Chapter 7

Human–Centered Systems Engineering:
Managing Stakeholder Dissonance in Healthcare Delivery

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ABSTRACT

Deploying new tools and technologies often results in creating new problems while solving existing problems. A root cause is the interaction between tool design and organizational deployment. One undesirable result is the creation of stakeholder dissonance (SD). SD is a term for the conflict between the needs, wants, and desires (NWDs) of different stakeholders. In healthcare delivery systems, it is evidenced by errors, workarounds, and threats to patient safety and organizational profitability.

Human-Centered Systems Engineering (HCSE) is the foundational paradigm for managing SD. HCSE emphasizes the criticality of the interfaces between humans, their tools, and their organizations, offering methods to recognize, measure, and control SD. It is complimentary to Lean, Six Sigma, Balanced Scorecard, and Quality Function Deployment approaches.

Managing SD requires recognition of all stakeholders and their NWDs, permitting discovery and mapping of potential conflicts. Prioritizing conflicts for mitigation relies on standard risk analysis and decision analysis methods. HCSE provides methods for measuring only those NWDs involved, once the critical conflicts are chosen. This permits the mitigations to be verified, and the deployment design to be validated in a pilot setting, prior to general release of the new tools and technologies into the organization.

INTRODUCTION

Effectiveness is the foundation of success –

Efficiency is a minimum condition for survival

after success has been achieved.

Efficiency is concerned with doing things right.
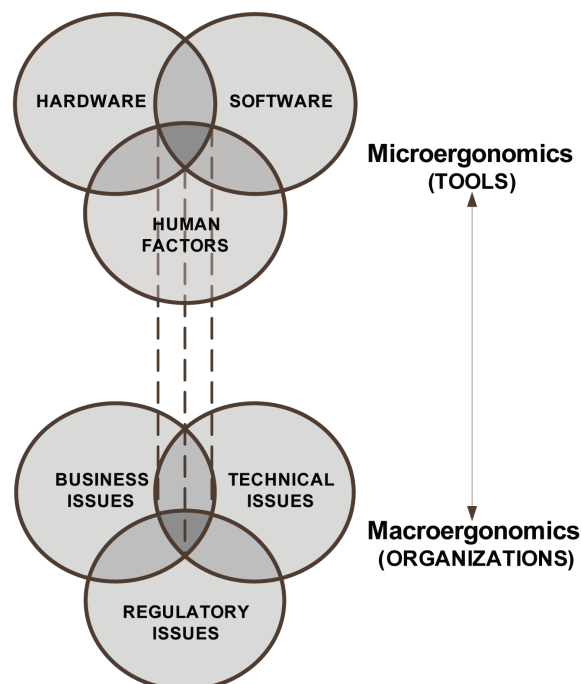
Effectiveness is doing the right things.

Peter F. Drucker (1909 - 2005)

I spend a considerable amount of my time haranguing my clients (the majority of whom are medical device manufacturers) that absent rigorous Design Controls (Samaras, 2010a) their products will have problems, will dissatisfy customers, and be potential sources of adverse events. What I conveniently forget to tell them is that, even though they may do everything perfectly, the way their products are deployed has a profound impact on meaningful use, patient safety, and profitability in the user organization. Why the concern with profitability? Because organizations that are not, by some measure, profitable will wither and die. Meaningful use, patient safety, and profitability in the user organization are three core issues for effective healthcare delivery.

Figure 1 shows two connected Venn diagrams. The upper Venn diagram depicts the interactions of hardware, software, and human factors issues in the design of tools resulting in tool-level problems; the locus of control is the manufacturer of medical devices, information technology systems, etc. The lower Venn diagram depicts the interactions of business, technical and regulatory issues in the user organization resulting in organizational-level problems; the locus of control is the hospital system, the nursing home, the physician's office, etc. In recent years, especially with increased emphasis on human factors engineering, manufacturers have become quite good at identifying

Figure 1. Source of errors from two levels of interaction

HARDWARE   SOFTWARE

Microergonomics
(TOOLS)

HUMAN
FACTORS

BUSINESS
ISSUES

TECHNICAL
ISSUES

Macroergonomics
(ORGANIZATIONS)

REGULATORY
ISSUES

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