

The Relationship Between Orthotics and Gainful Employment of the Disabled

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Statement of Problem

Physical and sensory disabilities restrict individuals from functional access to the environment.^{1,2,3} Since our environment is best suited to the average person, losses such as these represent formidable barriers to fruitful interactions with the environment and society.

Of special significance in this regard is the ability to function productively in gainful employment. National statistics reveal that the unemployment rate among the disabled is tenfold that of the general population (70% versus 7%).⁴ Barring all other variables, this statistic reflects that our environment is especially inaccessible to the disabled.

There are several factors which contribute to this serious unemployment problem.^{1,4} Notable among these is the fact that the disabled are unable to return to work due to "access" deficiencies caused by the nature of their disability. In this sense "access" means to bridge the barriers to the environment imposed by physical or sensory disability (Figure 2). This paper deals with the probable relationships between adaptive devices and employment/economic opportunities for the disabled.

Probable Solutions to Access Deficiencies

Appropriate solutions to these "access" problems can be complex, but all necessitate the use of orthotic or adaptive devices. Typically, these devices will aid the disabled to achieve a level of performance that, at best, approaches that of the able-bodied person.

The primary device for the severely disabled remains the wheelchair which, when appropriately prescribed and adapted, provides mobility throughout the workplace and good sitting posture for proper interface with tools at the workstation. A stand-up chair allows the worker to utilize a standard file cabinet and reach objects on higher shelving. Quadriplegics can manipulate keyboard sticks either with wrist-driven flexor-hinge orthoses if C-6 function is present or with the use of a universal utensil holder for those with C-5 function.

The advent of high-technology electronic devices such as computers and robots has greatly expanded the horizons of the severely disabled in the workplace. These devices, which are cost and energy efficient, can transform minimum physical energy into tangible and im-

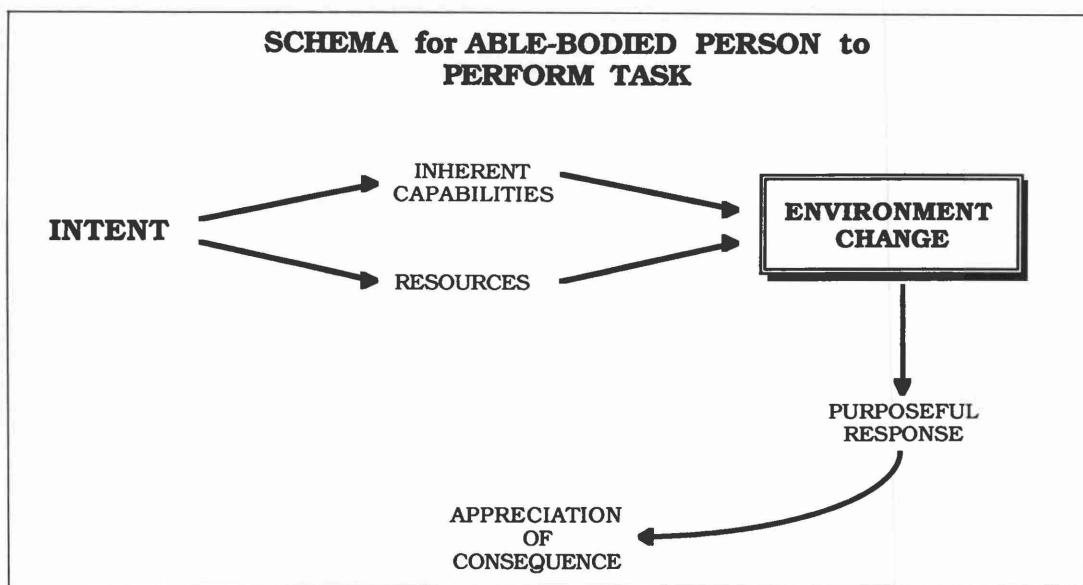


Figure 1.

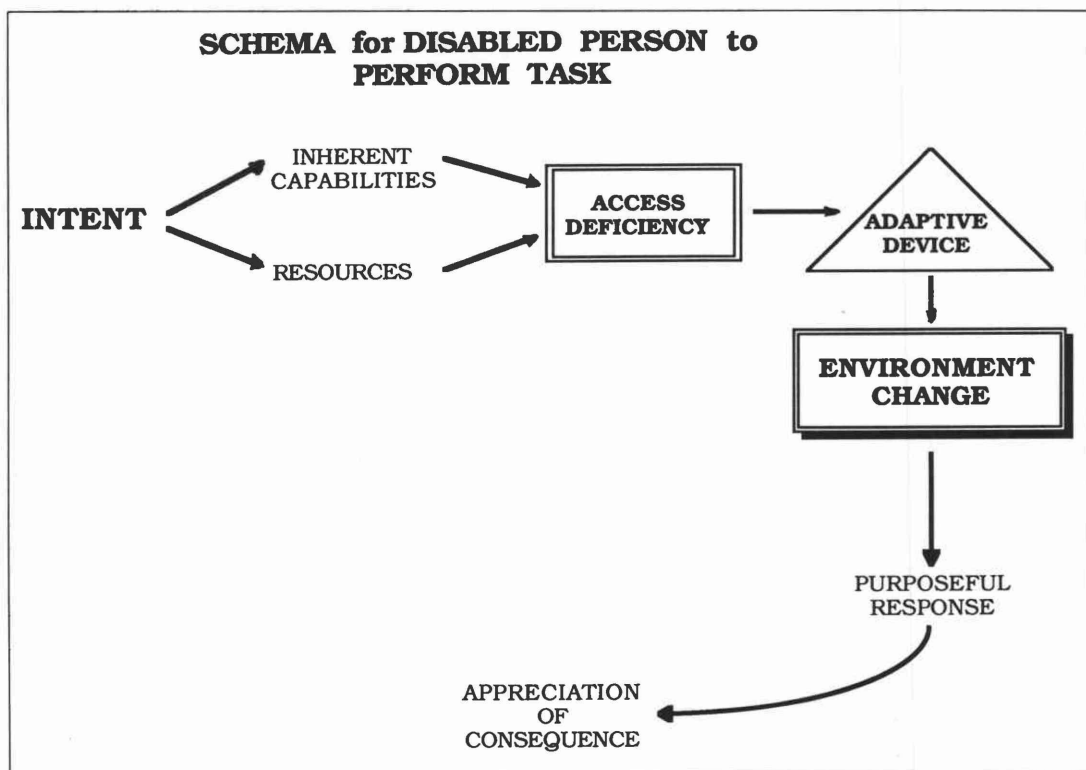


Figure 2.

pressive work events. A simple example is that of a quadriplegic operating a microcomputer by activating a switch by a "sip and puff" device or speech-recognition software and hardware.

For the purpose of this discussion, it is necessary to focus on the relevance of these devices to independent living and the achievement of gainful employment for the disabled. A behavioral model for task performance may be considered which allows the definition of the necessary device required to achieve a particular task.

Figure 1 is a schematic representation of the performance of a common task by an able-bodied individual. In this illustration, an intent or desire to perform a particular task is first identified.⁵ After assessing the person's inherent capabilities and resources, the activity can then be performed. Consequently, the immediate environment is altered, a purposeful response is made, and the consequences are appreciated.

Figure 2 depicts the same task presented to a disabled individual. This schematic is altered to demonstrate the physical and/or sensory barriers to completing a similar task.⁵ A disabled person may have a desire to perform this task, but may not have the same inherent capabilities or the resources as the able-bodied counterpart. At this juncture, "access" deficits to the environment become obvious. An adaptive device is required to facilitate the fulfillment of this task. One might expect the appreciation factor to be much higher compared to the able-bodied person.

Improvement of Function

For many years orthoses have been successfully fitted to restore and sustain the ability to carry out common activities of daily living. These biomechanical devices have improved the ability of the disabled person to perform such physical tasks as sitting, walking, reaching, and grasping.

Functionally, many of these activities are no different than those found in the current workplace. Those disabled persons previously employed in manual labor or manufacturing jobs would probably be displaced from their previous employment. This is due, in part, to the fact that conventional orthoses have definite

limitations in their ability to replace the physical potential of the able-bodied.

Therefore, till now, the highly disproportionate number of unemployed disabled persons does not indicate a positive correlation between employment and the use of traditional orthoses or adaptive devices. However, the emergence of microcomputer technology during the last decade has provided new potential for more effective use of these devices. Furthermore, the microcomputer can be regarded as both a biomechanical accessibility device and an employment tool which can be utilized for physical and economic rehabilitation.

The Change in Definition of Work

Our global economy is rapidly evolving from an "industrial" to an "information" age.⁶ Jobs are becoming more knowledge-based with increasing dependence on computer technology as the sole productivity tool.⁷ Indeed, the management of information is being realized as a central resource or commodity for jobs. Consequently, demand for manual labor is being steadily replaced by a demand for workers who can effectively manage information. In the coming decade, more than 50 percent of all jobs in this country will be found in high technology based information management. The personal computer is the principal instrument used in these jobs.⁷

These events are quite beneficial to those who are physically disabled, because the labor market will depend in a large degree on mental rather than physical capabilities. Coincidentally, the tool used in these new jobs is the same tool that can be used to access the environment: the microcomputer.

Economic Rehabilitation

Even in view of recent economic and technological developments, the question of the high ratio of unemployment among the severely disabled remains a serious and complex problem. In most cases, the severely disabled are displaced from their previous careers and require intensive rehabilitation to re-enter the job market. This implies that rehabilitation is certainly not complete until educational/retraining and economic goals are met to achieve financial independence. Therefore, complete reha-

bilitation is defined here as the process by which a person who is disabled and unemployed, can be physically and, more importantly, functionally and economically rehabilitated. This can only be achieved through a comprehensive program which includes not only conventional strategies of physical and occupational therapy, but vocational diagnostics, vocational counselling and retraining, and lastly, job placement.

MEED (Microcomputer Education for the Employment of the Disabled)

Appropriate vocational diagnostics and job retraining are key elements in successful economic rehabilitation. In most instances, this training has been inadequate, frequently resulting in supported job placement. Such a disincentive is often compounded by the possible loss of government-subsidized unemployment benefits and health care coverages.

Therefore, at the University of Miami, we have developed an economic rehabilitation program based on high-technology called MEED, or Microcomputer Education for Employment of the Disabled. MEED was conceived from the federal Projects With Industry (PWI) model to pilot a high-technology approach to rehabilitative training. It is a microcomputer-based training and placement program for the severely disabled, teaching information management skills which are necessary for competitive employment in business. This training is comprehensive, job-targeted, and cost-effective.

Other Causes of High Unemployment

Although access barriers are keeping many disabled persons from the workplace, their high rates of unemployment certainly reflect a minimal relationship between employment and adaptive devices. These devices may promote job function, but may not significantly increase the chance of that person acquiring a job. Many other factors come into play, especially the social issues facing disabled individuals and the marketability of their job skills. Other factors also contribute, including: first, unavailability of suitable retraining programs; second, chronic health problems; and third, govern-

ment-established major work disincentives, such as disability payments.

Conclusions

In our judgement, feasible vocational retraining approaches are needed. They must be designed to equip disabled individuals with marketable skills which are necessary for competitive employment. Partnerships among several sectors of the community are essential to make these efforts a success. These include academia, government, business and industry, and the rehabilitation and health-care communities.

Conventional orthoses will play a significant role in complementing the function of high technology devices. For example, various splints and universal utensils will improve computer keyboard access and function.

However, technology holds the key to the future of economic rehabilitation. We believe that the computer, particularly the microcomputer, is central to achieving this goal. The microcomputer is not only a valuable business productivity tool, but is also a vehicle through which a severely disabled individual can "access" his environment. In a sense, the microcomputer itself can be viewed as an orthotic or adaptive device. It is an extension of not only the body, but also the mind. So, in the "information age," the microcomputer is assuming a pivotal role in improving the quality of life for the able-bodied as well as, and even more importantly, for the physically disabled.

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