

Guest Editorial Preface

Special Issue on Health Digital Transformation II: E-Technologies and Intelligent Health IT/IS Adaptations to Increasingly Complex Problems in Today's Healthcare Services Delivery Systems

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This is the second of our two IJHISI special issues releasing a series of well-positioned, peer-reviewed papers presented at HICSS-50 conference in Hawaii. In the first IJHISI special issue series of papers, we observe that when transforming the healthcare sector in resolving complex challenges found across various aspects of the macro-micro dimensions of this evolving system, the growing use of emerging and innovative e-technologies arising from a multitude of perspectives have been the results of active engagements from and joint interactions among various healthcare stakeholders, including but not limited to such personnel as hospital managers, multi-provider care team members, health informaticians and engineers, health information systems and interface designers and even patients.

In this age of global network connectivity, we continue this critical train of thoughts in our next series of selected papers released herewith and abstracted across various Health IT mini-tracks on a “fast-track” IJHISI opportunity from the same conference (<http://hicssconference.wixsite.com/hicss/hicss-50-fast-track-opportunities>). These latter papers are again illustrative of the wide-ranging and emerging topics. As with the last series of accepted papers, the current series of papers have similarly passed through extensive peer-reviews and IJHISI acceptance process. It is now being assembled and publicized with the hope that the combination of these contributions encapsulated within the two Special Issues will have significant impact and further influence the future work of IJHISI readers in particular, and more broadly, the wider Health IT/IS research communities.

The first article, *“Incorporating Global Medical Knowledge to Solve Healthcare Problems: A Framework for a Crowdsourcing System,”* extends the current scope of investigation on medical knowledge management into how knowledge may now be intelligently aggregated from diverse traditions even though such traditions, according to the authors, follow different ‘grammar,’ thereby making the encapsulation of medical knowledge a very challenging task. In an attempt to demonstrate the deployment of emerging technology in the medical knowledge aggregation space, Kabir Sen and Kaushik Ghosh suggest to first explore the application of crowd-sourcing technologies to resolve complex health issues “for which cure is yet to be developed.” Moreover, they infer that not only would knowledge be accumulated from a wide variety of sources in an ideal crowdsourcing system, but that the very same system can also benefit from “the use of appropriate software algorithms” to achieving the best possible solution. Methodologically, Kabir Sen and Kaushik Ghosh advocate a stepwise research approach in intelligently drawing on an existing classification of crowdsourcing as a “springboard” towards generating a well-designed crowdsourcing system for medical diagnosis that would involve both the crowd population vis-à-vis the medical experts from across the world.

In other words, the crowdsourcing system that is being proposed would bring together a seamless connectivity among the thoughts of experts and the public, as well as with the help of specialized software algorithms, would drill down towards achieving “useful solutions for hitherto difficult to solve health problems.”

The second paper, “*Community Health Workers (CHWs) as Innovators: Insights from a Tele-Education Pilot for CHWs in Detroit, Michigan,*” highlights insights gleaned from a pilot study performed in Detroit, Michigan with a group of community health workers (CHWs) in basic grant-writing training using an implemented “e-platform” known as the CHIP, or Community Health Innovator Program. Here, Prentiss, Zervos, Tanniru and Tan argue that CHWs play a key and evolving role in enhancing the health and well-being of underserved populations within what is often regarded as “resource-limited” settings. As these CHWs are often “trusted in the communities they serve and are often able to see through solutions on community challenges that outside persons cannot, it is critical that CHWs be empowered through the use of e-technologies to perform their various critical servicing roles. In other words, the deployment of e-technological solutions is seen to be both cost-effective and efficient in enhancing access to knowledge for CHWs. So far, preliminary results of the Prentiss et al. study demonstrate that the application of “e-platform” technology is necessary for CHWs “to leverage knowledge from multiple sources in an adaptive environment.” Another interesting contribution of this work is the attempt by the authors to contextualize the discussion of their results within the perspectives of a well-accepted learning theory.

“*Inhibitors of Physicians’ Use of Mandatory Hospital Information Systems (HIS),*” the next paper, focuses on key reasons or inhibiting factors which may have prevented physicians’ acceptance and active use of information systems and technologies. In this paper, Heiko argues for a comprehensive framework to assess key inhibiting factors in the use of hospital information systems (HIS), which he observes, has been lacking despite previous efforts to investigate the use of HIS by physicians. Accordingly, he suggests using a qualitative approach to investigate HIS use inhibitors based on interviewing 48 informants in two German hospitals as well as intensively observing various physicians in their workplaces. Ultimately, his findings reveal that “focusing solely on the user does not lead to successful system deployment in hospitals.” Instead, what he discovers that “the road to success” has to do with taking an integrative approach towards the alignments of three building blocks within the organizational context, that is, the user, the process and the system. According to his analysis, should these three building blocks be contextually well-aligned within the organizational infrastructures and are endorsed by strong organizational leadership, then he submits that medical personnel will be much more satisfied, and thereby resulting in more meaningful and cost-effective use of HIS.

Following the Heiko study, “*Data Visualization on Global Trends on Cancer Incidence Based on WHO Datasets: An Application of IBM Watson Analytics,*” the fourth paper, is a joint work of researchers from the Stanley Ho Big Data Decision Analytics Research Centre, the Jockey Club School of Public Health and Primary Care, Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, and IBM China/Hong Kong Limited. In this work, Kelvin et al. cleverly explore *Visual analytics*, extending this methodology to examine cancer data patterns and trends across various sets of accessible and available data collected across hundreds of cancer registries worldwide by World Health Organization (WHO). Specifically, these researchers adopt the IBM Watson Analytics platform to compare and contrast various emerging patterns and trends of global cancer incidence. In total, twenty-six (26) forms of cancers from eight (8) different geographic regions, including the United States (US), the United Kingdom (UK), Costa Rica, Sweden, Croatia, Japan, Hong Kong and China (Shanghai), were analyzed. Interestingly, these researchers are able to employ a real-time interactive platform that runs on the cloud, featuring an interactive interface that can be applied “to plot a choropleth map to show global cancer distribution, and line charts to demonstrate historical cancer trends over 29 years.” Moreover, the featured interactive platform is also empowering them to explore the accessible and available WHO cancer datasets effectively and efficiently “with a selection of any cancer type, gender, age group, or geographical region,” including

subgroup analyses for different age groups. Finally, running the platform on the cloud also means that the system is accessible by any computer linked to the Internet to perform any needed big data analytics very conveniently.

Last in the series of papers included in the two Special Issues is “*From e-prescribing to drug management system: impacts of stress on usage continuance*,” a work contributed by Rola El Halabieh, Anne Beaudry and Robyn Tamblyn. Here, the researchers focus on the rarely studied “user reactions,” specifically, reactions from physician users when an older form of technology (more specifically, an e-prescribing system), is to be transitioned and replaced with newer technology (more specifically, a new integrated drug management system). In order to track physician perception in term of their system transition-induced level of stress, their satisfaction with the new system, and their intention to continue to use the new integrated drug management system, the researchers surveyed the physician users as well as collected data in the form of system usage logs prior to, during the system transition, and during post-transition period. Results of their study indicate that: (a) physicians with higher level of stress restricted their use of the new system during both the transition period as well as during two months post-transition period; (b) while physician intention to continue to use the system is not significantly related to stress, stress was nonetheless impacting on actual use during the transition period (-0.368 , $p < .001$) as well as for two months post-transition; (c) in contrast, physician intention to continue to use was positively related to satisfaction (0.578 , $p < .001$) during transition; however, satisfaction was not found to be significantly related to actual use for any of the three months under study; and (d) prior use was strongly positively related to continued usage for the three months under study.

Put together, the contributions in this second IJHISI (HCISS-selected) Special Issue bring us, as with those earlier contributions in the first Special Issue, to realize how rapidly the health digital transformation phenomenon has occurred during this era of big data, knowledge explosion and increased human-machine connectivity. As we learn how to apply more and more e-technological processing to massive healthcare data being captured automatically and ubiquitously across the evolving spectrum of private as well as community healthcare services and activities, we will become more knowledgeable of what is really going on and how best to improve personal health and public well-being, to heighten care quality and patient-provider relations, as well as to eliminate wastes, abuses and frauds. Applying e-health technologies and health IT/IS solutions appropriately will require us also to move towards a greater appreciation of machine-human learning integration so as to produce more precise and personalized health knowledge and intelligence for the greater good and advancement of individuals, groups, organizations and societies.

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