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An Exploratory Resource Allocation Model for Implementing Supported Employment Services

Philip S. Hall, *Minot State University*
John J. Wheeler, *University of South Dakota*

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Philip S. Hall
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Abstract: The purpose of this paper is to provide an exploratory resource allocation model for projecting the resource allocations necessary to implement community-based supported employment services to persons with mental retardation. The model relied on a survey of regional adult service and public school providers to obtain an estimate of the costs and time-lines required for job development. A multi-variate linear regression model was used to project the hours that would be required to develop a job site based on the size of the community, the rate of unemployment, and the percent of service jobs. The extant literature was used as a basis for projecting the costs and time-lines for job coaching and follow-along. An applied example of the model is provided.

The limitations and disadvantages of serving persons with mental retardation in sheltered workshops and day activity centers have been amply documented (Bellamy, Rhoades, Mank, & Albin, 1988; Elder, 1986; Murphy & Rogan, 1992; Rusch, Mithaug, & Flexer, 1986; Shuster, 1990). The findings from these studies have demonstrated that sheltered workshops and day programs are not cost-effective, lack in incentives, and they promote apathy on the part of service providers and consumers. Yet, sheltered workshops constitute the major source of employment for adults with mental retardation (Shuster, 1990). It could be surmised that sheltered workshops remain the primary employer of persons with mental retardation because administrators are uncertain of how to convert their agency from traditional operations to supported employment. The literature gives limited guidance to an administrator contemplating conversion to supported employment. Parent, Hill, and Wehman (1989) examined the organizational change processes associated with conversion and de-

lineated the requisite managerial steps required of such a process. Beare, Severson, and Lynch (1992) and Murphy and Rogan (1992) each provided a case study of an agency that undertook the conversion to supported employment. While enlightening, these studies provide no assistance with possibly the biggest obstacle to conversion, aside from philosophical change, that being finances. This paper therefore, presents an exploratory model for projecting the time-lines and estimated costs associated with the implementation of supported employment services, namely, job development, job coaching, and follow-along.

Method

Participants

Surveys were mailed to all 18 community-based programs in South Dakota and a representative sample of 15 community-based programs in North Dakota serving adults with mental retardation. Two school districts in South Dakota and one school district in North Dakota which operated community-based transition/employment programs for students with mental retardation were also surveyed.

Procedure

The participants were mailed a questionnaire which asked (1) how many staff were assigned

TABLE 1

Descriptive Statistics of the Dependent Variable and the Three Independent Variables

	Hours	Rate	Service	Size
Mean	105.50	3.47	27.95	29,470
SD	77.50	1.24	4.93	30,350
Minimum	44.00	2.00	19.00	1,871
Maximum	372.00	7.00	40.00	101,900

to job development; job development being defined as the identification and development of employment placement sites in the community; (2) the percent of time each staff member worked at job development based on a 40-hour work week; (3) how many months were the staff employed as job developers in 1991; and (4) how many supported employment job placements were developed in 1991. The replies to the survey were the basis for computing the dependent variable, hours to develop a job.

Results

Job Development

The return rate was 93% for the programs in South Dakota and 33% for the programs in North Dakota. The data from three respondents were removed. One data set was removed because the agency had negotiated a multi-million dollar service contract with a strategic air command base located in the area. The single contract instantly created more jobs than the agency could fill with consumers. Another data set was removed because the agency had just ventured into supported employment after an extensive and efficient public awareness campaign. Businesses were phoning to offer job sites before the agency had even hired a job developer. The third data set was removed because, it was later learned that the agency exclusively served consumers with profound levels of mental retardation. The agency's experience with supported employment was significantly different form the experiences of other agencies due to the extreme intellectual and physi-

cal challenges experienced by their consumers. After this culling, the data set consisted of the replies from 19 agencies.

It was hypothesized that the dependent variable, numbers of hours to develop a job, was a function of three community variables: (1) community size, (2) percent of service jobs (service jobs being exclusively selected based on the lack of availability of other types of industry/jobs in the region), and (3) rate of unemployment. Community size, percent of service jobs, and the rate of unemployment were obtained for 1991 from statistics supplied by the South Dakota and North Dakota Departments of Labor.

The summary statistics for the dependent variable, hours to develop a job, and the three community variables are provided in Table 1. It took one job developer an average of 105 hours to develop a single job. The amount of time to develop a job ranged from a low of 46 hours to a high of 372 hours. It should also be noted in Table 1 that the rate of unemployment for the sample had a truncated range. The average rate of unemployment for the sample was only 3.47 percent. The highest rate of unemployment was only seven percent, just about the national average for 1991.

Correlations were computed for each community variable and the number of hours required to develop a job (see Table 2). The percent of service jobs and community size were both significantly correlated with the dependent variable, hours ($r = -.41, p - .05$; $r = -.30, p = -.05$ respectively). As originally hypothesized, it took less time to develop a job if the community had a high percent of service jobs; and it took less time to develop a

TABLE 2

Correlation Matrix of the Dependent and the Three Independent Variables

	Hours	Rate	Service	Size
Hours	1.00			
Rate	.02	1.00		
Service	-.42	-.26	1.00	
Size	-.30	-.31	.02	1.00

job in a larger community. The correlation between the unemployment rate and the number of hours was not statistically significant ($r = .02$). One data set was, however, an outlier. The agency was located in a community of 1,871 people which had an unemployment rate of 2.3 percent; but it required 372 hours to develop one job. Even though the unemployment rate was low, there probably were not many job opportunities in the small community. When that one outlier was discounted, then hours to develop a job was significantly correlated with the rate of unemployment ($r = .39, p -.05$). Community size and rate of unemployment were significantly correlated ($r = .31, p -.05$). Ideally, there would not be a significant correlation between any of the independent variables in the model. However, 91% of the variance in rate of unemployment was not attributable to community size. Thus, the variable unemployment rate was retained in the model.

Multiple correlations were computed using all 19 cases and three independent variables, 19 cases and only two independent variables, and with just 18 cases. None of the three multiple correlations were statistically significant ($r = .55, F = 2.07, p = .15; r = .50, F = 2.74, p = .09; r = .40, F = 1.21, p = .34$; respectively).

Discussion

Job Development

The combined influence of the three independent variables did not account for 70% of the variance in the dependent variable, hours required to develop a job. The differences in the number of hours it took three different agencies in the same community to develop a job suggested that a large portion of the residual variance possibly was due to the level of the consumer's disability. Specifically, the one agency which served consumers with profound levels of mental retardation required 512 hours to develop one job. A sheltered workshop located in the same community which provided supported employment services to consumers with moderate mental retardation required 120 hours to develop a job. The school program in the same community, which served students with mild levels of mental retardation, required only 72 hours to develop a job. The suspected impact of the consumer's level of disability on the amount of time required to develop a job was supported by feedback from several of the job development personnel who participated in the study. The job developers related that the more significant the level of disability on the part of the consumer, the longer it took them to find a specific job match. This fact had more significance on those agencies in very small communities where limited employment sites existed.

A post-hoc effort was therefore made to quantify the level of disability of the consumers served by each participating agency so that the variable could then be entered into the model. A telephone interview was made to the participating agencies about the level of disability of the consumers placed in supported employment settings. Staff at the majority of agencies described their consumers as having mild and/or moderate levels of mental retardation. When pressed to quantify the degree of disability, most staff replied that they could reference the consumer's most recent score on a standardized intelligence test. However, it has been demonstrated that IQ is not an accurate predictor of the employability of persons with disabilities (Rusch, Schutz, Mithaug, Stewart, & Mar, 1982). The supported employment model has also refuted this notion and determined that social behavior and technical job skills are more important than IQ to employability and long-term job success (Brickey, Browning & Campbell, 1982; Ford, Dineen, & Hall, 1984; Greenspan & Shoultz, 1981; Wehman et al., 1982; Wheeler, Bates, Marshall, & Miller, 1988).

The data, with some manipulation of the cases, were supportive of the hypothesis that the number of hours to develop a job could be predicted from the percent of service jobs ($r = -.41$), the community size ($r = -.30$) and the rate of unemployment ($r = .39$ when one

case was dropped). The failure of the multiple correlation to reach statistical significance was attributed to the truncated range of the rate of unemployment and the smallness of the sample. With these considerations in mind, an unweighted least squares linear regression model was computed for the modified data set with a $N = 18$. The computation yielded these beta coefficients: constant $= 124.66$, rate $= 9.12$, service $= -2.15$, and size $= -.00017$.

Job Coaching

The extant literature in the area of supported employment provided the basis for estimating the amount of job coaching required from initial placement in supported employment settings. Kregal, Wehman, and Banks (1989) analyzed the amount of time amount provided by job coaches to 51 consumers with mild mental retardation (mean IQ $= 53$) across twelve months of employment. Wheeler (1986) determined the job coaching time required for an individual worker with moderate mental retardation (IQ $= 38$) and Johnson and Rusch (1990) analyzed the hours of direct job coaching provided for workers with various levels of mental retardation, among them persons with severe mental retardation. For purposes of this paper, data from the Johnson and Rusch (1990) sample of workers with severe mental retardation will be used for comparison. The results from these three studies are plotted in Figure 1. The data conveyed in Figure 1 provides the basis for estimating the percent of direct job coaching time needed for each consumer as a function of the level of disability and time spent on the job.

Follow-Along

Follow-along is hard to distinguish from job coaching for several reasons. First, the job coach and the follow-along person are generally one and the same. Second, the distinction between the two can only be made in retro-

spect-when the amount of time needed in job coaching no longer maximally decreases. Administratively, it is important to identify follow-along because it represents the lower limit of the costs required to maintain the consumer on the job. As illustrated in Figure 1, follow-along is reached for workers with mild mental retardation between weeks 16–20 and weeks 28–32 for workers with moderate mental retardation. Based on the limited data available (Johnson & Rusch, 1990), it is believed that workers with severe mental retardation do not require less job coaching over time.

Hypothetical Application of the Resource Allocation Model

The proposed model was applied to a hypothetical agency. The administrative team of this hypothetical agency seek to move six consumers from their sheltered workshop to supported employment. The hypothetical community has a population of 13,000 with 29% of their work force in the service sector. The unemployment rate is 3.5%. The linear regression equation for predicting number of hours to develop a job in this community is: Hours $= 124.66 + 9.12$ (3.5% unemployment) $- 2.15$ (29% service jobs) $- .00017$ (13,000 population). Completing the computation reveals that it will take the job developer from this agency 92 hours to locate each job. Since six consumers need jobs, 552 hours (92 x 6) are needed for job development. If the job developer is paid at a rate of $10 per hour and the fringe is 25%, which is the prevailing rate in the Northern plains, then it cost the agency $6,900 to develop jobs for the six consumers.

The hypothetical agency wants supported employment for two consumers with mild mental retardation, two consumers with moderate mental retardation, and two consumers with severe mental retardation. Figure 1 is used to estimate the amount of job coaching that will be needed at any point in time. For example, the amount of job coaching time that will be needed at the beginning of week 19 can be estimated from Figure 1. Table 3

WEEKS
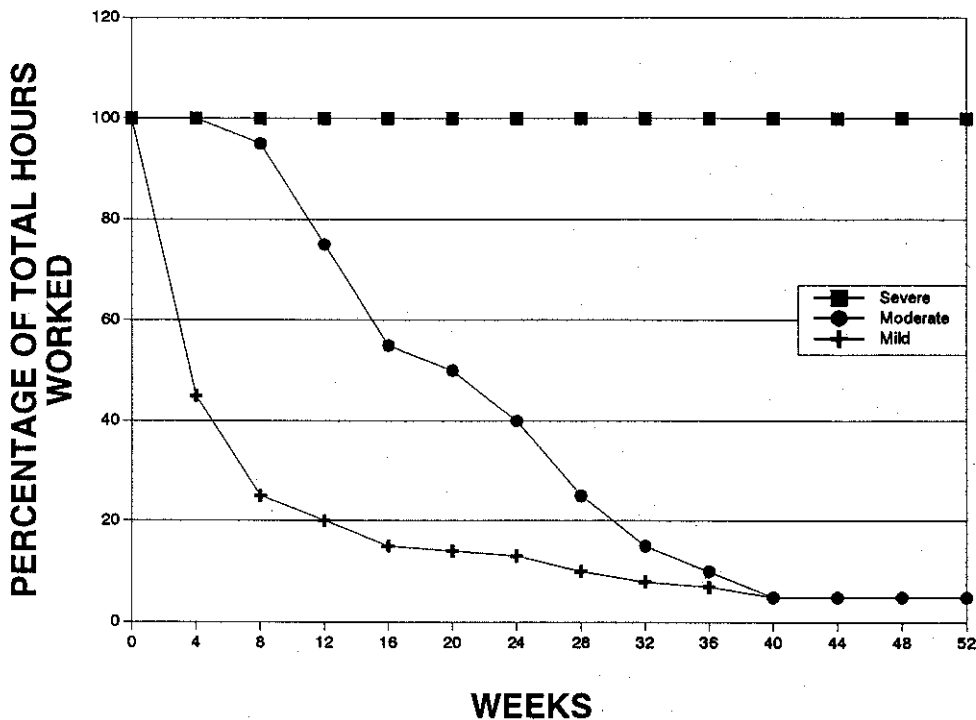
NOTE: FROM

1. Johnson, J.R., & Rusch, F.R. (1990). Analysis of hours of direct training provided by employment specialists to supported employees. <u>American Journal on Mental Retardation</u>, 94, 674-682.

2. Kregal, J., Wehman, P., & Banks, P.D. (1989). The effects of consumer characteristics and type of employment model on individual outcomes in supported employment. <u>Journal of Applied Behavior Analysis</u>, 22, 407-415.

3. Wheeler, J.J. (1986). Teaching appropriate social behaviors to a young man with moderate mental retardation in a supported competitive employment setting. <u>Unpublished master's thesis</u>. Southern Illinois University, Carbondale.

Figure 1. Total intervention time as a percentage of total hours worked by level of disability.

contains the resultant calculations. The first column is an identifier for each consumer. The second column is the consumer's level of disability. Column three is a projection of how long each consumer will have been on the job by the beginning of week 19. In this

TABLE 3

Computation of Direct Staff Time for Job Coaching at the Beginning of Week 19

Individual	Level	Weeks	%	Hours	Staff Time
Joe	Mild	16	12	6	.72
Ann	Mild	14	15	6	.90
Bob	Moderate	12	70	4	2.80
Sue	Moderate	10	90	4	3.60
Jim	Severe	8	100	2	2.00
Tom	Severe	4	100	2	2.00
			Total Direct Staff Time =		12.02

case, the projection is based on the estimated two weeks needed to locate each job. Column four, PERCENT, is obtained from Figure 1. Column five, HOURS, is the amount of time each consumer will be on the job. STAFF is the product of PERCENT times HOURS and is the estimate of the daily job coaching time each consumer will need at the beginning of week 19 into the project. The sum of the STAFF column is the estimate of daily amount of direct job coaching time needed for all six consumers. Approximately 12 hours of direct job coaching will be needed daily at the beginning of week 19. This calculation is based on placing the consumers on jobs in the order as listed. Placing the consumer on jobs in another order would change the amount of job coaching needed in any particular week. It is possible that a different order of placement would result in a more optimal allocation of job coaching time over the course of the conversion. The total amount of time budgeted for job coaching should be increased 30% to provide the job coaches with time to perform other components of their job (i.e., paper work, modification of the consumer's work stations, communication with the employer, making schedules, and travel time between job sites).

The amount of direct job coaching hours needed at two week intervals was computed from week three through week 37 (see Figure 2). The graph highlights some important projections. This hypothetical agency will not need two job coaches until the beginning of week five. Two full time job coaches will be

needed from week 9 through week 18. Weeks 11 through 16 will require slightly more than two job coaches. Finally, job coaching for this composite group of consumers will conclude by the end of week 32. Approximately, 2,081 hours (sum of week figures x 30% x 10 days) of job coaching will be needed. The cost of job coaching for these six consumers will be approximately $17,054 ($6.25 x 25% x 2,081).

These estimates are based on two assumptions. It is assumed that an optimal concurrence can be obtained between the consumers' job schedule and the job coach's availability. In other words, one job coach can not simultaneously give 100% assistance to two consumers working the same schedules on two different job sites. The model also assumes individual job placements. The time needed for job coaching per individual varies, however, with the type of work placement, e.g., individual, mobile work crew, or enclave (Johnson & Rusch, 1990). The agency might decide to reduce job coaching time by serving the two consumers with severe mental retardation within an enclave placement where both workers could receive the necessary assistance from one job coach.

Figure 2 was also used to project when the six consumers would collectively reach the lower limit of the time required for job coaching. This point, which is termed follow-along, will happen at the beginning of week 33. The six consumers will then require 6.58 hours of direct job coaching for an indefinite time. The annual cost to maintain these six
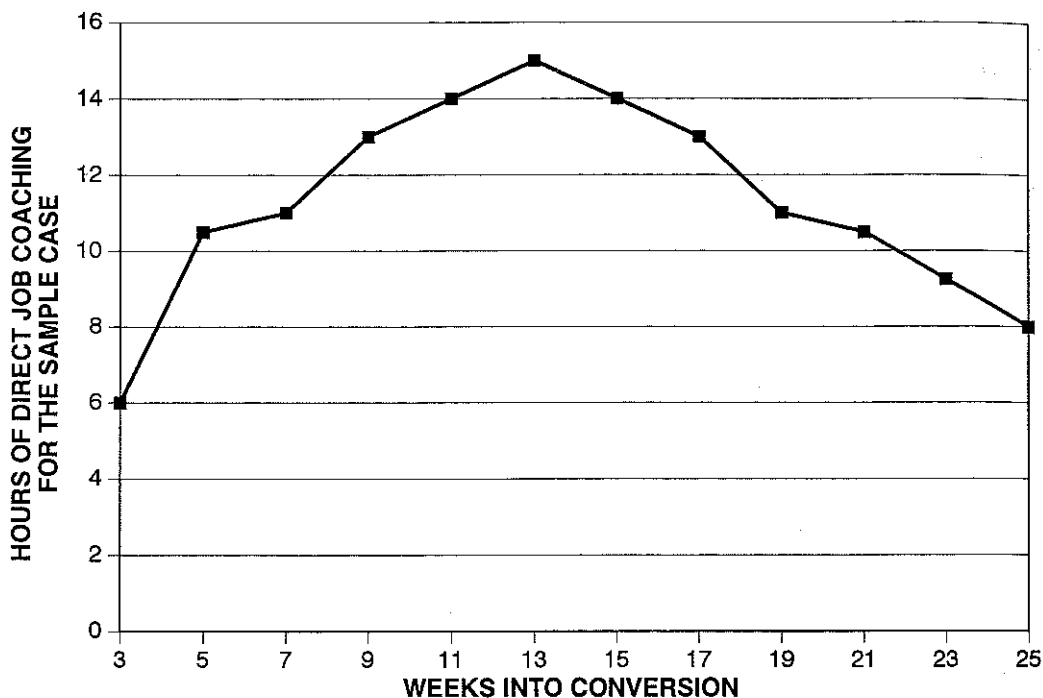
Figure 2. Hours of direct job coaching for sample case as a function of weeks into conversion.

consumers in supported employment jobs will be approximately $17,055.

This exploratory model projects the time-lines and the costs incurred when consumers are moved from a sheltered workshop to supported employment. Several limitations create questions concerning the model's reliability. The size of the sample surveyed, the unavailability of pertinent information, and gaps in the available literature are all mitigating factors concerning the model's reliability. The model is therefore not offered as an answer to an important question. Rather, the model is offered for it's heuristic value.

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