

Special Issue on “IT and Health Care in Developing Countries”

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The aim of this special issue is to emphasize the significance and role of information and information and communication technologies (ICTs) in health care in developing countries. Until only recently, in many developing countries, debates were rife about whether “ICTs were good or bad for development?” and whether investments should be made in these technologies at the expense of other development priorities like water, roads and electricity? Such debates seem to be at rest now, and instead the more important challenge and question is “how do we apply ICTs in effective ways such that they contribute meaningfully to socio-economic development processes?” The six articles in this special issue seek to address this extremely challenging question.

Health care in developing countries is beset with a complex set of problems that makes the challenge of introducing ICTs in the health care sector a very difficult one. We discuss three of these problems concerning infrastructure, focus, and organizational context.

Infrastructure: A key problem concerns the extremely poor infrastructure that exists in the health sectors of many developing countries, and more generally in the physical and communication infrastructure in the region. We have seen hospitals in Mozambique providing care to more than 10,000 people a month being staffed by a single doctor working night and day, and Primary Health Care (PHC) centres in India servicing more than 30,000 people without a telephone connection, and given a state quota of medicines of less than USD 0.10 a year per person in their jurisdiction areas. This extremely poor infrastructure in terms of communication, patient care and human resources serves as a serious bottleneck to attempts at reform since people are working everyday in Herculean circumstances with little incentives, resources or time to try and embrace new technologies and approaches. Attempts at reform are confronted with the classic “chicken and egg” problem in that the infrastructure required to introduce the technology is non-existent or weak.

Focus: Another major problem in the health care system has been the traditional focus of the system on cure rather than prevention. While resources continue to be pumped into large hospitals and information systems such as electronic patient records and telemedicine, the PHC systems which service a greater proportion of the population, get a very small share of the budget pie. So, what we have typically in many developing countries is a PHC system that is extremely strapped for financial, human and medical resources trying to provide outreach care to large numbers of people spread out geographically in remote areas, while governments enamoured with new technology and promises by vendors and international agencies pour in money into large complex systems in hospitals. How to shift this focus, is a major challenge for the future, especially in the context of introducing ICTs to support systems geared towards preventive care.

Organizational context. In most developing countries, health is primarily a state responsibility. While this helps to keep the system free of some of the problems and ills that come with privatization of health care, the system has to contend with other problems that come with the overdose of bureaucracy. The effect of this is seen very clearly in the manner in which information flows are organized and managed in the health care system. Health care workers spend a significant proportion of their working time filling out a multitude of forms and reports and sending these “upwards” to the districts, provinces, state, national and international levels. While this focus on reporting serves to fulfil the needs of the bureaucracy and their dependencies on international aid agencies, and certain of this information is important for epidemiological purposes, it is rarely ever used to guide local action at the level at which the data is collected. Data which could be fruitfully used at the local level to analyze trends and help develop interventions in cases of epidemics and to identify causes of various problems, is often (and regrettably) used by the bureaucracy for purposes of control and to reprimand hard working and already poorly motivated field staff. The most frequent problem is the lack of feedback to local districts and health care workers. Within this context, ICT introduction while providing the potential to shift the traditional focus from reporting to analysis will also confront the complexities of trying to change such strong and dominant traditions.

This brief discussion of some of the problems of health care in developing countries only touches the tip of the iceberg of an extremely complex and under-resourced system. In this special issue, we present six papers that discuss how organizations are trying to address some of these complexities in different contexts. The issue brings in a diverse and rich set of experiences drawn from Mozambique, Guatemala, Mexico, Philippines, Morocco, and Nigeria. Another paper discusses health care in a more global context, not restricted to any particular country. The papers address different kinds of issues in the health care domain including problems of infrastructure, systems development, methodologies, health care library automation, systems implementation, outsourcing, and the future possibilities of technology in health care. A distinctive feature of all these articles is their focus on the question of “what can we do to address the existing challenges and problems?” rather than just reporting on what the problems are.

The first paper by Ann Séror takes a global view on the problems of health care management, and develops some future scenarios. She takes the view that telecommunication technologies and the Internet offer a potential for a revolution in the management of global health care systems. Her “world systems view” links issues of health care management with sustainable development. In this way, she broadens the criteria for evaluation of health care systems to include dimensions of universal access, equitable resource allocation and consumer participation that are evaluated in light of ideological, political and cultural considerations of governance. She points out that there is an increasing trend in the costs associated with health care services, but the origin of the problem in the developing world appears to be more closely associated with organizational and ideological considerations than with availability of financial resources alone.

Séror’s view of health care systems can be described as being rather “technologically deterministic” as she suggests that “telecommunications technologies and the Internet may contribute significantly to improve global health care system performance, to manage ideological diversity and to reduce the wide inequities that separate the industrialized nations from the developing world.” In the health care systems of most of the developing world, such a technologically focussed vision seems to be still a distant reality. A counter argument to

this is that these technologies involve extremely complex infrastructures, and thus take a long time to stabilize and be institutionalized within particular contexts. What impact these technologies will have in the future, as Séror speculates, is still an empirical question that needs to be explored. While it is healthy to take a critical perspective on the actual value of these technologies in practice, Séror reminds that we should have an open mind towards these potentials in particular situated contexts.

The second paper by Jørn Braa and his colleagues is set in Mozambique, ranked as one of the poorest countries in the world. The article serves two key aims. Firstly, it provides an overview of the status and challenges relating to the use of ICTs in the health sector. Secondly, it argues that developments in the health sector cannot be seen in a void, but need to be conceptualized and planned within the context of the broader IT infrastructure that exists in the country. The article is based on a comprehensive survey that was carried out in three provinces in the country. Two survey instruments were used, one to assess the status of the health information infrastructure, and the other to look at IT infrastructure more broadly.

The genesis of the study is found in the broader Health Information Systems Program (called HISP) that was initiated by Braa and his colleagues in South Africa, and extended to Mozambique in 1998 and subsequently to India in 2000. So, apart from attempting to contribute directly to the strengthening of the health infrastructure in Mozambique, the overall HISP program brings to the foreground important issues relating to the transfer of technology, globalization, and systems development approaches that balance the tensions between the adoption of existing standards with locally specific views.

An interesting aspect of the HISP approach is its aim to coherently integrate action research, social change in the health sector, and education. Included in HISP is a PhD program in which a number of doctoral candidates from Mozambique, India and South Africa are currently engaged in graduate studies at the University of Oslo. The Mozambican doctoral students are exploring different problems relating to health information including laboratory data management, competencies of health professionals, communication practices within the health sector, community health, systems design and development, and integration of vertical programs with bottom up approaches. The education component of HISP is operationalized through the establishment of Masters and Doctoral programs in Health Informatics run jointly between University of Western Cape, University of Eduardo Mondlane, Mozambique and the University of Oslo, Norway. In this way, the project seeks to institutionalize North-South and South-South collaboration.

The third paper by Yasmin Chandani and Gerry Bretton is presented from the perspective of an International aid organization (USAID), which are significant actors in shaping health information practices in developing countries. Set in the Philippines and Morocco, the authors address the important issue of Family Planning, specifically relating to the design and implementation of a Logistics Management Information System (LMIS) to support the stocking and distribution of contraceptive in these two countries.

Historically, international aid organizations have provided free contraceptives to developing countries in an attempt to promote both family planning and reproductive health. An important consideration these international organizations have to deal with is how to ensure uninterrupted flow of contraceptives to the population through multiple levels of the supply chain, ranging from central warehouses to health clinics and community-based distributors. Design, development and institutionalization of effective LMISs are important efforts in this regard which can potentially reduce commodity costs, improve program

management, improve consistency and accountability of service provision, and integrate policy making more effectively with the ground level reality.

Through the comparative analysis of the LMIS in the Philippines and Morocco, the authors make the point that the success of the LMIS is not just a matter of technology, but is dependent on a combination of customization of the system to local needs and its continuing adaptations by system users. This combination helps ensure that the LMIS continues to meet users' needs in changing environments.

In the paper, the authors describe some of the differences in customization and adaptation of the same system in the two countries. In Morocco, customization proceeded rather smoothly as the system was based on the country's existing contraceptive distribution system, and current work systems. Effective customization was further strengthened by ongoing adaptations to design and the content of the system in the hands of the users. In contrast, in the Philippines the responsibility for the LMIS has changed hands several times within the Department of Health (DOH). These changes made customization of the system difficult because of the ongoing uncertainty about where the system would be housed. Contributing to the problems of customization is the geographical spread of the islands that are often subject to earthquakes and typhoons. Adaptation is also made difficult because there are few incentives to improve the system because of poor or uncertain funding and continuous changes in personnel at both higher and lower levels.

This paper provides insights to the perennial problem of providing sustainability to the information systems after the support of the aid agency is withdrawn. These insights come from the emphasis on the need to encourage users to engage in customization and local adaptations of the system, and by providing examples of how this was done. Both these processes cannot take place on their own and need to be supported within an appropriate institutional framework consisting of technical expertise, adequate funding and a strong institutional commitment. Without the buy-in from users at different levels, it is extremely difficult to ensure long-term sustainability of the system.

The fourth paper by Ms. H. Abimbola Soriyan and her colleagues is set in Nigeria, and addresses the issue of methodologies for software development in the health care sector. The paper is based on an ongoing program of research under the umbrella of INDEHELA that is being conducted through a collaborative effort of Nigerian and Finnish researchers. Similar to the HISP effort of Braa and his colleagues, this project also tries to integrate research into systems development with education and actual change on the ground.

Two key aims of the INDEHELA project are to develop an empirically grounded understanding of the challenges faced by information systems development (ISD) practitioners in Nigeria, and to develop approaches to address some of these challenges. To meet these two aims, the authors adopt a mixed research strategy including a survey to develop a landscape view of the software industry, supplemented with in-depth portraits of few selected companies.

Like the earlier paper by Chandani and Bretton, Soriyan et al. emphasize the complexities in building systems for the health sector in developing countries. Off the shelf software programs suitable for African hospitals are extremely difficult to obtain because of the very unique operating conditions, and this problem is further magnified in the case of primary health care. Within such a scenario, there is the important need for the local software sector to develop expertise to meet the complex software needs of the health sector. With this

in mind, Soriyan and her colleagues take a critical look at the capability of the Nigerian software industry to respond to the systems development needs of the health care sector.

The authors take a social system approach situated in an Activity Theory based framework that focuses on the work activities of the health workers, health care activity systems as the basis for analysis. The authors present observations about the competencies of the Nigerian software industry to service the health care sector. Systems development tends to be done more efficiently in large and rich firms like banks as contrasted to small and medium sized customers. Local companies hold an advantage over foreign companies in systems development because they tend to understand the requirements better and are also more physically present to troubleshoot problems and provide constant and early support to users. The authors conclude that the software industry in Nigeria is technically and methodologically capable of providing the health care organisations in the country with the kind of software and information systems required, if the customer side can afford the job.

The fifth paper in the issue is written by Leiser O. Silva and set in the hospitals of the Ministry of Health in Guatemala. Silva brings to the fore the question of appropriate approaches to systems development for Guatemalan hospitals administered by the Ministry of Health. The Ministry had to choose between in-house development (also called insourcing), purchasing off the shelf software or outsourcing. The Ministry ultimately decided on the strategy of “selective outsourcing” wherein only a part of the overall systems development lifecycle was outsourced. While the system requirements analysis was to be done by the hospitals themselves, the development of the administrative information systems including purchasing, despatch, accounting, finance and human resources was outsourced to a commercial organization. To ensure active user participation in the requirements analysis phase, focal groups constituted of the hospital staff were formed. Various discussions of these focal groups led to the creation of the requirements document that paved the basis to create the tender specifications for selecting the vendor for the systems development process.

Silva describes the Ministry of Health’s decision to go in for “selective outsourcing” as an improvisation since it was unexpected and went against the given tradition in the Ministry of accepting software given by a donor agency or to undertake in-house development. The outsourcing process was in response to an uncertain environment characterized by limited resources, an unstable political situation, and a rapid turnover of personnel. Through this analysis, Silva suggests a set of guidelines for outsourcing that concerns the need to develop a balance between the type of expertise and knowledge that the hospital is willing to outsource as compared to keeping it in-house. The nature of this balance then has wider implications on issues related to budgets, loan requirements, and human resources responsibilities.

The last paper by César A. Macías-Chapula comes from Mexico and deals with the important and often neglected area of library systems to support health care. Macias-Chapula makes the point that while health library automation is a well-established field of academic work and practice in developed countries, the field is practically non-existent in developing countries. While new ICTs provide tremendous potential to network health systems in developing countries with the rest of the world, this potential remains largely unfulfilled. An important reason is that attempts to modernise health services with ICT have not yielded effective results because often attempts to transfer technology have taken place without previous analyses of existing information processing procedures in the libraries, without giving enough importance to the social and cultural elements involved.

Macias-Chapula describes an attempt to automate a large library in Mexico's General Hospital (MGH). Despite the project not being a complete success, he draws out learning from the experience that could help to guide future projects. The key problems he identifies concerns the difficulties in changing the attitudes of people at the managerial and operational levels, in creating effective work teams, and in redefining existing work practices. Some of these challenges exist because the contextual conditions in developing countries are characterized by a plethora of problems including overdoses of bureaucracy, politics, lack of trained librarians and limited appreciation of the library's importance in the education system. However, Macias-Chapula points out that these challenges are not insurmountable, and at various levels steps can be taken to address them. A guiding principle for this is that organisations cannot continue to separate the technical from the organisational, and library staff needs to be more fully engaged in the decision-making. Important for this is effective communication with the library staff regarding aims of library automation and gaining the political willingness of the senior and middle level managers. Macias-Chapula emphasizes the importance of education and awareness building about the role of library automation in health care.

In summary, the six papers bring into focus various issues from different parts of the developing world. We hope that this issue will help to raise the level of awareness about the potential that ICTs have for supporting the health care system in developing countries, and the challenges that exist in realizing this potential.