

Ergonomics

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INTRODUCTION

With the many and vast advances of technology across generations and societies, the need to determine the best ways to align and use the human body in coordination with technology has increased accordingly. While occupational hazards and accidents date back to ancient times, and the Industrial Age resulted in accidents related to machinery, the human disabilities and debilities related to technology may emerge more subtly over time before they become acute.

It is the field of ergonomics that addresses the appropriate alignment and use of the body in all sorts of activities. The fundamental perspective is primarily that of proactive human behavior. However, it really has only been given the limited notice that it has because of the pain and debilitation that has arisen when it is not followed. Thus, a proactive perspective has gained recognition in a reactive environment.

Due to the efforts of the U.S. Department of Labor, and more specifically the Occupational Safety and Health Association (OSHA), the field of ergonomics has received increased press and familiarity with the general public in recent years. However this identity has mostly been in regards to either (1) simple body position and alignment issues or (2) workplace safety.

Therefore, the general public oftentimes does not realize the long term affects of improper postures from using increasingly ubiquitous office/computer technologies because it is not associated with heavy manual labor (Bright, 2006). Nagourney (2002) is but one study which demonstrates that even simple corrections to posture and equipment positioning can result in improved physical health for computer users (see also ECCE, 2006).

At the next level of consequence is the fact that numerous studies have documented that leaving small repetitive injuries uncorrected, those which result from improper posture from using technology and other office equipment, have been found to culminate into health problems over time (Ullrich & Ullrich Burke, 2006). Because of these findings and the direct benefits of

changing position and movement, public, workplace, and formal education needs to be improved.

Rather than isolated or temporary injuries, individuals in these conditions experience compounding effects of improper postures results in continuing, repetitive (oftentimes unnoticeable) injuries. Therefore, OSHA and a broad base of professionals need to continue to educate the general public so that they understand that ergonomics is more than health and safety codes for manual labor and or what may be generally perceived as physically “harmful” workplace situations. At the same time, both personal and a public responsibility for health and safety need to be exercised in communicating information and solutions and then implementing them in the many aspects of our lives in which we use technology.

Ergonomics Example

What does ergonomics mean on a day to day basis for people in 2006 and onward? In a word: *responsibility*. Bringing ergonomics into a very practical example for most readers, Kay’s (2001) article discusses the dilemma we face with the opposing merits and drawbacks of using laptop computers. Kay describes the merits of the laptop computer, presents the drawbacks in its improper use, and then identifies the ergonomic solutions:

The laptop computer is a valuable tool when portability is much needed function. It may not be the best choice when considering the ergonomics of the workstation. ..It is always advisable to use add-on devices such as an external keyboard, mouse and monitor. These items are considered essential equipment for users wanting to achieve ergonomically correct positioning their laptop computer. (para 1)

Rather than an oversimplified solution, this model provides several illustrations as to how to position oneself to use a laptop computer. The document also provides explanations as to why these positions are ergonomically effective.

As mentioned previously, the key here is *responsibility*. Contrary to what we may assume, we cannot not just take a computer out of a box, sit it on any table or our “lap” and continue to type for 6 hours. We have to consider ergonomic issues or else our health, and ultimately our ability to work and to enjoy our recreation time, will suffer.

BACKGROUND

Definition

The word ergonomics is derived from the Greek word for work, “ergo,” and thereby means the “study of work.” The commonly accepted definition of ergonomics is usually stated as the science of designing working environments and the tools in them for maximum worker health and safety and maximum work efficiency.

Furthermore, ergonomics as a field is very much application focused on the study of human physical characteristics and needs. Based on research that seeks to learn about a variety of human characteristics (capabilities, limitations, motivations, and desires), the most appropriate human-made environments are desired to craft living and working environments (Kroemer, 2002).

Kroemer (2002) continues to explain that the information is not confined to the simple solutions the general public might be familiar with in typical public education efforts. Instead, the research supports complex technical systems or work tasks, equipment, and workstations, in addition to the more commonplace tools and utensils used everyday in the workplace, home, and during recreation.

Ergonomics Perspectives Mature

Providing an insightful current perspective on the needs and issues of ergonomics, Kroemer (2002) summarizes the field as being “human-centered, transdisciplinary, and application-oriented.” This characterization accurately moves the description of the research, development, and educational/intervention work of the field of ergonomics circa 2006.

Rather than being solely focused on the issues of machines and positions, perhaps those of kinesiology and mechanics, ergonomics has matured into a field that necessitates the sharing of understanding across

several disciplines. The focus of those who work in this field is very much “human centered” in contrast to what may appear in the early literature, publications and even to those viewing the work from the outside. Ergonomics is not so much concerned with equipment and conditions as it is concerned about human interaction, human needs, and human responses to those and other environmental surroundings and interactions.

Human factors specialists are united by a singular perspective on the system design process: that design begins with an understanding of the user’s role in overall system performance and that systems exist to serve their users, whether they are consumers, system operators, production workers, or maintenance crews. This user-oriented design philosophy acknowledges human variability as a design parameter (National Research Council, 2002, para 3).

The transdisciplinary nature of ergonomics is easily identifiable in each study and educational material that is reviewed. For instance, a review of the material that is found at the U.S. Department of Labor’s (2006b) site, <http://www.osha.gov/SLTC/etools/computer-workstations>, reveals that this introductory page and OSHA’s eTool site together describe how users should evaluate their position and use of desktop computers and keyboards (<http://www.osha.gov/SLTC/etools/computerworkstations/positions.html>).

Examination of these diagrams and information reveals concerns that derive from the disciplines of biology, anatomy, and physiology. More specifically, the issues of visual acuity, eyestrain, spinal alignment, disc compression, and nerve damage become apparent as one reviews the points that need to be considered about positioning oneself or others at a computer workstation. In this way, the medical specialties of optometry, ophthalmology, orthopedics, chiropractic, and neurology would all be relevant in determining the accuracy of the information to be presented to the public in ergonomics informational materials, educational publications, or presentations.

In addition, once one considers the problems that can arise when people engage in activities when the best ergonomics conditions are not followed, transdisciplinary specialists and expertise are again indispensable. For instance in the case of spinal disc compression which might be aggravated by spending long periods of time sitting erect at a desktop computer, specialists in physical therapy, orthopedics, and pain management could be involved in treating the immediate difficulties and

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