Journal of Interprofessional Care, 2012, 26: 437–439

ISSN 1356-1820 print/ISSN 1469-9567 online
DOI: 10.3109/13561820.2012.728380

informa
healthcare

EDITORIAL

The intersection of informatics and interprofessional collaboration

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INTRODUCTION

As the interprofessional field has grown, it has benefited from the inclusion of perspectives by other academic fields such as sociology and economics (Reeves, 2010). Informatics is another field that can play a role in enhancing interprofessional collaboration and care. This editorial explores how we can establish synergies between the field of informatics and the interprofessional field. We first provide some defining characteristics to help understand the nature of informatics. We also discuss the array of functional (and dysfunctional) uses when designing and implementing informatics in healthcare.

CHARACTERISTICS AND FUNCTION

As a starting point we need to understand what informatics is. First and foremost, informatics is more than just technology. Rather it is an *interdisciplinary science* that incorporates fields such as information science, decision science and organizational theory. Although definitions vary, informatics involves the study of information and communication systems in healthcare and the application of these systems for decision-making and other tasks (Coiera, 2003; Shortliffe & Blois, 2006). A key focus of informatics is the development of solutions to address information processing and communication issues. These solutions include not only improved ways to collect data but also improved ways to analyze and communicate data so it can be incorporated into care delivery. Although many informatics solutions involve some aspect of technology, we should not assume that cutting-edge technology is necessary in all circumstances.

Associating informatics solely with technology is unfortunate and puts the emphasis on the tools (i.e. computers) rather than the collaborative processes and work undertaken as part of healthcare delivery (Musen, 2002). Coiera (1995) states that informatics is as much about computers as cardiology is about the stethoscope. A technology-centric perspective also implies that technology is always necessary to solve informatics problems. Rather the use of technology for problem solving should be dependent upon the task at hand. For example, the surgical safety checklist is an information management tool that lists the necessary tasks that need to be completed pre- and post-surgery (Weiser et al., 2010). Although not a high technology tool, studies have indicated it may be beneficial for enhancing interprofessional communication and patient safety in an operating room context (e.g. Haynes et al., 2009).

USES AND ABUSES IN HEALTHCARE

Informatics tools and applications have enhanced many aspects of healthcare delivery. For example, Kuziemsky et al. (2012) described how informatics applications can provide patient, service delivery and administrative benefits in hospital and community settings. These benefits included improved administrative decision-making about resource scheduling, the ability to provide patient-centered care and the linkage of patient records over time to support continuity of care. The asynchronous and distributed nature of collaborative care delivery has benefited from informatics tools that facilitate communication and information exchange across team members (Reddy, Gorman, & Bardram, 2011). Simulation tools and models have also been found to be beneficial for supporting the delivery of interprofessional care (e.g. Wisborg, Rønning, Beck, & Brattebø, 2008).

A key challenge for informatics is to ensure that its research is relevant and meaningful for healthcare professionals. While well-designed health information technology (HIT) can enhance delivery, poorly designed systems

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have been shown to cause workflow and communication issues and to contribute to clinical errors (Campbell et al., 2006; Keillor & Morgenstern, 2005). For example, studies on computerized provider order entry systems and other HITs revealed that they caused several categories of including errors in retrieving and entering information and errors in communicating and coordinating processes (Ash, Berg, & Coiera, 2004). These problems occurred for several reasons including cognitive overload, poor interface design and inappropriate fit with provider workflow. However, it is important to note that in many cases the HIT systems did successfully automate the task at hand (e.g. the order entry process), and therefore from a task perspective could be regarded as a successful implementation. These failures illustrate that HIT usage goes far beyond the task at hand and emphasizes the need to evaluate HIT in the context of the broader sociotechnical and interprofessional environments where they are implemented. People, processes and technology are interrelated and HIT must be designed and evaluated with that premise in mind.

In addition, informatics can also result in a number of unintended consequences. For instance, Lo et al. (2012) examined perceptions of acute care staff on the usage of smartphone devices and a new webpaging system on the inpatient units at two teaching hospitals. They found that while the smartphone technology was well received among clinicians, dissatisfaction was expressed, particularly by the nurses, who found that these technologies resulted in a reduction of face-to-face interactions with the physicians. Many of the nursing staff in this study lamented this loss of traditional communication, as often they found the use of webpaging limited their opportunity for more meaningful interprofessional interactions.

We also cannot assume that the size of HIT projects helps mitigate the risk of failure. In September 2011, the UK's National Health Service ceased development of their electronic health record system after a cost of at least 12.7 billion pounds (Charette, 2011). This national project, once referred to as the "world's biggest civil information technology programme" (Charette, 2011, p. 1), provides a poignant and cautionary tale of what can happen when technological solutions are deployed without an appreciation of the underlying complexity of healthcare systems, professional/interprofessional cultures and workflow processes. This failure also helps remind us that we still have a way to go and many lessons to learn about how to design and implement effective information technology in healthcare settings. Perhaps the most important lesson is that the complexity of healthcare delivery requires a collaborative approach to designing systems. A useful (smaller scale) example is provided by Scott and colleagues (2005) who examined primary care team members' perceptions of the implementation of an electronic medical record system. Findings from their study indicated that the initial decision to introduce the system was seen as remote from team members; many members felt that the system was not effective for the local environment, sparking doubt and resistance. Ongoing problems with software development increased local resistance, as clinicians' productivity and ability to collaborate were reported to have decreased.

Such experiences resonate for a recently published paper by Bitton, Flier, and Jha (2012) who stated that HIT is an inevitable part of healthcare reform. They went on to argue that we need to design healthcare systems with the ultimate goal of integrated and safe patient-centered care. Achieving that goal will require effective collaboration across many different professions and disciplinary fields.

INFORMATICS AND INTERPROFESSIONAL COLLABORATION

Informatics and interprofessional collaboration are two fields where there is great potential for synergy. Importantly, information technology can assist communication between professionals in both a synchronous fashion (e.g. computer conferencing and web-based interactions) and an asynchronous manner (e.g. email and Wikis). As a result, it can also overcome traditional limitations related to interprofessional work and its need for real-time interaction in a shared physical location. As Reeves and Freeth (2003) point out, these technologies can offer an "electronic bridge" to ensure that practitioners can communicate and collaborate to effectively deliver care.

Informatics can also contribute to the development of interprofessional activities, and support for the collaboration, communication and coordination of care across multiple settings and providers. Furthermore, as patients become more active in healthcare delivery, informatics can create the opportunity for expanded networks of collaborative care. These networks require the integration of people with processes, education, evidence and policy. Integration is a core component of informatics research and it can enhance interprofessional collaboration by developing tools for supporting interaction across disparate locations. For example, collaborative tools such as *Facebook* and *Twitter* have enabled us to digitize processes such as social networking, engagement and information exchange. We can use the same principles to design tools to support interprofessional teams by providing the means of networking, team development and collaboration across time and space.

Interprofessional collaboration can also play a valuable role in shaping the informatics research agenda. While studies have shown that HITs such as electronic health record and order entry systems can support collaboration, these discoveries have often been realized by chance (e.g. Reddy, Shabot, & Bradner, 2008). A better approach, clearly, is to draw upon the theories, frameworks and empirical findings from interprofessional collaboration and use them as the basis for HIT design and evaluation – this would enable informatics to design systems based on sound and robust evidence.

CONCLUDING COMMENTS

Informatics and interprofessional collaboration can be a great partnership that can ensure the HIT we design will be

interoperable from both a technology and a people and process perspective. As a starting point here are three ways that informatics can enhance collaboration. First, it can develop standards to provide common terminology for sharing of data across different settings. Standards will also enable us to conduct multi-center evaluation studies such as economic analysis. Second, we can use informatics methods for studying and modeling collaborative processes to get a better understanding of how the processes work and how we can better support them. Third, we can leverage the principles behind Web 2.0 applications such as *Facebook* to develop tools to support asynchronous collaborative environments.

Declaration of interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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