# Application of Information and Communication Technology in Public Health Information System Design

**Aakansha Soy[1], Sutar Manisha Balkrishna[2]**

*[1]Assistant Professor, Department of CS & IT, Kalinga University, Raipur, India.*
*[2]Research Scholar, Department of CS & IT, Kalinga University, Raipur, India.*

A strong and long-lasting public health information system is essential to effectively managing upcoming public health emergencies. Strong links between many partners and the coordination of preventive and response efforts are essential components of public health readiness. The effectiveness of the public health system to contain an epidemic of infectious diseases depends on its ability to do so across all levels of government. This implies that the strength of the public health system is based on the system's weakest jurisdiction. Although there has been increasing evidence of real and potential harm to the public's health due to flaws in the public health system, it's possible that these issues were not fully acknowledged until the SARS outbreak. A national public health system is now necessary due to the potential of bioterrorism and another pandemic, in addition to SARS. This effort sought to investigate how a new research strategy could be integrated into the healthcare sector with the development of ICT and how it could be applied to the creation of public health information systems (PHIS) using ICT and its applications.

**Keywords:** public health, Information and communication Technology, Information system.

## 1. Introduction

Inherently, governmental public health is a network of municipal, state, and federal organisations that work together to prevent, respond to, and control disease in the United States. Over time, various agencies' governmental duties and responsibilities have changed [1]. These organisations were founded many years ago to offer fundamental community services including gathering vital signs, promoting healthy lifestyles and health education, and providing preventive services like well-child care. These services also included making sure there was clean drinking water, maintaining cleanliness, and preventing and controlling illnesses [6]. Traditional public health practice is population-focused and centred at the community level. To address unique community health requirements, which may vary from jurisdiction to jurisdiction, the approach needs to be adaptable. Healthcare providers continue to allocate significant resources towards healthcare information and communication

technology (ICT) despite the worldwide economic downturn. As the healthcare sector upgrades hospital information systems, deploys electronic health records on a broad scale, offers telemedicine for distant diagnoses, and permits information sharing and distribution among key stakeholders via public networks, significant gains are anticipated [2]. ICT is seen to offer a great deal of promise to raise healthcare standards [3]. The advancement of ICT has already greatly benefited the healthcare sector, among others. Electronic information systems play a major part in patient care today. Applications that are integrated and stand-alone are both frequently used and modified. Many affluent nations, including Finland, have made large financial investments in the creation of national health record infrastructure and electronic health record (EHR) systems in the twenty-first century. The consequences of implementing new healthcare technologies appear to be numerous. Information technology is supposed to help streamline healthcare operations by meeting the growing demands for quality, efficiency, and enhanced workflow when correctly integrated [11]. It has already been demonstrated that healthcare information technology in hospitals improves quality through improving illness surveillance, lowering prescription mistakes, and raising adherence to standards [9]. Emerging ICT is anticipated to empower patients and give them the ability to actively participate in their healthcare in the near future. Although healthcare information technology benefits are obvious in theory, it seems that they are not clearly related in the operating conditions in the healthcare context of usage [13]. Research has indicated that while there are benefits, there are significant obstacles when it comes to creating and modifying applications for medical use.

In this instance, section 1 of the article examines the introduction, while section 2 examines the relevant literature. The purpose of the right to health is explained in Sections 3, and 4, the challenge of the proposed work is discussed in Section 5, and the project is concluded in Section 6.

## 2. Literature Review

Owing to the contradicting findings, a number of academics have stressed the necessity for additional study to fully understand the advantages and difficulties of technological adaptation in real-world settings [4]. Public debates in India have brought up a number of intriguing incidents and insights. The use of electronic information systems has affected clinical work practices in a number of ways. Patients have seen that during doctor visits, healthcare professionals are spending an increasing amount of time using computers rather than interacting with them. Doctors have asserted, among other things, that the adoption of information technology has resulted in a significant rise in the amount of time spent on supportive and clinical documentation duties. Regarding information technology usage in healthcare organisations and related experiences, some have expressed worry about issues linked to patient safety and reliability as well as their use in the delivery of treatment [5]. According to the poll results, more than 70% of participants (n = 550) believed that the workload of healthcare professionals had not lessened as a result of electronic health record systems, and around 80% disagreed with the claim that these systems allowed healthcare professionals to spend more time with patients. According to some opinions, the reason for the longer computer use hours is because the systems are not fully functional and are not well built. Healthcare personnel' views regarding technology adaption appear to have been

significantly influenced by the experiences and healthcare information systems now in use [12]. Due to limited acceptability and early bad experiences with the information systems' use, the deployment of a new information system was delayed in one hospital district. Research from academic institutions in the field of health informatics somewhat corroborates these claims and opinions. A few researchers have questioned the efficacy of healthcare IT systems. Research have shown that there are serious usability issues and that doctors are spending more time on computers. The simplicity of use of electronic patient record systems and the time required for clinical reporting and record-keeping have been identified as major issues [7]. Through a better understanding of how a user-centered approach could be used in healthcare ICT development, this thesis aims to bridge the gap between two interdisciplinary research areas: health informatics and user-centered design. The goal is to present a work in progress, discuss a set of discoveries that demonstrate the necessity of this kind of approach, and provoke new insights into the fields of research that have already been established. Describe the research area for healthcare ICT development and list the primary obstacles to its advancement. additionally Describe the current state of user-oriented research in the fields of public healthcare and IT technology by conducting a "state of the art" literature review [8].

## 3. Proposed Architecture

This chapter presents a researcher design (RCD) approach to interactive system development with reflections on ICT use in the healthcare development area in order to address these well-established difficulties. In order to c) bring these two distinct research perspectives—health informatics and our design—closer together, the analysis that will be presented aims to: a) improve understanding of how a proposed design approach could be applied in the health informatics domain; b) conceptually and thematically structure the research area of proposed ICT based public health information system development. This section is organised as follows: the next sections apply an RCD approach and available literature to describe the healthcare context of use, the usability of healthcare ICT systems, and the fundamentals for ICT based PHIS [14]. This is followed by a brief introduction to the fundamentals of the proposed design.

Enabling users to fulfil their demands and accomplish their goals within a specific use context is the aim of usability system design (ISO 9241-11, 1996). The ISO 9241-11 standard (1996) provides arguably the most well-known definition of usability. The degree to which a system may be utilised by particular users to accomplish particular objectives in a given context of use effectively, efficiently, and satisfactorily is known as its usability.

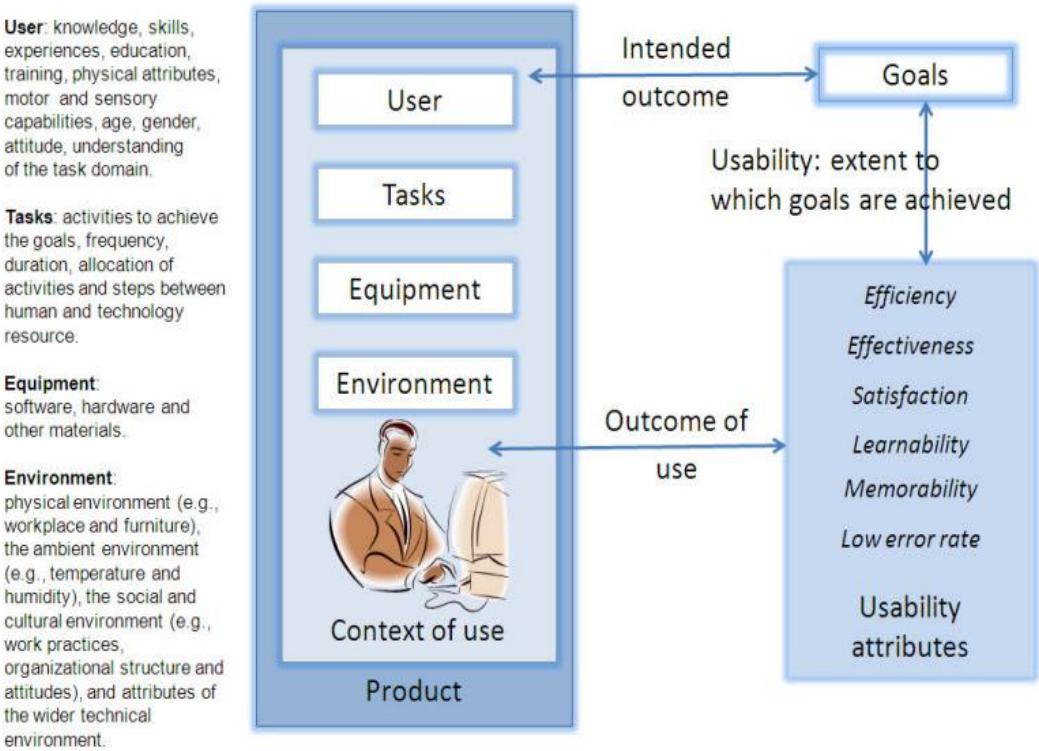


Figure 1: The components of proposed PHIS

The aim of healthcare practitioners is to deliver excellent patient care. Numerous computer programmes, medical equipment, and other technologies are utilised in clinical settings to assist healthcare workers in their work. When taken as a whole, the technology environment generally serves to help the workers in their caregiving duties. It has been said that the main purpose of healthcare information systems is to promptly provide pertinent information to the right healthcare provider. Healthcare ICT systems must be low mistake rate, effective, efficient, and simple to learn in order to facilitate the delivery of healthcare.

Effectiveness (ISO 9241-11, 1996) is the precision and thoroughness with which medical personnel accomplish their main objective, which is to deliver healthcare services to patients. To achieve a high degree of productivity in a demanding and important setting, the systems must be easy to use. The necessity for efficiency of use also means that the systems must enable a variety of working methods and be tailored to different use scenarios. To put it briefly, the apps ought to have a range of uses. Practically speaking, the systems should be simple to understand, given that healthcare workers are typically very busy in their work. They do not have time to read manuals or otherwise get familiar with new systems. Instead, they need to be able to rapidly start getting the work done in the way it is supposed to without errors. Sometimes these situations might be deadly serious.

## 4. Challenges in Selecting Suitable Implant Materials

ICT development and healthcare delivery are two fields that are always changing, as was previously mentioned. By providing information where it is needed and reorienting healthcare delivery around the needs of patients, healthcare information technology has the potential to completely change the way that healthcare is provided. There is undoubtedly a need for adjustments in the way healthcare is delivered given the major issues facing the industry today. The healthcare industry is currently dealing with a number of major issues, including an ageing population, medical error prevention, rising prices, and demanding patients and citizens. It appears that a number of consultative papers prioritise the first two challenges—preventing medical errors and rising prices. These difficulties are easily agreed upon in light of the review that has been presented and are directly tied to the growth of healthcare information technology. Though less evident, the latter two issues are clear when considering the previous sections on eHealth and consumer health technologies. The ageing of European society is a well-known reality [10]. This poses significant demands on the long-term care and healthcare sectors, making it one of the main obstacles to future healthcare planning and delivery. Patients are now supported and encouraged to actively participate in their own care. Simultaneously, it has been observed that the public wishes to have greater knowledge about their health options so they may make decisions about their support and treatment. Citizens are undoubtedly becoming more picky collaborators in healthcare. Activating and empowering citizens is seen as a critical competency for the future of healthcare. Involving the public in behaviours that reduce illness or enhance purchasing is one of the requirements for innovative changes to the care process. The efficient operation of the healthcare system and the provision of care might be greatly enhanced by the widespread incorporation of eHealth technologies into clinical practice. Hospitals should seek care models that will best satisfy patients' requirements across the continuum of care, wherever those services are given, as a result of the rising prevalence of chronic illness among patients they serve and the ageing population. Rapid developments were highlighted by the issues in the healthcare sector that were previously discussed. The trajectories indicate that most of the benefits of implementing healthcare IT will manifest themselves during the next ten years. The consequences will very certainly touch everyone's life and have an impact on every facet of society since they are expected to be so widespread and to have such deep primary, secondary, and subsequent-order effects. According to future scenarios envisioned for healthcare by 2013, patients will likely have considerably more financial control and accountability for their treatment. This will increase the need for easily accessible, trustworthy, and easily understood value data. Consequently, by 2015, IT-enabled disease management programmes that enhance results and reduce expenses will enable chronic patients to take charge of their conditions.

## 5. Conclusion

This effort aimed to investigate how a new research strategy could be introduced into the healthcare sector with the development of ICT and how it could be utilised in the creation of public health information systems (PHIS) using ICT and its applications. The literature surveys carried out for this thesis showed that, while the need for a fresh strategy in the field of health informatics has been acknowledged by many, no substantial and systematic study

has been done to back up the suggested design of healthcare ICT applications. As a result, the study done for this thesis is significant and represents a fresh strategy for the advancement of healthcare ICT. Regarding the research reported in the literature review, there are several limitations that must be recognised and taken into consideration. Firstly, there was no systematic approach taken in doing the literature review. Secondly, the study encompassed a somewhat small set of user-oriented studies that were published in different research forums. These choices were made in an expedient manner.

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