Chapter 2.30
Understanding the Nature of Task Analysis in Web Design

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ABSTRACT

Designing usable Web-based interfaces challenges practitioners to carefully consider end-user behaviour and requirements. Unfortunately, in meeting this challenge, human-computer interaction (HCI), task analysis is often poorly understood and applied during Web design activities. Rather than purely evaluating usability against prescriptive guidelines, we argue that designing for Web-based interaction requires a more holistic and descriptive approach. This chapter provides an overview of cognitive and postcognitive HCI task analysis frameworks, and their respective abilities to capture a systemic view of stakeholder requirements. As such, this chapter provides a valuable resource for researchers and practitioners alike.

INTRODUCTION

Although improved system design results when researchers and developers understand how users use technology (Raeithel & Velichkovsky, 1996), understanding individual user traits, such as motivation and other contextual factors that guide user participation during computer-mediated activities can be deceptively complex. Simply asking users what they want and how they use a system is further complicated by the fact that users are often incapable of vividly and objectively describing their experiences with the system (Sommerville, 2004). Expertise, sociocultural, and organisational policy factors may impact perception of purpose, meaning, and context, and hence influence the quality of user feedback (Gasson, 1999). Therefore, determining whether a

system is *fit-for-purpose* for a particular end-user population can be extremely challenging.

As developing fit-for-purpose systems is a principal concern of human-computer interaction (HCI), the system design process must ensure that end-user requirements are validated against those who have a vested interest in its use (stakeholders). Therefore, choosing the right HCI framework for eliciting, analysing, and modelling stakeholder requirements is critical for ensuring overall system quality (Farmer, Gruba, & Hughes, 2004). The process of seeking to understand the human nature of these requirements is referred to in HCI as *task analysis*. There is a wealth of frameworks, models, methodologies, and tools that can be applied to assist in this process. However, choosing the "most appropriate" approach is dependent upon several factors, including: the domain, context of use, and available resources.

Task analysis is arguably the most important aspect of HCI as it provides the analyst, researcher, or developer with insights into the nature of human behaviour. A major benefit of conducting task analysis throughout the software development life cycle (SDLC) is its communicative power and ability to elicit and elucidate requirements throughout each phase of development via a set of formalised attributes and notations. Unfortunately, comparing and choosing the right task analysis approach during system design is frequently hampered by the lack of universal notations and user attributes that can be applied across frameworks (Balbo, Ozkan, & Paris, 2004).

The aim of this chapter is to provide a critical overview of task analysis in HCI and its application to Web design. Specifically, the chapter will discuss the cognitivist origins of task analysis, and the recent shift towards more ecologically valid approaches. We discuss several leading approaches within each paradigm and describe their general applicability to Web design. We conclude with an integrative approach to task analysis that attempts to bridge the divide between cognitive and postcognitivist perspectives.

TASK ANALYSIS IN HCI

The term *task analysis* is commonly used to denote a wide range of activities and processes that attempt to either describe, equate, or predict human performance during task-based interaction (Diaper, 2004). A direct corollary of early cognitive psychological research concerning cognition and procedural knowledge (Kirwan & Ainsworth, 1992; Miller, 1953, 1962), task analysis has been applied successfully to numerous fields of research, including:

- Interactive system design (Newman & Lamming, 1998)
- Safety critical systems design and evaluation (Paternò & Santoro, 2002)
- Cognitive engineering (Rasmussen, Pejtersen, & Goodstein, 1994; Vicente, 1999)
- Computer-assisted language learning (Corbel, Gruba, & Enright, 2002; Farmer & Hughes, 2005a, 2005c)
- Multi-modal interaction (Farmer, 2005)
- Intelligent learning object classification (Farmer & Hughes, 2005b)
- Social intimacy (Vetere et al., 2005)
- Web design (Dix, 2005)

It is therefore not surprising to see an increasingly divergent array of theoretical perspectives emerging on the nature of human-machine interaction. Observing that methodologies in HCI have already reached a sufficient level of sophistication and application, Whittaker, Terveen, and Nardi (2000) have argued that it is time to address existing problems, rather than develop additional idiosyncratic models and notations. Indeed, renewed focus has recently been applied to the problem of integrating and grouping task analysis theories and techniques, which at first glance may appear fundamentally incommensurate (Farmer, 2006; Wild, Johnson, & Johnson, 2003).

The primary aim of task analysis is to produce a reliable procedural description of human praxis.