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Ergonomics

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Ergonomics

Investigation of human physical and mental abilities and the application of this knowledge in the design of products, equipment, and artificial environments.

The application of ergonomics can result in products that are safer or easier to use, such as industrial machines, a family car or food mixer. Alternatively, ergonomics can result in better procedures for performing tasks, from changing a nappy to welding.

Ergonomists are scientists who specialize in the study of the interface between people and the things they come into contact with—particularly artificial things. Their work yields information that helps other specialists, such as designers and engineers, to improve the usability of the products they develop. There is a particularly close relationship between ergonomics and industrial design which has resulted in design becoming more “user-centred” in recent decades. Ergonomists are likely to be involved in the manufacture of vehicles (cars, aeroplanes, and bicycles), household products (kitchen equipment, toys, computers, and furniture), clothing (shoes, sportswear, and work clothing) and many other products. Consider an ordinary family car. The driver's seat must be carefully designed to take account of varying arm reach, leg length, body shape and weight of different users. The instrument panel must be designed so as not to confuse the driver by providing excessive or unclear information. Controls and instruments must be distributed around the car according to where they are best for the driver - not necessarily those places that are easiest or cheapest for manufacture. Such controls should be neither too faint nor dazzlingly bright at night. Also, if the design of the engine layout is based on studies of the problems of real mechanics this will assist the efficient servicing of the car. Even the manual that explains the car must be designed to make it easy to read and find information. Ergonomics can assist with all these requirements. It is the process of discovering people's limitations and preferences as individuals and groups. It is a science of the body and the mind. Ergonomists might therefore specialize in human physiology, psychology or even sociology in making their contributions to design.

Designing products to suit the bodies and abilities of people is not new. Even prehistoric people shaped their tools and weapons to make them easier to use. In the 20th century the search for efficiency of effort and the requirements of mass manufacturing have stimulated research. Psychologists and physiologists have extended knowledge of the workings of our brains and bodies. In 1940 the British psychologist Hywel Murrell worked on improving the efficiency of military equipment such as gun emplacements and the controls of tanks. In describing his work he joined the Greek terms *ergon*, meaning work, and *nomia*, referring to management or organization, to christen the new science. More recently the term “human-factors engineering” has been widely used in place of the word “ergonomics”, since it facilitates a distinction between physiological, psychological, and sociological human factors.

Today, many designers and engineers rely on human-factors research in order to create products that match the needs and preferences of the intended user population. New consumer legislation has encouraged manufacturers to focus on the safety and well-being of their customers. The term ‘inclusive design’ has been coined to describe design processes that takes into account the human factors of a wide range of potential users. For example, some mobile phones are usable and desirable by the young as well as those with poorer eyesight and less nimble fingers. Computer software has emerged as a major area for study by

ergonomists as manufacturers seek to improve the usability of games, internet tools and office software. There have been specialist studies of children and the elderly that enable, for example, architects to design better schools and houses, and clothing manufacturers to produce jeans, coats and underwear that are more comfortable. Partly this ergonomics work has given rise to quantitative data (such as body measurements and other anthropometric data) and provided a better understanding of the dynamic movement of our bodies. It has also generated qualitative data from usability studies and these have ranged from studies of people using products in a laboratory to focus groups and covert observations of people going about their normal lives. The objective of these studies has been to provide knowledge to aid the process of making products easier to understand, safer to use, and better matched to the human body. In our modern consumer culture, ergonomics today is as concerned with designing for pleasure as designing for efficiency.

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