EFFECTIVENESS INDICATORS FOR EMPLOYMENT OFFICES: A SYSTEMS APPROACH

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PREFACE

This paper was written in the Spring of 1972 for Professor Melvin M. Webber's seminar on social indicators. In it, I attempt to design effectiveness indicators for public employment offices.

I began with the confidence that one could design useful statistical measures of results based on the wage records of participants in manpower programs. However, after recognizing the relationship between wages and the unemployment rate, I came to believe that wage records, like the unemployment rate, may not prove to be a satisfactory basis for evaluation. This conclusion is certainly not intended to discredit any of the work in progress that is attempting to use wage records; it is intended to suggest that one need not feel embarrassed about attempting to use "softer" data such as value judgments.

A central problem in developing effectiveness indicators for manpower programs is finding some way to judge whether or not the program participant is any better off than he would have been if he had not received services. Once I began to explore this question, I was led into the philosophical wasteland surrounding the problem of causation and counter-factual conditional statements -- a wasteland that seems to have no exit. Yet unless this problem is addressed, effectiveness indicators can create dysfunctional incentives to serve people who don't need the available services.

Perhaps the most important point in this paper is its recognition that effectiveness indicators should be designed and evaluated on the

basis of the organization's adaptive response to the indicators. The central problem is not to measure results but to create results. Unfortunately this makes the measurement of results a "wicked" problem that is not fully amenable to today's analytical techniques. However, both the sophisticated analyst who always avoids effectiveness indicators because they cause goal displacement and the naive analyst who eagerly embraces effectiveness indicators because they give an appearance of objectivity miss the point. All organizations have already undergone goal displacement in response to their management system; the objective of effectiveness indicators is to manage this goal displacement in order to improve the organization. Of course there are some difficulties with this position. For example, if the published measures of results are consciously used to create a change in the organization, what measures are used to determine the value of the organization change? And if such measures are available, shouldn't they be the published measures of results?

Although I did not carry the analysis to the point of developing specific action recommendations, I was encouraged by several people to make this paper available to other analysts working on the problem. I have left this working paper essentially in its original form with a few corrections and deletions of some items not of general interest. The term HRD is used throughout the paper as a generic abbreviation (Human Resources Development) to denote the state employment agencies which administer federal Department of Labor programs.

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I. INTRODUCTION

Upon learning of his wife's death, Theseus laments, "There ought to be a true yardstick to measure affection by, some means to know who is to be trusted and who is not."[1] This early recognition of a need has been followed by an erratic history of the development of social indicators. In recent years the force of necessity has awakened a dormant interest in developing new social indicators. Information zealots now call for more and more information and unabashedly assert that "short of a continuous and universal surveillance system, there is likely to be no ideal solution."[2] Perhaps unfortunately, the power of the computer gives substance to these Orwellian demands. It is unlikely that pleas for restraint in information collection will be heeded in the years ahead.[3]

In spite of these dangers, the judicious use of indicators can greatly improve government programs. The need, however, is not for more numbers or more statistics but, as Churchman has observed, "the need is for the basis of justifying the numbers -- the model or world view which tells us what difference the numbers make."[4]

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[1] Plutarch, as quoted in Edith Hamilton, Mythology (New York: Mentor, 1940), p. 157.

[2] Eleanor Bernert Sheldon and Wilbert E. Moore, Indicators of Social Change, (New York: Russell Sage Foundation), p. 11.

[3] M. Moss, "Consumption: A Report on Contemporary Issues," in Sheldon and Moore, op. cit., p. 515.

[4] C. West Churchman, "On the Facility, Felicity, and Morality of Measuring Social Change," Internal Working Paper No. 120, Berkeley, University of California, Space Sciences Lab, August, 1970, p. 8.

This paper explores the development of social indicators of organizational effectiveness through the systems approach. Emphasis is placed on developing a useful model of an employment office and the labor market system it is trying to improve, rather than on data collection. The term HRD is used as an abbreviation (Human Resources Development) to denote state employment agencies. The thesis that "analysts who want to help improve social service delivery should give high priority to developing and refining measures of performance,"[5] is supported.

The remainder of this section discusses the Background, the Nature of the Problem, the Study Objectives and the Technical Approach. The following two sections discuss Organization Effectiveness and the Environment of an HRD office. In the final section, on the HRD office, a mathematical model and indicators of effectiveness are developed and a weighted index of effectiveness is derived.

According to Spinoza, there are four sources of knowledge: intuition, reason, sensation and hear-say.[6] The lowest type of knowledge is hear-say (i.e., appeals to the authority of others). The use of footnotes, being hear-say, would therefore appear to be a better indicator of uncertainty than of knowledge -- the reader is forewarned that this paper is copiously footnoted!

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[5] Alice M. Rivlin, Systematic Thinking for Social Action (Washington: Brookings, 1971), p. 141.

[6] C. West Churchman, Design of Inquiring Systems, (New York: Basic Books, 1971), p. 25.

A. Background and Nature of the Problem

The twentieth century has seen a tremendous growth in the level of government operations in the United States. Government spending has increased from 7.7% of the GNP in 1902 to 31.1% of the GNP in 1970.[7] This growth has made the allocation of government resources and the management of government programs a vital element in any effort to improve the quality of life.

Government programs, however, usually do not have market prices established for their outputs. This means that the primary incentive for effective resource allocation and efficient management is absent. Indeed, the absence of market incentives is a fundamental characteristic of a bureaucracy.[8] It induces the adoption of a "highly administrative approach," i.e., detailed planning and control and an emphasis on activities rather than results. Probably because it promotes rigidity and stifles innovation, the highly administrative approach has not been successful in achieving program results in the social arena.[9]

The current disillusionment with highly centralized government programs is bipartisan. Decentralization is attractive for its potential to improve both the efficiency and the responsiveness of government. Decentralization, however, is only likely to improve results if appropriate measures of performance and incentive systems are first developed. As a former Director of the Bureau of the Budget has observed, "the

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[7] Thomas R. Dye, Understanding Public Policy (New Jersey: Prentice-Hall, 1972), p. 186.

[8] Anthony Downs, Inside Bureaucracy (Boston: Little, Brown, 1966), p. 25.

[9] Robert A. Levine, "Re-thinking our Social Strategies," The Public Interest, No. 10 (Winter, 1968), p. 1.

increasing complexity of governmental social programs, the growing political demands for 'participatory democracy,' and the considerations of sheer efficiency all call for a sharp increase in decentralized incentive programs."[10]

The need for indicators generated by these considerations is one for local or regional measures of those aspects of social systems that are a matter for government intervention. This accounts for the interest in indicators for health, poverty, education, crime, mobility, employment, and equal opportunity. Dimensions of the quality of life that are not candidates for government intervention, e.g., sexual relations, have a lower priority for measurement.

Some of the problems that will be encountered in developing effectiveness indicators have been discussed extensively in the cost-benefit literature.[11]

One problem that has been frequently ignored arises from the fact that government intervention itself can fundamentally change the nature of the social system. For example, large efforts to promote equal opportunity employment creates a new agency that is itself an important employer (thus any indicator of equal opportunity should also measure the agency itself!).

Another problem often neglected is that of obtaining a measure of results that allows judgments to be made about organization effectiveness. For example, the unemployment rate is a measure for a training program designed to reduce unemployment but unemployment is

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[10] Charles L. Schultze, The Politics and Economics of Public Spending (Washington: Brookings, 1968), p. 1

[11] See, e.g., R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," The Economic Journal (December, 1965), pp. 683-735.

influenced to such a great extent by economic factors that it is not useful for judging training effectiveness.

B. Study Objective

The objective of this paper is to design effectiveness indicators and a weighted index for HRD offices.

Primary emphasis will be placed on the development of a theory for effectiveness indicators for an HRD office and on the discussion of the philosophical problems of measurement that develop. The indicators will be designed to close a feedback loop to HRD management so that program emphasis can be shifted from activities to results. The indicators should be evaluated by the single criterion of whether or not they contribute to improving HRD effectiveness. To meet this criterion, the indicators must strike a balance between overly gross measures that are not sensitive to the impact of government intervention and overly specialized measures that only tell how well something is being done and not whether it is the correct thing to do to improve the labor market. An example of an overly gross measure is the unemployment rate; an example of an overly specific measure is the number of people referred to jobs by public placement service.

The indicators should be based on existing information if at all possible. If new information is required it should not entail additional paperwork from the HRD office.

Although the basic objective is to design indicators that will facilitate the improvement of HRD efficiency, the indicators should also facilitate program evaluation (e.g., as relevant to Congressional decisions). However, in government programs, as in the private sector,

there is often more potential for improving the system through improving existing programs than through re-allocating resources among programs.[12] The indicators should be designed on the assumption that HRD managers will have increased discretion and authority for making decisions.

In order to keep this paper to a reasonable length, it is written for the person who is knowledgeable both of analysis and of manpower programs.

C. Study Approach

Effectiveness indicators are measures of a system's performance, therefore one fruitful method for developing indicators is an explicit description and analysis of the system. Although the fact is frequently neglected, we know that measurement itself can only occur as part of a teleological system (even in the case of elementary measures such as "length").[13] Ultimately, the validity of any measurement system lies in its usefulness.[14] This conclusion is not surprising if one reflects, for example, on the history of temperature measurement. All of the stages, from the first qualitative judgments of hot and cold to the present molecular spin theory which allows negative absolute temperatures, occurred in conjunction with theoretical advances in the measurement system itself. These theoretical advances often take the form of scientific revolutions; they face all of the problems of a major organizational innovation.[15]

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[12] Harvey Leibenstein, "Allocative Efficiency vs. X-Efficiency," AER, June, 1966, pp. 392-415.

[13] C. West Churchman, DIS, op. cit., ch. 9.

[14] Abraham Kaplan, The Conduct of Inquiry (Scranton: Chandler, 1964), p. 198.

[15] Thomas S. Kuhn, The Structure of Scientific Revolutions, (Chicago: University of Chicago, 1962).

The approach of this study is to develop a teleological systems description of an HRD office and the labor market system it is trying to improve, and to design effectiveness indicators that can provide feedback information and incentives that will facilitate systems improvements. Churchman's "systems approach" will be used as the basic framework for this analysis.[16]

HRD offices have been selected for analysis for the following reasons:

- the author is thoroughly familiar with HRD operations
- there is a well recognized need for reform and decentralization of manpower programs that necessitates the development of effectiveness indicators[17]
- the author has designed and implemented indicators in one HRD program that were well received and instrumental in doubling program effectiveness.[18]

Where possible, an attempt will be made to formulate the systems description in mathematical terms. This will facilitate the precision necessary for useful measurement and enable the wealth of concepts of operations research to light the path.

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[16] C. West Churchman, DIS, op. cit., ch. 3.

[17] U. S. Senate, Committee on Labor and Public Welfare, Reform of Federally Funded Manpower Training Programs (Washington: U. S. Govt. Printing Office, Dec., 1971).

[18] Glenn A. Siebert, Work Incentive Program Productivity Summary, State of California, Department of Human Resources Development, Management Systems Section, January, 1971.

II. ORGANIZATION EFFECTIVENESS

This section discusses the major issues involved in measuring organization effectiveness. The treatment will be somewhat cursory, not because the problems are unimportant, but because they tend to be overwhelming.

A government organization or agency is one component of a social system. Only if it is a separable component can we speak of its effectiveness without considering the effectiveness of the larger system.

The problem of defining and measuring the public interest has received the attention of our best philosophers. Modern economists seem to have adopted (albeit implicitly) the philosophy of utilitarianism. But it is not at all clear that actual political decisions are based on utilitarianism, nor that they should be.[19] Our emphasis on scientific materialism and the "outer life" creates a conflict with the needs of individuals for a spiritual and "inner life."[20] The realization of individual potential, which certainly must be a concern of the public interest, requires the individual to retain moral autonomy, i.e., responsibility for his actions. Yet any form of government or authority necessarily reduces moral autonomy.[21]

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[19] Charles E. Lindblom, The Policy-Making Process (Englewood Cliffs, N. J.: Prentice-Hall, 1968), p. 17.

[20] C. G. Jung, Modern Man in Search of a Soul (New York: Harcourt, Brace and World, 1933), p. 220.

[21] Robert Paul Wolff, In Defense of Anarchism (New York: Harper, 1970).

Since employees of a government agency are also part of the public, their interests must also be considered in defining the public interest. The recent history of industrial attempts to consider employee satisfaction has been summarized by Simon.[22]

> The early proponents of scientific management adopted a fairly narrow, almost physiological, point of view; emphasized short-run efficiency through specialization; and pretty well neglected the subtler motivational aspects of the problem -- including the satisfactions of the worker on the job. The early human relations research directed attention to the workers' job satisfactions and on the long-run feedback of these upon performance; it undoubtedly swung the pendulum too far in assuming that if job satisfactions were handled, efficiency would take care of itself. More recent studies...re-emphasize the short-run conflict between [efficiency and satisfaction].

At this point it is only necessary to recognize the dimensions of organization effectiveness; the relative importance of these dimensions will be addressed when weights are assigned. The following is the basic model that is adopted in this paper:

- n mutually exclusive, homogeneous client groups of the system
- m dimensions of system performance
- X = system description (or state) vector
- $V_{ij}(X,Y)$ = value of system state X with respect to performance dimension i to client group j given environment state Y.
- V(X,Y) = total value of system state X in the public interest given environment state Y.
- W_i = relative weight given to client group i

Then:

- $V_j(X,Y) = V_{1j}(X,Y) + V_{2j}(X,Y) + \ldots + V_{mj}(X,Y)$
- $V(X,Y) = W_1V_1(X,Y) + W_2V_2(X,Y) + \ldots + W_nV_n(X,Y)$

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[22] Herbert A. Simon, "Authority," in Conrad M. Arensberg, et al., Research in Industrial Human Relations (New York: Harper, 1957).

In the ideal market place, V_{ij} is said to be equal to the price. Government services typically have characteristics of public goods (joint consumption, externalities, high cost of exclusion, or equity considerations) that prevent even a theoretical establishment of prices in the free market.[23] Effectiveness indicators can be developed that will lead an organization to efficient operation without addressing the difficult question of pricing. However, decisions that involve a trade-off, i.e., more of one output for less of another output, cannot be made without pricing (explicit or implicit).[24] More will be said of outputs and weighting in the following chapters.

A brief review of the (scarce) literature on organization effectiveness yields the following dimensions of effectiveness that have been used or proposed for private or public organizations.[25]

- survival
- productivity
- sales
- profitability
- flexibility
- worth of organization to members & society
- growth
- satisfaction
- enlightenment
- integrity
- balance
- adaptability
- product quality
- absence of inter-group strain
- return on investment
- payout & plowback

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[23] Werner Z. Hirsch, The Economics of State and Local Government, (New York: McGraw-Hill, 1970), p. 11.

[24] A. Myrick Freeman, III, "Project Design and Evaluation with Multiple Objectives," Robert H. Haveman and Julius Margolis, Public Expenditure and Policy Analysis (Chicago: Markham, 1970), p. 360.

[25] See Paul Wasserman, Measurement and Evaluation of Organizational Performance: An Annotated Bibliography (Cornell: Ithaca, 1959).

- prosperity
- market standing
- value added
- innovation
- absenteeism
- turnover
- grievance rates
- apathy
- alienation
- immaturity
- resources
- management
- public responsibility
- employee & management attitudes
- time spent in internal communication
- balance between short-range & long-range goals
- conformity
- debt and interest
- product leadership
- personnel development
- plan fulfillment
- labor productivity
- costs per unit output
- economy of resources (waste)
- improvement
- morale
- reputation
- disciplinary actions
- acquiring resources
- maintenance
- sick leave
- investment in organization
- suggestions for improvement submitted
- rationality

These dimensions of effectiveness can be usefully grouped into the following three clusters which seem to define the most important aspects of organization effectiveness.

- Productivity - in the broader economic sense of achieving the greatest results possible with the available resources. Roughly synonomous with efficiency, profits, effectiveness, resource utilization, etc. A short-run criterion. Productivity in this sense, constitutes the primary emphasis of much program evaluation, PPBS, etc. It is the (intended) counterpart to "profits."

- Adaptability - the ability of an organization to adapt to a changing environment. Includes flexibility, innovation, responsiveness, etc. In a changing environment

there is often a conflict between productivity (which requires high resource utilization) and adaptability (which requires organizational slack).

Satisfaction - the degree to which the organization facilitates (or does not hinder) personal growth and development of clients, specifically of employees. Includes both satisfiers and dissatisfiers, but does not include measures that are solely instrumental for productivity or adaptability. Satisfaction measures are different for different people. For example, a person motivated by self-actualization needs will evaluate satisfaction with an organization quite differently than a person motivated by basic or safety needs.[26]

Since the basic purpose of effectiveness indicators is to help improve the system, they must ultimately contribute to behavior modification. One way to do this is through incentives provided by user charges. Another way, and the one proposed here, seems to have been accidently discovered (or re-discovered) during the development of Management Information Systems. MIS analysts found that increased visibility of certain information had unanticipated (and therefore often bad) consequences. These consequences of increased visibility, however, can be used to improve performance. Published effectiveness indicators of themselves create incentives to modify behavior and can result in increased effectiveness, greater management control, and greater flexibility.[27] The increased effectiveness, however, occurs in the direction of improving the "indicators" (the "numbers game") and unless the indicators are carefully designed it is quite possible to obtain undesirable consequences (i.e., if it is possible for an organization to improve its indicators without also improving its performance).[28]

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[26]Abraham Maslow, Personality and Motivation (New York: Harper, 1954).

[27]Peter M. Blau, The Dynamics of Bureaucracy (Chicago: U. of Chicago, 1955).

[28]Valentine F. Ridgway, "Dysfunctional Consequences of Performance Measurement," Administrative Science Quarterly, Sept., 1956,a 1, 2, 240-247.

The designer of evaluation measures is often trying to judge past performance and is rarely concerned with adaptive behavior by the organization to his measures. In contrast, the designer of effectiveness indicators is trying to improve future performance and is consciously concerned with stimulating and managing an adaptive response by the organization to his measures.

The following two sections will apply the concepts outlined in the previous sections to HRD offices.

III. THE ENVIRONMENT OF HRD

This section describes the environment of HRD. The first part describes the labor market system and develops measures of its performance. The second part describes HRD's manpower programs which are designed to improve the labor market system.

A. The Labor Market System

The United States has a relatively free labor market system. Employers are free to hire when and whom they choose to hire, and workers are free to accept work when and for whom they choose to work. The labor market is a decentralized, private, free choice system that is concerned with the manpower logistics (or supply) for social collective action.[29] It is considered (in this paper) as separate from the consumer system that determines how much and what is produced. This approach enables us to utilize the results of inventory theory to explore the labor market's performance.

Figure 1 and the following paragraphs briefly describe the significant aspects and the dynamic operation of the labor market. In order to avoid burdening the reader, only general principles are given. For qualifications and exceptions as well as further explanation of these principles the footnoted references should be consulted. The approach here is based on microeconomic and manpower planning models.

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[29] Garth L. Mangum, ed., The Manpower Revolution: Its Policy Consequences (Garden City, N.Y.: Doubleday, 1965), p. 453.

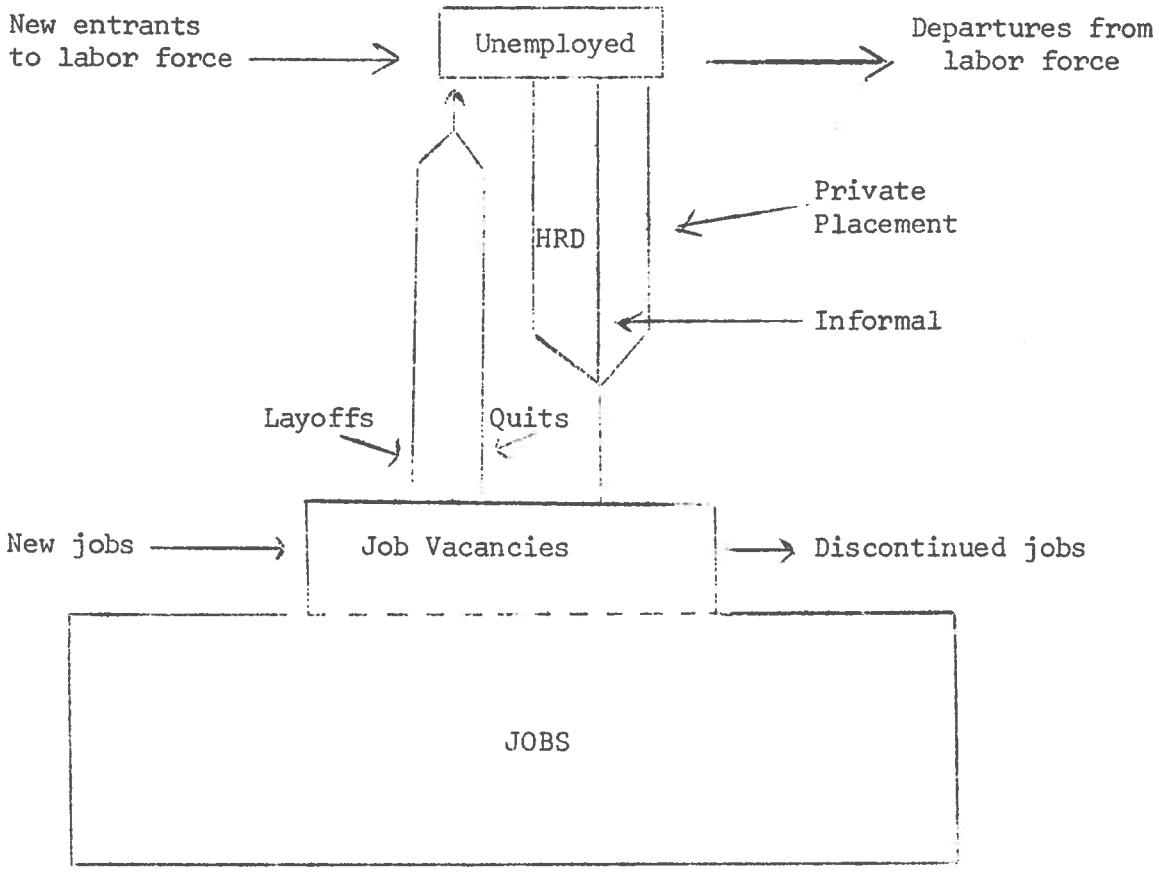

Figure 1. Labor Market Diagram.

Although both labor supply and demand are price elastic, it is desirable to treat wage levels as an environmental factor that is not controlled by HRD decision makers.

Although the diagram appears simple, it nevertheless is sufficient to provide a rough explanation of the causes of four major types of unemployment (excess supply, structural, frictional, and disguised), as well as a plausible explanation for the causes of the relation between inflation and unemployment (i.e., the Phillips curve).[30] Also, since HRD policies can only influence the flows (i.e., the arrows) in the diagram (it is impossible to directly influence the levels), it clarifies the possible objectives for HRD.[31]

The flow of new and discontinued jobs encompasses jobs created that had not existed before or rehires, and jobs permanently discontinued or temporary layoffs. The relevant decisions are made by employers.

The employers' decisions to change the rate of the job flow depends on the total consumer demand for goods and services. When demand for goods and services increases sufficiently, employers react by creating additional job vacancies, i.e., demand for labor also increases. Likewise, when consumer demand falls, the layoff rates are increased, i.e., demand for labor also falls.

There is a high degree of employee turnover, (in some states over 200% per year), due to new entrants into and departures from the

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[30]The following discussion draws heavily on the labor market model and discussion presented by C. C. Holt, in E. Phelps, et al., The Microeconomic Foundations of Employment and Inflation Theory (New York, 1970).

[31]Jay W. Forrester, Urban Dynamics (Cambridge: M.I.T., 1969), p. 14.

labor market and to job changes (many of which involve zero duration of unemployment).[32] The unemployment caused by the combined effects of turnover and average duration of unemployment is termed "frictional."[33] It can be reduced only by reducing turnover or reducing unemployment duration. The turnover can be a result of employee quits or employer layoffs. Quits tend to increase during periods of low unemployment and decrease during high unemployment. Although an employee may quit before he finds another job or search for another job while he is still working, excessive quit rates increase inflation because workers usually expect to get more wages from their new job and productivity of employers goes down since more resources must be spent training replacements. Layoffs are counter-cyclical to quits, i.e., as quits decrease layoffs increase. Many employers depend on the ability to lay off workers during slack periods (e.g., seasonal jobs).[34]

The total amount of unemployment due to the turnover and frictions in the labor market is proportional to the average (mean) unemployment duration and the average rate of turnover. (Thus, already there is a clue that when measures of "placement" productivity are developed, it will be necessary to design measures of turnover and unemployment duration in addition to placement counts.)

There are continual changes in consumer demand for different types of goods and services and continual changes in production methods.

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[32] Based on an indicator of turnover developed in State of California, Department of Employment and University of California, Institute of Industrial Relations, A Sourcebook on Unemployment Insurance in California (Sacramento, 1953), p. 40.

[33] M. W. Reder, "The Theory of Frictional Unemployment," Economica, (Feb. 1969), 36, 1-28.

[34] David C. Smith, "Seasonal Unemployment and Economic Conditions," in Arthur M. Ross, ed., Employment Policy, op. cit., ch. 6.

There is also a significant lag between the resulting changing demand patterns for labor (e.g., skill mix) and the labor supply which is usually catching up. The unemployment caused by these temporary maladjustments of labor force and job requirements is termed "structural."[35] It can be reduced by retraining the work force or restructuring job requirements.

The total supply of labor may be (and currently is) greater than the total demand for labor. The resulting unemployment is termed "excess supply" (or, more commonly, "deficient demand"). It can be reduced only by increasing the demand for labor or reducing the supply of labor. Programs designed to stimulate demand for labor are usually considered to be inflationary.[36]

During periods of full employment, the supply of labor will approximate the demand for labor, i.e., the job vacancy rate will equal the unemployment rate.[37] When supply exceeds demand, the job vacancy rate and job quit rate decline and the unemployment rate grows. Current manpower programs (most of which are frictional and structural remedies), are most effective in periods of full employment; they are least effective when labor supply exceeds demand.

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[35] Richard G. Lipsey, "Structural and Deficient Demand Unemployment Reconsidered," in Arthur M. Ross, ed., Employment Policy and the Labor Market (Berkeley: University of California, 1965), ch. 7.

[36] E. S. Phelps, "The New Microeconomics in Inflation and Employment Theory," American Economic Review Proceedings, (May, 1969).

[37] This is actually an oversimplification that would fail to the extent that in equilibrium the optimal job vacancy duration differs from the optimal unemployment duration. See M. W. Reder, "The Theory of Frictional Unemployment," op. cit., p. 9.

Not all employees are productive. In many circumstances it is rational for employers to hire more workers than needed to compensate for uncertainty in future demands and worker availability. The resulting (economic) equivalent to unemployment is termed "disguised" unemployment.[38]

A significant amount of unemployment also arises from labor disputes, work stoppages, accidents, sickness, disability, and from cyclical and seasonal employment. "Hidden" unemployment exists in the large numbers of employable people (e.g., housewives, students, etc.) who, out of desire or despair, are not actively seeking employment and thus not counted as part of the labor force.[39]

People who are unemployed must continue to meet significant fixed expenditures. If one defines "transfer payment" broadly as any transfer of money or benefits for which there is no quid pro quo, i.e., no expectation of return, then it becomes evident that every person who is unemployed is receiving some type of transfer payment. Only the source of these payments varies. They can come from taxpayers (welfare payments), employers (Unemployment Insurance), friends or relatives ("private" welfare), "past selves" (savings), or "future selves" (loans).

To complete the model it is necessary to partition the labor market (Figure 1) into n mutually exclusive labor markets. Each of these sub-markets is characterized by complete substitutability of

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[38] M. W. Reder, "The Theory of Frictional Unemployment," op. cit., p. 14.

[39] William G. Bowen and T. A. Finegan, "Labor Force Participation and Unemployment," in Arthur M. Ross, ed., Employment Policy, op. cit., ch. 4.

workers within it. An economic cost C_{ij} is incurred in transferring a worker from sub-market i to sub-market j. (It is also possible to transfer a job from sub-market i to sub-market j -- this possibility, as well as the dynamic feedback aspects of the labor market are important for long-range planning but will not be addressed in this analysis).

Before discussing social indicators for the labor market, it might be worthwhile to illuminate this model by considering an example in some detail.

In this hypothetical labor market there are three sub-labor markets: 1) construction workers; 2) engineers; and 3) educators. Upon graduation from high school each person can elect to become a construction worker, or go to college. After four years of college, the person can become an engineer or go to graduate school. After one year of graduate school the person can become an educator. There are no other barriers to employment (e.g., racial, geographical, specialization, health, ability, etc.). Assume student to teacher ratio of 5 to 1, and construction worker to engineer ratio of 5 to 1.

Define: $E_i(t)$ = # employed in market i at time t

$W_i(t)$ = annual wage in market i

$V_i(t)$ = # job vacancies in market i at time t

$U_i(t)$ = # unemployed persons in market i at time t

C_{ij} = cost of moving from market i to j

D_i = random variable of duration a worker in labor market i will retain a given job (if he is not laid off)

t_i = search time required to find a new job in labor market i

L = working life expectancy

S_u = # students in undergraduate school

S_g = # students in graduate school

Figure 2 shows this labor market. The numerical values are derived in the following paragraphs based on minimum assumptions.

Assume $E_1 = 1000$, L = (constant) 30 years, system in steady state. Then:

$E_2 = 200$

C_{12} = opportunity loss + educator cost

= 4 yrs x wage of E_1 x emp. rate - 4 yr x $\left(\frac{\text{educator}}{\text{student}}\right)$ x ed. wage

$$= 4 \times W_1 \times \frac{E_1}{E_1 + U_1} + 4 \times \frac{1}{5} \times W_3$$

$$= 4 \times W_1 \times \frac{1000}{1000 + U_1} + \frac{4}{5} \times W_3$$

$C_{13} = C_{12} + C_{23}$

C_{23} = 1 yr x wage of E_2 emp. rate + 1 yr x $\left(\frac{\text{educator}}{\text{student}}\right)$ x educ. wage

$$= W_2 \times \frac{E_2}{E_2 + U_2} + \frac{1}{5} W_3$$

$$= W_2 \times \frac{200}{200 + U_2} + \frac{1}{5} W_3$$

$$E_3 = \frac{1}{5} \times (S_u + S_g)$$

Assume all changes between labor markets are done at beginning of working career.

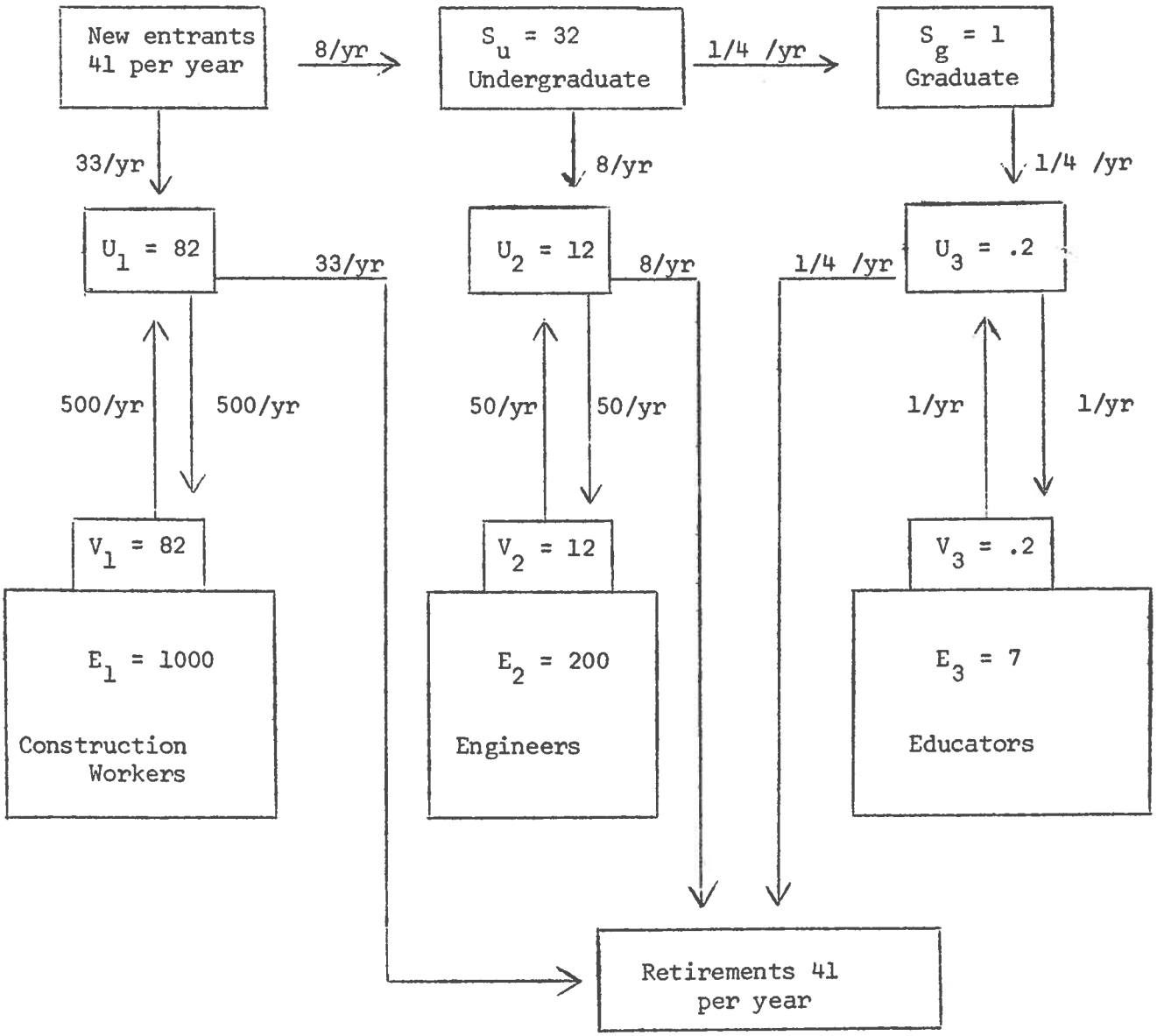

Figure 2. Labor Market Example.

Then: required new workers = $\frac{1000}{30} + U_1 = 33$ per year

required new engineers = $\frac{200}{26} + U_2 = 8$ per year

$S_u = 32 + \frac{1}{4}S_g$

$E_3 = \frac{32 + \frac{1}{4}S_g + S_g}{5} = 7$

required new educators = $\frac{7}{25} = 1$ per 4 yrs.

$S_g = 1$

Assume that $D_i = 2^{i-2}$ years, and that search time to find a new job is

$$t_i = \frac{1}{3} \times \frac{1}{\%\text{ of jobs vacant}} = \frac{1}{300} \times \frac{V_i + E_i}{V_i} \text{ years,}$$

then: $U_1^2 = (33 + \frac{1000}{.5})$ $\quad \frac{1000}{300} = 6776$, $U_1 = 82$

$U_2^2 = (8 + \frac{200}{1})$ $\quad \frac{200}{300} = 139$, $U_2 = 12$

$U_3^2 = (\frac{1}{4} + \frac{7}{2})$ $\quad \frac{7}{300} = .4$, $U_3 = .2$

This completes the derivation of the steady state values of Figure 2. In this example there is full employment, a static or non-changing demand for labor and a constant rate of entrants to the labor force. Nevertheless, there is a different unemployment rate in each sub-market (7.6%, 5.7%, and 2.8% respectively) caused by differential turnover rates and job search time.

One can readily visualize (although it is difficult to model) the effects caused by changing demands, mid-career changes, variable entry rates to the labor force, etc. Reflection on the previous discussions and model readily suggests the following three performance measures for the labor market.

- market segmentation -- segmentation on the basis of factors not related to ability or productivity is considered not in the public interest (of course in a society based on some other ethic, e.g., the caste system, the conclusion would be quite different). Segmentation is a measure of the mobility of workers.[40] Segmentation can be measured if both the number (and definition) of sub-labor markets and the vector C, where C_{ij} is the cost of moving from market i to market j, are known.[41] Thus, market segmentation = f(n,C). Data is available that might be used to segment the market as follows (note that it is C_{ij} that determines the measure -- if a single segment is partitioned it will have $C_{ij} = C_{ji} = 0$, therefore it does no harm to have an overly refined partitioning unless the data handling costs become prohibitive): region; industry; occupation; race; sex; age; and education. Current information, however, is insufficient to quantify C_{ij}.

- unemployment rates -- within each market segment. With full employment in any sub-market, $U_i = V_i$ (however, see note 37) and the unemployment rate is a function of turnover and job search time. As the unemployment rate increases, society incurs benefits from the increased stock of labor supply, and incurs costs from the non-productiveness of the unemployed workers. An optimum unemployment rate exists for each sub-market that will minimize the total social costs. Data is available on the total aggregate unemployment, as estimated by a monthly household survey, defined as the percent of the labor force unemployed and able, available and actively seeking work. Measures of job vacancy are not available but might be estimated by counting newspaper want ads or Employment Service data on job orders.[42]

- structural imbalance -- this is a relational measure. The market is structurally out of balance when the following three conditions hold:

  - one sub-market i has an unemployment rate that is higher than optimal

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[40] For a discussion of the concept and measurement of mobility, see Otis Dudley Duncan, "Social Stratification and Mobility," E. B. Sheldon and W. E. Moore, Indicators of Social Change, op. cit., ch. 13.

[41] For a discussion of the duality between flow costs and "attractiveness" potentials, see L. R. Ford, Jr., and D. R. Fulkerson, Flows in Networks, (Princeton: Princeton University, 1962).

[42] John G. Myers and Daniel Creamer, Measuring Job Vacancies, The Conference Board, Studies in Business Economics, no. 97, 1967.

- one sub-market j has an unemployment rate that is lower than optimal

- the benefits from transferring one worker from sub-market i to j are greater than the costs C_{ij}.

> Structural imbalances are one of the most important mechanisms for the self-regulation of the labor market. A more advanced treatment of the dynamic aspects of the labor market could replace structural imbalance with the two control theory concepts of sensitivity (responsiveness) and smoothing.[43]

These three performance measures (segmentation, unemployment, and imbalance) determine the effectiveness of the labor market (note that the partitioning must be such that imbalance includes, for example, racial discrimination). Improving the labor market means improving one of these measures. There are, of course, other possible measures of performance but they are more related to other interfacing systems. For example, the input to the labor force depends on birth and immigration, the departures depend on life expectancy, leisure and skill requirements depend on technology, wages and inflation depend on the economy.

Although it is defensible to define the quality of the labor market system in terms of segmentation, unemployment and imbalance, it is not advisable to immediately begin designing information systems to measure these dimensions. We must first know something about the nature of the proposed government intervention, the relevant decision makers, and their possible decision alternatives. In short, we must turn our attention to the intervention system in order to decide what should be measured.

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[43] For a stable system, sensitivity is a measure of the ratio of corrective action to system disturbance and smoothing is the ratio of system imbalance to system disturbance. See Harlan D. Mills, "Smoothing in Servo Processes," SIAM Review, 3,2, 1961, pp. 131-139.

The next part discusses the government intervention systems, i.e., the nature and objectives of manpower programs that have been developed to improve the quality of the labor market.

B. Manpower Programs

This section will describe the historical development and current status of the major manpower programs.

Current federal manpower policy evolved as a result of a proliferation of individual programs established to meet particular labor market needs as they arose.[44] It is characterized by many of the problems (such as overlap, inefficiency, conflict and duplication) that one would expect from insufficient centralized direction and control. However, it is also characterized by many of the problems (such as lack of responsiveness to the labor market needs of the community, rigid bureaucratization, and lack of innovation) that one would expect from excessive centralized direction and control.

Most state HRD agencies have "no planning element in the system which merely runs the federal programs as federally prescribed."[45] However, the national debate over decentralization and decategorization of funds has given birth to a need and interest within state (and even local) HRD agencies for developing planning and program evaluation capabilities.

Although efforts to establish public employment offices can be traced back to the early 19th century, the system we have today was established in 1933 by the Wagner-Payser Act.

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[44] E. Wight Bakke, The Mission of Manpower Policy (the Upjohn Institute for Employment Research, April, 1969). Bakke points out the need for a clarification of manpower objectives and an integration of manpower supply, demand, and matching functions.

[45] Garth Mangum, The Total Impact of Manpower Programs (Washington: Olympus Research Corporation, August, 1971) v. 1, p. 88, PB-202 929.

The Wagner-Payser Act (29 USC 49-49n) established the United States Employment Service (USES) Bureau within the Department of Labor (DOL). The USES was charged to develop a federalized system of employment offices to provide employment counselling and placement services to all people legally qualified to work. To receive appropriations under this act, each state is required to establish and operate a system of employment offices in conformity with Federal requirements.

A federalized system for unemployment compensation was established by Title III of the Social Security Act (42 USC 501-503) of 1935. Title III stipulated that unemployment compensation would be administered through the public employment offices (or such other agencies as DOL may approve). Unemployment insurance (UI) payments as well as UI and ES administration are financed through a wage exise tax on employers authorized by the Federal Unemployment Tax Act of 1961.

The Employment Act of 1946 (33 PL 304) enunciated national policy, declaring that it is the continuing policy and responsibility of the Federal government to use all practicable means to promote free competitive enterprise, maximum employment, maximum productivity, and maximum purchasing power (minimum inflation).

The major emphasis on UI administration and placement services began to shift in the early sixties. It became apparent that even though unemployment was low, there were still substantial numbers of people who were permanently excluded from the general prosperity. Attention gradually shifted to the problems of poverty.

The Manpower Development and Training Act (MDTA) of 1962 (76 Stat. 23) is the primary legislation for a national program of occupational training designed to reduce structural unemployment. The

act declares that it is in the national interest to identify current and prospective manpower shortages and to seek out and train persons who can be qualified for these positions. It recognizes that technological developments, shifts in market demand, other structural changes in the economy, and the rapid growth of the labor force demand improved planning to meet the resulting shifting employment needs. The three objectives of the act are explicitly stated: to reduce the hardships of unemployment; to reduce the costs of UI and public assistance; and to increase the nation's productivity.

Following placement services, unemployment insurance, and manpower training, the next major development was concern for the special problems of minorities. The Economic Opportunity Act of 1964 was passed and the employment service began to devote more of its efforts to disadvantaged applicants. The then current debate over methods of improving the employer's image of the "unemployment office" was superseded by the "HRD concept."[46]

The current national debate over manpower programs has been stimulated by the burgeoning welfare rolls and the widespread dissatisfaction with the structuralist unemployment remedies of the '60s. The proposed Family Assistance Plan and Opportunities for Families Program would remove some inequities in the current welfare system, subsidize the working poor, and provide work and training opportunities to employable recipients. Parts of this program have already been enacted through the Emergency Employment Act and through the Talmadge

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[46] U.S. Congress, House Committee on Education and Labor, Adam Clayton Powell, Chairman, The Role and Mission of the Federal-State Employment Service, 1964, and U.S., DOL, Manpower Administration, The Human Resources Development Concept, (USGPO, 1967).

Amendments to the Social Security Act (the later expands the 1967 Work Incentive Program), and are administered by HRD. Revenue sharing might bypass HRD to allow mayors to manage manpower programs.[47] De-categorization of the dozens of manpower training programs might give HRD the authority (and responsibility!) to plan, evaluate, and make program allocation decisions. Training funds may be cut and public service jobs (like WPA) may be expanded and administered by HRD. In any case, the future role of HRD is not yet settled.[48]

There seems to be a widespread misconception about the capability of manpower programs. One frequently encounters the basic (fallacious) premise that HRD can help any person HRD chooses to help, when in fact HRD has a limited range of information and services that can be of value to some people but of no value to other people. This misconception carries over into the discussions on "who should HRD serve?," where the over-riding question: "Who would receive benefit as a result of participating in HRD programs?," is rarely breeched. For, in fact, there are many people who would not, and do not benefit from HRD services, including some too far back in the unemployed queue, and some too far forward.

Manpower services are delivered to the public through numerous offices located throughout each state. Table 1 describes the major services provided (i.e., activities performed by the local office and

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[47] Charles L. Schultze, et al., Setting National Priorities: The 1972 Budget (Washington: Brookings, 1971), p. 167.

[48] U.S. Senate, Committee on Labor, Reform, op. cit., p. 12.

Service (activity)	Description	Estimated Annual Volume (in thousands)	
		Services	Individuals
New Applications	Interview job applicant, assign occupational codes, and complete job application form. Search job orders for appropriate job opening.	1,000	900
Subsequent applicant interviews	Additional interviews with job applicant.	150	100
Counselling	Interview job applicant who needs assistance in developing a vocational plan or overcoming problems that prevent employment.	200	85
Testing	Test job applicant for aptitudes, knowledge, or skills.	60	50
Enroll in training	Interview applicant, determine training needs, complete training application forms.	60	50
Orientation	Provide orientation training in job search, employment interviewing, etc.	18	16
Job development contact	Call employer regarding specific job applicant to solicit job order.	180	50
Job referral	Search files, match applicant with job order, send applicant to employer.	850	460
Job order (non-ag)	Accept telephone order for job, assign occupational code and complete job order form. Search applicant file for appropriate applicant.	325 (orders)	525 (openings)
Employer visit	Visit employers to develop contacts and promote use of HRD services.	150	---
Follow-up contact	Call or visit applicant after placement to insure job retention.	---	100

Table 1. Major HRD Services for One Large State

the estimated annual level of activity for one large state.[49] Although UI may have the potential to act as a significant employment stabilizer, developing useful indicators for UI would present a quite different (and much simpler) problem than for manpower programs. In the remainder of this paper, only manpower programs will be considered.

The local office activities described in Table 1 can improve the labor market system (i.e., improve the measures of unemployment, segmentation, or imbalance) by improving the component system of job search. Through labor-market information, search assistance (for both workers and for jobs), counselling and persuasion, the average time required to arrange productive employment interviews can be reduced. Market advice to workers and employers can promote realistic expectations and increase the chance that an employment interview results in a hire. Job search time can also be reduced through the economies of scale inherent in the system.

A second major way that HRD activities can improve the labor market system is by improving the component system of mobility between segments by forecasting manpower surpluses and shortages and financing manpower training to move workers from segments with labor surpluses to segments with labor shortages. Labor market information and counselling can direct youth to demand occupations and reduce the time required to discover a satisfying (or satisfactory) career.

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[49] Estimated annual activity based on doubling number of activities reported in first half of FY 72; the estimates have not been verified and are presented only to indicate approximate orders of magnitude. For national data and discussion, see U.S., DOL, Manpower Administration, Historical Statistics of Employment Security Activities 1938-1966, January, 1968.

There are of course many other ways to improve the labor market system, such as reducing the number of market segments, reducing non-productive turnover (either quits or layoffs), or reducing seasonality in employment. However, current HRD activities are at best only marginally directed towards these objectives. Programs that affect the creation of employment opportunities or the entry of people into the labor force affect the environment of the labor market system rather than the system itself, and thus are beyond the scope of this analysis.

We are now in a position to formulate a model for each of the two primary functions of the local office. The first function, improving the job search component of the labor market, will be referred to as the "placement" process. The second function, improving the segment-to-segment mobility, will be referred to as the "training" function. (However, it should be kept in mind that HRD does not do placement in the sense of hiring -- it only refers applicants to employees; nor does it do training -- it only refers people to training facilities, either institutional or on-the-job.) The models are not intended to be comprehensive but rather to be suggestive of the kind of indicators that would be most likely to measure program objectives, yet still be sensitive to management effectiveness. As the models are developed, it will become apparent that, although manpower programs have objectives of improving the labor market (e.g., reducing aggregate frictional unemployment), the significant decisions made by the local office only concern individuals.

The choice between individual and aggregate indicators presents a major policy issue. To illustrate this policy issue, suppose it is recognized that there is a serious health problem in a certain community.

To combat this health problem a free clinic is funded and established. It is now desired to develop a health index time series that will lead to maximum effectiveness of the efforts to alleviate the health problem. One's first thought might be to define the target population and develop an index of their health. But the health problem is so large and influenced by so many factors that such an index may be irrelevant to guide decision makers towards program improvements. Then, why not develop an index of the improvement in health received by patients of the clinic? Surely this would be an indicator that would lead to program improvements. But, perhaps the real community need is not for improvements in the clinic's performance, but for a different program. Consider an indicator of the number (and per cent) of clinic patients cured of infections from rat bites -- does an increase in this indicator, which is clearly related to clinic effectiveness, really indicate that health is improving? On the other hand, would an indicator of the number (and per cent) of rat bites received by the target population, which is clearly related to the health problem, really indicate clinic effectiveness? The answer to both questions is clearly, no.

Paradoxical as it may seem, the preceding example illustrates that to design a social indicator that is useful for guiding and improving an intervention system, we must first understand the system and the alternative decisions that can be made in the system. Truly in designing social indicators, "the aggregation, selection and organization of data are all part of a value-laden, mission-oriented process."[50]

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[50] Ida R. Hoos, "Information Systems and Public Planning," Management Science, (June, 1971), 17, 10, p. 659.

Placement

The placement process is illustrated in Figure 3. It can be seen that the major decisions required to produce a hire are made by the employer and the applicant, not by HRD. The placement process is primarily a screening (or information search and retrieval) function. It is secondarily a persuasive or educative function to the extent it aids employers and applicants to set realistic expectations (counselling and testing is a significant part of this function).

There is a basic difference between a job order and a worker application. The job order is a summary of those (legal) qualities that an employer demands -- presumably because he believes they are good criteria to predict success on the job. The worker application is a summary of selected aspects of the worker's life history that HRD believes will be useful. The qualities sought by an employer are often based solely on his own experience and not necessarily adequate predictors of success on the job. Although it would clearly improve the measures of performance of the labor market system to reduce non-productive turnover caused by unrealistic expectations or the use of poor selection criteria, the current use of "placement" counts as the measure of local office success provides no incentive for the HRD interviewer to help employers improve their selection criteria. On the contrary, "placement" counts, which are essentially the number of referrals which have resulted in a verified hire, provide an undesirable incentive to ignore any notion of "employment success" and to concentrate on quick hires (and preferably in rapid turnover occupations).

From Figure 3 we can explore the components of the placement process in order to gain an understanding of the alternatives available

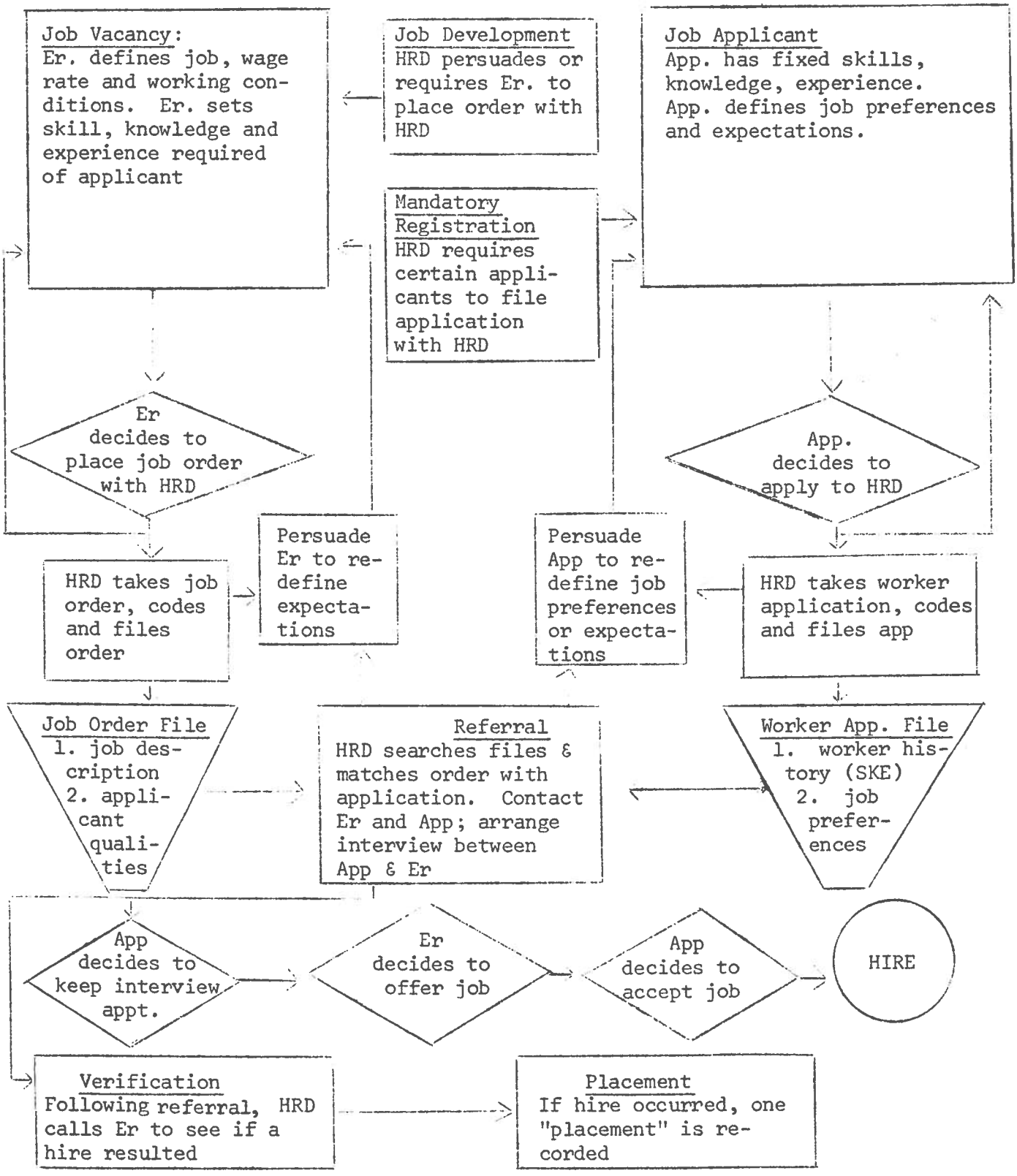

Figure 3. The Placement Process

to HRD decision makers and of the nature of improvements. The first component is advertising or marketing. Applicants and employers are persuaded or coerced to use HRD services. Ideally, this persuasion would be an implicit result of providing satisfactory service in the past. HRD has a large captive group of applicants -- UI claimants are required by law to register with HRD for work. Except for some recent legislation affecting employers with federal contracts, there is (fortunately) no mandatory requirement for employers to list job openings with HRD. HRD engages in a variety of efforts, such as mass mailings and individual employer visits, to obtain job orders. Performance measures of this component that have been or could be used include:

- penetration ratio (% of job vacancies listed with HRD)
- cancellation rate (% of job orders that have been cancelled)
- openings per JDA ratio (average number of openings received per job development attempt)
- orders per JDA ratio
- orders received
- employer return ratio (% of employers who repeat use of HRD services)
- wages of jobs listed
- occupational level of jobs listed (DOT coding -- skills, knowledge and experience requirements)
- status of jobs listed (determined by education and wages)
- client satisfaction level (opinion surveys of satisfaction with service and intentions to place future job orders with HRD)

The second component is job order and worker application taking. Through information or persuasion, employers and applicants are aided to set their expectations closer to market conditions. In this function,

the HRD interviewer is often performing a role similar to that of a consultant helping a client to define the problem. Some indicators for this component might be:

- wages paid to wages offered ratio (ratio of hiring wage to wage on job order and/or on app.)
- ability obtained to ability sought ratio (ratio of education and experience of new hires to that on job orders)
- job requirements improved per order ratio (opinion survey of employers to determine % who believe HRD helped them to set job requirements; or quality control monitoring and assessment of interviews by a panel of evaluators)
- placements per counselling interview ratio (% of counselling interviews designed to help applicant set realistic employment aspirations that result in placement)

The final component of the placement process is referral. Referral includes searching for applicants and searching for job openings, determining a satisfactory match, and arranging a job interview between the employer and the applicant. Some of the elements of referral can be (and in some offices are) done by the clients, for example, by letting the applicant pre-screen posted job orders or letting the employer directly search a computer listing of pre-screened applicants. There are four primary performance measures of referral: relevance, completeness, timeliness, and quality. Relevance (or absence of Type II error) is the per cent of the total applicants (or orders) retrieved from the search that meet the minimum requirements. For example, if a file search yields five applicants who are referred to a job, but only three actually meet the minimum requirements, then the relevance is 60%. Completeness (or absence of Type I error) is the per cent of the total applications (or orders) in the file which meet minimum requirements that are

retrieved and referred from a file search. For example, if there were four qualified applicants in the files, the identification of only three represents completeness of 75%. Timeliness is the length of time between receiving an order (or app.) and making a referral. A job opening that is not filled within a few weeks (often within a few days) will be filled from other sources. Time is often of the essence. Finally, since neither jobs nor applicants are drawn from a homogeneous population, it will be necessary to design weighting criteria in order to aggregate the measure of relevance, completeness and timeliness. The requisite weighting for aggregation will be temporarily referred to as the quality of the referral. Performance measures for the referral component that have been, or might be used are:

- placements (number of referrals that result in a verified hire)
- referral to placement ratio
- % applicants who receive a referral
- % orders that receive a referral
- % orders filled
- % applicants placed
- average time to fill an order
- average time to place an applicant
- % applicants placed still employed in 6 months
- % applicants placed still employed with same employer in 6 months
- ratio of wages 6 months later to starting wage
- % of time worked in 6 months following placement

- % of employers who believe they filled an opening either faster or with a more satisfactory worker as a direct result of HRD services (questionnaire).
- % of applicants who believe they obtained a job either faster or a more satisfactory job as a direct result of HRD service (questionnaire).
- quality: all of the above measures disaggregated by labor market segment.

Although all manpower programs have significant merit good aspects, the primary intention of the placement process is, or should be, to reduce unemployment within some or all of the labor market segments. One of the ways to reduce unemployment would be to re-define the nature of work to include activities such as house-keeping or meditation that are currently excluded from the socially defined concept of productive activity.[51] Another way would be through reducing working life by shortening the work week, lowering the retirement age, extending vacations or delaying entry to the labor force.[52] The placement process is a short run program that is designed to reduce unemployment by reducing the frictions in the market.

Therefore, it seems reasonable to assume that the placement process is operating in a labor market segment in equilibrium with a fixed number of jobs. Referring back to Figure 1, it can be seen that this assumption implies that the only way placement can be successful is if it reduces the average duration workers are unemployed or increases the average duration workers are employed. A necessary (but not sufficient) condition to improve these durations is that the HRD

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[51] In fact, the stigmatized dichotomy of work-no work is itself a fairly recent development. See "The Theory of the Leisure Masses," Kaiser Aluminum News, 24, 5, 1966.

[52] Sar Levitan, Reducing Worktime as a Means to Combat Unemployment (The Upjohn Institute, 1965).

applicant have his time spent unemployed reduced or his time spent employed increased (i.e., compared to what it "would have been" without HRD services). In other words, a necessary condition for placement to reduce unemployment is that the applicant's current spell of unemployment be reduced or his duration of employment be increased. These conditions are also sufficient to reduce unemployment if displacement does not occur, i.e., reducing the applicant's duration of unemployment does not result in increasing someone else's duration of unemployment. Displacement is a significant external cost of placement, yet it has typically been ignored because it is difficult to measure.

Training

The training process is illustrated in Figure 4. The two major components of the training process are training class generation and trainee selection and assignment.

Training classes can be established for basic or vocational education. They can be institutional (public or private) or on-the-job. Most on-the-job and private institutional training is for groups of trainees. Once training classes are established there is a tendency to continue them since a great deal of effort is required to develop a new training class and the lead time can be quite long (6-12 months). The objective in establishing training classes should be to identify occupations that are likely to have labor shortages and for which satisfactory training facilities (at reasonable time and cost) and qualified trainees are available. However, because the existing effectiveness indicators (placement counts) create undesirable incentives, "it is obvious that the tendency has been to train for those jobs characterized

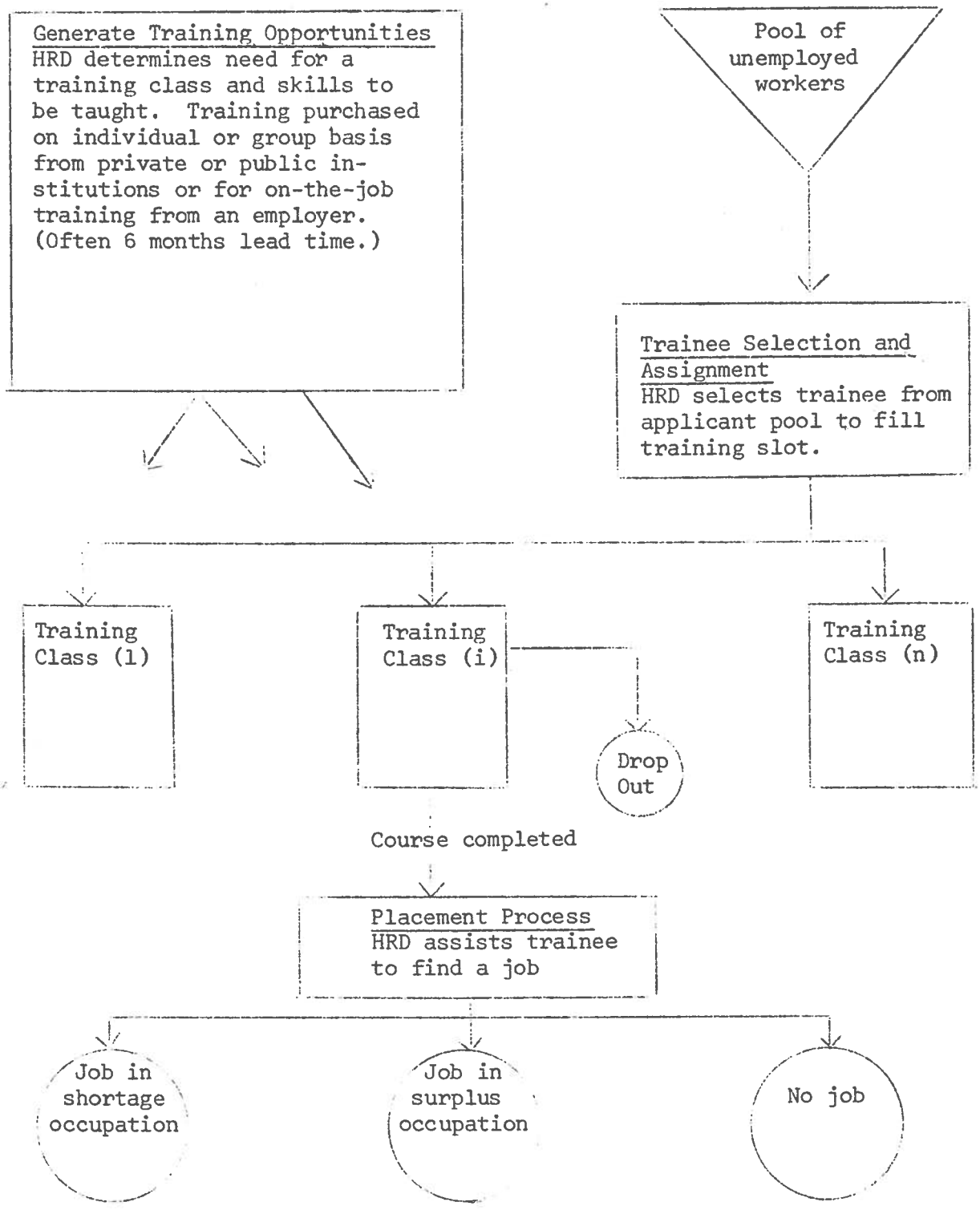

Figure 4. HRD Training Process.

by high turnover rather than those in expanding demand."[53] Some indicators for the training class generation components might be:

- training course drop-out rate
- % of trainees completing course who are placed in training-related job
- % of training-related jobs in labor shortage occupations
- % of training slots in shortage occupations
- % of training slots filled
- training course time and cost
- trainee evaluation of instruction (questionnaire)
- % of trainees placed

It should be noted that the training selection component is not measured by the quality of training (which is not under HRD control), but it should be measured by its ability to select quality training courses. Some poor quality training is unavoidable, but continued patronage with a poor training institution would indicate a faulty system design.

Not all training (even when successful) leads to increased productivity. Some training leads only to increased employer acceptance. The latter situation is characterized by requirements, such as high school diplomas, that are set by employers as personnel screening devices -- which may or may not be related to productivity. In fact, the basic premises of manpower training programs, i.e., that training will improve the marginal productivity of the unemployed labor force and thereby induce employers to increase employment, may be a chimera. In the first microanalytic study of disadvantaged workers in a

[53] Garth L. Mangum, The Total Impact, op. cit., p. 92.

specific area, Bennett Harrison concludes:

> The current orthodoxy in this field has been ineffective because it is based upon fallacious assumptions about the responsiveness of the economic system to improvements in the supply of ghetto labor ... as a short-run anti-poverty policy instrument, education without a supply of commensurate jobs ... cannot possibly be effective.[54]

Yet even if all manpower training was ineffective, HRD does not have the authority to shift resources to other programs (e.g., to create public service jobs). All of the training programs are labor intensive and thus contribute to reducing unemployment -- numerous full-time jobs in HRD and in training institutions depend on federal manpower training funds (and even more considering the economic multiplier effect). Thus even if the socially optimal decision would be to reduce training, each state would be forced (in its own interest) to suboptimize by continuing the training.

As a result of these constraints, the current decisions in selecting training classes are (and must be) based not on "which classes would be beneficial?", but on "how can HRD spend the allocated federal funds in order to get the most benefit (even if that means minimizing the net loss)?." This means that a training class is a good selection if it is better than the alternatives, whether or not it is itself a "good" class.

The second component of training is trainee selection and assignment. All unemployed or under-employed people who register for work with HRD may be considered candidates for training. Since there is always a much larger pool of applicants than of training slots,

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[54] Bennett Harrison, Education, Training, and the Urban Ghetto, Ph.D. Dissertation, Maryland University, College Park, Md., 1970, pp. 230-234.

there is usually no difficulty in finding willing trainees. Since training programs pay the trainee for enrollment, even applicants who have no interest or motivation for training may want to enroll. Training slots are geographically allocated on the basis of estimated need. Various legal requirements, depending on the particular training program, set priorities for enrollment (for example, the WIN program only enrolls welfare recipients). However, within these constraints, HRD interviewers have a great deal of discretion in whom they enroll. Given the training class opening, the objective of training selection is to find an applicant who is motivated to move into the new occupation, and who has the ability and motivation to complete the training. In other words, the objective is to find an applicant who can benefit from the training. Some programs have attempted to reverse this decision process, i.e., to find the training that can benefit a given applicant. In spite of the rhetoric, the long lead time in creating training classes has resulted in de facto adoption of selecting applicants for training classes. Indeed, the high sunk costs in developing training and the low marginal costs of increasing class size tend to recommend the traditional policy of selecting applicants for classes. The criticism that this is making the "foot fit the shoe" (the Procrustean bed) is unjustified if the training selection component has developed an adequate mix of training classes. Some indicators of this component might be:

- % of trainees who complete training
- % of trainees who meet entrance requirements (questionnaire -- judgment of instructor)
- % of trainees who are motivated for training (questionnaire -- judgment of instructor and attendance rate)

- % of trainees who drop out within 2 weeks
- % of enrollees (either graduates or dropouts) who enter training related job

Training is a vehicle for mobility between labor market segments that is analogous to a geographical move. If HRD pays for a moving van but the applicant is not motivated to move, then no move occurs. Nor does a move occur if the applicant arrives at the destination city but cannot find a vacant house so must return to his origin. The move is only successful if the applicant both reaches his destination and finds a vacancy when he arrives.

The following section will use the previously developed theory to design specific effectiveness indicators for an HRD local office.

IV. THE HRD OFFICE

Hopefully, the previous sections have laid the foundation for effectiveness indicators for Human Resources Development offices. In this section a framework for this ambitious edifice will be constructed. A completed plan only gives the client an option of accepting or rejecting someone else's plan. As David Ewing has observed, "overplanning is poor planning"; "effective planning (is) incomplete planning."[55] Therefore, a great deal of remaining work that is required to make the structure habitable will be left undone. It will be left undone because the usefulness of the structure can be greatly enhanced if users understand, participate in, and influence its final development.

This section is organized into five parts. In the General Description, existing measures of performance and their dysfunctional consequences are briefly discussed. In the next three parts, indicators are proposed for each of the three dimensions of organization effectiveness, and in the final part, a method for combining these indicators into an effectiveness index is described.

A. General Description

The existing measure of performance is the "placement." A placement occurs when a person who has been referred by HRD to an employer is hired by that employer. There are several operational

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[55] David W. Ewing, The Human Side of Planning (London: MacMillan, 1969), pp. 198-199.

requirements that must be met in order to record a placement -- however, these need not concern us at this point. What is significant is that placements are a transaction count of the filling of certain job vacancies. Placements are not measures of the performance of the labor market -- in fact a market segment with high unemployment, low outward mobility and unsatisfactory working conditions will probably have high turnover and as a result, high placements. A reasonable prima facie presumption would be that as placements increase, things are getting worse! This lends strong support to those critics of the existing measure of results who charge placements with creating a "numbers game." They are correct. The remedy, however, does not lie in discarding the present measure of results (which is better than no measure), but in developing a better alternative. Following are some dysfunctional incentives created by placement measures that the alternative measures should try to remedy:

- refer applicants to high turnover, short expected duration jobs.
- refer as many applicants as possible to each employer.
- neglect planning for future labor market needs.
- neglect client satisfaction.
- discourage employers from filling jobs with non-applicants.
- discourage applicants from seeking jobs on their own.
- train and refer highly employable applicants who could get a job without HRD services.
- give priority to easily filled jobs that could be filled without HRD services.

The effectiveness indicators will be a monthly time series. They must be reported in a manner sufficiently timely to be useful in modifying future behavior. For example, if college grades were

not made known to the student until graduation, they would be of less value in causing him to adaptively respond to the wishes of the instructor.

The following paragraphs briefly describe the existing information sources that can form the building blocks for the effectiveness indicators.

- Employment Security Automated Reporting System (ESARS). Based on information from worker spplications, job orders, and services provided. Contains information on client characteristics and services provided to every applicant.

- Wage History Tape (WHT). Based on information submitted by employers on quarterly UI Tax returns. Contains quarterly wages and place of employment for each person wcrking in UI-covered employment. (Not available in every state.)

- SSA Tape. Based on Federal income tax returns. Lifetime earnings record of a random one per cent sample of everyone with an SSA number.

- Cost Accounting System. Based on functional time-code self-reporting. Contains detailed breakdown of hours charged by each office to various activities.

- Information from outside HRD. Includes state income tax records, county welfare rolls, public employees retirement system earnings, census data, and other.

One of the first problems that develops is how should the state be partitioned? Should there be over 100 areas -- one for each office? Or should there by over 1000 areas -- one for each interviewer? Should the areas be geographical, occupational or industrial? In making this partition, there is a technical constraint. Aggregation must be sufficiently large so that random variations in success do not mask the differences in effectiveness. A relative accuracy of $\pm 10\%$ would be desirable, and $\pm 20\%$ would be the minimum acceptable. An estimate of required aggregation is the following (assuming a binomial distribution):

let P(X is success) = p = 25%

for $\pm$20% relative accuracy: $n \doteq 4(1-p)/(.2)^2 p$

or $n \doteq 300$

for $\pm$10% relative accuracy: $n \doteq 4(1-p)/(.1)^2 p$

or $n \doteq 1200$

Therefore, the partition for a 12 month moving average of effectiveness should be such that each reporting unit has an average client turnover of at least 100 per month, and in no case less than 25 per month. The partitioning, therefore, should probably not be less than by office. In the remainder of this paper, it will be assumed that the partitioning is by local office. Problems of geographical overlap or multiple registration of clients will not be discussed.

In the following three parts, indicators for productivity, adaptability and satisfaction will be proposed. A final recommendation to implement these indicators cannot be made until actual data is collected and statistically analyzed (which will not be done in this paper). More indicators than required may be suggested since it is presumed that a factor analysis will be used to reduce the dimensions. The indicators are discussed in Section II above.

B. Productivity Indicators

Productivity refers to short term performance, i.e., benefit and cost flows. In this paper, it is used to encompass what is often called effectiveness and what is often called equity (in contrast to popular usage). The indicators should be designed so that the only way a manager can improve his efficiency indicator is to take an action that would improve his benefit to cost ratio. An ideal

indicator, of course, would be the benefit-cost ratio itself, but not all of the required information would be available. It is therefore necessary to design an "index of an index" as it were.

A little reflection on the models in Section III should make it quite clear that manpower programs yield fewer benefits as the unemployment rate increases. If, for example, the pool of unemployed job seekers is large enough, any employer can fill a vacancy immediately and does not need placement services. Training (i.e., moving a person from one market segment to another), is of little value if there are (or will be) no segments with labor shortages. With sufficiently high unemployment, manpower programs become ritualistic, ineffective, and produce no results other than employing the people who perform the rituals.

Jesse Gordon's conclusion that "recognized experts have a stake in how a problem is defined, (and thus define them) in ways that are least dangerous to their positions in their own institutions" seems inescapable.[56] This tendency should be avoided -- efficiency indicators should be designed to reflect the values of the clients, not the values of the expert or the administrator.

In designing efficiency indicators, it will be assumed that the labor market system is separable from the society, i.e., that one can determine the value of a labor market system, and of HRD's efforts to improve it, without knowing the objectives of the society. In other words, a good labor market system would be good even if it were part of

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[56] Jesse E. Gordon, "What Shapes Poverty Programs," Manpower (April, 1971), 3, 4.

an evil society and thus helping it to do more evil. If the assumption of separability is unpalatable, it should not be any more so for making it explicit.

At least two major studies have recently been completed by consultant firms which recommend different effectiveness measures for HRD. The first study recommended a continuously updated measure of the conditional probability of placement, given client characteristics and labor market conditions. The second study recommended a measure of net increases in earned income of program participants. Neither of these models was acceptable for productivity indicators. One had a good control group but an unsatisfactory objective (placements); the other had a good objective (earnings increase) but an unsatisfactory control group.

The model for effectiveness indicators, discussed in Section II, is: $V(X,Y) = W_i \times V_i (X,Y)$. The interested client groups are applicants and employers. It is usual to assume strict additivity, i.e., that benefits to one person do not create external costs to another person, even though we know there are significant external costs.[57] Under this assumption, an office or program that accomplished nothing more than re-arranging the queue of unemployed workers would appear to be a great success. Before proposing a way around additivity, we shall first consider productivity under this assumption.

Consider placement. For each person i in the labor force, (or who may enter the labor force in the planning horizon), let $p_i(t)$ = probability that person i will be employed in time period t, if that

[57] Burton A. Weisbrod, "Conceptual Issues in Evaluating Training Programs," Monthly Labor Review (Oct. 1966) 89, 10, pp. 1091-1097.

person does not receive HRD services. Let $p_i(t:HRD)$ = probability that person i will be employed in time period t, if that person receives HRD services. Then, using a discount rate of r (or some planning horizon), the net benefit (NB) of the HRD service to person i is:

$$NB_i = K \times \sum_t \frac{p_i\ (t:HRD) - p_i(t)}{(1 + r)^t}$$

where K is some weighting constant. NB_i is a measure of the reduction in unemployment of person i, and under the assumption of additivity, is also a measure of the reduction in aggregate unemployment. NB_i can be improved by getting person i a job faster (reducing his spell of unemployment), or getting him a job that will last longer.

Now $p_i(t:HRD)$ can be readily measured by observing the person's subsequent employment history. A typical approach to measure $p_i(t)$ is to use a control group. Perhaps the most frequent, but certainly the least satisfactory method is to use a single control group, i.e., to assume for all i,j, $p_i(t) = p_j(t)$. In fact, adherents of this position may not even be aware that they are using a control group.

The problem with using a single control group (or equivalently, no control group) for effectiveness indicators is that it creates an incentive to "cream." In other words, if one used

$$NB_i = K_1 \times \sum_t \frac{p_i\ (t:HRD) - K_2}{(1+r)^t} \quad ,$$

then an incentive is created to serve those persons who are most likely to be highly employed with or without HRD services. This can be illustrated by Figure 5. "Creaming," a concept that is widely misunderstood, refers to using criteria that select groups A and B (both of which would have high employment in any event). The selection

criteria should choose groups A and/or C since these are the only people who can benefit from HRD services. To avoid the incentives to cream, we must disaggregate the control group.

		Employment Following HRD Services	
		Improved	Not Improved
Expected Employment without HRD Services	High	A	B
	Low	C	D

Figure 5. Client Selection.

The problem then is how can we best forecast a person's future employment if he is not provided HRD services? One approach is to extrapolate from the person's past history. Another approach is to infer from what happens to someone else in a similar situation but who did not receive HRD services. Another approach would be to use a clinical prognosis based on expert judgment.

But the best approach and the one explored here, seems to be an adaptation of the "control group." Namely, to use the entire population of HRD applicants during any time period (or a random sample thereof) as the control group. Perhaps half of this group will have received service, but this half is not a random sample. This means that this control group is not a non-treatment group in the classic sense -- but it does offer a possible solution to the problem.

Furthermore, there is little to be gained from more elaborate control groups -- the reason being that the known characteristics of applicants have notoriously poor predictive power for future employment. The reason for this is either that we don't have the correct data (in which case we should try to develop new testing instruments) or else that labor demand factors greatly override the effects of labor supply factors (in which case applicant control groups of any sort are inappropriate for forecasting employment).

To illustrate the objections to using all applicants as a control group consider the following Table 2 which summarizes some statewide averages for a recent six month period. It can be seen from this table that using all applicants as a control group for placements would lead to the conclusion that young, poorly educated, disadvantaged minorities have the highest probability of placement! Thus, less credit would be given for such a placement. The explanation for this unsatisfactory result seems to be that their placements are higher, not because young, poorly educated, disadvantaged minorities have a stronger attachment to the labor market, but because HRD priority has been directed to these groups -- for if HRD does not refer someone to a job, then that person can never count as a placement.

This problem, however, is not caused by the use of all applicants as a control group; it is caused by the use of placements as an objective. The idea of having a continuously updated control group of all applicants still appears to be the best yet proposed. However, the above comments demonstrate that it would be unsatisfactory if used with placement counts as the objective function. Before presenting an indicator that might solve these problems, let us first examine training.

Characteristics of Applicants	% of New Applicants	% of Applicants Placed
Age under 22	26	30
22 - 39	50	48
Male	65	69
8 - 11 education	30	35
Over 12	26	21
No unemployment	21	27
1 - 4 weeks unemp.	33	35
5 - 10 weeks	14	12
27 weeks or more	17	13
Negro	17	19
Spanish surname	19	23
UI Claiment	30	19
Disadvantaged	37	40
Has employment barrier	10	10
Lacks educ., skill, exper.	7	7

Table 2. Selected % HRD Placements.

If, as one consultant suggests, we can "assume that the only objective of any manpower program is to maximize a client's earned income over some period of time," then training presents no special problems and can use the same indicator as placements. The assumption, as all simplifications, is of course false -- but the question is how useful is it. It would certainly simplify the productivity indicators; it has precedents in much of the literature of evaluation; and it certainly is an improvement over present measures. Indeed, it seems ideal. But before accepting this objective function, first consider its deficiencies as a training indicator.

Recall that the training indicator should be designed to improve the selection of training classes and the selection of applicants to fill the training classes. Training is a vehicle to move an applicant from one market segment to another. The destination should be one with less unemployment and/or higher wages. Earnings (wages X days worked) would seem to be a satisfactory measure since a reasonable condition for training to benefit a client is that his during- and after-training earnings be greater than that expected without training (improved earnings, of course, is not a sufficient condition). Indeed the conclusion seems to be that it is unnecessary to treat training separately for the primary productivity indicator. We would only need to replace expected time working, in the NB_i formula above, with expected earned income.

We now seem to have the extremely desirable result that we can specify the HRD office objective as "for each client who walks in the door, make the greatest improvement in his earnings, etc." By measuring

earnings as of the arrival time, we are also able to automatically adjust for opportunity costs.

There is one possible problem. The reason earned income is so acceptable is because it is very similar to the unemployment rate. But we rejected the unemployment rate because it is not sensitive to HRD actions. What reason have we to think earnings will be any more sensitive? This is a serious problem -- if the HRD office does not significantly affect client earnings then an indicator based on earnings will be as useless as an indicator based on the unemployment rate. In fact it seems very likely that earnings will follow the path of the unemployment rate and be influenced by the economy to such an extent that they are of no value as HRD efficiency indicators.

Unfortunately, this analysis has led to an unexpected conclusion -- earnings are appealing because they are closely related to unemployment, so close indeed that they are equally unacceptable for use as indicators. We are forced to recognize that neither of the proposed measures is acceptable. We must back off from plans of measuring unemployment and earnings (as much as I hate to recognize this), and perhaps regress towards the use of activity measures in ESARS.

ESARS requires an important addition: an aging table or time distribution of the duration applicants have been on file, reported by applicant characteristic. This data is already on file and may only require some programming modifications to retrieve it. With the aging table available, we then proceed to develop a series of variance indicators such as those discussed in Section III, based entirely on the ESARS and Cost Accounting System. These indicators will then be analyzed to determine inter-correlations, and a reduced set of indicators

will be combined into an index using an experimentally derived set of weights (discussed in part D below).

We have concluded that statistically derived measures based on unemployment or earnings would not be sufficiently sensitive to measure HRD results (although the argument has not been fully developed). We must, however, break out of the introverted mode of evaluating effectiveness on the basis of internal criteria. The following part presents one method to do this through employer and applicant "mini-surveys."

C. Adaptability Indicators

Adaptability indicators should encourage investment in the maintenance and growth of the office through recruitment and training activities. They should also encourage building a customer base through improved employer relations and improved service to applicants. And finally, they should encourage responsiveness to changing environmental demands. The key idea for all of these indicators is "long-run" or "investment for future effectiveness."

The first adaptability indicator A(1) will be for staff time spent in training. An office with a high turnover will do more staff training -- the indicator should therefore be downward adjusted for turnover. Therefore define for each local office:

$$A(1) = \frac{T - h \times A}{.01 \times E} = \text{quarterly training indicator,}$$

where T = total non-supervisorial hours charged to training in quarter

h = # people added to staff in previous quarter

A = statewide average training hours per new addition in following quarter

E = total non-supervisorial hours in quarter

A(1) gives the per cent of non-supervisorial hours (less expected training required for new employees) charged to training to total hours. A(1) should be tested for sensitivity to the staff mix by the following regression:

$$A(1) = \sum_{i=1}^{n} a(i) \text{ X } p(i)$$

where p(i) is the per cent of employees in job classification i and a(i) is the regression coefficient. If A(1) is sensitive to the staff mix, then replace A(1) with $A'(1) = \frac{A(1) - r}{A(1)}$ where r is the residual.

The second adaptability indicator A(2) will be for building a customer base among employers. Building a customer base means gaining new customers and keeping existing customers. Assume that before an employer will place an order with HRD he must be convinced that the probability (p) that the order will be filled by HRD is greater than some constant. Also assume that there is a learning rate (a) such that

$$p(t+1) = a \text{ X } O(t) + (1-a) \text{ X } p(t)$$

where O(t) = % of the employer's orders in time t that are filled. We can approximately measure p(t) for employers in UI covered employment as follows:

$$p(t) = \frac{\text{job orders}}{\text{qtr wage items-aver \# ee's}}, \text{ or less accurately by}$$

$$p(t) = \frac{\text{job orders}}{\text{aver \# ee's X aver turnover in industry}}$$

Now O(t), i.e., the probability that an order is filled, is a productivity measure. But the learning rate (a), which may be influenced by the office is an adaptability measure. For example, if two offices both fail to fill an employer order, but the first office is discourteous,

then for both offices $O(t) = 0$ but for the first office (a) is much larger -- which results in the first office losing the employer while the second office retains the employer. A low (a) would indicate that the employer is a stable customer who will continue to place orders with HRD. Therefore we have for each employer:

$$p(t+1) = a(t) \times O(t) + (1-a(t)) \times p(t)$$

$$p(t+1) - p(t) = a(t) \times (O(t) - p(t)), \text{ or if } O(t) \neq p(t)$$

$$a(t) = (p(t+1) - p(t)) / (O(t) - p(t))$$

and we can define the first component of A(2) by the weighted average $A_1(2) = \Sigma n_i(t) \times a_i(t)$, where $n_i(t)$ = number of openings listed by employer i in quarter t. $A_1(2)$ should be regressed on industries in order to compensate for various turnover rates. A high value of $A_1(2)$ shows that the office has a lot of "fair-weather" customers while a low value of $A_1(2)$ shows the office has stable, committed satisfied customers. Net changes in $A_1(2)$ also show the direction of movement.

The second component of A(2) is the number of new customers developed. One order is not sufficient to make a customer. Therefore define a new customer as an employer who used HRD for the first time and who places at least 30% of the average ratio of openings to turnover for the office. Then let $A_2(2)$ be the weighted number of new customers:

$$A_2(2) = \Sigma n_i \times f_i,$$

where $f_i = 0$ if ratio of orders from employer i to turnover is less than 30% of the average, and $f_i = 1$ otherwise, and n_i is the number of openings listed.

It may be too costly to obtain A(2) by office, in which case A(2) should be reported by major geographical area or labor market.

In the course of analyzing A(2) from historical data the following hypothesis should be tested:

H: For all employers i, $a_i = 0$.

If this hypothesis can be rejected, we can be confident that providing service (i.e., filling orders) is necessary to maintain employer relations, and we can use the information developed to identify priorities for employer relations.

The next adaptability indicator A(3) should measure responsiveness and innovation. Proxies such as the time spent in internal communications as measured by forms, paper or typewriter ribbons are unsatisfactory since they can be easily manipulated. A low score on A(3) should indicate an office that is rigid and insulated from its environment and a high score should indicate an office that is flexible and responsive to its environment. The offices with high scores on A(3) evaluate training class results, they do not continue to use bad institutions, and they learn what type of applicant the employer is seeking. In general this office makes more errors because it takes risks, but it does not repeat its errors because it learns from its experience. This office can readily be identified by an on-site review by an expert evaluation team, but it is difficult to design a satisfactory indicator for A(3) (and I have none to suggest).

The objective of indicators is to close a feedback loop to HRD offices so that they can improve their performance. One reason the private market place is extremely successful compared to government controlled economies (it is worth noting that even the soviet systems find it necessary to adopt a form of private market) is that the agency or business can get rapid feedback on consumer preferences through what

is purchased. A strong form of an indicator of adaptability or responsiveness would thus be through a system of user charges. For example, instead of paying HRD costs directly, the taxes paid by employers could be used for coupons that would be given to unemployed people. The coupons could then be used either with private employment agencies or with HRD. HRD would be required to completely finance its operations through competitive user charges. Manpower programs seem to have a greater degree of private good aspects than education in general, so that all of the arguments for a voucher system in education would seem to apply equally well to manpower programs. The point of this discussion of user charges is to motivate the next indicator of adaptability, A(4).

A(4) is a substitute for user charges and is designed to provide some ongoing feedback on the perceived value of HRD services to the clients. A(4) will be based on a periodic survey of a random sample of employers and applicants. The survey will be designed so that applicants and employers can influence the effectiveness rating of each office in the same way that customers influence the profits of a firm.

Before describing A(4), it might be advisable to anticipate three initial objections that may occur: 1) that such a survey is unreliable; 2) that it is invalid; and 3) that it is too costly. There also will be a certain number of bureaucrats who fear opening themselves to criticism from the clients and a certain number of professionals who believe that they, not the clients, know what is best for the clients -- hopefully these types will be in the minority since they are unlikely to respond to this discourse. The questions of

reliability, validity and cost, however, must be dealt with. Since the surveys are only intended to provide comparative evaluations, the fact that responses may be biased toward the extremes does not present a problem. One major problem would seem to be designing the survey in order to truly measure the relative value of the HRD office to the user, and not simply how well known the HRD office is (i.e., the "halo" effect). Another validity problem is that no matter how the questions are asked, they are still hypothetical -- e.g., we are not asking the client to actually put up any money. Therefore there is no clear incentive for the client to estimate the true value. Indeed, since HRD services are "free," it might be in the client's best interests to overvalue HRD services. These problems can best be attacked by administering the survey on a pilot basis until satisfactory questions are developed. The pilot surveys should include sufficient questions in order to conduct simple correlation analysis to screen out questions that, for example, only measure "image" and not value. The final "mini-survey" should contain no more than two or three questions. A response of 7,500 questionnaires per quarter (which may require sending out 30,000) would be sufficient. The cost of mailing, keypunching and tabulating might not exceed a few thousand dollars -- certainly inconsequential compared to the potential value.

Keeping in mind the necessity of validating the survey on a pilot basis, we can tentatively define A(4) as follows:

$$A(4) = 300 - a - b - c,$$

where a = % of total questionnaires sent out that respond that HRD does not shorten their job search.

b = % of questionnaires sent out that respond that HRD does not improve the quality of the placement.

c = % of questionnaires sent out that respond that they do not intend to use HRD again.

A(4) should be computed both for applicants and for employers. If unsolicited letters of complaint are sufficiently numerous, they should be included in A(4). A(4) measures the per cent of people who are not dissatisfied. Additional refinements might be possible -- e.g., having each respondent rate value on a scale, or even attach a monetary value to services received. These possibilities and others should be explored in the pilot surveys in order to get an instrument as similar to user charges as feasible. If, for example, a valid measure of the amount clients would have been willing to pay for services received could be developed, then a stratified sample could yield a measure of value that would be a close analogue to social benefits -- such a measure, of course, is remote but it is the ideal for which A(4) should aim.

If, of all the indicators in this paper only one could be implemented, I believe the best choice would be A(4). If HRD managers know that their office's effectiveness depends on an evaluation by employers and applicants, just as a private firm's effectiveness depends on an evaluation by customers of services provided (i.e., purchases), then an incentive will be created to operate efficiently and to be sensitive and responsive to changing client needs. Indeed, the knowledge that A(4) is being developed would of itself direct greater emphasis toward client needs. Unlike health programs which have significant positive externalities, the benefits of manpower programs accrue almost exclusively to the applicant and employer. Even in its merit good aspects, i.e., the extent to which manpower services are provided to the disadvantaged in lieu of direct transfer payments (since presumably the disadvantaged would under-utilize manpower services), the value

accrues to the applicant. (The error of assuming that dollars spent is a measure of value received should be avoided.) An incentive to improve A(4) is, therefore, an incentive to improve the gross social benefit of the HRD office -- our sine qua non for a social indicator.

D. Satisfaction Indicators

Satisfaction presents even more measurement problems than adaptability. The problem is not so much how do you measure satisfaction, for the industrial relations literature is replete with such techniques, but how do you design satisfaction measures to improve satisfaction? Suggestion boxes and attitude surveys are both notoriously ineffective.

Satisfaction can be used to refer to a reduction in tension. However, in this paper it refers to those qualities of an organization that can be improved in order to provide more opportunity for the employees to be mature, to be creative, to grow and to develop their full potential. Thus satisfaction depends not only on how the organizational roles are defined but also on who is selected to fill each of the roles. The organization with a high satisfaction indicator is one that provides a healthy (in the broadest sense of the word) environment for the employees. Its employees are not simply "doing time," they are not getting ulcers, they are not strangled in red tape, and they are not afraid to innovate. This organization will also have a large percentage of qualified people, i.e., those people who have the opportunity to "vote with their feet" by leaving, yet stay.

Staff turnover might be a useful indicator for the entire organization, but the local offices are not large enough to draw conclusions from local office turnover rates. Another possibility is

to use sick leave as a satisfaction indicator. However, even if sick leave would be a good measure of satisfaction, its use as an indicator would create a dysfunctional incentive for supervisors to directly reduce sick leave rather than to improve satisfaction. In other words, sick leave might be a useful measure of dissatisfaction but it is not a useful indicator of satisfaction.

A recent attitude survey in one state agency showed that 60% of the respondents felt the survey was worthwhile, with a significant number qualifying that it was only worthwhile if management did something about it.[58] About 20% of the respondents felt there was no value in the survey. The analysts concluded that the attitude survey should be repeated periodically in order to measure changes in attitude. Yet attitude surveys are expensive and time consuming to administer. Their potential value as indicators seems problematical.

A problem with using attitude surveys or similar instruments as effectiveness indicators is that they might be perceived as by-passing the normal lines of communication and create morale problems.

An alternative might be the creation of a "hot-line" -- a telephone number any employee could call to anonymously register complaints or dissatisfaction. Or a stratified sample of (say 500) employees could be telephoned monthly to take the "pulse" of the organization. Neither the hot-line nor the telephone survey can be oriented to individual offices, nor can they easily measure the positive dimension

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[58] State of Calif., Department of Social Welfare, "Attitude Survey of the Management Services Branch Employees," March 16, 1970. An internal survey requested by a manager who desired to improve effectiveness through improving working conditions.

that is of interest. The absence of grievances, for example, is not a good indicator of creativeness, innovation, etc.

Unfortunately, this part must be concluded without a suggestion for a satisfaction indicator. To the reader who would have assigned a low weight or importance to satisfaction (beyond that related to productivity), this is no loss. For the other readers, hopefully someone will be able to design a useful satisfaction indicator -- or perhaps some of the alternatives discussed were ruled out too hastily. In any case, it seems probable both that it will require a great deal of research to design a satisfaction indicator and that such an indicator should receive low priority in development since the benefits to be gained from productivity and adaptiveness indicators are much greater.

E. An Effectiveness Index

In the course of collecting data for the indicators in this report and the subsequent statistical analysis, some indicators may be rejected and others may be added. However, it is certain that there will be multiple performance measures. One of the major advantages of effectiveness measures is in having a single numerical index. The Dow-Jones Index is often more useful than the plethora of market transactions which it signals. Similarly, the Consumer Price Index is often more useful than the actual market prices. Educators routinely convert multiple test scores to single grades. If one wishes to measure office effectiveness, or to say an office is more effective than another or than itself last month, then the multiple measures must be combined into a single index. There are technicians who will hastily argue that there is more information available if you do not combine the indicators and that therefore you should not combine them. That position is in

error. It is not true that the less aggregation the more information -- indeed this is obvious if one considers the size of the room that would be required to even hold one month's data if there were no aggregation. Information is something that can reduce uncertainty, which almost necessarily requires aggregation. Only a person with a morbid fascination for detail could have designed some of the existing reports that yield hundreds of pages of data (not information) for each office each month. A computer file of records containing twenty characteristics can be cross-tabulated $\binom{20}{2} = 190$ different ways, and in government it probably would be!

Granted that we should combine some or all of the indicators into a single index, how should we do this? In other words, given effectiveness indicators s(i), i=1 to n, how shall we design an effectiveness index E, where E = f(s(i), i = 1,...,n)? The most common answer is to ignore this problem and/or to assume the function is of the form $E = \Sigma w(i) \times s(i)$, where w(i) is a weight for indicator s(i) (i.e., separability and additivity). We shall adopt the assumption that $E = \Sigma w(i) \times s(i)$ unless more refinement is required. We shall also assume that each indicator has been converted to a standard scale, i.e., where the mean equals zero and one standard deviation equals one unit.

A number of approaches to determining w(i) are available. If, as is quite possible, the s(i) are not independent, some or all pairs of weights would be insensitive. A first step in estimating weights should be to test the sensitivity of the index over the range of reasonable weights.

If weights are sensitive, one method that can be used is to set w(i) equal to the marginal cost of producing i. This method will be used where possible, estimating marginal cost by the average variable costs. Unfortunately, the use of costs for weighting is equivalent to ratifying the current resource allocation. If, for example, the cost of one more referral is $25.00 and the cost of one more counselling interview is $25.00, then use of costs leads to the conclusion that both services have equal value. This method of weighting requires a periodic update, i.e., since the method assumes the resource allocation is correct, it must also assume changes in resource allocations are correct. An average office cannot improve an index based on cost-derived weights by shifting resources between programs.

Decisions to reallocate resources between programs cannot be made without an index (even if implicit) based on benefit-derived weightings. Wherever such decisions are present, some form of benefit measurements is required, such as the value of the service as an intermediate product to the client (e.g., net increase in earnings stream).

For the most intractable indicators, we can use the method of expert judgment.[59] This method has recently been used to weight multiple measures of performance.[60] It yields an index that is, in a sense, the "best judgment" of a group of evaluators. Each "evaluator" individually answers certain preference questions. Responses are made consistent and

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[59] C. West Churchman and Russell L. Ackoff, "An Approximate Measure of Value," Operations Research, 2, 1954, pp. 172-181.

[60] E. Turban and M. Metersky, "Utility Theory Applied to Multivariable System Effectiveness Evaluation," Management Science, 17, 12, August, 1971.

used to develop individual preference functions for each evaluator. The preference functions are then compared and differences are resolved through Delphi procedures or group meetings. The resulting preference function yields weights for each indicator.

The indicators and the index are an organization plan since they tell each office manager which actions have resulted in marginal improvements in effectiveness, and they provide an incentive for the manager to pursue those actions. How long is a plan valid? That question is difficult to answer, but we can be confident that every plan and every indicator eventually will become outdated. This means that, just as planning must be an ongoing activity, so also must indicator defining and weighting. The designer of indicators must observe the adaptive responses stimulated by the indicators and update the indicators as necessary in order to remove dysfunctional incentives. Indicators installed on a "one-shot" basis will eventually either become discredited or harm the organization.

Effectiveness indicators <u>do</u> make a difference. Whether the difference is good or bad depends on both the designer and the manager. Managers must be willing to accept a risk, and they must be prepared to understand and manage the indicator system. Otherwise, as one disgruntled counsellor put it, "giving effectiveness indicators to incompetent managers is like putting a razor in the hands of a monkey."