Macroergonomics

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Learning Objectives

After reading this chapter the reader should be able to do the following:

• Understand the definition, principles, and use of Macroergonomics.
• Describe the role of therapists in assisting in macroergonomic interventions or research efforts.
• List the ways in which Macroergonomics may differ from as well as interface with other disciplines, such as industrial engineering, organizational psychology, physical therapy, and occupational therapy.
• List some basic principles of Macroergonomics and how they may contribute to long-term, lasting change within an organization.
• Select, understand, and discuss a macroergonomic versus a Microergonomic approach, when to use each, and their pros and cons.
Macroergonomics

- A sub discipline of human factors or ergonomics that emphasizes a broad system view of design and fitting the organization to the person or persons within that organization
Macroergonomic Origins And Movement

- In 1978 the Select Committee on Human Factors Futures (1980-2000) was initiated to study societal trends and their impact on human factors and ergonomics.
- The sixth item identified was the “failure of traditional (micro-) ergonomics.”
Paying attention to specific components of the system, such as a workstation, might mean the bigger picture of the work environment was lost.

Organizational design and management (ODAM) has been integrated into the human factors or ergonomics field, with venues including the Macroergonomics Technical Group within the Human Factors and Ergonomics Society and other countries’ societies.
Microergonomics

- An approach to ergonomics that emphasizes the examination of the interface between person and the product, as opposed to other factors.
Macroergonomics explained

- Basically, rather than fitting the task to the man, Macroergonomics proposes to fit the organization to the person or persons within that organization.
In fitting the organization to the people, the ergonomist assesses each element of an organization with the thought that each element has the potential for redesign.

In addition, the ergonomist must also consider systems outside the organization that affect the organization.

From the highest level of the organizational hierarchy to the entry-level worker and from the most intricate technology to the simple interactions by the water fountain, all elements are interconnected with one another.

All have an impact on the achievement of an organization’s objectives.
The assessment includes looking at the organization’s complexity i.e. both the segmentation of the organization, known as differentiation,
Integration of the organization, known as integration, formalization (degree of standardization), and centralization
The difference between “regular” ergonomics, also known as Microergonomics, and Macroergonomics lies primarily in the complexity, both in terms of effort and time.
The Macroergonomic Process

- **Initial Evaluation:**
  - Examine all systems that influence the issue in question
  - External factors
  - Internal factors
Participatory ergonomics

- The process by which workers of all levels help identify ergonomic problems and solutions.
- The participatory process is one of the primary methods used during a macroergonomic project.
- During this process, workers and managers participate in identifying problems, methods to investigate those problems, and the development of solutions.
Using a Team Approach to Identify and Fill the Gaps:

- The immediate team included personnel with backgrounds in research, ergonomics, physical and occupational therapy, and athletic training.
- In addition, a team of consultants was developed from the initiation of the project.
A Research-Based and Community Process

- Clear outcome data should drive decision making and intervention strategies.
- Macroergonomic evaluations and interventions can be costly.
- It is up to the ergonomic team to assure the funding is well spent by demonstrating results through evidence-based outcomes.
The Role Of Occupational and Physical Therapists

- Most occupational or physical therapists will not take an assignment or consultation job that requires true Macroergonomics.

- They should recognize how that individual can potentially fit into various environments during and after treatment, and they provide the guidance to help the individual get back to the “job” of life.
Task analysis can be done by therapists.
Each profession has its own unique set of knowledge and skills.
Therapists can apply a macroergonomic approach to a specific problem or participate on an ergonomic team.
Individuals in a work setting might be experiencing a large number of work-related musculoskeletal disorders (W R M D).
LARGE-SCALE AND LASTING CHANGE (LSLC)

- Ergonomists often choose a Macroergonomics approach to achieve large-scale and lasting change (LSLC).
• Any change must clearly support the **mission and goals of the organization**
• Any change must clearly reflect the **culture and values** of the organization
• LSLC is unlikely to occur unless all **relevant aspects** of a system are involved
• LSLC is unlikely unless workers of all levels understand and agree with the need for change
• **Dictated changes** do not last; attitude and belief changes do last
• LSLC is more likely when **workers of all levels** help identify the problems and solutions (participatory ergonomics)
• LSLC occurs when each individual recognizes his or her role.
• LSLC occurs more readily when participatory ergonomic methods are conducted from the top down, bottom up, and sideways in
• LSLC tends to occur when carefully and methodically introduced, not when introduced quickly and dictatorially
• Although **evidence-based design** can persuade others that change is necessary, both the evidence and the display of the evidence must be relevant to the viewer.

• **Overall system change** sets the stage, so that targeted change can occur in a **climate of acceptance**, yielding the greatest results.

• **Top-level support is essential**
When should a practitioner use a microergonomic approach

- A microergonomic approach is appropriate when the identified problem is limited in scope.
- Limitations in resources can also dictate a microergonomic approach.
Summary

- Therapists are unlikely to perform Macroergonomic analysis and design (MEAD) unless they obtain substantial additional training, such as attending a degree program or a series of college courses.

- These are not skills that can be gained in a short course.

- However, therapists can play a significant role in helping individuals and managers see the value of ergonomics through microergonomic applications.