PLACEMENT OF SEVERELY DISABLED PERSONS: MULTI-DISCIPLINE TEAM COMPARED TO REHABILITATION COUNSELORS

An Abstract of a Dissertation by
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Introduction. The Rehabilitation Act of 1973 has mandated that state vocational rehabilitation agencies prioritize their services to those persons who have a severe disability. In order to effectively place the severely disabled through the use of more sophisticated placement techniques, a few rehabilitation professionals are calling for a new type of professional in rehabilitation. Recognizing that the new placement techniques would involve such things as job modifications and/or adaptations and job accommodations, the need for a rehabilitation worker skilled in engineering was identified.

The Problem. The purpose of this study was to determine if the utilization of a multi-discipline team utilizing bio-engineering techniques was efficient as well as cost-effective in placing severely disabled persons when compared to the traditional placement methods of public vocational rehabilitation agencies.

Procedure. This study was conducted in five midwestern metropolitan areas. The sample for the study was 28 severely physically disabled persons who were ready for placement. Matched pairs were established between subjects for the multi-discipline team and a control group. Successful and non-successful placements were recorded for each group. Further, cost information was maintained for each subject in their placement activities.

A sign test was used to distinguish the differences of the placement rates of the groups. A correlated t test was used to determine the difference in the cost-effectiveness of the two groups.

Findings. In testing the research hypotheses at the .05 level, a significant difference was found between the multi-discipline team and the rehabilitation counselors for the placement rates in the placement of severely disabled persons. There was not a significant difference between these two groups in the cost of placement services for severely disabled persons.

Conclusions. Two general conclusions were drawn from the findings of this study.

1. The movement of severely disabled persons into productive employment was improved through the use of a rehabilitation team that utilizes low cost bio-engineering techniques.
2. The cost-effectiveness of a specialized rehabilitation team over the traditional placement methods of a state's vocational rehabilitation agency cannot be substantiated.
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Doctor of Education

by
Marvin L. Tooman
August 1982
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Chapter 1

INTRODUCTION

The state vocational rehabilitation agencies have, since the Rehabilitation Act of 1920, been the primary means for the delivery of vocational rehabilitation services to the disabled citizens of this country. Focusing first on those individuals who experienced a disability through an industrial accident or war-related injury, the services have gradually expanded to include those who have a mental or emotional disability.\(^1\) Further, the Rehabilitation Act of 1973 mandated that the state rehabilitation agencies give their highest priority, in the delivery of services, to those persons who have a "severe" disability.

As the state vocational rehabilitation agencies reached out to serve persons with the more severe disabilities, it was soon realized that the complexity of providing comprehensive rehabilitation services, including counseling, guidance, referral and placement services, was greatly increased. In particular, the provision of placement services to the severely disabled has been complicated by such issues as job development and solicitation, architectural and transportation job barriers, employment practices of employers and labor unions, and job re-engineering.

Following the Rehabilitation Act of 1973, many rehabilitation

professionals began calling for a new type of professional in rehabilitation to concentrate on those areas primarily related to the placement of the severely disabled within both productive and profitable employment.\textsuperscript{1} In addition, this new rehabilitation professional would need to be able to serve the affirmative action needs of employers, especially as they related to the employment of qualified disabled applicants and their employees.

As disabled citizens modeled the advances of other minorities in the area of civil rights, the problems associated with architectural and transportation barriers became more obvious. Those dedicated to the removal of these barriers turned to such things as job modification and/or adaptation, and job accommodations as a means of reducing or eliminating barriers for the disabled. The engineer skilled in biology and anatomy proved to be especially useful in these tasks. The job of these "bio-engineers" took on new dimensions. In fact, the utilization of a para-professional (i.e.: technician) in this field was especially effective.\textsuperscript{2} The actual innovation, adaptation, and fabrication of devices and techniques frequently took place in the practitioner's workshop.

The combination of the rehabilitation counselor, the bio-engineer, and the placement specialist seemed to come about rather naturally. It was, however, the work of Kalisankar Mallik and the Job


Development Laboratory at the George Washington University that substantiated the combination of these separate, but yet related professional areas. Although the Job Development Laboratory was able to place a significant number of severely disabled persons, the effectiveness of a rehabilitation team, consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor, outside of the research laboratory had not been accurately established.

Statement of the Problem

The problem of this study was to determine if a higher rate of successful placements of severely disabled persons could be accomplished by the utilization of a multi-discipline team, consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor when compared to the traditional placement methods of a state vocational rehabilitation agency.

The concern for the placement of qualified severely disabled persons is widespread. Even internationally, the order of service with regard to the placement process was noted in a Regional Seminar conducted in Poland and co-sponsored by both the United Nations Development Programme and the International Labour Organization. It was stated:

"The biggest problem facing rehabilitation teams comes at the end of courses when disabled trainees found to be suitable and prepared for specific jobs in commerce or industry seek employment opportunities."


On the national scene, rehabilitation administrators have emphasized the importance of placement within the rehabilitation process. In 1975, two years after the passage of the 1973 Rehabilitation Act, Oliver P. Lasley, then Chief of the Bureau of Rehabilitation Services in the Department of Human Resources, commented, "So important is job development and placement that if failure is encountered at this point, for all intents and purposes, all that has gone before has failed as well. We may successfully rehabilitate a severely handicapped person, but if he does not ultimately secure and hold an appropriate job, one to which he is well suited physically, mentally and emotionally, then we have not vocationally rehabilitated him." Further, Mr. George Conn, present Commissioner for the Rehabilitation Services Administration within the Department of Education, has established placement as a priority of the present administration.

With the many years of experience in rehabilitation, since the Rehabilitation Act of 1920, and the many resources devoted to the training and preparation of rehabilitation professionals, the placement of the rehabilitated handicapped person can still frustrate the entire process. With respect to the previously mentioned rehabilitation team, the problem of coordinating and more effectively utilizing our experience, our human and material resources, and our technical expertise is the primary focal point of this study.

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2 Memorandum No. 4-82 from Isaac K. Johnson, Regional Commissioner (Region VII) for the Rehabilitation Services Administration, November 4, 1981.
Rationale

The number of disabled citizens in the nation far exceed the number of rehabilitation professionals needed to serve the disabled in the acquisition of meaningful and purposeful work. It has been estimated that there are 162,021 disabled persons in Iowa that could benefit from vocational rehabilitation services.\(^1\) As long as the need for vocational rehabilitation services outstrip the capability of public vocational rehabilitation agencies to serve those needs, disabled citizens will not have equal access to the entitlement of specialized services leading to employment and participation in the rights and privileges available to the non-disabled.

The discrepancy between need and services in vocational rehabilitation continues to widen as inflation places added burdens on those vocational rehabilitation administrators who are seeking to maintain or improve services within dwindling resources. Certainly, the complexity of vocational rehabilitation services for the severely disabled further taxes the finite resources available to administrators.

Where services and resources do exist, the lack of service integration can represent the primary barrier to placement. The severely disabled population faces many problems which must be considered in their total impact upon the vocational goal. Considering the number, the type, and the complexity of these problems, an approach by a multi-disciplinary team may be required. Each member of this team contributes specialized services to the goal of matching a client's capabilities to an existing employment opportunity.

By focusing a multi-discipline team, with the combined talents of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor, on the provision of placement services to the severely disabled, the vocational administrator is seeking to improve program systems, service deliveries and cost-effectiveness.

**Purpose of the Study**

If a single multi-discipline team can improve the placement of severely disabled persons, this type of service delivery component can be expanded in other portions of the State of Iowa. Further, the provision of this specialized resource will need to be established as cost-effective.

In addition to generally improving the state vocational delivery system, the study specifically seeks to improve and increase the delivery of low-cost technology to severely disabled persons through bio-engineering techniques. In doing this, the productivity and job stability of severely disabled persons can be increased. Beyond the initial placement of a state vocational rehabilitation agency client, the study, through the work of the multi-discipline team, extends follow-up and follow-along services to severely disabled persons already employed. Through this continued service, these rehabilitated persons can advance themselves on the employment ladder as they successfully demonstrate their capabilities.

**Significance of the Study**

In a time when public vocational rehabilitation agencies are being severely limited in both human and material resources, it is
difficult to look at new and innovative ways of resolving age-old problems. In periods of austerity, there is a tendency to cut back or limit services with the hope that a new time or a new age will allow a return to "normalcy". Unfortunately, public vocational rehabilitation agencies may not have time to wait for a renewal period of growth or expansion as experienced in the 1960's and 1970's. There may come a time when the public may become so dissatisfied with the limited services of vocational rehabilitation that the loss of those services may be acceptable if rational alternatives are available. The call for creative change from within the organization may suggest alternatives that could insure the public agency's continued viability.

Creative efforts in the rehabilitation of the severely disabled can be the involvement of other consultants not usually considered a member of the traditional rehabilitation service delivery system. Dr. Louis Nau, 1975 Lou Ortale Memorial Lecturer on Placement, suggested that the industrial engineer be added to the resource pool which should be available in the placement of the severely disabled. ¹ Through the auspices of a multi-discipline team, the professional expertise of the industrial engineer or rehabilitation engineer can bring to the rehabilitation process a perspective of the technical aspects of design and function.

The concept of a multi-discipline team devoted to the placement of the severely disabled has not been widely accepted or utilized within public rehabilitation agencies. Developed within the controlled

¹Louis Y. Nau, "Selective Placement: A Creative Art" (paper presented at the Lou Ortale Memorial Lecture during the National Rehabilitation Association Convention, Las Vegas, Nevada, September, 1975).
setting of a job development laboratory, the specialized multi-discipline team has not been thought of as a regular component of the vocational rehabilitation service delivery system.

If it can be substantiated that the multi-discipline team improves the placement of severely disabled persons in an efficient and cost-effective fashion, the likelihood of expansion for this concept should be very good. As additional severely disabled persons, of which many have been previously diagnosed as "non-feasible" for competitive employment, are placed within productive and profitable employment, the meaning for life and the dignity gained offers immeasurable justification for this type of rehabilitation service. Conley suggests that "to date, no benefit-cost analysis has attempted to place a value on the intangible or psychic effects of rehabilitation." ¹

Expansion and further development of a project of this nature could be insured if a degree of economic benefit could be substantiated. One previous study focusing on rehabilitation clients in general, including both severely disabled and non-severely disabled persons, computed a benefit-cost ratio of 8 to 1 for rehabilitated disabled persons.² In essence, there was an $8 increase in life earnings for every dollar spent for services.

Rehabilitation professionals are being asked to provide an increased number of complex services while they, at the same time, are experiencing diminishing resources. Certainly, the rehabilitation profession is not alone in the dichotomy of doing more for less. The


²Bitter, p. 5.
medical profession utilizes a "triage" team when its services are taxed by a natural disaster. This medical model attempts to streamline its services to serve as many as possible in the shortest period of time with a limited amount of resources.

The multi-discipline team could be vocational rehabilitation's "triage" model. Vocational rehabilitation's disaster comes in the form of inflation, taxpayer revolts, and balanced budgets. In times such as these, the traditional rehabilitation process becomes cumbersome and less efficient just as the traditional medical process is unable to effectively serve during natural or manmade crises.

Hypotheses to be Tested

1. The rate of placement of severely disabled persons served by a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor is higher than the rate of placement using the traditional placement methods of a state rehabilitation agency.

2. The cost effectiveness of a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor in the placement of severely disabled persons is greater than the cost effectiveness using the traditional placement methods of a state rehabilitation agency.

Definition of Terms

For the purposes of this study, the following definitions will be used:

Bio-engineering. Application to biological or medical science
of engineering principles or equipment.

**Cost-effective.** A favorable comparison of the amount of money, time, material, and labor expended in the placement of a severely disabled person versus the projected income of the disabled persons.

**Devices.** Pieces of equipment used to facilitate functioning for disabled persons; includes aids, self-help devices, equipment, appliances, mechanical aids used and worn by patients, and apparatus used in treatment.

**Employment.** Work in the competitive labor market, the practice of a professional, self-employment, homemaking, farm or family work, sheltered employment, home-bound employment, or other gainful activity.

**Ergonomics.** A way of looking at man and his relationship to machines. An inter-disciplinary approach, comprised of engineering and the sciences of the human mind and body.

**Functional Evaluation.** Assessment of a handicapped person's level of physical functioning as related to job tasks and the ability to perform self-care activities.

**Placement.** This term refers to obtaining a job for a client. Rehabilitation placement differs significantly from employee selection, in which the personnel worker seeks qualified job applicants for available openings. In placement work with disabled people, the counselor or rehabilitation placement specialist begins with the client and tries to find a job consistent with the vocational assets and limitations of the client. A rehabilitation placement is not completed until follow-up
for a reasonable period of time determines that all needed services were provided, that the job is suitable, that the client is satisfied, that the employer is satisfied, and that the client will have some permanency on the job.

**Placement Specialist.** A rehabilitation professional that facilitates the job placement of an individual who has some handicapping condition. Activities may involve the development of job seeking skills with clients and in performing necessary job development, placement and follow-up functions.

**Rehabilitation Engineering.** The application of engineering to improve the quality of life of the physically handicapped through a total approach to rehabilitation combining medicine, engineering, and related sciences; includes rehabilitation engineers.

**Rehabilitation Process.** A goal-oriented and individual sequence of services designed to assist disabled persons achieve vocational adjustment.

**Rehabilitation Services.** Medical, psychological, social, and vocational services including any goods or services which are necessary for rendering a disabled person fit to engage in gainful activity.

**Rehabilitation Services Administration.** The central rehabilitation agency of the U. S. Department of Education.

**Selective Placement.** The innovative adaptation of standard job development and placement procedures for the purpose of compatible welding together unique human capacities and unique employment settings.
Severely Disabled. A person with a physical or mental condition which so limits the functional capabilities so that he/she cannot perform some key life functions and which is expected to last indefinitely.

State Rehabilitation Agency. The only agency designated to administer the state plan for rehabilitation services.

Triage. The sorting out and classification of casualties of war or other disaster, to determine priority of need and proper place of treatment.

Delimitations

Placement is not the only indicator of rehabilitation success or failure. Although the study will be utilizing three dimensions of gain or loss, (hours per week gainfully employed, weekly earnings, and work status), a standardized system of measuring rehabilitation success has not been developed.¹

Several contemporary developments constitute potential threats to internal validity for the study. For example, the vast amount of new technological information has only been available to rehabilitation professionals and clients in recent years. Also, both the public and employers have an increased awareness of the abilities of severely disabled persons, and the enforcement of mandatory affirmative action legislation has increased.

Assumptions

For the purpose of this study, it was assumed that all participants, both clients and staff, fully cooperated in this approach to the rehabilitation process.

It was also assumed that there was no difference in the number and type of employment opportunities in the metropolitan settings used for the study.
A REVIEW OF RELATED LITERATURE

The placement of severely disabled persons within the United States has received special emphasis only within recent years. The Rehabilitation Act of 1973 mandated state vocational rehabilitation agencies to establish an order of selection that would set out the severely handicapped as a priority for service. As such, the history of the placement of the severely disabled is not very lengthy nor for that matter is there a consensus as to what placement should be within the rehabilitation process.¹

Placement Within the Rehabilitation Process

Vocational rehabilitation, since its beginning as a national program, has always embodied the concept that placement or the acquisition of appropriate employment is an integral part of the rehabilitation process. The Vocational Rehabilitation Act of 1920 provided benefits for five basic services: vocational guidance, vocational training, occupational adjustment, prosthesis, and placement services. The delivery of those services usually rested with the rehabilitation agent or counselor, and when it came to placement the counselor usually

was left to his/her own devices or experiences in facilitating the client's employment needs.

It was, in fact, the experiences of the counselor that increased his/her worth to the rehabilitation agency's administration. Rusalem has identified that, "from 1920 to about 1955, many counselors were recruited from industry or public employment service offices and they brought with them a keen sense of vocational rehabilitation and the employment objective."¹

The Vocational Rehabilitation Act Amendments of 1954 provide a great deal of assistance to the expanding rehabilitation program. Training for rehabilitation professionals at the graduate level was offered at colleges and universities across the country. Shawhan, however, noted that this training seemed to take a clinical bend without adequate attention to preparing the counselor to provide necessary placement services.² As the focus on attention within rehabilitation shifted from the practical aspects of developing the client's vocation to the concerns of the clients' psychosocial needs, the concern for job placement diminished.

The Rehabilitation Act of 1973 had a lasting impact on the need for placement within rehabilitation. Usdane, in 1973, identified that previous rehabilitation legislation did little to emphasize job


²Carl Shawhan, "Counseling Plus Placement Equals Rehabilitation: Rehabilitation Minus Placement Equals Counseling" (paper presented at the Job Placement Division meeting during the annual National Rehabilitation Association Convention, Salt Lake City, Utah, September, 1978).
placement when he said, "Past legislation has not specifically stated employability as a goal for the handicapped. This idea is basic, however, in the Rehabilitation Act of 1973."\(^1\) Since that time, activity in the area of job placement/job development has increased dramatically. In 1975, Drake University implemented a graduate (Master of Science) program for rehabilitation placement specialists. Dr. Howard Traxler, Director of this program from 1975 to 1979, emphasized the need for such a program by saying, "before undertaking a training program of this nature, we had to have strong feelings that present programs in rehabilitation were not adequately emphasizing placement strategies -- or at least not being reflected in the services being provided."\(^2\)

Even as the Drake University Rehabilitation Placement Specialist Program was developing momentum in the late 1970's, a number of rehabilitation professionals were maintaining that any rehabilitation person doing job placement should have no less professional preparation than other counselors. Patricia Livingston, of New York University, emphasized in 1978 that the placement specialist should be fully equipped with the same counseling competencies that any other rehabilitation counselor might possess.\(^3\) George Wilson Wright, in his

\(^1\)William Usdane, "Placement-Process and Professional Training" (paper presented at the Lou Ortale Memorial Lecture during the annual National Rehabilitation Association Convention, Atlantic City, New Jersey, October, 1973).

\(^2\)Opinion expressed by Howard Traxler, Director, Drake University Rehabilitation Placement Specialist Program, in an address at a conference ("Improving Rehabilitation Education-State Vocational Rehabilitation Director Communications") for the National Council on Rehabilitation Education at San Diego, California, March 8, 1978 (text on file at Drake University Rehabilitation Placement Office).

authoritarian book, Total Rehabilitation, continued to view placement merely as an extension of the rehabilitation counselor's duties. He suggests that anyone performing placement without a masters degree in rehabilitation counseling could be considered a sub-professional agency employee.¹

Regardless of the debate that may exist in professional rehabilitation literature, vocational placement seemingly has regained its major position within the rehabilitation process. The identification of placement techniques and competencies that are not a part of rehabilitation counseling have substantiated the placement specialist as a member of the rehabilitation profession as are the physicians, nurses, rehabilitation counselors, physical therapists and occupational therapists.

Placement Advocacy by Handicapped Citizens

It is important to note that the improvement of vocational services (i.e.: job placement/job development) within rehabilitation did not come about through the ambivalence of the country's disabled nor did it occur only because of the country's leaders in rehabilitation and/or Congress. In fact, if it had not been for the client-directed movements that spoke out for the disabled at a critical time in the evolvement of our national rehabilitation program, the process of vocational placement could have gotten lost somewhere along the line. Thoben has noted that handicapped citizens have raised their voices in an effort to awaken America's collective conscious to the needs and concerns of the physically and mentally handicapped.²

Placement Philosophy

Even as the number of rehabilitation professionals and disabled citizens began calling for more placement activity, differences became apparent as to how this increased placement activity should take place. The concept of selective placement assistance for rehabilitation clients was not new, but it received a number of new proponents following the Rehabilitation Act of 1973. Usdane, in 1974, recognized that the severely disabled needed more than innovative assessment and evaluation techniques. He called for a placement training program that would prepare placement specialists to assist the severely disabled in attaining the dignity of an appropriate job.1 Many, however, saw the use of the placement specialist as being inappropriate within the rehabilitation process. Salomone argued that the selective placement approach is not the key to successful placement of vocationally handicapped persons.2

The client-centered placement approach, as represented in Salomone's position, requires the client to assume the major responsibility for securing job leads, for contacting employers, and for performing the necessary follow-up activities after application. In most respects, this is in contrast to selective placement which has been defined as "the process of matching the physical, mental, and emotional capacities of a disabled person to the demands of a suitable job".3

While the debate between client-centered and selective placement continues, the real placement needs of the disabled may be overlooked. As with so many human needs, it is rather difficult to categorize how a specific need can be served in every situation. In providing job placement services, the rehabilitation professional, be he/she a counselor or placement specialist, will need to analyze the client's and the employer's need for services in the placement process. Shawhan appropriately identified the rehabilitation professional's responsibility when he said, "You do as little as possible, but every bit which is necessary."  

Optimizing Placement in Rehabilitation

The luxury of being able to pick and choose between different types of service delivery techniques may be quickly passing. The 1970's and the early 1980's gave evidence that public rehabilitation agencies will need to be doing more for less. The question of whether or not rehabilitation agencies use placement specialists will not be answered by the personal preference of an administrator of an academician. Rather, the utilization of all rehabilitation professionals will need to be optimized in a way that improves task performance. Certainly, within vocational rehabilitation one of the primary tasks is job placement. Giblin and Ornati emphasize that optimization requires that human resources be allocated in both an effective and efficient manner. With this consideration, it is rather easy to translate efficiency as to getting the job done and effectiveness as to getting the job done in the least costly fashion.

1Shawhan, p. 15.

Certainly, the concern for cost-effectiveness is not a new revelation. In 1966, Program Analysis Groups were formed to analyze costs, effects, and benefits of programs associated with the Dep't. of Health, Education and Welfare. A subsequent report from the Vocational Rehabilitation Administration probably marks the formal entrance of the vocational rehabilitation movement into public and studied assessments of "dividends" derived from vocational rehabilitation costs.¹ Spahr, in 1973, admonished the rehabilitation network to be more accountable for its production whether it is vocational rehabilitation or speech rehabilitation.²

The need for both effectiveness and efficiency in rehabilitation has already been addressed. Mallik and Sprinkle have suggested that rehabilitation agencies can be cost-effective by hiring a job placement specialist or by reeducating and by redirecting counselors' activities toward the placement process. Specifically, considerable benefit will result through the placement of severely handicapped persons.³

Zadny and James have viewed the problems of rehabilitation counselors in their efforts to provide placement services. Focusing on their need to "do more for less", they have, through research, attempted to resolve a few of the issues of rehabilitation placement.⁴


Issues and concerns within placement has been enhanced since the Rehabilitation Act of 1973. The calls for service by disabled citizens and the reduction in fiscal resources will necessitate that vocational rehabilitation administrators make decisions that both maximize staff performance and improve overall organizational effectiveness.

**Placement of the Severely Disabled**

As has been previously identified, the Rehabilitation Act of 1973 had a profound impact on the delivery of rehabilitation services for the severely disabled. Certainly one of the reasons this piece of legislation was enacted was the fact that an increased level of productive employment for the severely disabled would result. This concept was captured by a House Report accompanying the Rehabilitation Act of 1973.

that a significant number of severely disabled persons could be returned to gainful employment if greater emphasis were placed on accepting such clients for services and providing them with a comprehensive array of social adjustment and training.¹

Prior to the 1973 Rehabilitation Act, one of the numerous causes for non-service to the severely disabled was the belief that it was too expensive to work with the severely disabled. In contrast, the establishment of spinal cord injury centers throughout the country is an acknowledgement that it is too costly not to work with the severely disabled.²


The responsibility of employers to re-evaluate or eliminate barriers to the employment of the handicapped increased significantly with the Rehabilitation Act of 1973. In their desire to comply with their affirmative action obligations, while they at the same time seek to employ qualified and competent employees, employers have been forced to depend on rehabilitation agencies to not only supply them with qualified applicants, but to also serve the handicapped employee once hired. Shrey gave particular emphasis to the needs of the severely disabled during post-employment services. By establishing a post-employment program, the employer, the client, and the rehabilitation agency can accomplish long-range goals and develop further information sources.¹

While the requirement to work with employers on a more intensive basis is very real, the ability of vocational rehabilitation counselors to serve this need is in question. Sinick has pointed out that counselors are like clients in dreading rejection by employers.² It is understandable that the counselors dread this task if they are unfamiliar with strategies and techniques. Prior to the Drake University Rehabilitation Placement Specialist Program, which was started in 1975, there was little formal training for rehabilitation professionals in placement. In 1974, Usdane commented that the national rehabilitation administration had never in the preceding 50 years supported a sustained and distinct university training program for someone specifically called a placement worker.³

²Sinick, p. 196.
³Usdane, p. 12.
Recent advances in scientific and medical technology have greatly impacted upon the education, training and placement of handicapped individuals. Gradually increased numbers of severely disabled persons are participating in programs in schools, at home, in workshops, and on jobs due to these advances. Unfortunately, many severely disabled persons have not benefited from today's technological advances. Fullwood states:

"For many rehabilitation workers, the minimum goal of rehabilitation is not sufficient. The severely disabled should not only be enabled to maintain minimal function, they should be assisted to develop their talents and abilities as far as they can go. Denial of this verges on denial of equality of opportunity. There are no remaining good reasons why the severely disabled should be generally restricted to the least skilled jobs. But to develop higher order skills, the severely disabled will need additional aids and supplementary training." ¹

As science and technology has advanced the ability of rehabilitation workers to serve the severely disabled, the concept of rehabilitation engineering has taken on new dimensions in the profession. It was, however, back in 1944 that rehabilitation engineering first emerged. It was at that time that the Surgeon General of the Army requested that the National Academy of Sciences formulate recommendations concerning the development and provision of artificial limbs to disabled servicemen. The conference and special program which resulted from this request pioneered many new and improved devices and practices. ²

² Sixth Institute on Rehabilitation Issues, p. 10.
The concept of reasonable accommodation through rehabilitation engineering is occasionally referred to as ergonomics. Bridging from Fredrick Taylor's time and motion studies in the first part of this century, the use of the term ergonomics has turned from improving man's performance by making him machine-like to adapting the man-made world to man, instead of the other way around. With this end in mind, ergonomics blends human characteristics with the living and working environment. In many respects, this term may more accurately describe the service that is being provided to the severely disabled through technology.

A recently developed rehabilitation engineering program in North Carolina has concentrated on providing services to the disabled through low-cost technology. Chief engineer for the North Carolina program, George McCoy, commented, "When I see a complex problem, the needs of each rehabilitation client have to be addressed on an individual basis. We have to do this with skills and knowhow that does not spend a fortune." Typical of McCoy's program, a disabled farmer was able to continue farming with an adapted tractor. The modification cost for this effort was approximately $600.

The multi-discipline team associated with this study is utilizing many of the technological advances available to the severely disabled. Modeling a rehabilitation team at George Washington University, the team is working to increase the employment of severely disabled persons by enhancing their capacity to perform a wider range of job tasks.

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through the development and application of bio-engineering techniques.

Kalisankar Mallik, Director of the Job Development Laboratory at George Washington University, recently completed a research project dedicated to the placement of severely disabled persons. Following a three and one-half year period, Mallik was able to recommend his findings to state rehabilitation agencies. His project findings conclusively indicated that:

1. Information handling jobs are well suited for a severely disabled population;

2. Low cost technology can enhance the capacity of severely disabled persons to perform productively a wider range of physical job-related tasks associated with information handling tasks; and

3. A multi-disciplinary team approach towards the placement of the severely disabled results in increased quality employment of severely disabled persons.1

The Iowa state vocational rehabilitation agency is sponsoring a replica of the multi-disciplinary team developed by Mallik. The development and implementation of a rehabilitation team in Iowa is complicated by the fact that the Iowa multi-discipline team is working to establish a job placement technique that was originally developed in a job development laboratory in Washington, D.C. Although the concept of a multi-discipline team is not new, the approach taken by Mallik is, and the application of the approach outside the laboratory is particularly challenging.

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The Multi-Discipline Team and Placement of the Severely Disabled

The multi-discipline team seems to be especially attractive as the concerns for and the problems in placing the severely disabled become increasingly complex. Usdane suggested that one of the implications resulting from the Rehabilitation Act of 1973 was that the use of multi-service facilities along with multi-team members implies a stronger commitment to placement services. In that Usdane was one of the first proponents for a graduate program for placement specialists, it is likely that he was thinking of a placement worker as a member of the multi-discipline team.

The very aspect of rehabilitation suggests teamwork. In the early years of the profession, rehabilitation was defined as an interdisciplinary movement, thus laying the groundwork for teamwork activity. The comprehensive nature of rehabilitation requires the contribution of a number of specialized disciplines. The concept of the "whole person" is implemented by inter-professional teamwork which strives for total rehabilitation of the disabled person.

"No disabled person is less than the sum total of his needs..." said Allan, who elaborated as follows:

"The need for joint effort on the part of the various disciplines involved in the rehabilitation process is important not only to the understanding of the patient and his own concept of the full program, it is also vital to the practical success of the entire effort." 

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1 William Usdane, "Placement-Process and Professional Training" (paper presented at the Lou Ortale Memorial Lecture during the annual National Rehabilitation Association Convention, Atlantic City, New Jersey, October, 1973).


3 Wright, pp. 242-245.

While the combination of disciplines may be very attractive within the rehabilitation process, the problems of client confusion, overlap, inter-professional conflict, ill-defined roles, and high service costs are reasons for inadequate teamwork. Whitehouse has suggested that rehabilitation group members require a firm foundation in one science, which must include a keen awareness of its limitations, an understanding of some of the fundamental philosophy, practices, and limitations of the companion and cooperative sciences, and an open, mature, flexible mind towards meeting new ideas and challenges.\footnote{Frank Whitehouse, Contemporary Vocational Rehabilitation, Herbert Rusalem and David Matkin, eds. (New York: New York University Press, 1976), p. 215.}

The combination of rehabilitation professionals into a multi-disciplinary team suggests by the mere combination of skills and talents that the rehabilitation of a handicapped person will be enhanced. In that a team evaluation of a client does not usually rely, in total, upon previous external findings, there is the likelihood that the team will serve more severely disabled persons. Winter indicates that a team approach used in making decisions about acceptance or rejection of applicants for rehabilitation services may provide the impetus for more acceptance and liberal views about clients and may thus provide for more extensive delivery of rehabilitation services to individuals with severe conditions.\footnote{Marlene Winter, "The Rehabilitation Team: A Catalyst to Risky Rehabilitation Decisions?" Rehabilitation Counseling Bulletin, XII, No. 4 (1976), 580-586.} In addition, the decision to accept a client for services, applies added responsibility for carrying out the rehabilitation plan. Each team member will have an investment in the successful rehabilitation of the client.
It was recognized during the Sixth Institute on Rehabilitation Issues that the application of engineering in rehabilitation necessitated a team. In fact, rehabilitation engineering was defined as:

"... engineering to improve the quality of life of disabled persons through a team approach to rehabilitation combining medicine, engineering, psychology, counseling and other rehabilitation disciplines."¹

A rehabilitation engineer was further described as:

"... a professional involved in the analysis, design, manufacture, and alteration of adaptive equipment for disabled persons. The work involves discussions with physicians, therapists, counselors, evaluators, and other rehabilitation professionals to evaluate and improve the quality of life for disabled persons."²

Another integral member of this team is the rehabilitation counselor. In many respects, this team member functions as a traditional rehabilitation counselor with intakes, vocational counseling, and vocational evaluation consuming much of one's time. However, the counselor serving on a comprehensive rehabilitation team will need to determine the client's ability to physically function. For proper job matching, a rehabilitation counselor must be able to make or acquire detailed evaluation of the client's skills and abilities. The diagnosis alone will not be of much use unless the counselor has had several years of experience and even then there may be individual differences within a disability group. From time to time, there may be a new diagnosis that the counselor has never heard of. The important thing is to find out how the client physically functions.³

¹Sixth Institute on Rehabilitation Issues, p. 10.
²Ibid., p. 17.
As previously identified, Usdane was apparently suggesting that a placement specialist have a place on a multi-discipline rehabilitation team. Within a rehabilitation team, the placement specialist can be a dynamic source for change; for increasing employer's interest and receptivity; and for assisting both the client and the counselor in attaining increased confidence in the severely disabled person's capacity to succeed in employment.

Zauger saw rehabilitation placement as a separate entity within the rehabilitation process. "The placement specialist is an integral part of the team. With on-going, long-term involvement with clients and counselors, the specialist can gain insight and provide input."

The Iowa Facility Placement Team, which is the focus of this study, is a product not only of the Job Development Laboratory at George Washington University, but also of the placement-related developments for the last quarter century. It should not be surprising that the Iowa effort in rehabilitation engineering placement came shortly after the establishment of the Drake University Rehabilitation Placement Specialist Program. As such, this study will be taking advantage of the many contributions of the rehabilitation professionals that have contributed to rehabilitation placement research and writings in the past. Hopefully, the results of this study will enhance the literature for rehabilitation professionals dedicated to the placement of severely disabled persons within productive and profitable employment.

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Chapter 3

METHODOLOGY

This chapter will describe the process followed in conducting this study. Specifically, the sample selection for the control group will be discussed as will the procedures used for data collection and analysis.

Process

To determine if the placement rate of severely disabled persons can be increased by the use of a multi-discipline team, a comparison was made between the placement ready severely disabled clients assigned to a multi-discipline team and the placement ready severely disabled clients assigned to rehabilitation counselors in similar metropolitan settings and employment markets.

The aspect of being placement ready suggests that clients have completed their physical and/or mental restoration as well as any vocational training that was a part of their individualized written rehabilitation plan. The Rehabilitation Service Administration has designated this as being "Status 20" within the total rehabilitation process. This standardized concept of being placement ready was used for clients assigned to both the multi-discipline team (experimental group) and the standard rehabilitation counselors (control group).

Of course, the placement of severely disabled persons could be improved with unlimited resources requiring large amounts of money.
However, most state rehabilitation agencies find it necessary to deal with rather finite resources. Disabled persons and rehabilitation professionals are turning to the technological devices and techniques that have reduced many barriers. These techniques and devices usually carry a substantial price tag. It is at this point that the problems of placing severely disabled persons are compounded.

As a means of determining the cost-effectiveness of the use of a multi-discipline rehabilitation team, the cost of serving both the successful and unsuccessful clients for both the experimental and the control groups was measured. Average comparisons were made between the money, time, material and labor expended for the experimental and control groups.

For the purpose of this study, data was collected from the control and experimental groups for a period of nine months.

Sample Selection

All severely disabled clients referred to the multi-discipline team that were placement ready were accepted as a part of the experimental group. Further, any severely disabled clients assigned to the team who were not, but subsequently became placement ready were also counted as a part of the experimental group. It should be emphasized that the clients served by the multi-discipline team were, for the most part, more physically than mentally or emotionally disabled. The primary disability along with the secondary disability was listed as a part of the regular Rehabilitation Service Administration's record keeping system. In the case of the multi-discipline team, the clients selected for the study generally had a primary disability that was physical.
The control group consisted of an equal number of severely disabled clients from the Cedar Rapids, Iowa City, Council Bluffs, and Sioux City metropolitan areas. As each client was accepted from the multi-discipline team as a part of the experimental group, a similar selection was made from the group of severely disabled clients in the Cedar Rapids, Iowa City, Council Bluffs, and Sioux City areas. Similar primary disabilities were sought to match the experimental group by using the major sub-categories of disabilities as established by the Rehabilitation Service Administration.

Although it was anticipated that the experimental and control groups would each have between 35 and 50 clients accepted into placement ready status within a ten-month period, only fourteen matched pairs were obtained.

**Data Collection**

Performance of the control and experimental groups was measured by the number of their successful and unsuccessful placements when compared to the number of placement ready clients receiving services. As previously mentioned, a successful placement was established when the job knowledge and skills of a severely disabled client matched the requirements of an identifiable occupation and the client remained within that occupation for a minimum of 60 days. An unsuccessful placement, for the purpose of this study, occurred when a client's casefile was closed in a non-rehabilitated status, they failed to complete the minimum of 60 days on the job, or they failed to obtain employment within the time frame of the study.
In order to determine a cost comparison between the experimental and control groups, the following items were measured:

1. The earning potential (over a 12-month period) of placed clients;
2. The cost of the materials necessary for placement; and
3. The amount of staff time spent as determined by the number of hours devoted to the placement of a specific client.

Although most of the variables for the clients were obtainable through the Rehabilitation Service Administration's data collection system, a separate file was maintained for each client in both the experimental and control groups. The question of staff time devoted to placement of clients in both groups required a special data collection effort. A monthly data collection form was submitted to the team coordinator for the experimental group and to the rehabilitation supervisor for the control group. This data collection form focused on:

1. The % of staff time devoted to specific clients; and
2. The cost of the materials devoted to the placement of a specific client.

**Analysis of Data**

The clients in the experimental and control groups were closely matched in terms of their disability type, age, sex, and rehabilitation potential. The sign test was applied to these matched pairs and the direction of the differences was discerned between each pair. In that the sampled pairs numbered fewer than 25, a table of Probabilities Associated with Values as Small as Observed Values of x
in the Binomial Test was used to interpret the probability of $x$.\textsuperscript{1}

The placement data collected from the observations of the control and experimental groups are displayed in positive and negative columns. Clients placed successfully received a positive sign and clients unsuccessfully placed received a negative sign. The significance of the sign test was determined in a manner similar to that seen in the Wilcoxon test. It is emphasized that only the direction, and not the size of the differences, was measured between the matched pairs.

A significance level beyond the 0.05 level was chosen to reject the null hypothesis relating to the positive effectiveness of the multi-discipline team.

Once the question of efficiency was determined, the data collected from the Rehabilitation Service Administration and the data collection form was used to answer the null hypothesis on cost-effectiveness.

In that the severely disabled clients in the control and experimental groups were matched by characteristics relating to the type and severity of their disabilities, their age, sex, and rehabilitation potential, it was necessary to calculate the coefficient of correlation between the selection criteria. To insure homogeneity of variances, an $F$ test was used. The calculated $F$ value was compared against a .05 critical value of the "$F$ distribution table". Unless the calculated $F$ equaled or exceeded the appropriate $F$ critical value, it was assumed that the variances were homogeneous and the difference was not significant.

The t test for mean difference was used to determine the significance of the cost-effectiveness variables of the control and experimental groups.

\[
t = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} - 2r \frac{s_1}{\sqrt{n_1}} \frac{s_2}{\sqrt{n_2}}}}
\]

A significance level beyond the 0.05 level was required to reject the null-hypothesis relating to the positive cost-effectiveness of the rehabilitation team.
Chapter 4

ANALYSIS OF DATA

Introduction

This study investigated the relationship between the rehabilitation placement services provided by a multi-discipline rehabilitation team and those traditional placement services of a state vocational rehabilitation agency. These relationships were examined with respect to the effectiveness of the two rehabilitation placement models as identified by the placement rates for the models. Further, the relationship of the cost effectiveness of these two service models was also examined. This chapter provided an analysis of the data collected for testing the hypotheses that formed the basis of this study. It is divided into the following sections: 1) inferential statistics for effectiveness and cost effectiveness measures; and 2) testing the research hypotheses.

Inferential Statistics for Effectiveness and Cost Effectiveness Measures

The selection of the sample for both the experimental and control groups centered on an approximate matching of the disability codes, age, sex, and rehabilitation potential. If, in the selection of sample casefiles, an approximate match could not be obtained, the casefiles were subsequently excluded from the study. Table I shows the similarity of the matched pairs via the selection criteria. It also provides information on the success of the placement initiatives.
TABLE 1

Comparison of Selection Criteria and Placement Results of Control and Experimental Groups

Rehabilitation Team (Experimental) = x
Traditional VR Services (Control) = y

<table>
<thead>
<tr>
<th>Matched Pairs</th>
<th>Disability Code</th>
<th>Age</th>
<th>Sex</th>
<th>Rehab. Potential</th>
<th>Placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>x₁, y₁</td>
<td>358</td>
<td>33</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>380</td>
<td>22</td>
<td>1</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>x₂, y₂</td>
<td>315</td>
<td>19</td>
<td>2</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>379</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>no</td>
</tr>
<tr>
<td>x₃, y₃</td>
<td>300</td>
<td>44</td>
<td>1</td>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>39</td>
<td>2</td>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td>x₄, y₄</td>
<td>339</td>
<td>53</td>
<td>2</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>312</td>
<td>44</td>
<td>2</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td>x₅, y₅</td>
<td>361</td>
<td>20</td>
<td>1</td>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>361</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>no</td>
</tr>
<tr>
<td>x₆, y₆</td>
<td>370</td>
<td>21</td>
<td>2</td>
<td>2</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>360</td>
<td>17</td>
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<td>1</td>
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<tr>
<td>x₇, y₇</td>
<td>409</td>
<td>40</td>
<td>1</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>37</td>
<td>1</td>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td>x₈, y₈</td>
<td>360</td>
<td>49</td>
<td>2</td>
<td>2</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>360</td>
<td>28</td>
<td>2</td>
<td>2</td>
<td>no</td>
</tr>
<tr>
<td>x₉, y₉</td>
<td>434</td>
<td>47</td>
<td>1</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>434</td>
<td>43</td>
<td>1</td>
<td>1</td>
<td>no</td>
</tr>
<tr>
<td>x₁₀, y₁₀</td>
<td>318</td>
<td>32</td>
<td>2</td>
<td>2</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>27</td>
<td>1</td>
<td>3</td>
<td>no</td>
</tr>
<tr>
<td>x₁₁, y₁₁</td>
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<td>21</td>
<td>2</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>300</td>
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<td>1</td>
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<tr>
<td>x₁₂, y₁₂</td>
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<td>2</td>
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<td></td>
<td>318</td>
<td>32</td>
<td>1</td>
<td>3</td>
<td>no</td>
</tr>
<tr>
<td>x₁₃, y₁₃</td>
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<td>32</td>
<td>2</td>
<td>2</td>
<td>yes</td>
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<tr>
<td></td>
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<td>1</td>
<td>1</td>
<td>no</td>
</tr>
<tr>
<td>x₁₄, y₁₄</td>
<td>319</td>
<td>22</td>
<td>1</td>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>316</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>no</td>
</tr>
</tbody>
</table>
## Table 2
Rehabilitation Service Administration Disability Codes for Clients in Both Experimental and Control Groups

### Orthopedic Deformity or Functional Impairment, Except Amputations

Impairment involving three or more limbs or entire body, due to:

- **300** Cerebral Palsy
- **301** Congenital malformations or other and ill-defined birth injury
- **303** Other diseases, infectious and non-infectious, other infections (including local), and other neurological and mental diseases (excluding code 630, epilepsy)
- **312** Intracranial hemorrhage, embolism, and thrombosis (stroke)
- **314** Poliomyelitis
- **315** Muscular dystrophy
- **316** Multiple sclerosis
- **318** Accidents and injuries involving the spinal cord
- **319** All other accidents, injuries, and poisonings

Impairment involving one upper and one lower limb (including side), due to:

- **339** All other accidents, injuries, and poisonings

Impairment involving one or both upper limbs (including hands, fingers, and thumbs), due to:

- **358** Accidents and injuries involving the spinal cord

Impairment involving one or both lower limbs (including feet and toes), due to:

- **360** Cerebral Palsy
- **361** Congenital malformations and ill-defined birth injury
- **370** Arthritis and rheumatism
- **378** Accidents and injuries involving the spinal cord
- **379** All other accidents, injuries, and poisonings

Other and ill-defined impairments (including trunk, back, and spine), due to:

- **380** Cerebral Palsy
TABLE 2 (continued)

ABSENCE OR AMPUTATION OF MAJOR AND MINOR MEMBERS

Loss of at least one upper and one lower major extremity (including hands, thumbs, and feet), due to:

409 Accidents, injuries, and poisonings

Loss of one or both major lower extremities (including feet), due to:

434 Diseases, infectious and non-infectious (including peripheral vascular, diabetes, tuberculosis of bones and joints), and infections (including gangrene)

The non-parametric sign test was applied to this study to distinguish the difference in placement rates of the rehabilitation placement services of the control and experimental groups. The sign test was deemed appropriate as a measure for this considering that the related samples were measured only in terms of their successful or non-successful placement rather than any quantitative measure relating to those placement statistics.

Analysis of cost effectiveness came through the use of a t test for the mean differences of the control and experimental groups. Specifically, the correlated sample t test was used to measure this aspect of effectiveness.

To insure that the clients in the control and experimental groups were homogeneous, a calculated coefficient of correlation was conducted between the selection criteria. To insure homogeneity of variances, an F test was used. The null hypothesis of equal variability would be retained for each of the selection criteria if significant F's were not obtained.
The test for the assumption of homogeneity of variance for age indicated that the F test was not significant and that the postulated null hypothesis relating to the variability of age was accepted.

**TABLE 3**

Test for the Assumption of Homogeneity of Variance for Age

x = Experimental Group  
y = Control Group

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Variance</th>
<th>F*</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>14</td>
<td>34.4</td>
<td>138.388</td>
<td>1.675</td>
</tr>
<tr>
<td>y</td>
<td>14</td>
<td>28.2</td>
<td>82.597</td>
<td>1.675</td>
</tr>
</tbody>
</table>

(df = N-1 = 13  
P.05 = 2.58

(Not significant - null hypothesis that there is no difference between the groups regarding age is retained.)

*F test - tests the homogeneity of variance.

Another selection criteria for the sample groups was rehabilitation potential. Distinguished by the rehabilitation counselor, the rehabilitation potential is essentially determined as being high, moderate, or low, corresponding numerically from 1 to 3. A degree of equality of rehabilitation potential was sought in terms of the assignment of the cases to the control and experimental groups. The F test for the homogeneity of the variance was not significant; subsequently, this suggested that the null hypothesis, which establishes that there is no difference between the groups regarding rehabilitation potential, is accepted.
TABLE 4

Test for the Assumption of Homogeneity of Variance of Rehabilitation Potential

x = Experimental Group
y = Control Group

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Variance</th>
<th>F*</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>14</td>
<td>1.7</td>
<td>.42857</td>
<td>1.476</td>
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<tr>
<td>y</td>
<td>14</td>
<td>2.0</td>
<td>.63265</td>
<td></td>
</tr>
</tbody>
</table>

\( df = N-1 = 13 \)
\( P.05 = 2.58 \)

(Not significant - null hypothesis that there is no difference between the groups regarding rehabilitation potential is retained.)

*F test - tests the homogeneity of variance.

There may be some question as to whether the F test should be used to determine homogeneity of variance in this situation in that we may not have a true interval scale in the one, two, three rating. With this consideration, a 2 x 3 contingency table using a Chi square test was used in place of the F test. The results of the Chi square corresponds with the F test in that this test is not significant supporting the fact that we can accept the null hypothesis that there is no difference between the groups regarding rehabilitation potential.
TABLE 5

Chi Square - Observed and Expected Frequencies of Individual Subjects Falling in Each of the Three Possible Conditions of Rehabilitation Potential

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>14</td>
<td>3(5)</td>
<td>8(6)</td>
<td>3(3)</td>
</tr>
<tr>
<td>y</td>
<td>14</td>
<td>7(5)</td>
<td>4(6)</td>
<td>3(3)</td>
</tr>
<tr>
<td>Both Groups</td>
<td>28</td>
<td>10</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

A Chi-square test was used to determine whether the frequency of the conditions of rehabilitation potential of the selected clients differed among the two treatment groups. The obtained $x^2 = 2.934$, df = 2, was not significant at the .05 level.

Another means of matching the pairs between the experimental and control groups was sex. Unlike the previous criteria, sex does not lend itself to an F test as it provides only a dichotomous scale; male, female. The greatest difference would be $1 + 1^2 = 1$ or $1/n$. A significant finding would not be possible. Preferably, sex could be dropped as a variable in selection; however, the actual matching of the pairs took sex into account. To test for homogeneity, a binomial or a sign test could be used. The author, in this situation, selected a sign test. In contrast to the previous selection criteria, the sign test rejects the null hypothesis that there is no difference between the groups regarding sex. It is interesting to note that the experimental group included more women who are older and who are generally considered to have less rehabilitation potential.
**TABLE 6**

Results of Sign Test Used to Test the Homogeneity of Sex in the Control and Experimental Groups

(1 = male; 2 = female)

<table>
<thead>
<tr>
<th>Matched Pair Number</th>
<th>Direction of Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 = 1</td>
</tr>
<tr>
<td>2</td>
<td>1 &lt; 2</td>
</tr>
<tr>
<td>3</td>
<td>2 &gt; 1</td>
</tr>
<tr>
<td>4</td>
<td>2 = 2</td>
</tr>
<tr>
<td>5</td>
<td>1 = 1</td>
</tr>
<tr>
<td>6</td>
<td>2 = 2</td>
</tr>
<tr>
<td>7</td>
<td>1 = 1</td>
</tr>
<tr>
<td>8</td>
<td>2 = 2</td>
</tr>
<tr>
<td>9</td>
<td>1 = 1</td>
</tr>
<tr>
<td>10</td>
<td>1 &lt; 2</td>
</tr>
<tr>
<td>11</td>
<td>1 &lt; 2</td>
</tr>
<tr>
<td>12</td>
<td>1 &lt; 2</td>
</tr>
<tr>
<td>13</td>
<td>1 &lt; 2</td>
</tr>
<tr>
<td>14</td>
<td>1 = 1</td>
</tr>
</tbody>
</table>

Evaluation of the sign test indicates that there is a significant difference between sexes of the experimental and control groups at the .05 level.

A summary of the hypothesis used to insure homogeneity of the control and experimental groups is presented in Table VII.
TABLE 7
Summary Table of Sample Selection Hypotheses

<table>
<thead>
<tr>
<th>ACTION</th>
<th>1. There is no difference between the control and the experimental group regarding age.</th>
<th>Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. There is no difference between the control and the experimental group regarding rehabilitation potential.</td>
<td>Retained</td>
</tr>
<tr>
<td></td>
<td>3. There is no difference between the control and the experimental group regarding sex.</td>
<td>Rejected</td>
</tr>
</tbody>
</table>

Testing the Research Hypotheses

The present study focused upon two major research hypotheses. The sign test was used to study the placement of severely disabled persons served by a multi-discipline team and those served by traditional rehabilitation placement methods. In this analysis, a positive sign was given to each client placed by either the experimental or the control group. In turn, a negative sign was given to any client that was not placed or was placed unsuccessfully in either of these two groups. Further, an additional analysis was made of the relative cost effectiveness of the services provided to both the control and experimental groups. The factors served to make a determination of the cost of the placement services. These three factors were:

1. the amount of staff time devoted to the placement services for each of the clients;
2. the cost of the materials or equipment required to assist in placement; and

3. the potential annual income of all those clients who were placed in either group.

To determine or to equate the value of staff time devoted to the placement of each client, a standard figure of $8 an hour was utilized to establish this cost figure.

Analysis of these two main hypotheses follow:

Research Hypothesis 1: The rate of placement of severely disabled persons served by a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor is not higher than the rate of placement using the traditional placement methods of a state rehabilitation agency. This hypothesis was tested by a sign test which was applied to two related samples.

The statistics utilized to test Hypothesis 1 are presented in Table VIII.
TABLE 8

Results of Sign Test Used to Test the Placement Differences Between the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Matched Pair Number</th>
<th>Direction of Difference</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( x )</td>
<td>( y )</td>
</tr>
<tr>
<td>1</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>6</td>
<td>no</td>
<td>yes</td>
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<tr>
<td>7</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>8</td>
<td>no</td>
<td>no</td>
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<tr>
<td>9</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>10</td>
<td>no</td>
<td>no</td>
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<tr>
<td>11</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>12</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>13</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>14</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

Evaluation of these data by the Sign Test indicates there is a difference between the control and experimental groups and that with a one-tailed probability of .035 and an \( n \) of 8 the null hypothesis was rejected.

Table VIII illustrates that with a sign test and an \( n \) of 8 and a probability of .035 that the null hypothesis is rejected indicating that there is a difference between the placement rates of the rehabilitation team and the traditional rehabilitation placement methods of the state rehabilitation agency. Considering the direction of this
difference, the specialized rehabilitation team is able to distinguish itself at the .05 level in the placement of its clients over the placement of clients resulting from the traditional placement methods of the state rehabilitation agency.

Research Hypothesis 2: The cost effectiveness of a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor in the placement of severely disabled persons is not greater than the cost effectiveness using the traditional placement methods of a state rehabilitation agency.

TABLE 9
Projected Salary and Material/Labor Costs of Control and Experimental Groups

<table>
<thead>
<tr>
<th>Experimental (team)</th>
<th>Control (traditional approach)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Projected (Labor (Material Salary) Costs) Costs)</td>
<td>(Projected (Labor (Material Salary) Costs) Costs)</td>
</tr>
<tr>
<td>$x_1$</td>
<td>17160</td>
</tr>
<tr>
<td>$x_2$</td>
<td>8840</td>
</tr>
<tr>
<td>$x_3$</td>
<td>676*</td>
</tr>
<tr>
<td>$x_4$</td>
<td>6968</td>
</tr>
<tr>
<td>$x_5$</td>
<td>7280</td>
</tr>
<tr>
<td>$x_6$</td>
<td>0</td>
</tr>
<tr>
<td>$x_7$</td>
<td>8840</td>
</tr>
<tr>
<td>$x_8$</td>
<td>0</td>
</tr>
<tr>
<td>$x_9$</td>
<td>15600</td>
</tr>
<tr>
<td>$x_{10}$</td>
<td>0</td>
</tr>
<tr>
<td>$x_{11}$</td>
<td>13832</td>
</tr>
<tr>
<td>$x_{12}$</td>
<td>6864</td>
</tr>
<tr>
<td>$x_{13}$</td>
<td>7956</td>
</tr>
<tr>
<td>$x_{14}$</td>
<td>10868</td>
</tr>
</tbody>
</table>

$y_1$ | 9204 | 68 | 0 |
| $y_2$ | 0 | 24 | 0 |
| $y_3$ | 4888 | 40 | 0 |
| $y_4$ | 260* | 56 | 0 |
| $y_5$ | 0 | 104 | 0 |
| $y_6$ | 7904 | 36 | 0 |
| $y_7$ | 5200 | 20 | 0 |
| $y_8$ | 0 | 92 | 0 |
| $y_9$ | 0 | 40 | 190 |
| $y_{10}$ | 0 | 132 | 0 |
| $y_{11}$ | 0 | 22 | 0 |
| $y_{12}$ | 0 | 14 | 0 |
| $y_{13}$ | 0 | 11 | 0 |
| $y_{14}$ | 0 | 30 | 0 |

*Homebound Employment
To obtain the cost-effectiveness ratio for each group, the cost of the staff time \((A)\) and the cost of the materials \((B)\) were added and then divided by the projected annual income of the placed clients \((C)\).

\[
\frac{A + B}{C}
\]

The statistics utilized to test Hypothesis 2 are presented in Table X.

**TABLE 10**

Comparison of the Cost-Effectiveness Ratio of Two Methods of Providing Rehabilitation Placement Services

<table>
<thead>
<tr>
<th>Group</th>
<th>(M) (Cost/Income Ratio)</th>
<th>SD</th>
<th>(t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Experimental) Multi-Discipline Team</td>
<td>.1573</td>
<td>.4614</td>
<td>1.13*</td>
</tr>
<tr>
<td>(Control) Traditional Method</td>
<td>.0170</td>
<td>.0571</td>
<td></td>
</tr>
</tbody>
</table>

*Not significant at the .05 level for a one-tailed test.

Table X indicates that there is not a sufficient difference in cost-effectiveness ratios of the control and experimental groups to reject the null hypotheses \((t = 1.13, \text{df} = 13, p.05 = 1.77)\).

A summary of the findings is presented in Table XI. The first main hypotheses concerning the placement rate of the two rehabilitation placement methods was rejected at the .05 level of significance. The main hypotheses concerning the cost effectiveness of the two rehabilitation placement methods remained tenable at the .05 level of significance. The homogeneity of the control and experimental groups was assured through the use of the \(F\) test upon two of the criteria used for the selection and assignment of the sample population. Further, the
selection criteria that did suggest a difference, sex gave evidence that a greater proportion of women who were older and who were considered to have less rehabilitation potential were assigned to the experimental group (i.e.: the multi-discipline team).

It should be noted that the material costs for the experimental group (multi-discipline team) were bi-modal. Two comparatively large material purchases for clients $x_3$ and $x_{11}$ did not allow for a representative mean for the cost of materials for the experimental group.

**TABLE 11**

Summary Table for Major Research Hypotheses

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Retained</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The rate of placement of severely disabled persons served by a specialized rehabilitation team is not higher than the rate of placement using the traditional placement methods of a state rehabilitation agency.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2. The cost effectiveness of a specialized rehabilitation team in the placement of severely disabled persons is not greater than the cost effectiveness using the traditional placement methods of a state rehabilitation agency.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a summary of the findings of this study as well as the conclusions and recommendations for future research.

The purpose of this study was to determine if the placement of severely physically disabled persons could be improved through the utilization of a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor. Further, the study sought to determine if the services of this multi-discipline team in placing severely disabled clients would be as cost effective as those rehabilitation placement methods traditionally utilized by state vocational rehabilitation agencies in serving the severely disabled.

This study was conducted in five major metropolitan areas in the state of Iowa. The subjects for the study were twenty-eight severely disabled clients who had completed the initial stages of rehabilitation or restoration and were either experiencing or waiting rehabilitation placement services. All severely disabled clients referred to the multi-discipline team that were placement ready were considered initially to be a part of the experimental group. Any severely disabled clients assigned to the team after the initiation of the study were also counted as part of the experimental group. Following the selection of the experimental group, a computer search was used to seek comparable clients in other metropolitan areas of Iowa to create a
control group. Matches between the experimental group members and the control group members were sought on common disabilities, age, sex, and rehabilitation potential. If an appropriate match could not be established for each experimental group member, the client was excluded from the study. The 14 pairs of clients were observed for the first 9 months of 1981.

In order to distinguish the difference between the two placement rates of the control and experimental groups, the sign test was used. A positive sign was applied for each client successfully placed within the framework of the study. In turn, a negative sign was applied to each client who was unsuccessfully placed or who was not placed at all.

To compare the cost effectiveness of the two placement methods, a correlated t test was used to determine the mean differences of the cost of placement for the two groups. To establish a cost figure for the placement activities of the two groups, the following items were considered:

1. cost of the time expended by VR staff members on rehabilitation placement activities (established at $8 per hour);
2. the cost of material and/or equipment required for placement; and
3. the projected annual salary for each client placed.

SUMMARY AND INTERPRETATION OF FINDINGS

The hypotheses established for this study are stated below:
The first hypothesis focused on the placement rate of severely disabled clients for each of the two placement methods. The second
hypothesis sought to establish the cost effectiveness of a multi-discipline team which utilized low cost bio-engineering techniques. The following hypotheses were tested at the .05 level of significance.

Research Hypotheses 1: The rate of placement of severely disabled persons served by a multi-discipline team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor is not higher than the rate of placement using the traditional placement methods of a state rehabilitation agency. This hypothesis was rejected at the .05 level due to the value of the computed sign test which had a probability of .035.

Research Hypothesis 2: The cost effectiveness of a rehabilitation team consisting of a bio-engineering technician, a placement specialist, and a general rehabilitation counselor in the placement of severely disabled persons is not greater than the cost effectiveness using the traditional placement methods of a state rehabilitation agency. This hypothesis was accepted at the .05 level utilizing a one-tailed correlated t test.

In the selection and assignments of subjects for the experimental and control groups, several tests were conducted on the selection criteria to insure that the groups were homogeneous. As subjects of the two groups were paired, matches were sought in terms of the subjects' disability, rehabilitation potential, sex, and age. The Rehabilitation Services Administration's disability codes were used in the initial pairing of subjects between the two groups. Further, the remaining selection criteria were tested at the .05 level to insure that both the pairs and the groups were evenly matched. With the exception of sex, each of the selection criteria established that there was no significant difference between the groups regarding the criteria used for
selection. The sign test was used to establish the homogeneity of sex for the two groups. The result of this test was significant with the results indicating that there was a greater number of women assigned to the experimental group when comparing the sex of the subjects assigned to the two groups. When the difference relating to the homogeneity of sex between the two groups was discovered, this was compared with the other selection criteria, and it was found that more women who were older and who were considered to have less rehabilitation potential, were assigned to the experimental group (i.e., multi-discipline team).

The results of the testing for the research hypotheses plainly indicated that a multi-discipline team utilizing low cost bio-engineering techniques can significantly improve the placement of severely physically disabled clients in productive employment. The results of the testing for the selection criteria reinforces this finding by suggesting that the subjects assigned to the multi-discipline team were slightly more difficult to place when compared to the subjects of the control group even though only the sex difference in the selection criteria was significant.

The hypothesis concerning the cost-effectiveness between the two rehabilitation placement methods was tested through the use of a one-tailed correlated t test. The null hypothesis relating to cost-effectiveness was not rejected. In fact, a comparison of the cost-benefit ratios of the experimental and control groups illustrates that the control group had a better cost-effectiveness ratio than the experimental group.

Although the study only dealt with the placement activities of the two groups, it is interesting to note that the total costs of rehabilitation case services for the control and experimental groups were nearly identical. (Experimental case service costs = $18,102; Control
case service costs = $17,712). The total case service costs reflect the costs to the state vocational rehabilitation agency for the entire rehabilitation process (excluding labor costs) to include placement. With that consideration, the overall cost effectiveness for the experimental group would have undoubtedly been greater than the control group. Further, the longer the placed clients are employed, the more cost effective the experimental group becomes.

CONCLUSIONS

Two general conclusions can be drawn from the findings of this study. They are:

1. Through the utilization of low cost bio-engineering techniques, in combination with personnel skilled in rehabilitation placement and rehabilitation counseling, the movement of severely physically disabled persons into productive employment, can be improved. By establishing this type of multi-discipline team as a regular component of a state vocational rehabilitation agency service delivery system, services cannot only be improved, but the intangible, psychological benefits to the disabled persons may be greatly enhanced; and

2. The cost effectiveness of a multi-discipline team over the traditional rehabilitation placement methods of a state's vocational rehabilitation agency cannot be fully substantiated.

These results support the application of low cost bio-engineering techniques through the use of a multi-disciplinary team in the rehabilitation process. As the "world of work" becomes more technical and/or complex, the response of vocational rehabilitation administrators will need to include new and innovative developments within the rehabilitation service delivery system. Certainly, one of these new innovations could
be a specialized rehabilitation team utilizing bio-engineering techniques.

RECOMMENDATIONS FOR FUTURE RESEARCH

Based upon the results and generalizations derived from this study, future researchers might address themselves to the following suggestions and recommendations:

1. Studies are needed which replicate this study to evaluate the generalization of the findings;

2. Studies are needed to further investigate the cost-benefit ratio of a multi-discipline placement team utilizing low cost bio-engineering techniques when compared to the traditional rehabilitation placement methods of vocational rehabilitation agencies;

3. Studies are needed to evaluate the psychological effects of severely physically disabled persons in response to the availability of bio-engineering services leading to employment;

4. Studies of a longitudinal nature are needed to determine if severely disabled persons who are placed with the aid of a multi-discipline team, which utilizes bio-engineering techniques, have a greater likelihood of moving further up the career ladder;

5. Studies are needed to determine the effect of the bio-engineer on the services to the physically disabled earlier (prior to placement) in the rehabilitation process;

6. Studies are needed to determine the best way to fully integrate the services of a multi-discipline team within the regular rehabilitation service delivery system;

7. Studies are needed to determine the best or the most efficient combination of rehabilitation professionals with specialized
disciplines within the regular rehabilitation service delivery system;

8. Studies are needed to determine the effectiveness of a multi-discipline team, utilizing bio-engineering techniques, in a private proprietorship rehabilitation program;

9. Studies are needed to determine the effectiveness of a multi-discipline team, utilizing bio-engineering techniques, in an internal rehabilitation program of a major business or corporation. (There may even be a possible application of rehabilitation bio-engineering techniques in the prevention of disabilities and other general health and safety concerns.); and

10. Studies are needed to establish an equitable prioritization of rehabilitation services to the disabled when the availability of finite rehabilitation resources are so limited that all those eligible for vocational rehabilitation services cannot be adequately served.

These recommendations may provide additional information to rehabilitation administrators enabling them to more fully utilize the personnel and material resources available to them in serving our country's vocational disabled population.
BIBLIOGRAPHY
BIBLIOGRAPHY

A. PERIODICALS


Margolin, R. J. "Rationale for Teamwork." Rehabilitation Record, II (March-April, 1969), 32-35.


B. BOOKS


**C. OTHER SOURCES**


Rehabilitation Services Administration, Region VII. Memorandum No. 4-82 to Region Directors from Isaac K. Johnson. November 4, 1981.


APPENDICES
APPENDIX A

REGIONAL R.S.A. LETTER REGARDING PLACEMENT
REGITIONAL OFFICE MEMORANDUM NO. 4-82

TO: Mr. Jerry L. Starkweather  Mr. John H. Taylor
     Mr. Gabriel R. Elmon  Dr. Richard A. Schutz
     Mr. William H. Keith  Mr. Charles T. Stevens
     Dr. Jason D. Andrew  Dr. James S. Nyman

FROM: Isaac E. Johnson, Regional Commissioner
       Rehabilitation Services Administration

SUBJECT: Request for Information on Placement Activities

As we reported to you at the recent State Directors' meeting and as Commissioner
Conn confirmed during his teleconference during that meeting, the number one
priority for RSA is placement. This has, of course, always been the ultimate
aim of all vocational rehabilitation services, but never before have we placed
as strong an emphasis on it as we are now doing.

During our meeting, we solicited from each of you activities in which your agency
is engaged which enhance the placement process. We would now like to request some
additional information, your agency's activities relative to placement. Please
send to us the following information by December 4, 1981.

1. Your agency's written policies and procedures on placement including,
but not limited to, manual chapters, memoranda to staff, position
descriptions of persons responsible for placement, etc.

2. Any special instruments developed to analyze potential of clients for
placement or area of employment client should enter.

3. Any reports you have initiated in the area of placement.

4. Any special studies your agency may have completed in the area of
placement.
APPENDIX B

SAMPLE LETTER TO CONTROL GROUP SUPERVISORS
MEMORANDUM

January 22, 1981

TO: Ruth Ruden Burrows, Supervisor, CRREU
    William Bristow, Supervisor, Cedar Rapids
    Orville Townsend, Supervisor, Iowa City

FROM: Marvin L. Tooman
      Chief of Placement

RE: Data Collection for Research Paper

Attached you will find a copy of the methodology for data collection relating to the research effort that I visited with you about on the telephone. I certainly appreciate your willingness to assist in this effort. You, of course, will note one major deviation from what I've suggested in the paper. On Page 28, I've suggested that a weekly questionnaire be sent to the rehabilitation counselor for the control group. In actuality, there will be a number of counselors involved with the "control group clients". Further, I'm hoping to be able to avoid having the counselors working with the "control group clients", know that they are part of any research effort. This is done to avoid the "Hawthorne Effect". (Experiencing a change due merely to the impact of the investigator.) In turn, I will personally be collecting the data from the experimental group.

I'm anticipating that the information that you will be collecting for each "control group client" will be quite simple. (I like things that way!) Primarily, the amount of weekly staff time devoted to a particular client is about all that I need. Once a client has been identified, you will be notified and you'll receive a card each week to record this information and return to me. If there's anything unusual about the case, you'll also be able to record that.

If you should have any questions about this research effort, please don't hesitate to contact me. To insure that everything is on "an even keel", I'll be getting in touch with you again before we get started.

MLT/bh
Attachment
APPENDIX C

DATA COLLECTION FORMS
### WEEKLY CLIENT INFORMATION - CONTROL GROUP

<table>
<thead>
<tr>
<th>WEEK</th>
<th>HOURS OF STAFF TIME DEVOTED TO CLIENT</th>
<th>COST OF MATERIALS/ EQUIPMENT</th>
<th>CLIENT STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**COMMENTS:**

**PLACEMENT DATE** __________ **SALARY** __________ **DOT #** __________ **TOTAL TIME IN 14/20** __________

### WEEKLY CLIENT INFORMATION - F. P. T.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOTAL HOURS SPENT</th>
<th>HOURS FOR COUNSELOR</th>
<th>HOURS FOR PLACEMENT SPECIALIST</th>
<th>HOURS FOR ADAPTIVE EQUIPMENT SPECIALIST</th>
<th>COST OF MATERIALS/ EQUIPMENT</th>
<th>CLIENT STATUS</th>
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<tbody>
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</tbody>
</table>

**COMMENTS:**

**PLACEMENT DATE** __________ **SALARY** __________ **DOT #** __________ **TOTAL TIME IN 14/20** __________
APPENDIX D

GEORGE WASHINGTON UNIVERSITY NEWSLETTERS

(Reprinted with permission)
INTRODUCTION

In 1978 the Job Development Laboratory of the Rehabilitation Research and Training Center (RT-9), The George Washington University, completed a three-and-a-half-year research project in which an innovative job placement model for severely disabled persons was designed and tested. Due to the success of this project and the interest it generated, the Laboratory received a research grant from the National Institute of Handicapped Research (NIHR) to test the use of the model by state vocational rehabilitation agencies.

Under this new project, "Comprehensive Job Placement Models for State Vocational Rehabilitation Agencies," the project staff developed placement models, along with staff training packages which are consistent with the service delivery capabilities of the state rehabilitation agencies.

The three models presently in use by participating states (See chart below) include: (1) The Team Approach in which the responsibility for the client's rehabilitation program is shared among three rehabilitation counselors, each having responsibility for specific aspects of the rehabilitation program; (2) The Facilities Team Approach in which vocational rehabilitation counselors screen and refer clients to a facility which provides specialized evaluation, job development/placement and engineering services to severely disabled clients; and (3) The Job Placement Specialist Approach in which a job placement specialist is trained to coordinate special community services, including job engineering, to place severely disabled clients in gainful employment.

Agency staff selected by their respective states to implement the new placement models on behalf of their severely disabled clients (SSI and SSDI recipients) received one week of intensive training from the Laboratory staff at The George Washington University in the Fall of 1979. All model programs are now in operation. This newsletter is initiated to highlight accomplishments of the participating states:

<table>
<thead>
<tr>
<th>STATE/REGION</th>
<th>TEAM APPROACH</th>
<th>FACILITIES TEAM APPROACH</th>
<th>JOB PLACEMENT SPECIALIST APPROACH</th>
<th>STATE COORDINATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire Region I</td>
<td>X</td>
<td>X</td>
<td>Phil Waterman (603)547-3311</td>
<td></td>
</tr>
<tr>
<td>Virginia Region III</td>
<td>X</td>
<td>X</td>
<td>Milford Walker (804)257-0285</td>
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<tr>
<td>North Carolina Region IV</td>
<td>X</td>
<td>X</td>
<td>Paul Cline (919)733-5920</td>
<td></td>
</tr>
<tr>
<td>Michigan Region V</td>
<td>X</td>
<td>X</td>
<td>James Scott (517)372-3978</td>
<td></td>
</tr>
<tr>
<td>Iowa Region VI</td>
<td>X</td>
<td>X</td>
<td>Marvin Tooman (515)281-4150</td>
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</tbody>
</table>

The Job Development Laboratory, Rehabilitation Research and Training Center (RT-9), The George Washington University, under the project "Comprehensive Job Placement Models for State Vocational Rehabilitation Agencies," sponsored in part by The National Institute of Handicapped Research, Grant No. 16-P-568033-15.
JOB DEVELOPMENT ACTIVITIES

The ultimate success of job placement lies in the effectiveness of the job development efforts. A well designed job development program must foster education, cooperation, communication, and motivation of employers and rehabilitation personnel. All participating states are actively developing programs in this crucial area of the job placement process. The following provide some examples.

The Facility Placement of Iowa has already conducted four employer seminars. In all, 23 representatives of insurance companies, hospitals, educational institutions, utility companies, banks and retailers were in attendance. The 4-hour seminars presented employers with information about physically disabled persons, examples of jobs that such persons can perform competently, and ways in which the team can assist employers to implement successful job placements through job analysis, client evaluation, job-client matching, job re-engineering, and follow-along services. Employers were also provided with short summaries of job-ready clients for their consideration in filling job vacancies. The seminars created such employer interest that all who attended volunteered to serve as members of the placement team's "Employer Advisory Committee." This committee, which will meet periodically, will discuss hard-to-place clients, employers' problems, successes and needs in hiring in general, and employers' specific needs in the area of hiring the handicapped. The Iowa Facility Placement Team feels that these efforts have laid the groundwork which will open many placement opportunities in the future. In fact, a number of severely disabled clients have already been placed.

Michigan's "Independent Living and Employment Options (ILEO)" project has been meeting monthly with a group known as the Facilities Team Planning Committee. The committee is composed of representatives from the Program Development Office of the Bureau of Rehabilitation, the Lansing District Office, the Lansing Metro Local Office, Pecham Rehabilitation Center, Projects with Industry, the Center for Handicapped Affairs, and the ILEO team. The committee has been working diligently to identify and address the problems of the area's handicapped population as well as the concerns of rehabilitation counselors. This committee has already established a task force to develop a "Business and Industry Council for Handicapped Employment." The objectives of this council are to make employers sensitive to the needs of the handicapped, make the resources available to employers to help meet these needs, and develop a listing of job-ready clients that employers can draw from in filling job vacancies.

Virginia's Placement Team held its first employer's seminar on February 1, 1980.

North Carolina's Facility Team held its first employer's educational seminar on April 10, 1980. Topics discussed included: abilities of disabled persons, job tax credit laws and benefits to employers, and the availability of continued services from the team members to the employers.

The New Hampshire team is planning a series of presentations geared towards job development in the near future.

JOB PLACEMENT ACTIVITIES

The model programs for job placement have been operational for only a short time. However, some states report that a number of severely disabled persons have already benefitted from the specialized placement services now available and have been placed. These include the following.

A 42-year-old man with coronary artery disease referred himself to North Carolina's placement team for assistance in maintaining his newly found position as a marine mechanic for a
local company in Greenville. Continuation of his employment was contingent on his acquiring his own hand tools. Through client input, comprehensive evaluation and consultation with the team engineer, tools were located and purchased which are appropriate for the work in which this client will engage. This client, an SSDI recipient of $650 per month, is now earning a starting salary of $22,672 annually.

The North Carolina team counselor assisted in the placement of a 22-year-old man disabled by multiple fractures of the left and right arms. One week after this client was interviewed for a job as a production operator at a local industry, the team counselor followed up with a visit to the company's personnel manager. The client's functional limitations and assets in relation to the job tasks were discussed, and an explanation of the "targeted job tax credit law" was provided by the counselor. Through this involvement the client was hired at a rate of $3.74 per hour, working 30 hours per week. At the time of placement this client was receiving $219 per month in Social Security payments.

Iowa's team reports a number of job placements. A 30-year-old female client disabled due to a cervical laminectomy in January 1974 was referred to the Iowa team in November 1979 from the state agency's field counselor. Comprehensive evaluation revealed that in spite of limited head movement and decreased strength in her left arm and hand, her strengths (e.g., normal intelligence, ability to write, mobility independence, and pleasant voice and personality) made her ideally suited to a receptionist job at the Headquarters Building of Ardan Corporation. Her major job tasks include greeting visitors, answering the phone, taking messages, and distributing materials within the building. She is now working full-time at a starting salary of $3.75 per hour.

A 20-year-old male quadriplegic referred to the Iowa team was able to begin full-time employment on January 1, 1980, in the micrographics department of the Bankers Life Insurance Company. His job tasks involve document preparation, camera operation and quality control using a microfilm/fiche reader. To enable him to carry out these tasks productively, it was necessary to modify the fiche reader and to raise work surfaces for wheelchair access. This client, known to the state vocational rehabilitation agency since March 1975, was receiving $208/monthly in SSI payments. He now earns $560 monthly with full company benefits.

Adapted Microfiche Viewer

Problem: finger soreness due to continuous contact with metal frame control edge.

Solution: rubber padded post added to frame control to eliminate finger contact with metal edge.

Material Cost: $ .30

Design/fabrication time: 1.5 hrs.

Fabrication and photograph by Iowa's Facility Placement Team
In addition to these on-site placements, the Iowa team also reports that a 51-year-old female with rheumatoid arthritis has been placed as a telephone salesperson for a waterproofing/construction company, working from her home. Home-based employment was required as a suitable solution to transporting her and her electric wheelchair to a job site could not be found. Due to her limited hand dexterity and diminished reach and strength in the upper extremity, a speaker phone and a raised desk surface were provided by the team engineer. By her own choice she works a six-hour day and is now earning $3.25 per hour.

Michigan's facility placement team reports that they have assisted in placing two Bureau of Rehabilitation clients disabled by cerebral palsy into CETA positions. One client began working part-time (30 hours/week) as a microfilm operator, but will soon be full-time after building up her physical tolerance. The other client is already working full-time as an assistant to the microfilm operator. With the addition of a new microfilm camera, reachable levers on the microfilm reader, and a keyguard on the typewriter, the clients are performing their jobs satisfactorily.

Virginia's placement team recently assisted a 27-year-old male cerebral palsied client realize full-time employment as a payroll clerk at the Department of Housing and Urban Development. The team had identified poor interviewing skills and poor attitude as the major obstacles to this client's vocational progress. After many hours of interviewing practice using videotaping and cassettes with team members and employers, who volunteered their time, the team felt he was ready to begin actual job interviews. The extra effort paid off. This client, once a sheltered workshop employee and a $240/month SSDI recipient, now earns $8,200.00 annually.

Rehabilitation Engineering in the Vocational Rehabilitation Process

The rehabilitation engineers from the participating states have agreed to establish a communication network to facilitate transfer of technical information among participants, the JDL staff and other interested persons. The JDL staff plans to compile this data and provide short summaries describing specific technical problems and solutions. A composite technical assistance resource is also planned as a product of this project. The following summaries represent selected technical problems and solutions compiled at this point.

Modified Microfilm Camera

Problem: a client with cerebral palsy found it difficult to feed documents into camera without skewing them.

Solution: height of right hand guide was increased to aid client in lining up documents correctly.

Material Cost: $ .50

Design/fabrication time: 1.5 hrs.

Fabrication and photograph by Iowa's Facility Placement Team
Elevated Work Surface*

Problem: existing work table did not allow easy access of work surface by a person with spinal cord injury who also uses an electric wheelchair for mobility.

Solution: standard work surface was elevated by 3 inches by adding leg extenders to table. This allowed client to get close enough to his work to be able to function without strain.

Material Cost: $8.00
Design/fabrication time: 7 hrs.

Spray Can Adapter*

Problem: a client with weak finger dexterity was engaged in janitorial work but lacked sufficient strength to grip and press dispenser buttons on disinfectant spray cans.

Solution: a spray can adapter was fabricated which allows for easier grip and spray nozzle control. The adapter may be adjusted for cans with other diameters and head configurations and can be used by clients who do not have thumb and pointing finger dexterity.

Material Cost: $10.00
Design/Fabrication time: 16 hrs.

*Fabrication and photographs by Iowa's Facility Placement Team

Other types of spray can adapters are available from sources such as Fred Sammons, Inc., Brookfield, IL

COMMENTS:

1. Please comment concerning this issue:

2. I suggest the following changes in future issues of InterCom:

3. In future issues of InterCom, I would like to see information on the following:

4. Do you know someone who would like to receive InterCom?
Name/Address:
Hydraulic Floor Lift

Problem: TV's to be repaired are left on the floor at the worker's bench; after repairs are made, the sets are marked and returned to the floor for storage and pickup. Worker is unable to lift the TV sets to working height and back to floor.

Solution: The employer was able to supply a swiveling roller base for easy sliding of the sets onto a platform; a push-button-operated hydraulic lift under the platform then raises the set to working height for repair (height adjustment 4-7/8" - 30½").

Material Cost: Model #110480 Hydraulic Scissors Lift: $1,120.00 (Global Equipment Co., 6556 Hemlock Drive, Hempstead, NY 11550, 800/645-1232); ask for their catalog.

Design/fabrication time: none

PLANNED TECHNICAL SOLUTIONS

Problem: The team engineer in New Hampshire has evaluated and identified the need for equipment/devices to enhance the functional abilities of their clients including:

• adaptations to an engraving machine to allow a middle-aged man with loss of central vision due to hemorrhages to resume a career as a trophy engraver
• a lift to assist a wheelchair user to stow his wheelchair behind the front seat of his car independently
• an IBM selectric typewriter modified with typing guard for a woman with cerebral palsy who cannot write manually
• specially designed hand tools to increase productivity of a man with cerebral palsy involved in assembling hardware on the "uppers" of boots.

Solutions: Specification for fabrication and/or purchase of necessary devices have been made and are currently being provided. Detailed descriptions of solutions with photographs will appear in the next issue of InterCom.
HAPPY NEW YEAR

A quarterly newsletter from the Job Development Laboratory, Rehabilitation Research and Training Center (RT-9) of The George Washington University, under the project "Comprehensive Job Placement Models for State Vocational Rehabilitation Agencies," sponsored in part by The National Institute of Handicapped Research. Grant No. 16-P-568030-15.

No. 2 January 1981

THANK YOU

We wish to thank the individuals from fifty-five organizations who took the time to provide us feedback on our first issue of INTERCOM. We were gratified by the positive responses and appreciative of the excellent suggestions offered to improve future issues. Many organizations and individuals have asked to be added to INTERCOM's mailing list, increasing our current list from 700 to 1000 recipients. In addition, a number of organizations have informed us that they will be including information from INTERCOM in their own newsletters. Through INTERCOM we will continue to highlight the activities of the five-state model programs participating in our research project. At the request of many readers, we will also include, as a regular feature, a selected overall statistical summary of each state's accomplishments in terms of placements (see chart below) to afford readers a wider perspective of each state program's growth and caseload status.

<table>
<thead>
<tr>
<th>STATE/REGION</th>
<th>*LENGTH OF MONTHS PROGRAM IN MONTHS</th>
<th>TOTAL # OF SEVERELY DISABLED CLIENTS REFERRED TO MODEL PROGRAM</th>
<th>**TOTAL # OF CLIENTS WHO HAVE RECEIVED SERVICES TO DATE</th>
<th>TOTAL # OF UNSUCCESSFULLY CLOSED CASES</th>
<th>TOTAL # OF CLIENTS PLACED IN SHELTERED EMPLOYMENT AND/OR CLOSED AS HOMEMAKERS</th>
<th>TOTAL # OF CLIENTS PLACED IN Gainful Employment</th>
<th>AVERAGE STARTING ANNUAL INCOME OF GAINFULLY EMPLOYED CLIENTS</th>
<th>CONTACT PERSON</th>
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<td>Phil Waterman (603) 547-3311</td>
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<td>60</td>
<td>37</td>
<td>4</td>
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<td>Maureen McGuire (703) 379-6550</td>
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<td>North Carolina</td>
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<td>75</td>
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<td>Richard Heath (919) 733-5920</td>
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<td>Michigan</td>
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<td>Clendon Wooldridge (517) 394-6821</td>
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<td>Iowa</td>
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<td>67</td>
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<td>$ 7,240</td>
<td>Marvin Tooiman (515) 281-4150</td>
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*Months of Operation

**Severely Disabled is defined as meaning SSI and SSDI recipients for the purposes of this project. Many of these client cases were previously closed by their counselors and have been reopened for referral to the Model Program.
ON-SITE FOLLOW-UP TRAINING

Our research methodology called for the Job Development Laboratory staff to visit each participating state program after six months of operation, post-training. The six-month time frame was selected to allow each state program sufficient time to implement its model and gain experience in providing special services. In preparation for the visit, participants were asked to evaluate the progress of their efforts in the following areas:

- development of severely disabled client caseload
- provision of direct client services (i.e., evaluation, independent living, job development, job analysis, job/client matching, job accommodations, placement, and follow-along services)
- development of interest and cooperation in the rehabilitation community
- development of employer interest and cooperation
- development of community resources

After receiving this feedback, site visits were arranged. The objective of site visits was to provide additional consultation/training to further strengthen the programs and reassess operational plans. State visits by JDL staff were conducted on the following dates:

<table>
<thead>
<tr>
<th>State</th>
<th>Visit Dates</th>
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<tbody>
<tr>
<td>Iowa</td>
<td>May 13-14, 1980</td>
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<tr>
<td>Virginia</td>
<td>July 14, 1980</td>
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<tr>
<td>Michigan</td>
<td>August 7-8, 1980</td>
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<tr>
<td>New Hampshire</td>
<td>September 3-4, 1980</td>
</tr>
<tr>
<td>North Carolina</td>
<td>October 14-15, 1980</td>
</tr>
</tbody>
</table>

Consultation During Follow-Up Visit at Iowa:
Standing (left to right): R. Humphrey, C. Miller
Sitting (left to right): J. Shaver, B. Antenucci, M. W. Keller, E. Malik, E. Shaver, P. Griswold

Consultation During Follow-Up Visit at Michigan (Left to Right): C. Wooldridge, R. Brewer, B. Antenucci, K. Malik, E. Shaver, P. Griswold

VOCATIONAL EVALUATION ACTIVITIES

A concern commonly cited by vocational evaluators is that many commercially available work samples cannot be used to test severely physically involved clients due to a client's functional limitation to access work sample materials. The vocational evaluator, Susan D. Hilchev, from New Hampshire's Facility Placement Team is actively reviewing commercially available work samples used at Crotched Mountain Rehabilitation Center and modifying them to overcome such problems. For example:

(1) Persons with limited reach experienced great difficulty when asked to sort parts into proper compartments during an inspection task with Valpar's Tri-Level Measurement Work Sample (#10). To alleviate this problem, portable plywood compartments were constructed to replace the Valpar equipment. These portable compartments can be freely rearranged to best suit the reaching capability of the individual client being tested.

Portable Plywood Compartments for Sorting Parts
A Wide Range Interest-Opinion Test was modified for clients who, due to limited finger dexterity, had difficulty turning the test booklet pages and recording answers on computer scoring sheets. The test booklet was reproduced in a slide format, and a carousel slide projector was adapted so that various control switches (slip and puff, cross lever and finger switches, etc.) could be used to advance the slides. Answers then are either typed on a handmade answer sheet or recorded on a cassette tape recorder and then transferred to the computer sheet for normal scoring. Modifications such as these greatly enhance the ability of the New Hampshire team to collect useful information for vocational planning and placement efforts.

Sharon Bender, vocational evaluator for the Virginia Placement Team, is also actively using innovative techniques to test severely disabled clients who have often been excluded from receiving comprehensive vocational evaluation services in the past. To inform and encourage counselors to avail these and other services for their clients, the Virginia Placement Team has developed their own newsletter, Cross Talk, for state-wide circulation. Their first issue describes a program for evaluating brain-damaged clients at Northern Virginia's Evaluation Center. The evaluation program for brain-damaged clients is tailored to each client's individual abilities and limitations. Tests and work samples that do not require timing are used in place of timed tests. Work space and testing equipment frequently are modified to meet each client's needs (i.e., Dymo grip pads may be used to secure papers and equipment for persons having problems in stability on upper extremities). The career exploration segment of their program is also different from conventional career exploration, rather than identifying how a client can meet the requirements of a job, exploration focuses on how a job might be modified, either in content or location, for the client to be able to function at his or her highest potential. This program exemplifies how Virginia's Placement Team is initiating improvements in vocational evaluation techniques.

JOB PLACEMENT ACTIVITIES

In our last issue of INTERCOM (August 1980) we included a short summary of a 20-year-old quadriplegic placed by Iowa's Team into the micrographics department of the Bankers Life Insurance Company. We were pleased to learn that this client was selected over a number of other nominees to receive the Iowa Rehabilitation Achievement Award for 1980. This award is based on one's effort in overcoming handicapping conditions and thereby becoming involved in the world of work. Similarly, a mentally retarded client from the Northern Virginia Team was recognized as Client of the Year in the State Rehabilitation Conference. All of us join in the Iowa and Virginia Teams' pride in their clients' achievements and applaud the Teams' contribution to these persons' success.

We are also pleased to announce that many more job placements have been achieved by the model teams than we have room to write about in this newsletter. However, we would like to share a few with you....
the upper extremities. This client was unemployed for eight years prior to placement and was receiving $249 in monthly Social Security payments. To accommodate this client and improve the work environment for both clients the work area was modified (i.e., a U-shaped, barrier-free work station was provided; a large card file system was replaced by a more accessible 3-drawer system; to spare expense, the cathode-ray tube was positioned on a lazy Susan plate to be accessible to two workers; a map rack to hold 35-40 maps of the city and county was accessibly located; and telephones were equipped with headsets). Both clients work 40-hour weeks and are now earning $4.35 per hour plus full benefits.

evaluation revealed that she was able to drive a modified van and was proficient at light filing and bookkeeping tasks. Her main restriction to clerical work was her inability to type. The team was able to convince the employer to drop the normal typing requirement associated with the receptionist position she filled. In addition, bathroom modifications were made at the worksite to accommodate her needs as a wheelchair user. A van was also modified for her use, and special parking arrangements were made for her at the work facility. This client now earns $837 monthly.

REHABILITATION ENGINEERING IN THE VOCATIONAL REHABILITATION PROCESS

Contributions by the rehabilitation engineers from the participating states continue to be a significant factor in the growing number of success stories of many severely disabled clients who are now gainfully employed. The following summaries represent a small sample of selected technical problems and solutions compiled since the writing of our August issue of INTERCOM.

MODIFIED HAMMER HANDLE

(Submitted by Iowa's Placement Team)

Problem: Due to amputation of his right thumb, a carpenter lost his ability to maintain control of his hammer, resulting in damage to the fine woodwork on which he worked.

Solution: Epoxy material was applied to the hammer handle and then custom-molded to the shape of the client's hand in order to evenly distribute stress loads throughout the hand and afford directional stability. Due to the need to change leverage, two positions were molded on the hammer handle.

Material Cost: $2.00

Design/fabrication time: 4 hrs.

A Paraplegic Client Working as a Dispatcher at Ingham County Animal Shelter

Iowa's Team recently placed a 22-year-old male with multiple handicaps as a bed strapper/dishwasher at a local motel. This client's disabilities include epilepsy, hearing loss, club feet and mental retardation. The client has a sixth grade education and was receiving $175 monthly in Social Security benefits at the time of placement. His present job duties include stripping beds, picking up and sorting linens for the laundry, and washing glasses by hand. The placement provided two days of on-the-job evaluation to insure that the client could perform the work. The client's starting salary is $3.20 per hour, and he presently works a 20-hour week. Iowa's Team, however, has worked out an arrangement with the employer for this client's hours to be gradually increased, and it is expected that he will be working a 40-hour week in the near future.

Virginia's Team reports that they recently placed a 27-year-old quadriplegic woman as a receptionist with the Federal Government. This client is a high school graduate with one year of college credit and was receiving $180 in Social Security payments per month at the time of placement. Comprehensive

Modified Hammer Handle
80

STEP LADDER MODIFICATIONS
(Submitted by Iowa's Placement Team)

Problem: A client with stability problems due to cerebral palsy, placed as a file clerk, had difficulty

-9-
carrying file folders while negotiating the steps of a ladder to reach high shelves of a floor-to-ceiling file system. Attempts to accomplish this task frequently resulted in files being dropped onto the floor, creating a time-consuming problem of chronological reassembly.

Solution: A custom-designed aluminum receptacle was fabricated and mounted on the leading edge of the step ladder platform to hold the files upright. This eliminated the need to hold them when climbing up or down the ladder and allowed for easy insertion and removal of documents.

Material Cost: $800

Design/fabrication time: 7 hrs.

Richard Juergens, Engineer of Iowa Team,
Observes Client Using Step Ladder Modifications

24-COMPARTMENT CARRIER TRAY
(Submitted by Iowa's Placement Team)

Problem: A client, placed as an internal courier within a large hospital, has congenital abnormalities of both upper extremities. His left arm ends above the elbow and is fitted with a prosthesis. His right arm has two fused fingers extending from the elbow. A tray provided by the hospital for the client's use in picking up slips of paper for distribution was too heavy, too cumbersome, and needed additional compartments. Other problems included reaching into individual compartments to extract credit cards and keeping weight in the tray evenly distributed.

Solution: A lightweight polyvinyl carrier with 24 compartments was constructed to conform to the client's body. Individual credit card holders were installed in each of the 24 compartments, and lift-A-DOT fasteners were placed on each side of the tray to enable the client to adjust the point at which the carrying strap is attached to the tray. A tab was also installed on the back of the carrier which will fit into either a belt or strip of webbing on a shirt to further enhance ease of weight distribution.

Material Cost: $19.00

Design/fabrication time: 45 hrs.

24-Compartment Carrier Tray
DESK MODIFICATIONS
(Submitted by North Carolina's Placement Team)

Problem: Paper manipulation, writing, and holding a phone handset presented major problems to a client with cerebral palsy who has spasticity in the upper extremities. Finding adequate methods for this client to perform these tasks was essential prior to placing him as a social worker trainee.

Solution: A telephone extension arm with an on-off switch was provided; this eliminated holding a handset while using the phone. Dycem non-slip material was used on desk surfaces to eliminate sliding of papers, thereby making paper manipulation easier. Dictating and transcribing equipment were provided to replace writing as a means of generating reports.

<table>
<thead>
<tr>
<th>Material Cost:</th>
<th></th>
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<tbody>
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<td>Telephone extension arm</td>
<td>$40.50</td>
</tr>
<tr>
<td>Dycem non-slip padding</td>
<td>30.45</td>
</tr>
<tr>
<td>Dictating/transcribing Equipment</td>
<td>900.00</td>
</tr>
<tr>
<td>Total</td>
<td>$970.95</td>
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</table>

Design/fabrication time: 2 hrs.

WORK ENVIRONMENT MODIFICATIONS
(Submitted by Michigan's Team)

Problem: A client impaired since birth by arthrogryposis (bone and joint deformation that causes atrophy in the limbs) was in danger of losing her job as a contract analyst because her efficiency was low. With just slight right arm movement this client performs most tasks with her mouth, tongue, and a mouthstick, and uses an electric wheelchair for mobility. Her office setup hindered efficient functioning. Her two desks, set up at opposite walls, were disorganized and cluttered since she could not operate a conventional filing system. She wasted time maneuvering her wheelchair between the desks in her work area, and she required assistance getting file books off shelves.

Solution: A microfiche viewer was purchased, and reference books and files were microfilmed. She can select and insert microfiche in the viewer with her mouth. Work surfaces were angled and other essential equipment positioned for greater efficiency on a crescent-shaped desk for easy mouthstick access. An open-ended, motorized up-and-down file system was built into the desk so that papers can be slid into appropriate opening levels from the desk surface by mouthstick. The crescent-shaped desk also eliminates the need for constantly repositioning the wheelchair movements. The client recently received a satisfactory rating largely due to the more efficient work environment provided.

Cost of Materials & Equipment: $493.44

Design/fabrication time: 10.1 hrs.

INDEPENDENT LIVING MODIFICATIONS

MOBILE HOME MODIFICATIONS
(Submitted by North Carolina's Placement Team)

Problem: A T-11 paraplegic faced serious architectural barriers to mobility after completing an intensive rehabilitation center program for his spinal cord injury. Steps leading to the front door did not allow for independent wheelchair access. Kitchen work counters and major appliances were inaccessible and/or inconveniently positioned for a wheelchair user. The hallway and doors leading to bedrooms and bathroom were too narrow (only 26" width) for wheelchair clearance, and the existing bathroom layout did not allow for easy wheelchair transfers to tub and commode. Financially, it was not feasible for this client to relocate and purchase an accessible mobile home.

Motorized Up-and-Down File System

Microfiche Viewer & Table Top Modifications
**Solution:** The client's mobile home was evaluated to determine modifications needed to make the home barrier-free. Based on the evaluation, detailed specifications were prepared by the team engineer and let out for contractor bids. Major changes made to the home are indicated on the layout sketches and picture which follow.

**Material Cost:**
- Wheel-O-Vator Wheelchair Lift: $1,508.00
- Cost of Contractor's Work & Materials: $2,015.00
- Total: $3,523.00

**Design/Fabrication:** 10 hrs. (design time)

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**COMMENTS:**

1. Please comment on effectiveness, applicability, format, etc. concerning this issue.

2. In future issues of *InterCom*, I would like to see information on the following:

3. I suggest the following changes in future issues of *InterCom*:

4. Do you know someone who would like to receive *InterCom*?
   Name/Address:
MODIFIED RECREATIONAL WHEELCHAIR

(Submitted by New Hampshire's Placement Team)

Problem: A client with cerebral palsy, who uses a power chair for mobility, would like to participate in family outings such as camping trips, hiking and other outdoor activities. Due to the level of his disability, proper positioning and restraint are essential for such rigorous outings. The client's experience with commercially available wheelchairs has also been poor, in that they do not stand up to the strain of difficult terrain, resulting in structural and wheel fractures to his wheelchair.

Solution: A custom manual wheelchair was designed and developed for the client's outdoor use. The design incorporates a frame welded together from lightweight tubing. The wheels used for the chair are high strength 20" bicycle wheels. The seating unit was custom-molded for the individual by Tufts Bioengineering Department, Boston, MA, and is the same as used on the client's power chair. Total weight of the chair is 28 pounds.

Material Cost: $100.00
Design/fabrication time: 20 hrs.

Modified Recreational Wheelchair
MODEL PROGRAM MAKES IMPACT IN STATE AGENCY

Mr. Jerry L. Starkweather, Associate Superintendent and Director of Iowa Department of Public Instruction's Rehabilitation Education and Services Program, formally expressed his delight and continuing interest in the work of Iowa's Model Program in a recent letter addressed to Mr. Marvin Tooman, Coordinator of Iowa's Model Program.

In the letter Mr. Starkweather says, "I've discussed enthusiastically the work of this group both with other rehabilitation staff and with persons external to our program. I believe all I've visited with are as enthusiastic as I am and truly believe we are on the right track and should do even more in this area throughout the state and certainly never be timid about the good things we've seen happen even in a fairly short period of time."

Mr. Starkweather went on to thank and commend the staff for the creativity and innovativeness they have demonstrated through the model program and for "the dramatic effect it's had on the lives of 67 severely disabled Iowans served and the 28 disabled Iowans who have been placed through the 13 months the model project has been operating."

Mr. Claude A. Myer, Director of the Department of Human Resources in North Carolina, has also expressed his enthusiasm for that state's model team's efforts. . .

Mr. Kalisanker Mallik, Director
Job Development Laboratory (RT-9)
George Washington University Medical Center
Suite 420, 2300 Eye Street, N.W.
Washington, D.C. 20037

Dear Kali:

I am pleased to advise you that the "Comprehensive Job Placement Model" located in our Greenville office is successfully producing job opportunities for severely disabled clients who have been described as extremely difficult to place in employment. There is no question that the "Model" provides the method and structure needed to bring about these placements. It is my view that the "Model" is significantly influencing the direction our program is taking in meeting the employment needs of clients.

I appreciate your sharing with us a worthwhile and effective method for getting an important job done.

Sincerely,

Claude A. Myer
UPDATE: STATE PLACEMENT MODELS

In spite of such problems as Federal funding and frequent staff turnover (particularly in Virginia), the Comprehensive Job Placement Models in five states are still very active. This may be due to the fact that the state participants have demonstrated the need for such services in job placement of severely disabled clients receiving SSI/SSDI support. The amount of time each model program has been operational varies among the five states, and their various activities have been reported in our newsletters, "INTERCOM" No. 1 and No. 2.

Length of Model Programs

<table>
<thead>
<tr>
<th>State</th>
<th>Length</th>
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<tbody>
<tr>
<td>Iowa</td>
<td>19 months</td>
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<tr>
<td>Michigan</td>
<td>20 months</td>
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<tr>
<td>New Hampshire</td>
<td>15 months</td>
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<tr>
<td>North Carolina</td>
<td>14 months</td>
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<tr>
<td>Virginia</td>
<td>12 months</td>
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The state administrators have recognized these activities and made commitments to continue the programs using their regular state operating budgets. Two of the state administrations (Michigan and Iowa) are planning to expand their programs on a wider scale so that many of their field counselors can tap these resources in rehabilitation planning for their clients.

The following describes the recent activities of each state:

Iowa: With very limited staff time (evaluator/rehabilitation counselor = 1 full time; engineer = 4/5 time; and job placement specialist = 3/5 time), the Iowa team placed 28 severely disabled SSI/SSDI clients during the period of one year. One client also received the "Client of the Year" award during their State Rehabilitation Conference. The "Engineer" from this team also received an award from local employers for providing most valuable services in their community. In June 1981, the engineer also received an international award for providing rehabilitation engineering services for mainstreaming severely disabled persons. The members of the team are making every effort to prioritize and incorporate rehabilitation engineering as an integral part of the state vocational rehabilitation agency's services. This process will help the government to fund the rehabilitation engineering project when the "Block Grant" concept takes effect.

Michigan: The team, consisting of a rehabilitation engineer, equipment designer, job placement specialist, occupational therapist, and technician, are currently serving clients referred from state vocational rehabilitation agencies as well as from private sources. The team has given training sessions to 120 counselors selected from eight mid-Michigan field offices. These sessions are designed to teach counselors to effectively utilize the rehabilitation engineering concept in independent living, vocational evaluation, training, and job placement situations.

Through this training, the service is receiving referrals from many counselors, who are recognizing the clients' specific needs for rehabilitation engineering services. The team has received nearly 160 referrals, currently has a large active case load, and has effected a number of job placements or re-placements through effective engineering.

New Hampshire: Despite some staff reduction, the New Hampshire Rehabilitation Engineering Program is continuing to provide vocational evaluation and rehabilitation engineering services to the northern New England area. Areas of service have been expanded to meet adaptive equipment needs of those handicapped individuals who are not necessarily in a vocational program. Discussions with other health care facilities, including sheltered workshops, are proceeding to develop contracts for rehabilitation engineering services. A series of in-service programs are being developed to be given to health and rehabilitation professionals throughout the area.

North Carolina: There will be some reduction of staff by October, 1981. However, the engineer, the job placement specialist and the evaluator will remain in function as active members of the state vocational rehabilitation agency.

Virginia: In spite of the severe staff turnover (four staff members in one year's time), the Commissioner of Virginia is still committed to continue the project. In every case the new staff member was trained by the existing staff or/and by our office. They were also able to maintain a high quality and quantity of placement in the state of Virginia.

The team's activity is considered most innovative in the placement approach to severely disabled clients. The coordinator of the team presented the effectiveness of the placement model to participants from other states within Region III during the RSA "Regional Meeting on Job Placement" on June 5-6, 1981 in Philadelphia, Pennsylvania.

This project is being modified and expanded to serve all nine field offices in the Northern Virginia area. In order to achieve this goal, a panel of people trained by the Job Development Laboratory staff and a specialist from the community have been selected. Counselor(s) will meet monthly with the panel and will present one client history. The panel will then make recommendations for the necessary rehabilitation services to the counselor(s), and the panel will follow along to ensure a positive rehabilitation outcome. The panel concept was instituted to overcome the effects of staff turnover and to expand services to multiply handicapped clients who are also receiving public financial supports.
MOUTHSTICK TELEPHONE CIRCUIT CONTROL

(Submitted by Iowa's Placement Team)

Problem: A client, quadriplegic due to polio, placed as an Employment Interviewer with the Job Service of Iowa (CETA), is required to use a telephone on an ongoing basis to perform her job. As she has limited use of her hands and arms, she was unable to hold the receiver and operate a standard pushbutton telephone.

Solution: To eliminate this problem, the telephone receiver was placed in a flexible extension arm (gooseneck) and positioned for easy access from the wheelchair. A special hinged switch plate was designed and fitted to the phone in order that the telephone circuit could be easily activated or shut off, using a mouthstick. The dialing function can also be accomplished using the mouthstick and touch-tone key system.

Material Cost: $45.00

Design/Fabrication Time: 8 hrs.

CONCEALABLE HELMET

(Submitted by the Job Development Laboratory)

Problem: Head injuries due to seizures may be seriously debilitating, with injury ranging from lacerations, fractures, and concussions to cognitive impairment due to brain damage. The problem of adequate head protection from uncontrolled seizures is compounded by the necessity for a cosmetically acceptable form of protection.

Solution: A concealable helmet, to be worn under a wig, turban, or hat, was designed and tested for use by individuals with seizure problems. The helmet is composed of an inner and outer shell made with Pelite (polyethylene foam) with sections of Temper Foam sandwiched between the shells. Vacuum forming facilities are required for molding the helmet to the contour of a user’s head. The finished helmet weighs about 5 ounces and compared favorably to other helmets in protecting against concussion in testing conducted by the National Bureau of Standards, Product Safety Technology Division. Additional information on manufacturing process and probable costs can be obtained by writing to the Job Development Laboratory.

Material Cost: $15

Design/Fabrication Time: 12 hrs.

The client accesses telephone using a gooseneck, a hinged switch plate and a mouthstick.
JOB PLACEMENT ACTIVITIES

The model placement teams continue to provide us with summaries of their placement activities. Following are samples of the placements achieved since our last issue.

Iowa's Placement Team reports the recent placement of a 52-year-old double amputee with a cardiac condition as a shop teacher for vocational education classes conducted through the CETA Program. This client's abilities include good intellect, full use of upper extremities, and a substantial technical background gained from years of work as a tool and die maker, production engineer, and machinist. As a wheelchair user requiring more sedentary activities, given his cardiac condition, the client was unable to continue with the physically demanding activities of his former occupations. However, the Placement Team was able to satisfy his occupational interests within the limits of his physical capabilities through the shop-teacher placement. Prior to this job this client was unemployed for 4 years and received SSDI payments of $152.00 per month. He now works 30 hours per week at the rate of $10.60 per hour.

New Hampshire's Placement Team at Crotched Mountain Rehabilitation Center was instrumental in assisting a 28-year-old man, diagnosed as having partial quadriplegia post-polio/myelitis, to return to employment. This client is a wheelchair user, who is partially blind in his right eye, and has relatively good use of upper extremities, except for weakness in his triceps, which makes it difficult for him to extend his elbow. The client worked for two years, in spite of this disability, as a sleeve turner (someone who turns sleeves inside out after they have been sewn) for a garment manufacturer until his job was eliminated due to changes in the manufacturer's contracts. The manufacturer had attempted to reemploy him as a bolt and hood turner, but he was unable to operate the required equipment adequately to perform these functions. The placement team was involved, at the request of his state vocational rehabilitation counselor, to see if he could be more productive at these tasks through reengineering of his work station. After evaluation, specific recommendations as to how to adapt the various machines and jigs for his use were made and later fabricated by the manufacturers. This client's job is now secure, and he is presently earning an average of $3.46 per hour (piecework rate). Total costs involved were $331 for the team's site visit and approximately $50 in costs for materials used by the manufacturers in fabricating adaptive equipment. Without the team's intervention, this client would most likely have relied on SSDI of $400-$425 per month.

Virginia's Placement Team successfully placed a 33-year-old mentally retarded and epileptic woman in a sheltered workshop where she now earns $30 per week doing light assembly work. Sheltered employment was sought for this client as she requires close supervision, her seizures are not under total control, work speed is slow, and she has poor finger dexterity. Light assembly work was possible, as the client's gross motor dexterity is good, and, most importantly, the client was eager to work.

Largely due to the client's seizures, some accommodations were required to make even sheltered employment feasible. The client was provided with a customized molded helmet (concept originally developed by the Job Development Laboratory—see REHABILITATION ENGINEERING section) which can be concealed under a wig, to provide head protection, and at the same time alleviate the client's concern over her appearance. In addition, a padded work chair with arms was also provided to prevent falls when seizures occur. This client continues to receive SSI benefits of $178.00 per month.

Virginia's Placement Team was also able to assist a 31-year-old quadriplegic (C6-C7) male to begin work as a full-time computer programmer for Fairfax County Park Authority at a starting salary of $12,000 per year. This client was employed with the Fairfax Parks Department, first as a laborer and then as a computer operator, prior to his injury two years ago. In addition to provision of additional computer training, the team arranged for extensive home modifications to increase personal independence and van modifications to enable the client to drive independently. As the client lives in a rural setting, such mobility was essential to the success of this placement. At the time of placement this client was receiving $260.00 per month in SSDI benefits.
TRACKING CLIENT PROGRESS

All too often we hear that the clients who receive the greatest attention from state vocational rehabilitation agencies are the ones who are most vocal, and not necessarily those most in need of specialized services. Unfortunately, many less vocal severely disabled clients are not adequately served and remain in the same status, without progress, for long periods of time. To help avoid inadvertent neglect of severely disabled clients, the state model programs have developed ways of tracking client progress according to length of time they have remained in any one status.

For example, Virginia's Placement Team has developed a computerized system for monitoring the progress of their most severely disabled clients. Every month, the team receives a readout from the computer, which indicates the length of time each SSI or SSDI client has remained in a given status. The readout also provides the team with summary information on intervention initiatives taken since each client entered into the particular status. Using this data, the team is able to recognize which clients are not progressing towards job placement, identify the cause, and formulate plans to assist the client to begin progressing again.

North Carolina's Placement Team has initiated weekly team staffing meetings to evaluate the movement and progress of their severely disabled caseload. During each meeting, each client's status, as well as team member activities on behalf of each client, are reviewed. When a client's progress is found not to be satisfactory, the team develops new intervention strategies and assigns responsibility for implementation to appropriate team members. This system has been very useful in helping the team to manage their caseload responsibilities effectively and to provide adequate and timely services to all clients within the caseload.

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JOB DEVELOPMENT ACTIVITIES

Iowa's Placement Team reports that their community employers are able to avail themselves of a newly-implemented Rehabilitation Education and Service Branch (RESB), Job Bank. The Job Bank is staffed by two job placement specialists working full-time at developing jobs with large employers in the Des Moines area. All job orders received are organized by DOT code and filed in a Cardex system. Information on all job-ready RESB clients is also placed in the system, and the placement specialists then attempt to match client skills with job requirements. Iowa's Facility Placement Team works closely with the two placement specialists, and the Job Bank has already enhanced services to both employers and clients. In addition, listings of job-ready clients are prepared periodically for distribution to employers, providing another dimension to the job development effort. As the service is relatively new, it is not yet possible to report on the success of this effort. However, indications of successful impact are already evident.

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COMMENTS:

1. Please comment on effectiveness, applicability, format etc concerning this issue.

2. In future issues of InterCom, I would like to see information on the following.

3. I suggest the following changes in future issues of InterCom

4. Do you know someone who would like to receive InterCom

Name/Address
The availability of continuing services after job placement is as critical to the severely disabled clients' vocational success as are the services leading to and including the initial placement. Changes in job tasks, promotions, or problems with adaptive equipment or the work environment may occur at any time after a client begins working, resulting in poor job performance. Continuing contact with both client and employer is essential and allows for immediate intervention to avert major crises. The Model State Programs have firmly integrated follow-along services as part of their day-to-day service delivery systems, and a number of clients have already benefitted.

An Iowa client with congenital abnormalities of both upper extremities, previously placed as a hospital courier, informed Iowa's Placement Team that the compartment carrier tray specifically designed for his use needed further refinement. (Compartment carrier tray was originally presented in INTERCOM No. 2, January, 1981.) Experience in using the tray had revealed two primary inadequacies:

1. The client had a tendency to dump the tray and its contents when he detached it from his belt and bent down to open doors;

2. The forms that went in the tray were longer than anticipated and would fold over adjoining compartments, obscuring their contents.

The team conducted a follow-along site analysis to gain a complete understanding of these problems. After analysis, the tray was modified by adding hinged aluminum strips to the tray so that when the client stooped to open a door, the tray would remain level. Further, each compartment was made deeper by adding a piece of polyvinyl to each compartment side.

A second quadriplegic client, originally placed as a junior clerk in the micrographics department at the Bankers Life Insurance Company, also required and received follow-along services from Iowa's placement team. (Placement was originally reported in INTERCOM No. 1, August 1980.)

This client received a promotion to a quality control/microfilm inspector position. This new position required him to run a microfilm inspection station which was too high for him to access comfortably from his wheelchair. In addition, the position normally requires that the employee run a processor located in an inaccessible darkroom.

Consultation was provided to the employer in modifying the microfilm inspection station for the client's use. The job requirement to work in the darkroom was temporarily eliminated from the client's job responsibility, since the company had already planned to remodel this area over the coming summer months. The Iowa team has agreed to consult on the design plans to ensure that this client will have access to the darkroom once remodeling is completed.

24-Compartment Carrier Tray