such Surabaya use smartphones or tablets, 0.65% of users use laptops or PCs only, 38.31% use both smartphones and laptops, while the rest use other digital devices.[4] Therefore, the digital-based health promotion platform being developed must be appropriate and easily accessible at least on both types of digital devices (smartphones and laptops).

Meanwhile, the type of software that most widely used by millennial and post-millennial generations in Surabaya is digital applications. Other types of software or platforms that they also use a lot, namely specific applications in the form of social media. APJII survey results in 2018 showed that the most frequently visited social media are Facebook (50.7%); Instagram (17.8%); youtube (15.1%), followed by other social media such as twitter, linkedin, and so on.[12] Furthermore, they also mention the website or web-blog as a type of software or platform that still needed, although not as much as other platforms. Thus, digital health promotion platform for millennial and post-millennial generations in Surabaya should be able to be applied in all three types of software or platforms (digital application, social media, and website) so they have various alternative choices according to their various needs. One of the platforms can be the main channel, while the other platforms can be the support channel. Its existence can be a complete unit that complements each other.

Delivering messages via communication strategies with various digital platforms will expand the impact while strengthening the message conveyed. Today, various messages can very easily translated into digital media. There are few effectiveness studies to assess this, but various anecdotal reports show encouraging results. The platforms that successfully engage many users to participate and visit their channels have proven to be more dynamic, flexible, frequently changing contents and approaches to keep it interesting. Developing a community of active users is one way to keep contents updated and interactions alive.[13]

4. Size

Size of digital health promotion platform is also a consideration for some millennial and post-millennial generations to use a certain platform. Those who consider the size, have their own tolerance limits regarding the size of a platform that is still acceptable, which is an average of 50 MB and a maximum of 3 GB when first downloaded. Meanwhile, those who do not consider the size, prioritize the function and urgency considerations

as long as the device memory is sufficient.

**Interface requirements**

These requirements consist of a visual display related to the user interface and operating system.

1. User Interface (UI)

Millennial and post-millennial generations in Surabaya need user interface with the following characteristics.

a. Elegant visual design, capable of attracting attention, not stiff, causing a sense of pleasure and comfort.

b. User-friendly, uncomplicated, and doesn't cause confusion even when using it for the first time.

c. Visual design that fits with the type of device.

d. Features, menus, contents are well organized, neat and systematic.

e. Proper visualization of the algorithmic system on a platform, for example with certain layouts or highlights so that users can understand it more easily.

The UI of a digital platform can also influence the success of digital health interventions in addition to functional, technical and performance aspects. Millennial and post-millennial generations as users have various characteristics and different roles, so the UI must also be able to adjust. Likewise the needs, experiences, and perceptions of every users that very dynamic should also be considered. User responses and behavior need to be continuously tracked to support an adequate level of personalization, thus ensuring user adoption and engagement. This is needed to adjust the interaction experience between humans and digital devices related to visual aspects such as font size, themes, illustrations, and others.[14] These data are collected to analyze the user's ability to understand and use the system, for example in the aspect of content readability so that the User Interface (UI) component can support the User Experience (UX).

2. Operation System (OS)

Other aspects relate to the operating system used for at least the following 2 types of hardware.

a. Smartphone

Android is the most needed OS for millennial and post-millennial generations in Surabaya today. On the other hand, some of them also use iOS even though the number of users is not as many as android users. According to Statcounter (2020) data, the android smartphone leads market with 93.06% active users in Indonesia, followed by iOS smartphone which has 6.47% active users in last year. While the rest are recorded using other operating systems such as BlackBerry OS, Tizen, Series 40, and so on.[15] Therefore, the two operating systems (both android and iOS) should be accommodated by the digital health promotion platform that will be developed. However if the budget is limited, platform development in the android version should be prioritized because the segmentation can be wider than iOS.

b. Laptop atau PC

Millennial and post-millennial generations in Surabaya more require Microsoft Windows operating system (often called Windows). But there are also mention that the MacOS operating system (often called Mac) is also required, although the number of users is not as much as windows. As stated in Statcounter (2020) where Windows leads the market for desktop-based operating systems (laptop or PC) with 86.09% active users in Indonesia, followed by Mac or OS X with 9.54% active users in last year. While the rest are recorded using other operating systems such as Linux, Chrome OS, FreeBSD, and so on.[15] Therefore, a digital-based health promotion platform should be developed in 2 versions of the operating system for laptops and PCs, both Windows and Mac.

**Performance requirements**

The most required performance characteristics for millenial and post-millenial generations in the development of digital health promotion platform in Surabaya are related to efficiency and effectiveness. The platform that will be developed must be more efficient, effective, and capable to perform better than various existing platforms. Regarding the efficiency aspect, the informants hope that with the use of digital technology, more information and health promotion efforts can be done at one time. The coverage of issues is also more varied and more updated. In addition, digital technology

must be able to reach a much wider range of targets, even across geographic and administrative boundaries. Digital technology must also help accelerate health promotion efforts, so that it becomes more quickly achieve the desired objectives.

Various health promotion tasks and works are also expected to be done easier and cheaper because the use of digital technology. All the energy (including money, material, time, and other resources) that has been used up to do one thing, can be saved and then diverted to other things that are more important and substantive. The existence of digital health promotion platform must also be able to relieve the burden on users, because its application becomes more practical and can be accessed anywhere and anytime, without having to come and gather at a certain place which often spend more time. Moreover, digital health promotion platform not only relieve the burden on users, but also hoped that the workload of health workers will be reduced if many things can be carried out more efficiently, including health promotion services.

Meanwhile, related to the aspect of effectiveness, digital-based health promotion is expected to be more effective in reaching millennial and post-millennial generations whose level of interaction with technology is very high. At least, digital health promotion must be effective in increasing the knowledge, understanding and awareness of its users. Although in the context of behavioral changes, would still need a long process and many factors are involved. The available features must be sufficiently effective to solve problems and capable to answer users need. The content presented must also be more on practical rather than theoretical aspects.

The following are more specific details about the specification of performance requirements to develop digital health promotion platform for millennial and post-millennial generations in Surabaya.

1. Speed and accuracy

Millennial and post-millennial generations need a platform that can perform various functions more quickly and precisely. Opening up an opportunity that must be achieved in digital era with the need of speed and accuracy greatly determines the success of health promotion strategies. Digital technology also needs to support quick and precise decision-making processes.[16]

2. Security

Millennial and post-millennial generations also pay more attention to this aspect. This is reflected in the results of APJII survey (2017) which showed that 65.98% of internet users in Indonesia have the awareness that data can be retrieved. Therefore, 61.38% of users said it is important to maintain data confidentiality. In fact, 58.52% of users also feel it is important to install anti-virus as a form of protection to secure data and operation system.[4] The rapid advancement of digital technology requires sophisticated protection to ensure the security of users data and operating system in order to be protected from various threats such as hackers, viruses, and bugs that interfere system work.

Data security issues are also related to the norms and ethics that people believe as users. However, digital platform developers do not always take appropriate steps to protect users' personal data. In fact, personal data can include things that are very sensitive, such as data on reproductive function, sexual practices and partners that cannot be leaked carelessly.[17] Digital platform developers must pay close attention to this aspect, so that health promotion efforts do not violate ethical aspects and norms in society. Furthermore, the government also needs to establish clear and firm regulations to protect the data security

Good and adequate data security system can be built through privacy and policy system in the developed digital health promotion platform. It should also be separated between an open access platform for users with a closed access platform, which is specifically for administrators or managers, such as special account for health workers in health care facilities. One of the ways to do this is to ensure the confidentiality of users data, especially big data in the system that has been built. Moreover, human resources support to tighten the security protection of a platform is also very necessary. All parties involved must be able to hold back and if necessary also bound by regulation to ensure data security. For example, consultants is not allowed to divulge users data who consulted with them. If data security is guaranteed, then users will also feel safe and comfortable using digital health promotion platform.

3. Data center, server, and hosting capacity

Millennial and post-millennial generations need a health promotion platform with large capacity of data center, server, and hosting. The data center is a place to store servers and keep them working optimally. Server is a system that provides certain services in the computer network. While hosting is a place to store data in the digital system.[18] Large capacity is needed so that a platform can contain many features, menus, content, and various information without any significant obstacles even though it is accessed simultaneously by many users.

4. Frequency and reach

If the frequency of views is higher, the reach of a platform will be wider. It means that more users are accessing a platform.[19] This is an of the most important aspect to encourage millenial and post-millenial generations who can access the digital-based health promotion platform easily. Increasing frequency and coverage requires adequate digital management and systems, especially in terms of automation. It has been attempted since the beginning of digital technology development in health sector.[20]

5. Easiness and cosiness

This performance characteristics are also urgently needed for millennial and post-millennial generations to develop digital-based health promotion platform in Surabaya. The digital platform ease of use will have a significant impact on user convenience. Apart from developing a user-friendly system to make it easier for users, platform developers and managers also need to minimize aspects that can interfere user convenience, such as commercial advertisements that appear too often and other disturbing aspects because Indonesia is one of the countries with the highest adblocker installers in the world, reaching up to 65%. It means that more than half of Indonesians who access internet do not want to be bothered by advertisements.[21]

## Conclusions

The development of digital-based health promotion for millennial and post-millennial generations in Surabaya should meet all requirements specification, both functional, technical, interface, and performance. Some mistakes that often occur in health promotion efforts are that the goals to be achieved is not chosen by the targets. The available resources are considered more than the target needs, so that the efforts made are not right on target. It has resulted in many health promotion efforts, both conventional and digital, hard to be long lasting and sustainable. In addition, the targets are not made to be aware in advance of the problems that will be overcome through health promotion efforts, so they feel no interest in getting involved. Therefore, all digital health promotion efforts must be developed based on target needs along with public awareness, then adjusted to the available resources. If the targets have been aware and these requirements can be met, they will be easier to accept and use the digital health promotion platform.

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