Usability through System-User Collaboration*
Deriving Design Principles for Greater ERP Usability

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Abstract. Enterprise Resource Planning (ERP) systems have become essential in industry, yet the potential value created through system use can be illusive due to poor usability. Extensive interviews with users revealed that the underlying complexity of these systems manifests itself in unintuitive interfaces that are challenging to use. Given the lack of progress made with traditional design approaches, we propose a different tactic based on a system-user collaborative approach. This entails that the system acts as a collaborative partner by sharing knowledge, providing task-specific support, and adapting to user behaviors. Based on this collaborative view, we derive a set of principles for guiding the design of ERP systems and provide concrete examples demonstrating (1) how a lack of collaborativeness contributes to various usability problems, and (2) how our proposed design principles can be used to enhance the collaborativeness and, hence, the usability of ERP systems.

1 Introduction and Motivation

Enterprise Resource Planning (ERP) systems are widely employed in industry to integrate various business processes. While this integration has the potential to provide tremendous operational value, using these systems can be a challenge for novices and even experienced users. ERP interfaces are typically unintuitive, presenting an abundance of information reflecting the underlying complexity of the processes around which they are built. The poor usability of these systems has been noted in industry reports [13,14] and field studies on usage [15,25,7].

The lack of progress in addressing the usability of ERP systems has motivated our interest in this topic. The prevailing theme in user interface design is the human-centered paradigm, with its emphasis on knowing the user. While user-based methods work well for uncovering usability problems [8], they typically focus on a narrow scope of specific features of the existing implementation. This tends to lead to localized fixes rather than system-wide alterations of the design [19]. This is particularly problematic for ERP systems, whose broad scope and

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integrated functionality require the use of multiple system features by multiple users for achieving comprehensive goals.

We propose that viewing system-user interactions through a “collaboration lens” affords a novel perspective that is advantageous for improving usability. The human-computer collaboration paradigm specifies that the system must act as a partner to its users by supporting them in the increasingly complex environments of modern applications [11]. This changes the dynamic from the user being the only one with responsibilities and knowledge about the process to one in which the system is called upon to do its part. Note that this approach is different from Computer-Supported Cooperative Work (CSCW), which is concerned with computing technology that supports human collaboration.

The work presented here is part of a multi-method research project for addressing ERP system usability that uses collaboration theory as a unifying framework. Components of this project include conducting field studies for identifying usability issues, modeling usability based on collaboration theory [7], developing software artifacts for addressing usability limitations identified in field studies [2], and designing an infrastructure that supports input logging for use in evaluating proposed design interventions [1].

In this paper, we make the following contributions:

– demonstrate how to use the theory of collaboration to derive novel design principles for improving the usability of enterprise systems,
– highlight usability problems in ERP systems based on findings from our interviews and observations in the field, and
– link the collaborative properties of a system to usability using empirical data and theory.

The next section of this paper describes our theoretical framework and related work. We then examine the link between usability and collaboration as revealed by concrete examples from a field study of ERP users at three organizations. Next, we derive a set of design principles based on characteristic properties of ERP systems and illustrate how they can be applied for achieving greater usability. We conclude with a discussion and directions for future work.

2 Theoretical Framework and Related Work

2.1 Human-Computer Collaboration

The collaboration paradigm of human-computer interaction (HCI) [24] views the interaction between a system and its user as a process in which they work together to achieve shared goals. There are various philosophical accounts [23,14] and computational frameworks (e.g. [12,6,17]) of collaboration involving humans and/or computer agents. Terveen’s review article [24] summarizes several different approaches to modeling collaboration in interfaces. Terveen identifies the following key issues as being present in virtually all of these approaches: