Chapter 1
Identification and Assessment of Mental Tasks Using Task Flowcharts

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ABSTRACT

Traditional methods for ergonomic evaluation do not consider the identification and assessment of mental tasks. This chapter proposes a method for the Identification and Assessment of Mental Tasks (IAMT) through the development of task flowcharts. Using a semi structured interview and a task flowchart, the mental tasks are identified and described. Applying the Cognitive Task Load Model (CTLM), a cognitive effect is assigned to every mental task identified. A theoretical/common example and a study case were developed to exemplify the proposed method. IAMT method was developed to be useful mainly in industrial environments; however, IAMT should be applied in different work contexts and environments.

DOI: 10.4018/978-1-5225-1974-4.ch001

INTRODUCTION

Over the last few decades, the way many human beings perform their work has changed significantly. Factors such as huge production increments, the use of new and more sophisticated machinery, among others, have modified the traditional ways to work (Hernandez-Arellano, Ibarra-Mejía, Serratos-Pérez, Garcia-Alcaraz, & Brunette, 2012; Salmon, Stanton, Walker, & Green, 2006). The physical component of the labor and the jobs has diminished, whilst the cognitive component has increased significantly. Nowadays it is common to find jobs where the mental component is much higher than the physical one. This has been reported, for example in the work performed by a secretary in an office environment (Sonne, Villalta, & Andrews, 2012), or the work done by a control room operator (N. A. Stanton, Ashleigh, & Cale, 2006). In these cases, workers are asked mainly to stay in front of a computer screen, developing mental tasks.

The traditional methods for ergonomic task analysis and ergonomic evaluation, do not consider the mental evaluation as a component of the analysis. Thus, today exist methods used to develop ergonomic diagnoses, which include physical evaluation or Physical Task Analysis (PTA), along the cognitive evaluation or cognitive task analysis (CTA). However, these methods do not involve the clear identification of mental tasks. The main goal of this chapter is to present a method developed purposefully for the Identification and Assessment of Mental Tasks (IAMT), using task flowcharts.

BACKGROUND

As things stand today, ergonomic evaluation covers two main areas: physical and cognitive, and usually they are considered separately. So, methodologies have been developed in principle for Physical Task Analysis (PTA) and Cognitive Task Analysis (CTA); there are however methods that combine the evaluation of physical and mental tasks. This section presents a review of the most common and most used methods in ergonomic evaluation.

Methods for Ergonomic Evaluation

Methods for physical evaluation are aimed at postural demands, lifting operations, repetitive movements, environmental, and biomechanical stressors. All of them focus on the determination of a risk level during a specific task. Table 1 summarizes the most widely used among these methods.