



Information and Communication Technology Requirements for Iran's Holistic Scientific Map on Health: A Qualitative Study

Mohammad Dehghani,¹ Djavad Ghoddoosi-Nejad,² Roohallah Khara,³ Narjes Mirabootalebi,⁴ and Mohamad Hosein Hayavi Haghighi^{5,*}

¹Ph.D Student of Health Information Management, Iranian Center of Excellence in Health Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

²Social Determinants of Health Research Center, Birjand University of Medical Sciences, Birjand, IR Iran

³Ph.D. Student of Health Information Management, Student Research Committee, Tabriz University of Medical Sciences, Tabriz, IR Iran

⁴Master of Science in Health Information Technology, School of Medicine, Maternal and Child Health Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, IR Iran

⁵Assistant Professor, Department of Health Information Technology, School of Allied Medical Sciences, Hormozgan University of Medical Sciences, Bandar Abbas, IR Iran

*Corresponding author: Mohamad Hosein Hayavi Haghighi, Assistant Professor, Department of Health Information Technology, School of Allied Medical Sciences, Hormozgan University of Medical Sciences, Bandar Abbas, IR Iran. E-mail: hayavi2005@gmail.com

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Abstract

Background and Aim: Medical universities need to fulfill many requirements to achieve the goals of the Holistic Scientific Map on Health development based on Iran's 20-year vision plan. This study aimed to determine information and communication technology requirements for the Holistic Scientific map on health from the perspectives of the administrators of medical universities.

Methods: This qualitative study was done in 2017 using the Delphi method and the nominal group technique. Sampling was done purposively and heterogeneously to recruit 20 junior, middle, and senior university managers. The MAXQDA software (v. 10.0) was used for qualitative data management and the SPSS software (v. 16.0) for quantitative data analysis.

Results: Medical universities need to fulfill 20 information and communication technology requirements to achieve the goals of the Holistic Scientific Map on Health. The most important requirements are "creating electronic health record" (score: 691), "increasing internet bandwidth and speed" (score: 668), "establishing a customer relationship management system" (score: 667), "developing telehealth system" (score: 623), and "establishing a disease record system" (score: 586).

Conclusions: Creating an electronic health record is the most important requirement for reaching the goals of the Holistic Scientific Map on Health. However, there are different barriers and problems in fulfilling this requirement.

Keywords: Health Information Technology, Electronic Health Record, Holistic Scientific Map on Health, 20-Year Vision Plan of Iran

1. Background

Iran's 20-year vision plan is the guide for most micro and macro activities. This plan introduces the attributes of a good society (1, 2). One of the requirements of a good society is to maintain good health and quality of life for all people (3). According to the constitution of Iran, health is the absolute right of all Iranians and the responsibility of the government (4-6). The national 20-year vision plan highly values health and holds that by 2025, Iran should be the healthiest country in the local area (7-9). In order to achieve these goals, Iran's holistic scientific map on health (HSMH) was developed for the universities of medical sciences. HSMH explains the major goals and the strategic plans of the Iranian ministry of health in the areas of education, research, and technology (4, 10). The aim of developing HSMH was to use collective wisdom to facilitate

scientific developments in health-related areas in order to reach the goals of the 20-year vision plan (11, 12).

Globalization, rapid flow and development of information, as well as the emergence of modern technologies have considerably increased humans' dependence on information and technology (13). Therefore, most activities are directly and indirectly affected by information and technology (14). The development of HSMH also requires processing a huge amount of data as well as information and necessitates determining information requirements and infrastructures (15).

A study in a public university in Iran reported that the 10 challenges in achieving the goals of HSMH were related to policy-making and management, financing and facilitating academic process, staff development, educational development and promotion, conducting research, knowledge advancement, entrepreneurship, service provision,

culture and norms, and facilitating communications. The most important challenges in this study were related to policy-making and management, culture and norms, as well as educational development and promotion (2).

In order to reach the goals of HSMH and improve community health, some requirements are needed, including HSMH-related policies and strategies (16), advanced information technology, and wise decision-making based on Islamic values (11). The present study was conducted to determine information and communication technology (ICT) requirements for HSMH from the perspectives of the administrators of medical universities.

2. Methods

This qualitative study was done in 2017 using the Delphi method. The 4 phases of the study were as follows.

In the first phase, HSMH was read and discussed in 4 1-hour sessions by 7 experts in healthcare management and health information management. Then, the nominal group technique was used to create a list of 20 junior, middle, and senior managers who were involved in the implementation of HSMH. Sampling was done purposively and heterogeneously. Managers were recruited from 3 universities of medical sciences in Iran. The eligibility criteria included work experience of more than 5 years, familiarity with HSMH, and involvement in its implementation. In this phase, an ICT requirements questionnaire with 2 open-ended questions was developed based on HSMH and by using the nominal group technique. The validity of this questionnaire was confirmed by 5 experienced faculty members.

In the 2nd phase, participants were provided with the above-mentioned questionnaire, a printed copy of HSMH, and verbal information about the aim of the study. After 1 week, we referred to them and collected the questionnaires. Collected data were qualitatively analyzed and categorized into several themes using the MAXQDA software (v. 10.0). Irrelevant themes were deleted. Then, the generated themes were used to develop a 26-item questionnaire on ICT requirements. Items were scored on a 5-point Likert-type scale (from "Completely agree" to "Completely disagree"). Based on the theoretical underpinnings of the Delphi technique, the questionnaire needed no validity and reliability assessment because it had been developed based on the opinions of a panel of experts.

In the 3rd phase, study participants were invited to complete the 26-item questionnaire. Collected data were entered into the SPSS software (v. 16.0) and the score of each item was calculated. Finally, 30% of the lowest-scored items (6 items in total) were excluded. Therefore, the final questionnaire contained 20 items.

In the 4th phase, participants were provided with a 20-item questionnaire and the results of the 2nd phase; in addition, they were asked to rank the items with respect to their importance. In other words, they were taught to rank the most important item 1 and the least important item 20 and so on. Then, questionnaires were collected and the data were entered into the SPSS software. Item scoring was done reversely to item ranks. For instance, the items that had been ranked 1, 2, and 3 were scored 20, 19, and 18, respectively. Moreover, participants' opinions were weighted based on their managerial levels. In other words, the responses of junior, middle, and senior managers were weighted by 1, 2, and 3, respectively. Subsequently, the score of each item was calculated through multiplying its raw score by managerial weight and thereby, the importance of each item was determined.

The ethics committee of Hormozgan University of Medical Sciences approved the ethical considerations of the present study under No HUMS.REC.1395.147.

3. Results

This study was done on 20 managers. Participants were 7 females (35%) and 13 males (65%). A total of 6 participants had a work experience of 5 - 10 years, 9 had a work experience of 10 - 20, and 5 had a work experience of more than 20 years. They were 4 university deputies, 3 faculty deans, 3 faculty education deputies, 3 faculty research deputies, and 7 managers in university administrations. There were 7 individuals aged less than 40, 9 aged 40 - 50, and 4 older than 50. They held postdoctoral (3), doctoral (10), master's (5), or bachelor's (2) degrees.

Themes deleted in the 2nd phase were the development of an accreditation and evaluation system, inter-university meetings, and staff management and development. Moreover, the 6 lowest-scored items, which were excluded in the 3rd phase, were the development of fiber-optic communication system (28%), the use of appropriate hardware (19%), equipping workshops with modern technologies, strengthening educational and research systems (24%), developing regulations for health information technology (27%), and using the original copies of software programs (16%).

"Creating electronic health record" was the most important ICT requirement for achieving the goals of HSMH. The score of this item was 691. All managers from different managerial levels had chosen this item as the most important ICT requirement. Moreover, although "increasing internet bandwidth and speed" was the most important ICT requirement in the 2nd phase of the study (with a score of 100), it was the 2nd most important requirement in the 3rd phase (with a score of 668). On the other hand, the

least important requirements were “developing and using video conference system” (with a score of 86) and “expanding digital libraries” (with a score of 100). Table 1 shows all 20 ICT requirements for achieving the goals of HSMH.

4. Discussion

This qualitative study aimed to determine ICT requirements for HSMH from the perspectives of the administrators of medical universities. Findings revealed that “creating electronic health record” (with a score of 691) was the most important ICT requirement for HSMH. Electronic health record is one of the most important tools for the collection and management of health-related data (17). The United States of America allocated 28 billion dollars to the creation of the electronic health record (18). Physicians in developed countries use patients’ electronic health records for more than 2 hours a day (19). Electronic health record is considered as a way for recording all health-related data of an individual from birth to death. This system facilitates decision-making and guides healthcare universities towards the goals of HSMH. Yet, the creation of electronic health record faces different barriers such as users’ limited information literacy skills and unfavorable attitudes toward its use (17).

The 2nd most important ICT requirement for HSMH from the perspectives of managers was “increasing internet bandwidth and speed”. In the past decade, internet was the most important method used by patients and healthcare providers for accessing health information (20). Currently, most adults in developed countries use the Internet for obtaining health information (21). Moreover, the Internet has turned into the most effective channel for obtaining information in universities and higher education centers in recent years (22), therefore, most researchers and students currently fulfill their informational needs via the internet and without the need to go to the library (23). However, Internet speed in Iran is still very low, even though Iran was the first country in the region to be connected to the Internet. Low Internet speed not only demotivates researchers, but also wastes their time. Therefore, medical universities need to adopt strategies to increase internet speed.

Medical universities provide a wide range of educational, research, and medical services and therefore, have a wide spectrum of clients. One of the most important challenges in healthcare organizations is to fulfill customers’ needs and improve their confidence and satisfaction in the shortest possible amount of time and with the highest possible quality and productivity (24). Study findings showed that the 3rd most important ICT requirement for achieving the goals of HSMH was “establishing a customer

relationship management system”. Given the importance and the significant effects of customer satisfaction and loyalty on market share of an organization, healthcare organizations need to consider customer relationship management as an effective instrument (25). Customer relationship management is also an effective strategy for healthcare organizations to improve their status (24). Currently, university hospitals and university healthcare centers in Iran have numerous customers due to the fact that they use governmental resources, are the main referral centers in the national health reform plan, and thereby, have no strong competitors. Accordingly, most public hospitals do not greatly value customer relationship management. Given the high importance of personal and public health in the National 20-year vision plan, public healthcare organizations and medical universities need to make the most from customers’ feedbacks through establishing efficient customer relationship management systems.

“Developing telehealth system” was the 4th most important ICT requirement for achieving the goals of HSMH. Telehealth is to assess patients’ health conditions and provide healthcare services via communication equipment such as telephone, radio, and visual contacts (26). It was first established in the 1993 in the United States and was used mainly in emergencies and natural disasters. However, it is currently used in all areas of healthcare delivery such as counseling, self-care, geriatric care, and mental illnesses and is covered by insurance organizations. Telehealth was also established in Canada in 2000 for psychological and oncologic services (27), while this technology in European countries is mainly used for home care (28). Medical universities in Iran can use telehealth to provide care services and make use of specialists’ services in distant areas. Telehealth can significantly reduce healthcare costs.

The 5th most important ICT requirement for achieving the goals of HSMH was “establishing a disease record system”. This system is an electronic system for recording the data related to diseases or medical interventions. It uses secondary data and includes more extensive and structured data compared with conventional medical records (29). The aim of this system is the purposeful collection and provision of health-related data (30), mainly for care quality improvement (28).

One limitation of the present study was that we could not find any similar study in Iran and hence, could not compare our findings with the findings of other studies.

4.1. Conclusions

One of the most important ICT requirements for HSMH is easy access to high-speed internet. It can facilitate effective telehealth service provision, which is another

Table 1. ICT Requirements for Achieving the Goals of HSMH

Rank	Requirements	Score in the Second Phase	Senior Managers' Scores			Middle Managers' Scores		Junior Managers' Scores		Final Score	Priority (Importance)
			3*	2*	1*						
1	Creating electronic health record	94	77	231	167	334	126	126	691	1	
2	Increasing internet bandwidth and speed	100	76	228	153	306	134	134	668	2	
3	Establishing a customer relationship management system	76	75	225	161	322	120	120	667	3	
4	Developing telehealth system	66	66	198	155	310	115	115	623	4	
5	Establishing a disease record system	67	61	183	145	290	113	113	586	5	
6	Developing clinical systems	78	46	138	144	288	101	101	527	6	
7	Developing managerial systems	82	53	159	126	252	96	96	507	7	
8	Developing knowledge management systems	85	53	159	117	234	95	95	488	8	
9	Strengthening information security in cyberspace	80	56	168	109	218	102	102	488	8	
10	Developing national research system	82	48	144	98	196	81	81	421	9	
11	Establishing national information network (National Internet)	83	40	120	101	202	67	67	389	10	
12	Developing an information bank for scientific journals	53	29	87	80	160	64	64	311	11	
13	Improving intra-university internet networks	57	30	90	70	140	50	50	280	12	
14	Improving academic data centers	47	36	108	58	116	52	52	276	13	
15	Improving academic email system	44	31	93	54	108	40	40	241	14	
16	Using data processing and statistical software	51	20	60	38	76	30	30	166	15	
17	Improving university websites and portals	32	19	57	34	68	27	27	152	16	
18	Developing an integrated library system	32	11	33	23	46	23	23	102	17	
19	Improving digital libraries	48	5	15	36	72	13	13	100	18	
20	Developing video conference systems	40	8	24	21	42	20	20	86	19	

main ICT requirement for HSMH. It is noteworthy that National Internet can overcome some Internet-related problems in Iran, while it may restrict access to international databases. Governmental authorities need to develop exclusive policies in order to provide medical universities with high-speed internet.

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