Thematic Analysis of CPOE Implementation in Inpatient Settings Using Fit and Subjective Usability in the DeLone Model

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Introduction

- Healthcare system: a complex adaptive system.
- Successful Computerized Physician Order Entry (CPOE) implementation is a process of transformation within these complex healthcare settings.
- An “efficient technology” is the one which reinforces current ways of working and performing ongoing tasks and a “transformational technology” as the one which changes the nature of the work.

Objectives

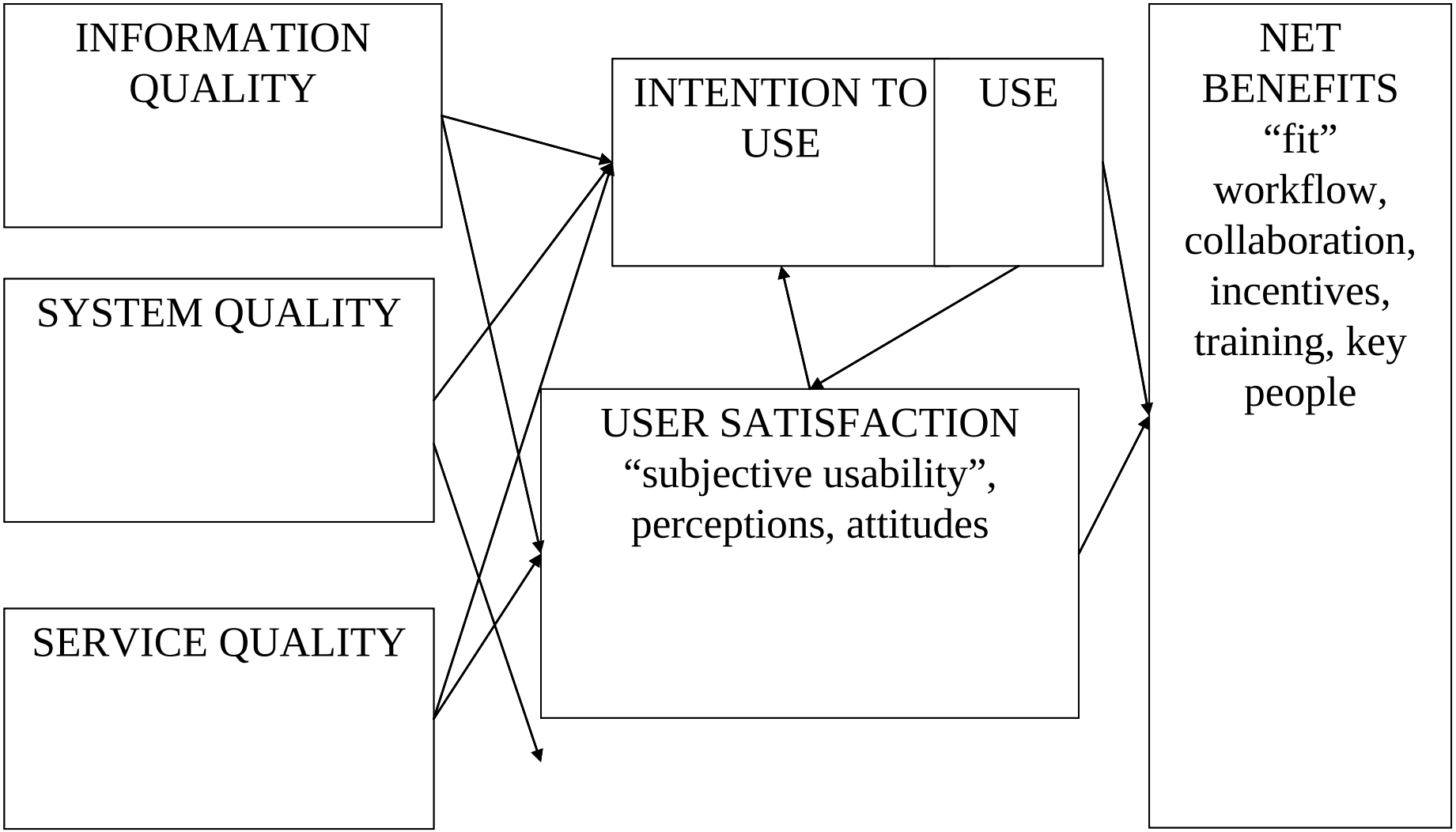
- Kaplan-reviewing implementation is important because: it is often ignored; it does not often concern issues of user acceptance or changes in work; and, it does not examine processes of actual system use during daily activities.
- We hypothesize that successful CPOE implementation means that the system has good fit at the organizational level and satisfaction at the user level as defined by subjective usability.

Concepts Used

- **Fit:** Dimensions to fit: workflow, level of expertise, professional norms, values, institutional setting, communication patterns, organizational culture, technology and information needs.
- 'Fit,' is useful for understanding implementation issues surrounding a particular system, why the same system may be viewed differently by different users, and also why it may be implemented more successfully in one setting than in another.

Concepts Used

- **Usability:** We use Hornbæk's model of usability as it provides the ISO 9241 standard usability definition as the "[e]xtent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction. We shall be concerned with the satisfaction element of usability.
- We examine a sample (19 studies) of the CPOE implementation literature with the concepts of fit and subjective usability within the IS success model of DeLone and McLean (next slide).


INFORMATION QUALITY
SYSTEM QUALITY
SERVICE QUALITY
INTENTION TO USE
USE
USER SATISFACTION
“subjective usability”, perceptions, attitudes
NET BENEFITS
“fit” workflow, collaboration, incentives, training, key people

Results: Thematic Analysis

- **<u>"Fit" is a change of technology and workflow</u>**
- **Fit is a dynamic process.**
- Fit is achieved through change or transformation of technology and work practices. Some authors see only the technology as transforming work, rather than a pure efficiency tool. The organization's track record of making changes in the past influences these transformational changes as CPOE changes committee structures, membership and accountabilities.
- **Encourage change: collaboration**
- People work collaboratively when using clinical information systems and not recognizing this is a source of implementation failure.

Results: Thematic Analysis

- **Encourage change: collaboration.**
- Awareness can be fostered by educating all members of the healthcare team on the activities of other group members, so that each person understands what others do.
- Collaboration must also happen between administration and clinicians. There must also be collaboration between problem solvers meeting regularly with users to work out procedural issues that cross boundaries.
- **Encourage change: incentives.**
- These can include paid release-time fees to physicians to compensate them for time spent outside their clinical and administrative duties. Incentive structures can also exist at the institutional level such as better access to care, better quality of care etc. Incentives must be created to motivate each user to adopt new medical technology.

Results: Thematic Analysis

- **Encourage change: training and support.**
- Training and support are important tools to help staff change and accept CPOE. There must be extensive 24/7 support and a formalized training program before, during, and after implementation.
- Problems will occur; they will be solved only if people focus upon how to make the system work better instead of whether the institution should be implementing CPOE.
- **Encourage change: key people**.
- Key people have universal attributes, including stability through adversity, steadfastness, initiative, and toughness.
- These include: clinicians, top leadership, chiefs of staff, CEO, advisory groups, problem solvers.

Results: Thematic Analysis

- **User Satisfaction is experienced as efficiency**
- People who have already changed and committed to a change focus more on issues surrounding actual implementation whereas those still contemplating the change are more concerned with the pros and cons.
- The strongest correlates of CPOE satisfaction in the literature were efficiency characteristics such as productivity, ease of use, and speed.
- In other words, although the technology itself was transformational, and patients and the hospital benefited substantively from improved quality and reduced costs, the users' satisfaction of the technology was primarily predicted by efficiency concerns.

Conclusion

- We have addressed Kaplan's concern about user acceptance and changes in work by using subjective usability (user satisfaction) and fit respectively.
- We have used a sample of international CPOE implementation literature to find and organize some themes describing these concepts within an IS success model.
- Although the IS success model is useful for thematic analysis, more rigorous techniques of thematic analysis and a broader context for the IS model are needed to capture the transformational impact of implementation.