Evaluation of Knowledge Development in a Healthcare Setting

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Abstract. Healthcare organizations worldwide have recently increased efforts to improve performance, quality, and knowledge transfer using information and communication technologies. Evaluation of the effectiveness and quality of such efforts is challenging. A macro and micro-level system evaluation conducted with a 14000 member US hospital administrative services organization examined the appropriateness of a blended face-to-face and technology-enabled performance improvement and knowledge development system. Furthermore, a successful team or microsystem in a high performing hospital was studied in-depth. Several types of data methods including interview, observation, and questionnaire were used to address evaluation questions within a knowledge development framework created for the study. Results of this preliminary study focus on how this organization attempted to organize clinical improvement efforts around quality and performance improvement processes supported by networked technologies.

Keywords: Knowledge transfer, Microsystems, Knowledge Systems, Evaluation.

1 Introduction

The relationship between knowledge, performance, and quality development within organizations is complex. Knowledge management theory recognizes the importance of efficient information management but greater emphasis is on the creation and sharing of knowledge. There are several reasons for this shift. One is the value organizations place on innovativeness requiring freedom to experiment. Dorothy Leonard-Barton [1] suggests learning organizations are confident in their ability to innovate and solve problems precisely because they "know what they know". Sustainable knowledge creation presents the challenge of finding and reusing what one knows when it is needed.

Knowledge management approaches in healthcare are diverse and often related to increased emphasis on quality of care. Berwick [2] argues that experiential learning by healthcare professionals can be facilitated by local tests and evidence collection using plan-do-study-act cycles. This notion has gained some traction and is seen as an alternative to randomized clinical trials especially relative to understanding process innovations.

One way to support knowledge created through experiential learning is to support individuals in their collaborative practice. Teams or units of individuals with technical expertise and prior experience with a particular problem and a sufficient amount of resources have great potential to innovate. For example, a study of 43 hospital teams or microsystems identified eight themes associated with high performance. Those themes are: integration of information, measurement, interdependence of care team, supportiveness of the larger system, constancy of purpose, connection to community, investment in improvement, and alignment of roles and training [3].

Socially mediated knowledge development approaches represent a convergence of knowledge, technology, and design practice situated in communities of practice. One study explored how a community of practice facilitated quality initiatives in surgical oncology [4]. The socio-cultural context in which work is performed, and knowledge is applied, is the subject of such communities. This idea supports the notion that organizations learn as they solve problems [5].

Nonaka [6] suggests that knowledge is not another branch of information technology but rather is a kind of human capital simultaneously produced and consumed. This notion of renewable knowledge suggests a convergence of social-cultural and technical systems. The current evaluation study is grounded in the practice of knowledge development within and across hospital systems.

2   Methods

This study was conducted in partnership with a 1400 member, US-based hospital administrative services organization. The overall goal of the study was to determine if technology-enabled Clinical Improvement Services (CIS) support critical performance of hospital staff. Specific questions addressed: What is the theoretical and intellectual basis for the CIS design? Do these services support member performance and quality improvement projects? Do they support member knowledge development processes?

Examples of online CIS approaches include the documentation and dissemination of member hospital best practices related to key clinical indicators; forms, documents, and artifacts; and educational interactions such as podcasts, videoconferences, forums, and coaching sessions.

2.1   Study Design

Data collection was grounded in the knowledge development framework shown in figure 1. The framework represents a basic systems approach that describes iterative knowledge building cycles. This framework is conceptually similar to the Plan-Do-Check-Act problem solving cycle developed by Shewhart in the 1930's and popularized by Deming and Juran. Solving problems that impact business processes drives activities in the planning phase. Small teams or microsystems are convened to conduct analyses, and generate and test potential solutions to problems or address opportunities for improvement. Artifacts created during this phase are essential to developing capacity for solving future problems. Selected solutions are validated through testing and evaluation. Process and product artifacts are captured, formatted,

Fig. 1. Knowledge development system incorporating knowledge creating (planning, building, evaluating) and knowledge sharing (storing and sharing) processes

tagged, and digitized for storing and retrieval. New knowledge is shared across internal and external networks in phone calls, hallway conversations, formal meetings, emails, forums, and conferences.

Research questions were investigated using literature review, questionnaire, direct observation, and interview. A case study conducted with a high performing hospital team was completed to see the framework in action.

3   Findings

Macro-level. A major finding based on questionnaire results is that current web-supported CIS were not easily understood by hospitals with less sophistication in quality and performance improvement processes. These hospitals had fewer resources to learn about, adopt, and adapt CIS innovations locally. Use of the CIS by hospital performance or quality improvement staff was more event oriented rather than as a primary resource. This finding suggests that the CIS design was more traditional in that it focused on transactions and artifact storing rather than promoting dialogue and a practice community. Questionnaires revealed that high performing hospitals frequently share successes and practices in informal social and professional networks with in-hospital peers and those in other hospitals. The findings suggest that online knowledge development systems should focus on patient care and related problem solving rather than on knowledge development.

Micro-level. Case study findings were interpreted within the framework in figure 1. Study of a high performing hospital in the southeastern United States indicated that a culture of improvement created conditions for strategic resource allocation to support team problem solving. Interviewees used the language of quality and performance improvement frequently, knowledgably, and passionately. This level of engagement was not based on specific clinical improvement services, processes, or

tools but rather on patient outcomes. Examples of team problem solving within the knowledge development systems framework include:

Planning: *"…increased awareness of SCIP really drove home the importance of follow through on orders… I had heard of SCIP but thought it was an Op Room thing...never realized the importance of it pre and post op."* Director, Surgical Nursing.

Building: *"With a plan in hand, we worked with the team to create the new discharge instructions and related documentation …"* Director SCN.

Evaluating: *"…my role was to validate this new product…I call patients to follow up as to whether they rec'd discharge instructions and if they were understandable to them… we were at the 40th percentile on this core measure; after one month we were at 73rd percentile; and after two months we were at 90th."* Performance Improvement Specialist.

Storing: *"We worked with a physician to get the documentation and instructions included in the patient file."* Director SCN.

Sharing: *"I just spent an hr discussing our pilot and process with a peer, Director of ICU, who thinks we should standardize the discharge instructions process across the system."* Director CCU.

4   Conclusions

The knowledge development system framework provided a useful way to link the evaluation of clinical improvement services to specific hospital quality practices focused on patient care. Analysis of the context and processes related to actual performance and quality improvement processes across a variety of healthcare organizations will provide an excellent grounding for design of information and communications technology support systems. Identification of the current levels and types of knowledge sharing that can be leveraged and more effectively supported with technology across a wide range of hospitals is the subject of future study.

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