IMPROVING THE QUALITY OF WORK: ERGONOMICS AS A COMPLEMENTARY DISCIPLINE TO SOCIOLOGY

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Ergonomics focuses on microscopic aspects of work such as the interaction between the workers and the machine, while sociology usually addresses macroscopic concerns such as the broader social structure and processes within which the worker operates. The paper describes the discipline of "ergonomics" and illustrates how it can complement the discipline of sociology.

In these contemporary times when scientific knowledge grows rapidly and disciplines transcend boundaries, multi-disciplinary and interdisciplinary approaches are increasingly being used for a deeper understanding of various phenomena. In some instances, the emergence of new disciplines can be traced to newly discovered ways of combining and using knowledge derived from related disciplines. One discipline with its particular approach may give new insights to another discipline in the study of the same phenomenon. An example of this is ergonomics, a little known discipline in the Philippines.

The sociology of work has been a neglected area of study in this country. Much concern has been devoted to research on development such as poverty and the means to correct inequalities such as employment and education. Sociologists have focused on productivity but given little attention to the work setting and how the worker can be productive under improved conditions. It is acknowledged that development takes place in the wider context of social, political and economic structures.

Upgrading the quality of work through the improvement of working conditions and environment can lead to changes in the structure of employment. The main concern of this paper is to suggest that more attention should be given to the worker and the work setting where productive activity actually takes place. An identification of the causes and consequences of poor working conditions and environment is a step toward the improvement of the quality of work. For this purpose, ergonomics can be useful to sociology.

In this paper, the discipline of ergonomics is introduced and some illustrations are given on how and why it can complement sociological studies of work. First, the discipline of ergonomics is briefly explained. Second, some examples of ergonomic research and applications are presented. Third, some examples of related areas of sociological research are also given to show common concerns. Fourth, the usefulness of ergonomic research and some of its limitations in industrializing countries are cited.

The discipline of ergonomics

The term ergonomics, coined by an Englishman named Murrel, was first adopted in 1949 during the establishment of the Ergonomics Research Society. This meeting was composed of physiologists, psychologists, and engineers who met to discuss problems of adapting work to the human individual (Laville 1981).

Known as a science of work, ergonomics may be defined as "the sum total of scientific knowledge concerning man necessary for the conception of tools, machines and equipment which can be used with maximum comfort, safety and efficacity" (Wisner 1973). Ergonomists study how the worker functions in various activities with the objective of conceptualizing tasks, tools, machines and systems of production (Laville 1981).

As an applied discipline, ergonomics is mainly concerned with the improvement of the quality of an individual's working life. Using scientific methods, ergonomists try to humanize work by adapting activities and machines to the worker. This position is contrary to Taylor's idea of scientific management where the worker adapts to the machine's efficiency.

Ergonomics, with its roots in the sciences of physiology and psychology, can be considered as a body of interdisciplinary knowledge. It has progressively enlarged its scientific base to include other disciplines because of the complexity of how the person functions at work (Laville 1981). More recently, the usefulness of other disciplines such as sociology, anthropology, geography, and computer science has been recognized by ergonomists. Engineering and management have also contributed to the ergonomists study of manufacturing and process technologies.

As ergonomics increasingly makes use of interdisciplinary knowledge, it becomes open to the risk of losing its limits in relation to other fields of study. However, it retains its identity as a distinct science by keeping its principal objective which is the conception of how the individual functions with tools in the work situation (Laville 1981).

Ergonomics: research and applications

In the United States, early studies in ergonomics were intended for military applications and space research. For example, anthropometric measurements were used as the basis for the design of military hardware. In France, ergonomics had its beginnings in research and teaching; then, it progressively reached the industrial sector (Laville 1981). However, in many countries in Western Europe like Belgium, Switzerland, and the Scandinavian countries, industrial problems provided ergonomics with its areas of application and research themes (Laville 1981).

For example, the "ergonomic chair" has been designed for man based on the individual's physical dimensions and the work he does. Ergonomists designed the chair for computer users considering the position of the VDU (visual display unit) in relation to certain factors, e.g., the user's height, reach, line and angle of vision, length to arms and legs, and the different tasks to be performed. At present, ergonomists continue to do this kind of work but they have also gone beyond studies of this nature.

Trends and developments in ergonomic research are closely related to changes in scientific knowledge which influence the evolution of problems in the work setting. Current ergonomic studies include such topics as the consequences of working conditions on workers' occupational health and safety, and

provide data for the design of equipment, for the conception of work organization, and training (Wisner and Daniellou 1986).

Recent studies in work medicine reveal that technologies have brought about new problems at work. Certain diseases have also been found to be occupation-related or -caused. Exposure to radiation, inhalation of fumes and gases, and contact with certain chemicals are some examples of hazards at work which may cause respiratory ailments, dizziness, headaches or allergies among workers.

With the increased use of VDUs for word processing in recent years, fears have been expressed about their possible harmful effects, e.g., on pregnant women-users (McDonald 1990) or on vision (Bergqvist et al. 1990).

The carpal tunnel syndrome has been found among frequent users of typewriters, computer keyboards, calculators and jackhammers. The symptoms of this disease include pain and numbness of the hand due to pressure and chronic trapping of the involved nerves. In severe cases, if surgery is not performed, it can lead to a deformity where the hand becomes claw-like. The use of keyboards has also been associated with musculoskeletal strain (Guggenbuhl and Krueger 1990).

In the assembly line where workers cannot leave their work station to go to the toilet unless the machine is turned off, a higher rate of kidney ailments has been observed.

The advent of high technology has changed the work environment and work demands giving ergonomists new research concerns. While developments in the field of electronics have revolutionized manufacturing and increased productivity, they have also altered work and brought about problems. For example, the changed rhythm and pace of work has made shiftwork and nightwork possible. Improved machine efficiency has resulted in increased workload and modified work patterns.

Studies have been done on stress at work brought about by the introduction of machine-paced and machine-monitored computer systems (DiTecco et al. 1990). Common complaints by air traffic controllers who go on strike include heavy workload and stress because of the increased volume of airplane arrivals and departures at international airports.

Having identified problems in the work situation, ergonomists recommend changes to improve work like redesigning jobs and machines, or modifying work processes and environment to improve work. An example is the development of a split keyboard which is adapted to the normal position of a person's wrists to minimize problems like the carpal tunnel syndrome.

Ergonomic and sociological studies of work

Ergonomic and sociological studies of work focus on such topics as the socio-technical system; the organization of work; the social psychology of the worker; the sociologies of labor, industry or occupations; the impact of technology on work. Studies on such topics contribute to a better understanding of the worker in rapidly changing societies.

Modernization and development are viewed by sociologists as having social, economic and political consequences for society. New technologies bring new roles and ideas. Increased social differentiation can lead to structural changes like new patterns of work, decision making, specialization, division of labor and power relations. Greater specialization and division of labor can result in the emergence of new positions, new skills and qualifications. Consequently, new mental orientations, work values, and perceptions of work may develop.

For example, new technologies like computers have had consequences on decision making, division of labor and specialization in organizations. Due to computerization, the concentration of information or supplies in the hands of a few (e.g., an EDP staff) has altered power relations in the work setting. New positions have been created and special qualifications required. The management of information systems has led to the emergence of new organizational structures and patterns of work.

In factory systems, offices or firms engaged in productive activities, machines are an important component of the work process. A knowledge of the conditions under which these machines are used at work contributes to a deeper understanding of the worker. In studying work with the purpose of improving working conditions, ergonomics can contribute to sociological studies of humans at work.

The accidents at Bhopal (a chemical plant) and at Chernobyl and Three-Mile Island (two nuclear plants) exemplify the problems brought about by the use of highly complex technology. The Bhopal accident was found to have been caused by technical, economic, and socio-cultural factors, e.g., reduction of qualified personnel to reduce costs, decision making in the organization, the location of the plant in a densely populated area, switching off the alarm system "so as not to disturb the neighborhood" and labor problems (Wisner 1989).

The trend toward interdisciplinary research can be seen in the related concerns of sociology and ergonomics in the study of work. While sociologists study the more macroscopic aspects of work, ergonomics focus on its microscopic aspects such as the interaction/interface between humans and the machines. Work at the office or shopfloor is organized within the broad framework of a social and technical system. With a detailed study of how humans function at work, ergonomists can complement the sociologists' study of the broader social structures and processes within which the worker operates.

Improving the quality of work in industrializing countries

Not all ergonomic research undertaken in industrialized countries are suited to the current needs of those in the process of industrialization. Some examples cited are more applicable to industrialized countries which have the means to do research. They also have the resources to implement changes and improve the quality of work. However, though industrializing countries can learn from these studies, they cannot always introduce changes which entail great cost.

They have to develop different approaches and cheaper ways of solving their problems. There is a need to develop an ergonomics for industrializing countries which is suitable and affordable. Tools used to study work have to be adapted to the poorer country's needs and objectives.

Research concerns of industrialized and industrializing countries vary because of differing social, cultural, political and economic history and conditions. In many cases, what industrialized countries consider as "givens" such as codes and standards of safety, anthropometric data for tools and equipment design, or suitable protective devices for workers, have yet to be developed by the industrializing countries.

As previously mentioned, improving the quality of work has been a neglected aspect in the study of development. Economic and social development will not necessarily lead to an improvement of living and working conditions. Preoccupation with productivity is not enough

because providing jobs for the worker does not guarantee that the improvement of one's working life will follow. In addition to determining the measures that can be taken to increase productivity, attention has also to be directed at what happens to the worker at work. There is no need to wait and ensure everyone has a job before attempting to improve working conditions.

In the Philippines, improving the quality of work is not an easy task. There are many constraints such as: the unfavorable economic conditions; a declining quality of educations the resistance of management to invest in the improvement of conditions at the workplace; and the non-existent or weak enforcement of safety and work standards. Moreover, labor lacks awareness of work hazards and how working conditions may be improved.

Even when there is awareness, workers are usually powerless in their fight to eliminate work hazards and improve their working conditions. This problem can be seen in the case of a paper mill where despite some work accidents and the death of a worker, labor did not succeed in having safety structures installed by management. This case was reported in the newspapers and on television several times but the mill has continued to operate.

For industrializing countries, ensuring worker safety and comfort is not seen as a priority when providing employment is a more basic concern. Safety is difficult to enforce when means are limited, or when workers lack awareness about hazards at work. Employers consider the increase of production as more important than investing in the improvement of conditions at work. Workers do not have much choice because of the stiff competition for jobs. When there is a high rate of unemployment, one is grateful to have a job, so why complain and jeopardize one's position?

In the Philippines, limited attempts to increase consciousness about safety and improving working conditions can be noted. For example, TV time has been used for very brief film clips on safety at the work place. The Occupational Safety and Health Center, a Japanese financed institution, under the Department of Labor and Employment provides training courses on safety and health. It also provide services for testing equipment, protective devices and air quality in the work setting. The Center also has medical equipment and personnel to diagnose workers with occupation-cause diseases. However, small firms may not have the means to avail themselves of the services offered.

At present, very little is being done to systematically increase the awareness of various sectors and sensitize them to the importance of improving working conditions. This accounts for the occurrence of accidents which could have been avoided if people knew what precautions to take. Different strategies can be used for various sectors like labor, management, students, and housewives.

Television, radio, newspapers, ads, calendars and posters can be tapped to increase safety consciousness at the workplace. Schools through their curricula can raise the awareness of students about improving the quality of work and sensitize them to more general concerns such as safety at home and the environment.

It is about time to consider the worker as a person in the production system. Interdisciplinary studies such as ergonomics and sociology can contribute to the improvement of the quality of working life. The worker can be more productive under better conditions of safety and comfort at work.

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