Chapter 14

A Healthcare Team Communication Research Agenda

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> There is always an easy solution to every human problem—neat, plausible, and wrong.
> H.L. Mencken

Research into clinical work reveals the day-to-day difficulties that healthcare workers confront, as well as the means they conceive to surmount them. These are the *messy details* (Nemeth, Cook and Woods 2004a) that comprise the actual clinical experience in which communication plays such a vital role. This approach contrasts with the popular rush to provide solutions for reported patient safety problems without the benefit of understanding the problem. The notion that a "silver bullet" can solve patient safety problems is neat, plausible ... and wrong. David Musson provided an example of such a solution in Chapter 4: crew resource management (CRM). While interest continues in the use of CRM to improve healthcare communication, the data do not support such enthusiasm. Rigorous reviews such as Salas et al. (2001) have surveyed the literature on crew resource management and found that, while CRM seems to have a positive effect on behavior, its effect on safety is unproven. CRM is not the only popular trend. Surveys such as Sexton et al. (2006) have applied the aviation model to healthcare by assessing *perceptions* of clinical teamwork. Surveys of perceptions, though, do not reveal what actually happens in the clinical setting. Improvements to healthcare team communications are intended to ultimately improve healthcare for clinicians and patients alike.

Improving Healthcare Team Communication grounds the understanding of issues related to healthcare team communications in well-considered, methodical, valid research. The chapters have drawn the connection between original research into aviation and aerospace team communication and current work that is underway in healthcare. Each of the chapters reflects original research of actual work as it is performed. This is in marked contrast to the way that work is imagined by those who have not done it, or by practitioners trying to reconstruct what they have done. The chapters provide part of the foundation of understanding technical work, which is the planning and management of care.

A select number of researchers featured in Nemeth, Cook and Woods (2004b) currently use *systems engineering* (Samaras and Horst 2005) and *cognitive engineering* (Woods and Roth 1988) to reveal and support sharp end (operator) cognition. Emily Patterson analyzed an adverse event involving communication of an order for an oncology medication, using a case-based analysis to shed light on how communication mechanisms and breakdowns contribute to undesired outcomes. Anne-Sophie Nyssen assessed the effect of adding new technology such as an infusion device and robotic surgical system on healthcare team collaboration. Yan Xiao discovered care providers are predisposed to respond in certain ways to acoustic alarms, due to the large numbers of alarms, confusion among alarms, temporary episodes of high workload, and external economic pressures. He also uncovered a number of proactive interventions at unit and organizational levels that sometimes had unanticipated effects. Meghan Dierks demonstrated how the implementation of a "count" protocol during surgical procedures to reduce the likelihood of leaving a tool in a body cavity actually had negative consequences. Stephanie Guerlain determined that viewing video clips of procedures improved medical student perception and procedural knowledge about laparoscopic surgery. Helen Klein and Amy Meininger found that as Type II diabetics try to manage their own care, they typically do not understand the dynamics of controlling their disease, which often renders their efforts ineffective.

Other similar contributions to understanding group cognition can be found in two special issues of the journal *Cognition, Technology and Work* on the large scale coordination of cognitive work (Nemeth 2007a and 2007b). In the first special issue, authors explore the use of naturalistic decision making (NDM) methods to reveal how groups of operators have developed ways to perform inter-group work in real world settings. The first two papers examine theoretical issues in coordination at large scale. Björn Johansson and Erik Hollnagel's paper discusses how control at large scale emerges as a product of human interaction. Jill Ritter et al. propose a framework to assist the development of widely distributed systems and teams to support military logistics coordination. The second two papers describe the results of efforts to simulate large scale coordination. Laura Militello et al. account for the successes and shortcomings among ad hoc teams that sought to manage emergency response to natural disasters. Colin Mackenzie et al. explored large scale coordination at international scale, experimenting with complex communications technologies to support expert decision making during an emergency. The final paper by Phil Smith et al. discusses improvements to managing the complex, dynamic US national air transportation system. Larry Hirshhorn's reflections offer insights into what such work may reveal.

In the second special issue, authors focus on large scale coordination in healthcare. Yan Xiao and colleagues found the goal of operating room (OR) team stability is nested within longer term goals of equity in the assignment of work and allocation of resources. Nemeth et al. explained how clearing space to accommodate sicker patients in a patient care unit is nested within the longer term goal of accommodating the demand for care. Sara Albolino and Richard Cook revealed how making sense of diagnostic and therapeutic needs "on the fly" in a hospital intensive care unit (ICU) is nested within a plan for a course of treatment that serves as a defense against future days, weeks, or months to come. Anne-Sophie Nyssen discovered how local action by workers outstrips the ability of centralized ICT (for example, medical records) to share information, which resulted in a failure to integrate crucial healthcare information among medical units. Emily Patterson et al. found that crosschecking methods such as hand-offs can make processes more evident, and detect and correct erroneous assessments and actions, although poor versions can create gaps in care continuity.

These contributions have added new insight to the conventional view of healthcare and its management. We believe the above authors would agree that this is just the start of understanding a complex and little explored domain. Where do we go from here? The next section lays out an agenda for how to conduct substantive work in this area.

A Research Agenda

The ability to truly improve healthcare requires a well-grounded understanding of the nature of actual work. This understanding requires insight that comes from thoughtful, repeated, deep looks into the way work is performed. Judith Orasanu and Ute Fischer's thorough understanding of aircrew communications described in Chapter 3 has taken years to cultivate. Healthcare, which is an even more complex and variable work domain than aviation, will take even longer to understand. The process requires time because the complexities of the daily work setting are too entangled to gain insight by asking for opinions or making quick, superficial observations. It is necessary to visit and revisit actual work settings. Such rigorous scrutiny makes it possible to discover the driving forces that underlie work; forces that are apparently simple, but are in reality quite complex.

This approach has a direct bearing on the communication of information within and among teams. As in other high hazard settings, expertise (Feltovich, Ford and Hoffman 1997) in healthcare is the ability to know what is, and what is not, important. Healthcare activities rely on the acquisition, portrayal, and analysis of therapeutic and diagnostic information as an integral part of individual patient care. The need for accurate, timely information exists not only at the individual patient level but also at the unit level—that is, the OR, ICU, and emergency department (ED). Unit-level planning and management directs who will get care, what type of care will be provided, and when it will be provided. As a result, the daily work of the clinician requires representations that serve as a map of the ever-changing territory of work that must be successfully navigated (Rasmussen and Pejtersen 1995: 132). What information is presented, and how it is presented, depends on the individual and group cognitive work that it is intended to support. Individual elements of information vary enormously in the length of time that they remain reliable, and their weight depends a great deal on their context and other elements that are present in the same moment. Language provides us with a useful analogy. Linguistic signs have little intrinsic meaning, but derive it instead from their relationship to other signs (Cilliers 1998). All well and good, but what can we do to proceed?

As two of their strategies to improve patient safety, the Institute of Medicine (Kohn, Corrigan and Donaldson 2000) advocated improving access to accurate, timely information, and making relevant information available at point of patient care. Soon thereafter, the IOM (Aspden et al. 2004: 6, 8, 17, 20) recommended developing a national health information infrastructure, facilitating the use of decision support in clinical information systems. The recent National Academy of Engineering/IOM report (Reid et al. 2005) encourages federal research and mission agencies to significantly increase their support for research to advance the application and utility of systems engineering in healthcare, including research on new systems tools and the adaptation, implementation, and improvement of existing tools at all levels. The NAE/IOM report recommends the creation of 30 to 50 multidisciplinary research centers that include both human factors and healthcare professionals. The report also recommends three initiatives for these research centers: (1) demonstrate and disseminate the use of tools that support communication and coordination—this includes, but is not limited to, information and telecommunications systems; (2) conduct basic and applied research on the systems challenges to healthcare; and (3) educate current and future healthcare researchers in the science, practice, and challenges of systems engineering for healthcare. Woods and Cook (2002) outline nine steps that would make it possible to realize these goals:

1. Pursue second stories beneath the surface to discover multiple contributors
2. Escape the hindsight bias
3. Understand work as performed at the sharp end of the system
4. Search for systemic vulnerabilities
5. Study how practice creates safety
6. Search for underlying patterns
7. Examine how change will produce new vulnerabilities and paths to failure
8. Use new technology to support and enhance human expertise
9. Tame complexity through new forms of feedback

Translating these steps into action requires a few essential initiatives:

1. *Develop a coherent program of study* using healthcare institutions as living laboratories. Academic medical centers are in a position to coordinate efforts to study technical work, including communication. However, they may not be in a position to successfully lead it (Wears, Perry and Sutcliffe 2005). These programs will need an infrastructure to coordinate research scope, methods, and initiatives in a substantive, long-term collaboration with research professionals from other fields such as human factors.
2. *Develop a program of study to build a base of understanding and improve practice.* Individual studies performed on a shoestring are necessarily limited in scope and offer only limited "keyhole" views of a complex world. Support for ongoing research in healthcare technical work will make it possible to understand healthcare as a whole, not just as individual parts such as communication. Ongoing studies that build on the work of others will develop reliable, useful results.
3. *Cultivate a cadre of human factors and healthcare professionals* who are adept at this kind of research. Produce a continuing stream of well-qualified and trained researchers with a clear career path who will be able to carry this work forward through decades, not a project at a time. This research cadre will be well qualified to engage crucial issues that are related to information and

clinical care, but are not currently grounded in science. Such issues include: "How do clinicians make decisions with regard to changes in their approach to a particular patient?" and "How do clinician working groups recognize, identify, and re-prioritize problems in their work?"

Funding, attitude, and organizational support need to change in order to pursue such changes. Above all, a constancy of purpose will be crucial to success. At the moment, studies in technical work are done occasionally when grant funding permits, or as unfunded initiatives. This fragments and blunts the progress that could be made. An ongoing program of activities, rather than occasional studies, would develop the intellectual capital and data that is essential for such a body of knowledge.

Summary

Human factors skills and knowledge can be successfully teamed with healthcare expertise to inform the work of healthcare, including team communications. It is difficult at this stage, though, to see a career for the study of technical work in healthcare until academic, professional, and funding organizations provide a path to follow. Manager and senior clinician support for joint research initiatives by human factors professionals and clinicians can open the way.

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