RESEARCH UPDATE: A VOCATIONAL EVALUATION PROGRAM FOR QUADRIPLEGICS

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ABSTRACT

An update is presented on a research project pertaining to vocational evaluation of persons who are quadriplegic resulting from spinal cord injury. The project focuses primarily on quadriplegics who are not candidates for higher education or who choose not to attend college. The developmental phase covers 1) identification of job options for quadriplegics including labor market data; 2) utilization of a job matrix process to document commonalities among the jobs identified; 3) review of assessment tools in terms of feasiblility for performance by the quadriplegic population as well as for matching tools to measure potential to perform tasks associated with identified jobs. Job modification procedures and compensatory techniques are also discussed. A vocatonal evaluation program for quadriplegics has been initiated and program evaluation has been established to measure its effectiveness. At the end of the project, a comprehensive and final report will be submitted to the rehabilitation community.

At The Institute for Rehabilitation and Research (TIRR) in Houston, Texas, we are concerned with the vocational rehabilitation of persons with spinal cord injury. In addition to our service delivery programs, we have also been involved in vocational research for many years. Currently we have a five year NIHR sponsored research project which is concerned with the development of a more accurate vocational evaluation for persons with quadripligia resulting from spinal cord injury. The project specifically focuses on persons who are not candidates for higher education or who choose not to attend college. The majority of quadriplegics fall in this category as statistics revealed that 57% of them have a high school education, 35% have less than a high school education, and more than 85% of them are unemployed (National SCI Data Research Center, 1978, 1979).

Questions continue to be raised whether current vocational evaluation programs simply fail to identify vocational potential or whether most quadriplegics with a high school education or less truly lack vocational potential. Several investigators (Berstein and Karen, 1979; Moed, 1961; Schlenoff, 1974; Siegel, 1969; Spangler et al, 1961) have questioned whether the tools of assessment, often involving psychomotor skills and performance, measure intended aptitudes and abilities, or whether such tools measure only degree of impairment.

In our research update, data only on the developmental phase will be presented. Three basic tasks were involved.

Task 1. Identify Realistic Job Options for Quadriplegics

Before developing a vocational evaluation program, an answer must be provided to the fundamental question of what it is one proposes to evaluate. In our project, we selected the answer -- to evaluate ability of quadriplegics to learn and perform tasks associated with jobs that do not require a college degree. With this objective, we realized that our first task was to find out what the job options are before developing a process to determine potential.

To date we have identified 497 D.O.T. job titles that we have judged to be within the realm of quadriplegic's physical capacity and which do not require a college education. Table I presents the destribution of these jobs by occupational categories.

These jobs were identified through 1) review of reference sources (Alfred, 1979; Crewe et al, 1978; Laurie, 1975) which contain

descriptive employment data about quadriplegics and other severely physically impaired persons who have been employed; 2) review of placement records of TIRR and state vocational rehabilitation agencies; 3) job duty analysis of all light and sedentary jobs in the Dictionary of Occupational Titles (D.O.T.) (1977).

Table I Job Options for Quadriplegics by Occupational Category

Occupational Category	No. of Jobs in D.O.T.	No. of Jobs Options for Quads
Professional, Managerial, Technical	1,498	2
Clerical & Sales	950	154
Service	546	6
Agricultural, Fishery, Forestry	233	0
Processing	2,793	33
Machine Trades	2,172	143
Benchwork	2,330	142
Structural	841	0
Miscellaneous	915	17
TOTAL	12,278	497

Subsequently we attempted to identify the occupational outlook for these 497 jobs in Texas and in the Houston area. Although job market data is not available by D.O.T. job titles, three recent publications (Botterbusch, 1985; Field, 1984; Vegt, 1984) have become available permitting crosswalks between D.O.T. job titles and other job classification systems that do provide labor market statistics.

The project staff selected to relate the D.O.T. job titles to the Census Code Job Classification System. This system groups the +12,000 D.O.T. titles into 503 generic job titles, and provides labor market statistics by city, state, and nationwide. Statistics are based on the 1980 census survey of approximately 85 million households in the United States. Through statistical procedures, labor market data can be updated annually.

The 154 D.O.T. clerical jobs identified as feasible for quadriplegics were classified under 44 Census Code titles. Since many D.O.T. jobs are compressed into a single Census Code, labor market analysis became difficult if only one of the D.O.T. jobs is applicable to quadriplegics out of 25 to 50 that are not feasible for quadriplegics. Consequently an adjustment was made to select Census Code job titles with 50% or more representation of D.O.T. job titles feasible for quadriplegics. The end results produced 24 Census Code job titles. These are listed in Table II with the numbers of persons employed in these jobs in Texas and in Houston. The starting wages for these jobs range from $4 to $7 an hour.

The current update on the 143 machine trades and 142 benchwork occupations is discouraging. We have become aware that there are far more machine trades and benchwork job titles compressed under a single Census Code title than under clerical occupations. For example, Census Code 785 - Assembler comprises more than 600 D.O.T. job titles. Of this group, we have determined that there are possibly 25 assembly jobs that quadriplegics may be able to perform. According to labor market information there are more than 11,000 assemblers in Houston. How are the +600 D.O.T. jobs distributed among the 11,000 employed workers? How many of the 25 assembly jobs identified as feasible for quadriplegics exist?

Table II Job Options for Quadriplegics by Census Code Job Titles

Code No.	Census Title	1984 No. of Persons Employed Texas	1984 No. of Persons Employed Houston
316	Interviewer	8,817	1,926
318	Transportation Ticket & Reservation Agents	8,010	2,488
319	Receptionists	36,326	9,920
323	Information Clerks, N.E.C.	6,166	1,461
325	Classified Ad Clerks	792	153
327	Order Clerks	20,559	4,657
328	Personnel Clerks, Except Payroll & Timekeeping	5,541	1,146
336	Record Clerks	9,548	2,289
337	Bookkeepers, Accounting & Auditing Clerks	134,440	30,566
338	Payroll & Timekeeping Clerks	9,910	2,811
339	Billing Clerks	7,653	2,303
343	Cost & Rate Clerks	6,018	1,238
344	Billing, Posting, & Calculating Machine Operator	3,261	639
348	Telephone Operators	19,793	4,701
353	Communications Equipment Operator	601	151
359	Dispatchers	6,589	1,907
363	Production Coordinator	14,617	3,838
373	Expediters	6,307	2,125
375	Insurance Adjustors, Examiners, & Investigators	10,891	2,648
377	Eligibility Clerks, Social Welfare	692	90
379	General Office Clerks	85,710	20,176
384	Proofreaders	1,348	316
386	Statistical Clerks	9,552	2,191
389	Administrative Support Occupations, N.E.C.	23,650	6,077

Consequently, we embarked on our own labor market survey. To date we have telephoned 72 companies in 21 cities in Texas to investigate 166 of the D.O.T. jobs. We utilized a list of Texas companies and industries identified by Standard Industry Classification (SIC) codes for which there are also crosswalks to D.O.T. jobs. The results of the survey are presented in Table III.

Table III Results of 72 Industrial Contacts to Locate D.O.T. Jobs in Machine Trades and Benchwork Occupations Appropriate for Quadriplegics

D.O.T. Job not available in Texas Industries	50%
D.O.T. Job is obsolete	4%
D.O.T. Job is task of a larger job	4%
D.O.T. Job exists but extra duties beyond quad's physical capacity (i.e. janitorial, material handling)	26%
D.O.T. Job exist, and appropriate for quadriplegic	16%

Based on current employment trends it appears that the best job options for quadriplegics who are not college bound are in clerical related occupations.

Task 2. Development of Job Task Matrix

With the identified clerical jobs that were determined as feasible for quadriplegics, we proceeded to follow Dunn's (1975) recommendations of developing a job task matrix. The objective was to find commonalities and similarities among the job duties under each Census Code job title as well as across the 24 Census Code titles. The steps required listing the job duties for each of the D.O.T. titles under a single Census Code and then combining the job duties that were similar. When this was completed then we combined the job duties listed under the 24 Census Code job titles. The composite job duties were classified into four categories: communications, data handling, computational, and office machine operations. An example of the end result of a matrix for a single Census code is presented in Table IV.

It must be pointed out that there are a number of incidental tasks associated with all clerical jobs that are not reported in the D.O.T. Most likely performance is taken for granted, but can present major obstacles to quadriplegics. For example, attaching paper clips to sheets of paper; using a staple remover to remove staples from a thick stack of sheets; placing materials in a clasped file or notebook; handling bulky files and materials; performing other similarly related tasks. In working with quadriplegics, every task, no matter how minute or incidental, has to be investigated and resolved.

Task 3. Development of the Vocational Evaluation Process

Having identified clerical jobs that quadriplegics can pursue and the duties associated with these jobs, we proceeded to develop a process to evaluate a quadriplegic's ability to learn and perform these job tasks.

During the early stages of this project, we initiated a comprehensive review of existing work samples and vocational tests to determine

Table IV. Example of Matrix for Single Census Code Job Title

348 TELEPHONE OPERATORS

Composite Job Duties

Communications

1. Obtain personal/financial data from customer/applicant/ public
2. Assist customer/applicant/public in preparing/ completing forms
3. Receive and answer inquiries/requests from customer/ applicant/public
4. Provide information about services/facilities/programs/ policies
11. Receive callers/visitors and direct to destination
12. Relay incoming, outgoing, and interoffice calls/messages
13. Arrange and schedule appointments/services

Data Handling

1. Record data obtained from customer/applicant/public onto standard forms
2. Record/copy data obtained from other records/forms
4. Read and examine records for completion/accuracy and make corrections
7. Sort and classify data into sequences/groupings
8. File data and maintain files/records
12. Route data to appropriate departments for action/ disposition
19. Receive and record payment/fees and issue receipts

Computational

2. Total/tally amounts
3. Make change
5. Compute values using rate tables/references

Office Machines

3. Cord or cordless switchboard
8. Computer terminal
9. Public address system
10. Electronic monitoring panel
11. System of bells/buzzers to page individuals
14. Calculagraph

which assessment tools could be administered to quadriplegics. To date the project staff has reviewed 334 vocational assessment tools. Specifically, the staff has reviewed 13 commercial vocational evaluation systems comprising 276 work samples; 53 non-commercial work samples available through the Materials Development Center; 10 work samples developed at The Institute for Rehabilitation and Research; and 50 psychometric tests covering intelligence, interests, academic achievement, and aptitudes. Of the total number reviewed by a criteria which we established, 55 commercial work samples, 18

non-commercial work samples, and 15 psychometric tests were judged to have relevance for quadriplegics.

From among the appropriate assessment tools for the quadriplegic population, we have attempted to match those that appear to measure the duties of the clerical jobs that we have identified. This has been a comparatively easy task, but interpretation of results require careful considerations. It must be remembered that skillful performance on a work sample does not always mean that a quadriplegic can physically apply such skills in an actual job. For example, most of the filing work samples require a person to file index cards in alphabetical or numerical order and insert them into a small file box. While ability to file has been assessed, a quadriplegic may not be able to file materials in heavy and clasped file folders nor be able to place such files in cabinets or on shelves which span to the ceiling.

Further psychometric tests which require even less physical performance than work samples, provide even less information about a quadriplegic's physical ability to apply an identified aptitude to an actual job.

In addition to assessment tools, we have attempted job modifications through investigation of commercial clerical tools and aids that may facilitate a quadriplegic's functional performance. We have purchased such items as electric stapler, electric letter opener, paper crimper to substitute for paper clips, rubber finger tips to facilitate paper grasp, calculator stands to place calculator at an angle for better reach and operation, and other similar items. We have not located a commercially available solution for removing staples, and we are still exploring ways to set up filing systems that would be easier for quadriplegics to handle.

As part of job modifications, we have also focused on compensatory techniques, that is, performing tasks in ways different than the able bodied person would do. In the absence of an electric stapler, we have demonstrated how quadriplegics may be able to use forearm or elbow force to hit the head of a standard stapler. Without an electric letter opener, we have demonstrated that a quadriplegic person can use teeth to chew off the short end of the envelope, blow into the envelope to inflate, and then use teeth to remove letter. For select assembly work, we have demonstrated that some quadriplegics can hold objects in the crease of one arm while using opposite hand and arm to perform the assembly task.

As of January 1, 1986 we have incorporated the vocational evaluation process into the vocational delivery system. Our model includes psychometric testing, work samples, simple work modifications, training in compensatory techniques, and some situational assessment. We have set up a program evaluation system to measure the effectiveness of our program. At the completion of the project a final report will be prepared and distributed to the rehabilitation community. This report will contain 1) details of the process of identifying job options and list of appropriate jobs for quadriplegics; 2) details of criteria in selecting assessment tools and list of appropriate tests and work samples relevant to the quadriplegic population; 3) description of the developed vocational evaluation process; 4) outcomes of the program evaluation; 5) guidelines for replicating the vocational evaluation process; 6) recommendations for future research and strategies.

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