

INFORMATION TRANSFER AND THE  
DELIVERY OF MANPOWER SERVICES

by

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ABSTRACT

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Information forms one of the most fundamental bases for decision-making. Information transfer can be viewed as a dynamic process in which information is utilized by decision-makers as the basis for policies and programs whose actions impact on target groups, with the expectation of effecting a change in the condition of these target groups. However, when insufficient or incorrent information is available, the decision-making process becomes much more difficult and much less exact.

Decision-making by providers of manpower services has been used as an example of the uses of information in decision-making. A spectrum of decisions has been identified through the use of four case studies--manpower planning, occupational education, employment counseling, and skill training. The informational inputs for these decisions, together with actual sources used, have also been identified. The usefulness of the sources has been analyzed through the use of information features relating to the scope, structuring, and manipulation of data. The analysis indicates that most of the current sources are deficient in some way, thereby hindering the decision-making processes.

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## TABLE OF CONTENTS

I.	Introduction.....	1
	A. Scope, Methodology, and Definitions.....	1
	B. Information Transfer Model.....	6
	C. Information Features.....	12
II.	Four Case Studies.....	20
	A. Manpower Planning.....	21
	B. Occupational Education.....	29
	C. Employment Counseling.....	38
	D. Skill Training.....	44
III.	Information Source Evaluation.....	51
	A. Population Needs Assessment.....	51
	B. Labor Demand Indicators.....	61
	C. Occupational Information.....	69
	D. External Program Information.....	76
	E. Program Evaluation.....	79
IV.	Summary and Conclusion.....	81
	Footnotes.....	88
	Bibliography.....	91

### Figures and Tables

Figure 1.	Generalized Information System.....	7
Table I.	Population Needs Assessment Information.....	53
Table II.	Labor Demand Indicators.....	62
Table III.	Occupational Information.....	70.

# Information Transfer and the Delivery of Manpower Services

## I. Introduction

### A. Scope, Methodology, and Definitions

Information acquisition and transfer form one of the most fundamental bases of decision-making. Decision-makers, in the light of full information, can objectively assess the elements of a situation and then maximize the possible outcomes through knowledgeably trading-off the various considerations according to decision criteria; in the absence of full information or with improper or incorrect information, the decision-making process becomes less objective or less certain and the outcomes can be predicted with lesser certainty since intuition, conjecture, and a large doses of subjective judgment must replace the missing information.

In an effort to explore some of the issues relating to information transfer and decision-making, I have conducted a study of how and what information is utilized by persons functioning in the task of providing manpower services.\* The connection between information transfer and manpower service delivery is an important and relevant one for several reasons--considerable amounts and varieties of information relating to manpower already

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\*Manpower services refer to actions which seek to enhance the employability of individuals and relate them to the employment needs of society. (See definitions, page 5.)

do exist, the delivery of manpower services encompasses a number of different functions which require the acquisition of different types of information for decision-making, and the difficulties encountered in acquiring and using the manpower information highlight more general problems of information transfer related to other urban planning and urban service delivery activities. With these justifications in mind, I will present my findings, analysis, and conclusions with regard to information transfer and manpower services and their implications for other activities and potential areas of improvement.

Scope and Methodology. As stated, the information transfer activity has been limited to the field of manpower services for reasons of information availability and applicability. The approach taken involved several elements. One is the application of an appropriate information transfer model as a framework for viewing the interaction of information and decision-making. Another looks at the development of criteria for analyzing the usefulness or quality of information sources. A third examines four case studies of different functions within the umbrella of manpower services, specifically, manpower planning, occupational education, employment counseling, and skill training. The goal here is to illustrate the range of decisions that have to be made within this one field. The final component is a review of literature pertinent to information or the case studies.

The use of an information transfer model enables us to systematically look at the components and decisions subsumed in each of the manpower functions as described in the case studies.

The model that is presented provides a dynamic-system view of information transfer, such that each component receives information from the previous component, acts upon it, and passes on transformed and/or additional information to the next component in a closed loop feedback fashion. By isolating the components and decisions of each manpower function, the particular informational needs can be cited and described. Each case study will indicate both what the information needs of that particular function are and what is generally used and/or available. The case study method was used in order to present a range of decisions within the large field of manpower services. Different decisions require different information inputs and since part of the purpose here is the evaluation of the available information sources it was deemed desirable to analyze as wide a range of sources as possible. It is also the case that different functions may utilize the same information source, but because of the differences in their decisions, they may have different objectives in consulting the source and may have different levels of satisfaction with it. The use of case studies will point out these differences in decision-making information-need as well as the common areas of information interest among the different functions. The material presented in the case studies was obtained through a series of interviews with persons performing the manpower activities in question and from material they gave me on the subject.<sup>1</sup>

A portion of this research was conducted in the Fall 1972 term in conjunction with a term-paper for the course Poverty, Urban Employment, and Manpower Planning (11.56) and thesis preparation. From reviewing this preliminary work, dealing only

with the manpower planning function, it became desirable to develop an analytical framework for viewing the information sources. Therefore, from material contained in this previous paper and from literature on information, I isolated several "Information Features" that seemed pertinent to this discussion. These information features are related to the internal structuring, timing, and scope of information sources, all of which affect the useability of information. The information features will be used in developing a matrix of "Information Features X Source" which should serve to highlight the strengths and weaknesses of a number of the sources described later on. During the interviews, questions were asked concerning how the sources of information used by the person related to these features.

The end product of these presentations (information transfer model, case studies, "Information Features X Source" matrix) will be an analysis of how information is currently serving, or not serving, the needs of persons providing manpower services. A number of issues will be treated including the reasons why some kinds of information are conceptually deemed necessary, the methods of obtaining information, and the problems with the structuring of information.

Some Definitions. Before progressing any further, it would be desirable to define some of the basic terms and concepts that will be used herein.

Information should be viewed as any piece of knowledge or intelligence that reduces uncertainty or fills in gaps in knowledge or understanding of a subject. For our purposes, information can take both quantitative or qualitative forms, e.g., statistics,

numerical projections, statements about modes of operation in a particular job, or qualitative assessments of the employment situation.

Information transfer relates to the act of acquiring information from its sources, processing it, and then making it available to others who might wish to use it.

Manpower refers to the realm of issues relating to employment and unemployment including socio-economic characteristics of the employed and unemployed, employment needs of the private and public sectors, and the needs and conditions of people who are unemployed.

Manpower services then are taken to mean actions which seek to enhance the employability of individuals and relate them to the employment needs of society; such actions would include skill training, counseling, education (occupation, vocational general), planning and resource allotment to allow the preceding to occur.

A prerequisite for analyzing the uses of manpower information by those providing manpower services should be an understanding of the role that such information plays in the functioning of the delivery of the service. This can best be achieved by viewing each function in terms of an information transfer model, as presented in the following section.



## B. Information Transfer Model

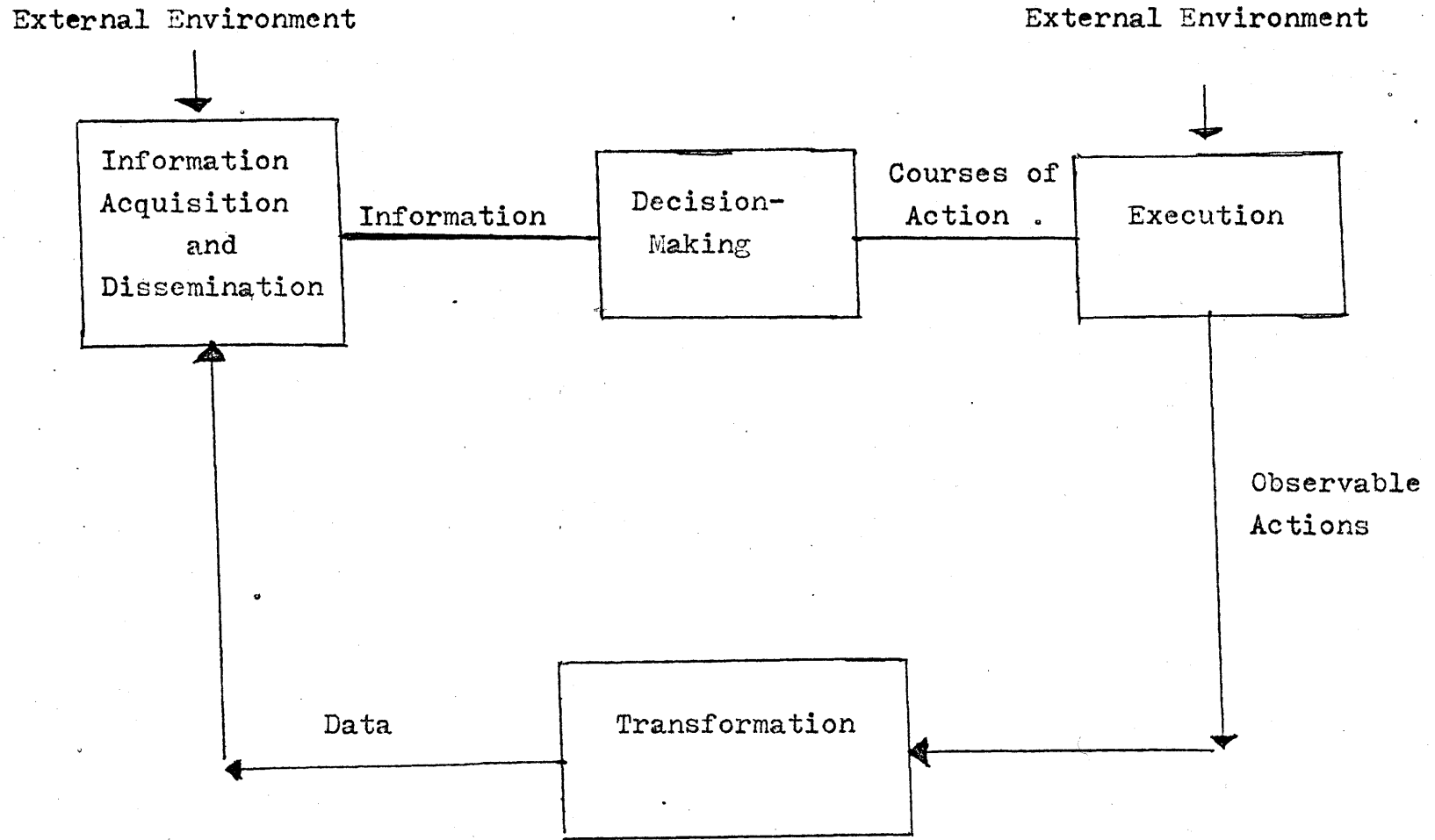
In recent years, with the burgeoning role and capabilities of computer-based information system, attempts have been made to systematize the information transfer process in order that advanced storage, manipulation, and retrieval capacities can be better geared to and employed in the transfer of information. Consequently, much of the current literature concerning information has been oriented toward computer science and engineering. However, I have been able to isolate a more general information transfer model, presented on page 7, which generalized about the components of an information system. This model can be applied to a variety of activities, from the simple automatic feedback control of a thermostat-furnace system to, I believe, the more complex organization of a social service delivery system. In presenting the model, I will also pose questions and issues as to how manpower functions relate to such a model.

The Information Transfer Model, developed by Yovits and Ernst<sup>2</sup>, contains four essential functions: Information Acquisition and Dissemination (IAD), Decision-Making (DM), Execution (E), and Transformation (T).

The DM function is by far the most important since decisions form the bases for programs or courses of action which impact on target groups (be they machines or people). In a rational decision-making process the DM would first collect information from the IAD. Three kinds of information have been cited as being useful to the DM. These are:

- 1) information on the particular activity under consideration;

Figure 1. Generalized Information System



2) information on the external environment, over which the decision-maker has no control, but may have knowledge; and  
3) other fundamental information that the decision-maker may utilize.<sup>3</sup> In the case of manpower services, examples of the first kind of information would include population characteristics, unemployment rates, job vacancies, industrial and occupational projections, and job contents and requirements; these types of information are of primary importance to manpower services and it is expected that at least some of these kinds of information, e.g., unemployment, would be altered because of programs executed by the manpower services. Examples of the second type of information would be externally imposed budgetary limitations, present and future-projected conditions of the overall economy, trends in industrial location, and knowledge of how other external factors, e.g., political considerations, will affect the execution of the service. The third kind of information would include references, tables, reports, and textbooks. The DM has the ability to store this information as a data base or memory.

The DM then processes these information resources into "courses of action" by developing or altering previously developed "predictive models". Such predictive models would be plans or patterns of behavior which are expected to produce a certain solution to the problem in question. They are produced from conclusions drawn from the information about the problem and the decision-criteria used to evaluate the information. The predictive models dictate courses of action that the DM disseminates to the E function. It is the

Execution function which transforms the decisions into observable actions.<sup>4</sup> The predictive models for manpower services would include manpower plans, educational plans, or the expectations of certain persons, e.g., counselors or trainers, that following a set of steps will lead to employment or acquisition of skills. Translated into courses of action or programs these would be funding programs, training or educational curricula, job placements, and skill training programs. However, the E function is also operating in an external environment which, by its uncontrollability and uncertainty, can perturb what would otherwise have been a deterministic function<sup>5</sup>, e.g., political factors, change in funding levels, or an overall depressed economy.

The results of the E function are the observable actions which are physical in nature and so are capable of being measured. However, before observable actions can be useful to decision-makers as informational inputs, they must be converted from a physical activity (funded programs, career programs, job placements, skill training programs) to a quantitative or qualitative measure (how many programs? at what funding levels? how many students? how many jobs? what? where? how many trainees? doing what? what is the impact of all these?) by the T function. Thus data, or transformations of observable actions, are an input into the IAD function and hence will be useful to decision-makers as a means of comparison at a future point.<sup>6</sup>

The IAD performs several distinct activities. It collects the data that was previously said to be useful to the DM. It

can store all these in a data base. In addition, the IAD can operate on the data; such operations usually include restructuring, filtering, weighting, selecting and rejecting, analyzing, sequencing and ordering, predicting, and displaying. Finally, the IAD disseminates the data for use by the decision-maker.<sup>7</sup>

One important element of this model is that information transfer is perceived as a dynamic process. Data that the IAD originally disseminated to the DM can be acted on and transformed through the DM, E, and T functions such that at the end of the loop it may be quite different than at the beginning. Such differences in data can then serve to tell the DM whether or not its decisions are having the effect they were expected to have. This in turn may affect the courses of action imparted to the E function which in turn would alter the observable actions and data obtained through subsequent transformations. The cycle would then begin anew with the decision-maker comparing the new and old data against his expectations.

Such comparisons should be important to manpower service delivery since the services have a stated goal of having a beneficial impact on certain groups of people. In order to ascertain if this goal is being accomplished it is necessary to measure the outputs of the programs to compare them with program-success criteria, e.g., cost-benefit analyses, analyses of employment progress within certain socio-economic groups, reduction in unemployment, etc. However, as will be seen in

Chapter III, the transformation of program outputs into usable information is the weakest link in the entire information transfer process thereby adversely affecting the operation of the other components since the true impact of decisions and programs has, in many instances, not been measured. Such lack of program output transformation prevents the predictive model from being validated or invalidated and so many decisions are made in an atmosphere of imperfect information.

### C. Information Features

Since the primary focus of this discussion will be concerned with the information acquisition and dissemination function, especially as it relates to the decision-making function, it is desirable first to identify qualities of information that make it useful to decision-makers. This will allow the information sources then to be analyzed with reference to desired or useful characteristics.

After having begun the initial research for this paper, it became apparent that the usefulness of information sources was related to the structuring of information, the frequency with which it is collected, and its comprehensiveness. Therefore, from material obtained in the early interviews and from a review of pertinent literature, I have isolated eight "Information Features" which relate to factors affecting information usefulness. These Information Features will be defined and described below, together with the issues which make them important for manpower service delivery. Later on, in the section dealing with the actual sources used, these features will be used to analyze and evaluate the information sources. The Information Features are 1) retrievability of micro-data, 2) currency, 3) comprehensiveness, 4) categorical disaggregation, 5) comparability, 6) compatibility, 7) precision, and 8) technical soundness.

1. Retrievability of Micro-Data. This is the ability to obtain data of sufficiently geographical disaggregation such that information pertaining to small geographical areas is

available (e.g., sub-state, SMSA, sub-SMSA, city, sub-city). Very often data is collected at the local level and then aggregated to cover several areas, with the resulting loss of the ability to retrieve the local information. Micro-data that is retrievable is usually tagged at its collection point with a geo-code such as a census block/tract number or zip code.

The lack of retrievability of micro-data is one of the most serious problems faced by those providing manpower services. This problem arises in that, although data is gathered at the local level, it is then aggregated to cover a larger region and the place of origin is lost (an example of this is the BLS Current Population Survey, while an exception is the decennial census). Such aggregation without geo-coding and also suppression of micro or disaggregated data results ultimately in lost information and often the cost and time required for additional data processing for recovery is too great. The result of such aggregation is that manpower service providers, particularly manpower planners, cannot use national data for state use and many not even be able to use state data for sub-state areas because the applicability of the aggregated data relative to the smaller region is highly questionable.

2. Currency. Currency relates to the up-to-dateness of the information. Some kinds of information need short periodic up-dating, i.e., a matter of months, whereas it is satisfactory for others to be up-dated in periods of several years.



Short-periodic up-dating can be justified by the need to spot trends in the labor situation through an analysis of short-term time series data. On the other hand there is other information, e.g., population characteristics, which change more slowly and thus would not need very short intervals between collections. For certain activities, e.g., employment counselling, almost daily up-dating is necessary in order to keep abreast of employment openings.

3. Comprehensiveness. Comprehensiveness refers to whether or not the information takes into consideration all possible categories. In certain kinds of statistical work, such as industrial and occupational breakdowns, comprehensiveness can usually be obtained by including a category of Not Elsewhere Classified (NEC). Thus, even though an information source may be considered "comprehensive", it may still not be particularly useful, since too many categories are aggregated together (see #4). Information sources that are not comprehensive usually collect data relevant to some fields but not to others either because of the purpose of the information or the nature of its collection. An illustration of this is when information is sought voluntarily, such as for job vacancy postings, a case where a variety of channels exist for disseminating this information, such that none of the sources will contain a complete range of the available jobs.

4. Categorical Disaggregation. This refers to the fineness of detail in categorizing data. Information that is not finely disaggregated usually contains categories covering

a wide-range of data, although they are usually related in some broad manner. More finely disaggregated information usually contains sub-categories within large categories or many smaller categories with a narrower range of data in each one.

As will be seen, information that is not sufficiently disaggregated causes difficulty in attempting to get hold of small sub-sets of data. This is similar to the problem of retrieval of micro-data relative to geographical location. This may be particularly acute to persons needing data pertaining to relatively small categories which are subsumed in larger categories as might be the case with manpower planners and educational planners in their quest for occupational information.

5. Comparability. This is the ability to compare two or more sets of data. Comparison can be the same source compared against itself in time or different sources compared against each other. Examples are comparing information from two years of the census against each other or comparing the same kind of information from different sources, such as occupational information from the census and from Division of Employment Security employment statistics. The ability to compare sources is related to the use of similar data structuring (see #6).

6. Compatibility. Compatibility refers to the ability to use information sources together (either in comparing or in some other use) and is related to the same or similar data structuring of the sources, e.g., types of aggregation, categories, geo-coding, etc.

Two of the principal problems that will be subsequently discussed in more depth are changing definitions over time and coding differences. In the former case, a change in definition requires re-categorization such that older and newer classifications are not commensurate. An example of this is a shift in specific sub-occupations from one broad occupational category to another. There may be some attempts to regroup the older information but the time, money, and trouble involved usually mitigates against this. The latter problem arises in that different data sources may be structured according to different classification philosophies, such that the coding systems used are not compatible. Sometimes it is possible to employ a conversion table between the two but again the difficulty in doing so usually prevents this. A prime example of this is the different occupational classifying schemes employed by the census and Dictionary of Occupational Titles which prevent compatible use of the two.

7. Precision. Precision is what makes categories unique. It refers to the degree to which similar items have been similarly categorized. It is dependent upon both uniqueness of definition and the degree to which different investigators assign the same or similar items to the same category. This is analagous to the definition of precision that is used in scientific experimentation; data from the same experiment performed several times should be expected to be the same or else fall in a small range--this is precision (not necessarily accuracy since the data may not correspond

to the true value for the experiment since it may not be being performed correctly!). Precision is important to people providing manpower services so that they can have confidence that the information they use really pertains to what they think it does. As will be seen later, precision problems occur when definitions are unclear or inapplicable and when items are assigned to the wrong category such as occurs with some census classifications and job classification by employers.

8. Technical Soundness. This relates to how well the conceptualization, collection, and manipulation of data is performed. This is more important to certain kinds of information, e.g., projections, where relationships have to be conceived and expressed mathematically, and survey information, where statistical sampling techniques have to be applied, than to other kinds of information, e.g., the census, where data is simply collected (although manipulation of census data is some times technically questionable). The technical soundness affects the credibility of information in that data that is arrived at through suspect means cannot be used with much confidence. This is an important issue for manpower services since certain kinds of information are based on surveys, mathematical manipulations, and the like. Examples would be employment projections, derivation of unemployment rates, and survey research data.

In applying these Information Features to the information sources, I will be employing a rating system based on how well

the source satisfies the individual features. Since this is an area of relative measures rather than absolutes, a descriptive system will be used relating to how satisfactory the source is to the users. The codes are as follows:

VS - Very Satisfactory: the source measures up very well against the feature, e.g., very high retrievability of micro-data, finely detailed dategorical disaggregation, etc,

S - Satisfactory: the source adequately satisfies the feature. There would be room for some improvement, but the data is generally useful.

SR - Satisfactory with Reservations: the source is generally adequate but there are a few areas which are questionable or unsatisfactory.

U - Unsatisfactory: the source measures up poorly against the feature. Room for much improvement.

SD - Source Dependent: for general types of categories, the level of satisfaction depends on the individual sources that would fall under this category, e.g., a general class of information sources would have certain ratings against some of the features while other ratings would depend on the individual source within this class.

T - Time-Dependent: level of satisfaction depends on how far away it is from the time of collection.

In constructing the Information Features by Source matrices not every feature will be compared against every source as not every feature is applicable to every source.

In addition, some sources that are used for different functions will be evaluated as they relate to each function, so some sources will appear more than once although the ratings may be different.

## II. Four Case Studies

As previously stated, a series of case studies will be presented in order to indicate a spectrum of decisions relating to the provision of manpower services. It should be noted, however, that the particular cases in question--manpower planning, career education, employment counseling, and skill training--are but a few of the types of activities pertaining to manpower development and utilization. The manpower services have been restricted to those performed in the public sector, as these comprise sub-sections of a larger manpower service delivery system which has been receiving considerable attention in the last decade because of national concerns over poverty and unemployment. Actually, many of these functions also operate in private enterprise, along with others internal to organizations, but it was felt that inclusion of private manpower functions would overly enlarge the field of view.

The manner in which these activities are performed is as much a result of institutional or political factors as it is of perceived need for manpower services. Therefore, the principal emphasis will be on the decisions relating to manpower which are exemplified in the cases rather than on the structure of the service, as the people and organizations involved are a set of actors in a larger manpower system and a change in policy or priorities might change the actors, but not the basic decisions. This is not a study of decision-making, per se, however, but of the use of information in such situations.

### A. Manpower Planning

The description of the structure of Manpower Planning in the following case reflects the present role of this function in state and local government. It should be noted that manpower planning on these levels is a relatively new addition to governmental activity. Originally, such manpower planning activities were funded through direct federal mechanisms and they were established to perform specific duties; however, with the changing funding mechanisms and a shift toward more local accountability, it can be expected that the structure of manpower planning will evolve from that which is described below.

The State Manpower Planning Council (SMPC) and the Manpower Planning Councils (MAPC's) are products of the 1971 reorganization of the U.S. Department of Labor's Cooperative Manpower Planning System (CAMPS) initially established in 1968. The original CAMPS was intended to provide a framework for the exchange of information among the many manpower and manpower-related agencies at the state and area levels (mostly funded through a variety of federal programs) in order to discuss and develop potential inter-program linkages. Until 1971, CAMPS possessed no clearly defined role or power and remained basically a group of state and local committees meeting regularly to discuss and haggle over fund allocations and program performance, while the Department of Labor made all the decisions. However, with the national policy move toward decentralizing authority under the present administration, in



1971 CAMPS was restructured to give state and area planning councils the power to make concrete recommendations for the implementation of specific kinds and levels of funding. The titles of the State Manpower Planning Council and Manpower Area Planning Councils were created while the title CAMPS was retained for the totality of the national system.

Each state established a SMPC. Two criteria were set for the establishment of MAPC's: an area which contained a city of at least 100,000 people and which, in the judgment of the Regional Manpower Coordinating Committee in consultation with the governor and appropriate local elected officials, would be served most effectively in this manner. The remaining areas of a state were subdivided by the SMPC into areas under Ancillary Manpower Planning Boards (AMPB's). As with all such structures, there is a national hierarchy consisting of: the National Manpower Coordinating Committee (NMCC), chaired by the Assistant Secretary for Manpower and including representatives from each of the participating agencies\*; ten Regional Manpower Coordinating Committees (RMCC's), coinciding with Manpower Administration regional offices and the geographic regions suggested by the Office of Manpower and Budget; SMPC's; MAPC's; AMPB's. Under these guidelines, Massachusetts contains a SMPC housed under the Secretary for Manpower Affairs Office, four MAPC's--Boston, Springfield, \*Agencies participating in the NMCC: DOL, HEW, HUD, OEO, Dept. of Agriculture, Dept. of the Interior, Dept. of Commerce, Civil Service Commission, Environmental Protection Agency.

Worcester, and New Bedford--and nineteen AMPB's covering the remainder of the state.

The SMPC with the aid of a technical staff develops the state manpower plan for the governor. The members of the SMPC, appointed by the governor, are expected to include members of client groups, agencies and program sponsors, and the public, including business and labor. The state manpower plan includes assessment of need, setting of priorities of services to meet the needs of the state-wide program efforts and for programs within the limits of ancillary districts, and the development of a funding plan. In developing the state plan, the SMPC is expected to take into account the recommendations of the MAPC's. The state plan constitutes recommendations to all program agencies for the implementation of specific kinds and levels of programs and also constitutes specific funding recommendations to the Regional Manpower Administrator for Manpower Administration funding. In making their funding requests the SMPC can make recommendations concerning the allotment of funds within and among four major categories of programs--Manpower Training Services (funds available under the Manpower Development and Training Act (MDTA) and the Economic Opportunity Act except Job Corps); Job Corps; Work Incentive Program (WIN); and Public Employment Program--most of which have now been terminated with the demise of the "War on Poverty". The MAPC, with a similar type of membership, acts in a comparable capacity for the mayor, or other executive head of local government, and prepares a manpower plan for the area, again including the assessment of need, setting of

priorities, and recommendation of funding programs for the above categories. In addition, both Councils have the responsibility of monitoring and evaluating the programs they recommend funds for. It is important to note here that the planning councils do not administer or develop programs at the moment; they do recommend funding levels and may suggest program linkages. The plans that are developed are then sent to the Regional Manpower Coordinating Committee for review and approval. The RMCC then will recommend action and also mediate differences between mayors and governors, provide technical assistance to state and area planners, maintain up-to-date, integrated state and area plans, and act as an appeal authority.<sup>8</sup>

The decisions that the planning councils must make in developing their manpower plans can be summarized as:

Assessment of Need. The first step is determining the universe of need. The thrust of manpower legislation in the 1960's was aimed at improving the skills and opportunities of the unemployed and underemployed, particularly racial and ethnic minorities (with Vietnam veterans added later). Programs were designed to provide training, job opportunities, and work incentives for individuals falling in these categories. So the first task of planners is identifying the numbers of people in their regions who qualify as being in need of manpower services.

Setting of Priorities. Since the planners are in the position of recommending allocation levels of scarce resources, they must establish a schedule of priorities so that the resources can be used most effectively. This involves the

the study and comparison of a number of different factors which affect the aggregate state of employment and the employability of individuals.

Development of Funding Plan. After establishing a schedule of priorities, the planners can assign recommended dollar values to the programs within their scope of responsibility. This will depend on what their expected funding level will be, which is usually made known from the funding source.

In this case, priority setting and the development of the funding plan may seem a bit narrow in scope, but this is because the fundable programs have been limited by the federal government in the past. A change in policies could widen the planning horizons. In a broader sense, these three decisions illustrate basic decisions relevant to manpower planning. The population to be served must be identified and then measured with regard to their employment needs. The demand for employees must then be analyzed along with the available or potential mechanisms for affecting the universe of need in order to establish a priority schedule relating to the most probable ways of solving local and state employment problems. Finally, a funding plan must be developed which will allocate resources according to these priorities.

The courses of action flowing from these decisions are the State and Area Manpower Plans. These are executed then as recommendations to program agencies, funding recommendations to the federal Manpower Administrator, and the monitoring and evaluating of funded programs. As can be seen, the first

two executions are more or less parallel while the third occurs at a later time. The observable actions resulting from these executions are manpower programs operating at certain levels and evaluations of the funded programs. These can be transformed into information on program outputs such as what each program does, how it does it, how many people it serves and their characteristics, how much money it spends, and evaluative outputs such as how successful were the programs in training people and helping to employ people, as measured by increases in skills and/or job placement.

This returns us to the Information Acquisition and Dissemination function. A variety of information needs can be related to the decisions involved in manpower planning.

Since the assessment of need is aimed at determining the numbers of people (and their characteristics) who are in need of manpower services, a primary information need is population characteristics (age, sex, race, ethnicity, household characteristics, work-week trends, occupational and industrial breakdowns, income, and poverty indices). Manipulation of this type of information, which is generally available in the decennial census, has led to the development of need criteria and measurement (such as numbers of unemployed per district, target ethnic and age groups, etc.) on which funding allocations recommendations can be made. Perhaps the most important bit of this information is the unemployment rate, preferably group specific and by sub-state area, which enables manpower planners not only to identify special needs

groups but also to measure the impact of programs on their targets. Unemployment rates are available on a state wide basis monthly and for specific groups and areas in the census.

The setting of priorities requires a wide range of information relating to jobs, employment institutions, and the state of the economy. These can be viewed as pieces of a puzzle which the planners have to assemble in order to achieve a full picture of the situation. One missing piece can seriously handicap the planners in correctly assessing the situation and setting priorities. Three general information needs would be knowledge of existing programs, labor demand indicators, and job contents and requirements.

A requisite information need is knowledge of what programs can be funded, what their objectives are, what type of services they offer (e.g., training, placement, on-the-job-training), who their clientele are, and what their success pattern in the past has been. This information can generally be obtained through written program descriptions, personal visits to programs in operation, and evaluation of the program outputs. Having identified the mechanisms through which the population targets can be affected, the manpower planners must develop an understanding of the overall economic and employment conditions and patterns in the state and areas so they will be able to decide intelligently what should be priority occupations for people to be trained for. These priorities would be based on knowledge of growth or high turnover occupations, wage scales, economic structure of the state such as the changing composition of the service

and manufacturing components, location factors and mobility and commuting patterns. The general kinds of information relating to these needs are: labor demand indicators, meaning where jobs are and where jobs are likely to be and encompassing a wide variety of types and sources including job vacancy information, employment projections, industrial-occupational relationships, and overall economic activity; and information pertaining to the contents and requirements of jobs, again available in a variety of forms and sources (see Chapter III). The end product is an attempt to relate the programs to the employment realities, both in terms of the likelihood of having people find jobs and the time constraints on training them, in order to allocate funds most effectively.

This attempt to "match" programs with employment needs, both of the target population and employers) results in a schedule of priorities. The final decision, developing a funding program, uses this priority schedule in conjunction with the amount of budgetted resources in order to draw up funding recommendations.

It can be seen then that manpower planners must acquire and assimilate a large variety of material from many sources. In addition, they must be aware of the political consequences of their funding recommendations which may be overridden because of political pressures, such as when a program receiving fewer funds than desired complains to a higher authority such as a mayor and gets the funding level changed to a higher figure. They therefore must strive to develop the

optimum plan possible given budgetary and political constraints. Therefore, having proper knowledge and information serves as a basis for developing a realistic and justifiable plan.

### B. Occupational Education

The Community College holds a unique position in American education in that although it is found, "fitting between the familiar high school and college concepts, it has characteristics of each, but it is totally identifiable with neither."<sup>9</sup> Community colleges are perceived as extending higher education to a significantly large segment of the total population by providing, through their low cost and "open door" admissions policies, a financial, geographic, and intellectual equality of access to higher education not normally available to the general public through other institutions of higher education. Typically, community colleges offer to commuting students a number of educational options including general education, college or university transfer education, occupational or terminal education, adult or continuing education, and guidance or counseling. In addition, these colleges may provide secondary services such as providing second chances for students who "flunked out" of other higher institutions, enabling "late bloomers" to find themselves and "explorers" to test out different interest areas, helping those with academic deficiencies carried forward from high school, and providing community services.<sup>10</sup>



The enabling legislation for the Massachusetts system of regional community colleges was passed in 1958 (Ch. 605, Acts of 1958). Since that time, thirteen regional community colleges have been established throughout the state, with two new ones scheduled to open this coming fall. To give an indication of the size of the system, it should be noted that there were 11,600 students enrolled in general education, liberal arts transfer, and occupational education programs in the fall of 1967 and 21,500 in these programs in the fall of 1972, a 95% increase.<sup>11</sup> As was noted in the previous paragraph, occupational or career education is one of the principal functions of community colleges and this will be focussed on in the remainder of the case.

The major thrust toward providing occupational education seems largely predicated on the idea of meeting the employment needs of the state and nation. The 1965 summary of the Master Plan cites "the present and impending shortage of all categories of trained, skilled manpower and the changing 'mix' (from "goods-producing" to "service-producing") of manpower components in our economy"<sup>12</sup>, as prime movers behind the establishment of occupational training programs, even though occupational and vocational education has traditionally carried with it low prestige relative to other educational programs. Although the needs of students seem to take a second place to the manpower needs of society in this publication, my sense from the interviews is that now there is also the emphasis of providing training, career, and educational opportunities to the students involved, particularly for disadvantaged groups.

(Another Master Plan is currently being written so this added emphasis may be included in the newer document.) Since their inception, the enrollments in community colleges have been increasing in the occupational education option, with the ratio of student enrollments changing from 80% liberal arts transfer/20% occupational education in the early days to 47% liberal arts transfer/53% occupational education at the present time.<sup>13</sup>

Currently, the community colleges offer occupational education in four broad categories--business, health, technical/engineering, and human services. Each option has a commonality of core subjects; there are subdivisions in each category allowing the student to specialize. However, the core curriculum should allow some degree of transferring and transferability of skills between sub-categories.

The Massachusetts Board of Regional Community Colleges views occupational education and all education for that matter as one component of a larger system, consisting of the students, the educational system, and the variety of institutional and industrial options open to them. Occupational education is concerned with imparting to students a set of marketable skills with which they can present themselves to these outside institutions and industries. As such, occupational education has problems different from general education because it is seeking to coalesce a variety of different interests some of which general education does not address. Some of the divergent interests which must be served are:

students: open-enrollment students who perhaps lack the academic background to attend liberal arts or other colleges and who want training in more specific, career-related fields (especially with the scare stories associated with the "glut of B.A.'s");

institutions and industries: these have certain job requirements, skills and ability requirements; and

manpower and economic development interests: there is the need to identify growth and need areas to lessen the gap between the supply and demand of skilled workers and prevent over-supply in some areas.

The principal decisions relating to the combination of these concerns are:<sup>14</sup>

Curriculum Development. Decisions must be made as to just what will be taught, how it will be taught, and what will be included in the course of study. Questions must be raised concerning priority occupational areas, the content of jobs contained in these categories, and the institutional and industrial requirements necessary for entrance.

Supportive Services. Since many of the students attending community colleges have usually attained average or below average academic records, there is a general need for additional aid to the student in the forms of supportive services such as guidance and placement. It is necessary to ascertain which of these services prove most effective, as is currently being attempted in a study of disadvantaged students, since such aids may have as important an impact as the training or education itself.

Capital Facilities Planning. Capital facilities planning related not only to the physical college buildings but also to educational equipment, such as machines, tools, and laboratory supplies which are used in the various curricula. The former requires knowledge of the projected demand for community college education, the state of the present physical stock and its need for renovation and replacement, and trends in comparable private college enrollments, declines in which could cause increases in the demand for public education, but also could make buildings available. The latter capital facilities concern again requires knowledge of job contents and training methods so that planners can know what kinds of equipment should be purchased.

These decisions in a generalized form are applicable to most educational planning processes but there is the added consideration of meeting fairly specific external needs, such as the provision of trained personnel. The resulting courses of action are straight-forward: curriculum programs, supportive service programs, and capital facilities programs, which in the execution component would be academic and occupational courses, guidance and counseling services, and purchase of new or replacement capital goods. The observable actions of this system are the changes in the students who attended the community colleges which can be transformed into data relating to skills acquired, educational attainments, and, in a larger sense, the ability to obtain jobs.

The informational inputs required as a base for these decisions again cover a spectrum of areas. Curriculum development requires having a manpower needs assessment in order to prepare students for industries in which they have a reasonable chance of finding employment as well as satisfying the employment needs of society. It also requires knowledge of contents and requirements of jobs not only so that students will be adequately prepared for employment but also so that skills will not be taught which are technically obsolete or too job-specific. The particular pieces of information that would be desirable for curriculum development again include such diverse elements as information on existing programs, labor demand indicators (as described before), and job contents and requirements.

In a sense, the current curricula are the predictive models that educational planners have devised to impart skills to and enhance the employability of the students. It follows then that an important information input into the decision process is how well the curricula are actually performing their role, in terms of student acquisition of skills, preparing students correctly for jobs, etc. The best method of obtaining such information would be through an internal record-keeping process of how many students were enrolled in each program and in what fields students found jobs, particularly to see if there is a significant relationship between the community college program enrollment and eventual job placement.

The labor demand indicators would be similar to those needed by manpower planners--information on occupations with high vacancy rates, growth occupations and industries.

This is important to curriculum development so that educational planners can have an idea of the kinds of manpower requirements the state needs to be filled, as well as pointing the way to occupations with career advancement opportunities.

An example of this is the fairly recent establishment of programs geared toward the health-care industry--technicians, assistants, paraprofessionals; this was an industry that was pinpointed as being growth-oriented. On the other hand, there is also the need to know when programs should be phased out because the jobs in question are diminishing; such has been the case with many older technical high school programs which have failed to keep pace with modern technology and are turning out students trained for obsolete occupations.

A third major information need is that of job contents and requirements. These are needed in order to develop the curriculum contents both in terms of the general educational background needed to perform the job and the specific training related to the specific occupation. It is necessary to have accurate information along these lines, so the students will have received training and educational courses adequate for placement in existing jobs. In addition, there is the need to keep abreast of changes and technological advances in occupations so that obsolete courses and skills will not be taught.

In the areas of supportive services, in particular guidance and counseling, there is very little externally-generated information relating to manpower that is of much help. Counseling related to occupational education is different from that related to employment counseling, since

the former is oriented toward helping the student make long-term educational and personal self-assessments whereas the latter is usually more employment specific and operates on a shorter time scale. The information inputs needed for this kind of counseling are not specifically manpower-related, but are geared toward an understanding of the individual student's background and role in the institution and society. Nevertheless, it would seem that collection of information internal to this process could provide guidelines as to what the needs of the student-clientele are. Counselling was emphasized as a necessary and highly desirable element in the occupational education process. Placement services, on the other hand, require very specific pieces of information related to the actual jobs vacant at a given time, so that students can be aided in finding jobs. Since vacant jobs are made known through a variety of means, it is necessary for placement officers to develop wide-ranging contacts in the fields they are placing students in.

The process of capital facilities planning requires information related to user demand and teaching-oriented material. Two broad areas of information inputs are population projections and participation rates and again job contents. Population projections are needed in order to determine what the demand for community college facilities by residents in the state will be at future times. This is necessary in case it appears that new colleges should be started or older ones expanded to meet an increased demand

due to population growth. Also along this line, it is useful to have an indication of the participation rate in community college education programs by the residents, e.g., the figure of 7 people per thousand might be used to calculate the number of people expected to enroll in a community college. The participation rate coupled with population projections should give an indication of user demand. Job contents information is useful to capital facilities planning in helping to determine what kinds of equipment should be purchased for the teaching programs. This is important in that it may be desirable to buy equipment related to more general training since many institutions already have large amounts of technologically obsolete capital equipment, which may not be quite applicable to current jobs but is too costly to abandon.

All these decisions are, of course, being made with fiscal limitations in mind. It should be noted, however, that these decisions are also made in light of other constraints, two of which are worth mentioning. The first is an institutional constraint related to the hiring of personnel. The number of teachers is related to the amount of tax dollars appropriated for community colleges so, although reduction in the teacher/pupil ratio might be desirable, it is not always possible. In addition, there is the problem of tenured personnel who will not or can not adapt to changing educational programs. A second problem is the existing physical materials available. There is a not uncommon problem in all of vocational education that some of the



teaching equipment is technologically obsolete such that some students may be taught outmoded methods. There is hesitancy to purchase new equipment, lest it too prove obsolete in a short period of time.<sup>15</sup>

Again, it is desirable to have as many objective pieces of information as possible, since the decisions made in this arena are also made in the context of tradition, political, and fiscal considerations.

### C. Employment Counseling

Delivering the service of employment counseling is a considerably different process from those described in the previous two cases. While manpower planning and occupational education seek to bring the demand for and supply of labor toward some aggregate equilibrium position, employment counseling treats the points of intersection of the supply and demand system on the most micro level. While many of the types of information which are of paramount importance to planning in the two previous cases do relate to labor supply and demand, they do so on such an aggregate level, that they take a second place in employment counseling to very concrete micro-level pieces of data such as what specific jobs are available, what specific training programs are available, and what specific educational or health services are available.

This case was developed through an interview with an employment counselor for the Massachusetts Division of Employment Security.<sup>16</sup> The services provided by the Employment Service are offered free of charge to everyone. Although one of the major functions of DES is processing unemployment insurance claims (this is why DES offices are referred to as the "unemployment office" rather than the "employment office"), another major service is the offering of free employment counseling. Employment counseling includes aspects of client assessment with regard to educational level and skills, the development of an "employability plan" for each individual, and referral to appropriate job interviews, educational or training programs, or other agencies.

The employment counselor I interviewed spoke of the counseling process as containing three general stages. First would be the intake and counseling stage in which the client gives information concerning his personal background; he may also take some education and skill related tests. The counselor can then present the options open to the client such as school, training, employment, or remaining unemployed. Finally, at the end of the first stage, the counselor and client can decide upon a course of action based on some matching of the client's assessment and available options. These sections of the first stage form the basic decisions relevant to the delivery of the employment counseling service and will be described in more depth later in the case. The second stage is an interim waiting period between the time the client

has decided what he wants to do and the time he is able to obtain his goal. This may be a time when he is seeking employment or awaiting action on his referral to another agency or program as this sometimes is delayed because of funding limitations or time lags. The third stage is when the client has obtained his goal, be it employment, training, etc. A follow-up call is usually made after a one-month period (more follow-up is made if there appears to be a problem) and then the case is considered closed.

There are three decisions basic to employment counseling. These are:

Assessment of Counsellee. In order to know where the client fits in the employment picture, it is necessary to have knowledge of his personal history--education, employment, health, handicaps, etc. In addition, it may be desirable to test the client's skills potential, basic learning ability, and interests when this is not easily obtainable from his history. The employment service utilizes a number of standard tests for these purposes including the General Aptitude Test Battery (GATB)--a test measuring such skill-related aptitudes as verbal and mathematical abilities, form and spatial perception, and manual and finger dexterity and whose scores can be directly related to some occupations, the Kuder Preference Test indicating the client's interest areas, and the ABLE (Adult Basic Learning Evaluation) which measures basic learning ability. This is essentially the most micro-level step of the needs assessment performed by manpower planners.

Appraisal of Options. Having obtained information relating to the client's background and abilities, the counselor can then present the available options to the client and aid him in choosing a course of action. The counselor must have the knowledge of just what educational, training, and health opportunities and services do exist, the cost, time, and eligibility limitations of them, and how to get the client enrolled in one if he so desires. In addition, the counselor must be able to present accurate information concerning employment prospects, such as what jobs are available, where to look for them, and what the job contents and requirements are.

Aid to Client in Self-Assessment. The employment counselor can now assist the client in appraising himself in relation to the options that are open to him. Information gained from the previous decisions are examined together with the client's interests and aspirations. This is more or less a matching process in which it is necessary to know how the counsellee's background and test scores relate to the various training, educational, and employment choices.

The course of action resulting from this process is an "employability plan" which the client executes by enrolling in a training or educational program or by seeking employment. The observable actions would be whether or not the person was trained or obtained employment and transformation of this would be a record of the result of the employability plan.

The informational inputs required for employment counseling are on the whole different from those already mentioned in

previous cases. In the area of client assessment, the counselor needs individual information that can only be obtained from a self-generated information transfer, that is verbally by the client and through individual testing.

In order to appraise the counsellee of his options, the counselor must use a variety of sources, falling in three general categories: other agency referral options, such as educational opportunities, training programs, and other employment and service references; job contents and requirements; and specific employment opportunities, including information on duties, wages, hours, etc. The first group of three information needs can be viewed as service referral options, taking the client one step further along the road to employment without actually finding him a job. It might be the case that the client could benefit more in the long run if he foregoes immediate placement in favor of upgrading his skills (investment in human capital) or seeking help for any personal problems. In order to be able to appraise the client of all these possible programs, and agencies, the counselor must be aware of them himself and know what they offer and how well they succeed in their goals. The second major information need is descriptions of job contents and requirements. This is important so that the counselor and client can review the realm of existing jobs, in the light of what is required to perform them (education or skills), what their duties are, and how these relate to the client's education, interests, skills, and aspirations. Finally, and most important to the supply and demand intersection, is the information on specific,

available employment opportunities, including duties, wages, hours, etc. This information will enable the counselor to provide information to the client pertaining to just what jobs are available, their working conditions and pay-scales, so that the client can see which ones he is suited for and which ones appeal to him. Without having adequate information on specific job openings, the employment counseling system could not operate effectively.

For the process of helping the client to develop an employability plan, the counselor needs, in addition to the items just mentioned, certain broad types of information such as skill transferability information and labor demand indicators. Skill transferability information is important in enabling the client to switch from one kind of job to another based on his past experience and skill acquisition which can be utilized in a different job. This is useful since the unemployed are often unable to find jobs exactly like they have previously been employed in. Therefore, the counselor would find it desirable to have information relating the skills required to perform specific jobs to more general categories of jobs, thereby indicating a wider job selection choice for clients. Labor demand indicators, of the type already described, are useful in helping the client to choose occupations where he has a chance for longer term employment and advancement. The counselor can use these indicators to steer clients away from declining occupations and industries toward growth and high demand occupations.

The role of the employment counselor is an important one in that this is one of the levels where individuals directly receive the benefits of manpower services and it is on these levels that manpower service delivery succeeds or fails. The counselor must have access to pieces of very specific information in order to effectively execute a matching of supply and demand. It is interesting that employment counselors may use some of the same sources of information that the previous cases use, but in an entirely different manner and with different results (see next chapter).

#### D. Skill Training

Another example of a function which directly impacts on individuals is the skill training program. Although broadly this may be construed as being similar to occupational education that has been previously discussed, the institutional structure of this case and many other skill training programs is quite different from the formal community college system. First of all, the skills being taught are usually fairly job-specific, e.g., business machines, autobody, television repair, rather than the cluster format utilized by the community college curricula. Second, the training is relatively short term as compared with community colleges which have a two year minimum program. A third major difference is the program's clientele. The

community colleges, although they do have open-enrollment policies, they do expect that the students will be capable of performing post-secondary work; on the other hand, many skill training programs, particularly government-sponsored ones, must accept most of the applicants regardless of ability, with the result that many of the enrollees are deficient in many basic learning skills. The reasons for the differences between these two examples of occupational education are related to the different needs they are serving. The community college framework is more oriented toward career development while skill training is aimed at imparting skills on a short term basis in order to enable persons to enter the labor force in as short a time as possible.

The particular skill training program described in this case is the Boston Skill Center located in the South End of Boston. The Center is operated by the Division of Occupational Education of the Boston School Department. It has been operating since the mid-1960's and at one time this Center and another skill center in East Boston commanded about two-thirds of all the Manpower Development and Training Act funds coming in to the city of Boston.<sup>17</sup> At the time of my interview I was able to tour the building and visit some of the classes in progress. The offerings of the Center at the present time are basic English and mathematics, bi-lingual education, general office work, autobody, auto-mechanics, and electromechanics. Other courses offered in the past have been television repair and carpentry. The



Center also offers supportive services including health referrals, counseling, and evaluation. Since the program is funded largely through MDTA (with some donation of space and salary by the Boston School Department), the enrollees do receive a modest stipend while in training. At the present time the Center is embroiled in political conflict and the future role of the Center as a training resource are in doubt.<sup>18</sup>

The Skill Center is not an autonomous body, however, since it is supposed to be fitting into the larger manpower service system of the Division of Employment Security. DES decides what should be taught, sets eligibility and makes referrals, and also performs the placement function. A DES employment counselor is stationed at the Center. The Skill Center follows the directives of what should be taught, but has the responsibility of determining the content of the training courses and manner of teaching them. It can be seen that the decision process involved here includes elements of both employment counseling and planning for occupational education.

The decisions which need to be made for such a skill training program would be the following (in this case some of the decisions would be made by DES and some by the Skill Center):

Assessment of Trainee Need: This is needed both on an individual level and on an aggregate level. On the individual level, this would be similar to the initial assessment in the employment counseling function--background, skills, abilities,

interests of the individual--in order to steer him to an appropriate program. On a more aggregate scale, assessment of the general skill and educational level of the program's clientele should serve as an input into curriculum development so the program could be geared to the general needs of the students.

Curriculum Development: The first step in this decision (in this case the responsibility of DES) is a manpower needs assessment which should pinpoint growth occupations which the Center has the capacity to train people for. The Center itself takes over here and decides what each course will contain and how it will be taught.

Equipment Purchase: Since large capital facilities decisions were not a major factor here (although they could be in other examples), they will not be considered as a primary decision here. However, the need to purchase equipment for use in training classes is dictated by the curriculum needs.

Employment Placement: Again this is similar to the employment counseling example and, in this case, is performed both by DES and the Skill Center. This process is again a very personalized one in that it is individuals who must find jobs.

The results of these decisions are comprehensive training programs which seek to impart skills, usually to the most disadvantaged, enabling them to assume a productive position in the work force. The outputs of the programs, transformed into data, would be information on people trained, skills acquired, and jobs obtained.

Most of the information inputs needed for these decisions have already been mentioned in the previous cases, but a reiteration of the necessary data will help to clarify the types of information that are desirable.

For trainee assessment is needed self-generated information acquisition pertaining to the trainee's background and abilities--personal history, skills, abilities, and interests. On an individual level, this will enable counselors and personnel at the Skill Center to determine what kind of program the trainee should be enrolled in. The aggregation of this data for many trainees should indicate the types of people engaged in skill training and the general needs of this clientele. Such information might point up that English-as-a-second-language courses should be taught or the need for basic education classes.

Curriculum development needs similar informational inputs to those described in the occupational education case. Evaluation of existing programs is needed in order to judge how effective the on-going courses are in helping trainees to acquire skills and then to enter and remain in the labor force. Those in charge of deciding what occupations should be included in the training courses again need information on the demand for labor in the different occupations so high demand occupations will be chosen rather than jobs in which trainees will have a difficult time finding employment. In addition, it is necessary to have information on job contents and requirements so that the course developers will have a solid basis

drawing up their training class contents. In this case, it is probably more valuable to have very specific job information since the training is short term and the idea is to train people in specific skills, rather than general types of skills.

For decisions relating to equipment purchase it would be helpful to have information relevant to job contents. This is again related to the specific nature of the training. Trainees can best acquire the necessary skills in a short period of time by practicing their skills on the types of equipment they would use on the job. It is common then for training classes to include work on business machines, automobiles, sewing machines, and other mechanical equipment.

In order to place the trainees, both the DES counselors and the personnel at the Skill Center need information on where available jobs are. The DES counselors are apt to use the types of information generally available to DES employees (see next chapter) while Skill Center personnel may use their own personal contacts they have in business and industry.

These decisions all have to be made in the context of what monetary resources are available and what the overall economic conditions are.

These four cases have demonstrated that the delivery of manpower services requires several general types of decisions. These cut across manpower functional division lines. Five such decisions can be identified. These would be: determination of need, both in terms of individual need and aggregate need; manpower needs assessment as regards what and where growth occupations or other occupational opportunities are likely to be; curriculum development for both career-oriented and skill training programs and concomitant capital equipment and facility planning; job or educational placement; and program evaluation in terms of objectives met. These cases pointed up a number of manpower informational needs which pertain to a number of decisions in more than one case. It is these pieces of information which have more universal relevance to manpower services that will be analyzed in the following chapter. The types of information that will be included will be: general population characteristics, unemployment rates, labor demand indicators, job contents and requirements, descriptions of non-function performed services, and evaluations of function-performed programs.

### III. Information Source Evaluation

Although the kinds of information useful to providers of manpower services in their decision-making processes can be easily identified, it is another matter to have actual sources of information that will meet these needs in a satisfactory manner. Decision-makers, however, must utilize the sources that are available even though they must also take into account the deficiencies of the sources. This chapter attempts to analyze several of the primary information sources available to providers of manpower services. The characteristics of the sources will be summarized in the "Information Features X Source" tables; the strengths and weaknesses of the sources will be discussed at length in the text. The five general information types that are included are population needs assessment, labor demand indicators, occupational information, external program information, and program evaluation.

#### A. Population Needs Assessment

Information pertaining to the general composition and employment characteristics is necessary in order to understand the magnitude and scope of employment needs. An institutional factor is also at work here since manpower planners have been deriving allocation formulae for sub-state areas based on the numbers of people contained in various need categories. The basic desired population breakdowns are age, sex, race, and ethnicity, and unemployment, underemployment, and skill

levels specific to these form population sectors and combinations thereof.

The Decennial Census. The principal source of population characteristics is the decennial census. From the second and fourth counts of the 1970 census can be obtained social and economic characteristics such as age, sex, race, ethnicity, household characteristics, education, labor force participation, unemployment (including previous occupations of the unemployed), work-week trends, occupational and industrial breakdowns, income, and poverty characteristics. For most of these items, the census does provide detailed reliable information.

Table I (page 53) indicates how the population characteristics compare with the information features. One of the major advantages of census information is that it is available on an extremely detailed local basis--census tracts/blocks. However, the currency of the information is very time dependent as it is already two years out of date when it is released. The value of the data is decreased with each additional year in the decade. Any changes that occur within the decade are usually not well documented enough to be used as formal information sources and so the census information remains the principal population characteristics source even though its validity in the eighth or ninth year of the decade may be highly questionable. This is a more severe problem on the local and area levels where changes in demographic characteristics have a greater impact than on the state level where population movements within the state may have a

Table I. Population Needs Assessment Information

	Retrievability of Micro-Data	Currency	Comprehensiveness	Categorical Disaggregation	Comparability	Compatibility	Precision	Technical Soundness
U.S. Census	VS	F	S	S	SR	SR	SR	S
ESARS	SR	VS	U	S	S	S	S	
DES Unemployment Rate	SR	VS	S	U	S	S		SR



cancelling effect. An example of this time problem is that the Manpower Area Planning Councils feel that the composition of their cities is changing fairly rapidly with influxes of Spanish-speaking and Portuguese groups such the 1970 census may already underrepresent their present needs. The census unemployment data is virtually useless since the state of employment in April of the census year is really only a snapshot of a highly fluctuating condition such that other sources for unemployment data, collected at more frequent intervals, must be utilized.

For demographic data, the census is very comprehensive. In each of the numerous classifications, all cases are considered; the use of the category, Not Elsewhere Classified, is of negative import mainly in the case of occupational data, which will be discussed later. In addition, most classifications are sub-categorized, very often with many detailed cross-tabulations, so that the degree of categorical disaggregation is generally very acceptable (again, occupational information is an exception).

The issues of comparability and compatibility do raise some problems, although they do not preclude effective use of the census in most instances. First, with regard to most demographic data, the census is generally comparable and and compatible with itself except for a few areas. Certain geographical sub-areas, for which census information is aggregated, do change from census to census because of population movement. The prime example of this is the addition of cities and towns to the Boston SMSA after the 1960 and

the 1970 census, such that the SMSA was redefined after both counts. Thus, the two census are not completely comparable with each other in this respect.<sup>19</sup> Another example of lack of comparability occurs when questions are added or subtracted or the categorization of the data is changed. These two kinds of comparability problems are related to internal compatibility problems in data structuring. Since very few other sources of information are collected concerning population characteristics to the same extent as the census, few external compatibility problems have arisen, again the major one being occupational information.

The precision of the census is again not usually questioned, although one issue was brought up by manpower planners. That was that Spanish-speaking persons may have been originally under-counted since they may have been difficult to communicate with or they may have been able to pass as "melting-pot" Americans. This lack of placing people in the correct categories can cause distortion of the information. On the last issue, technical soundness, the census is conceded to be generally reliable in its collection, presentation, and sampling methods.

The two functions that mentioned using the census were manpower planning and occupational education. The former utilized the population characteristics in order to determine the relative needs of the state and local areas based on various need indicators that were available through the population characteristics. Except for the difficulties already mentioned, census information is generally adequate for

their purposes.<sup>20</sup> For occupational education planning in the community colleges, the individual characteristics are of less importance than the total population in given areas since there is an attempt to project the demand for community college programs based on a percentage of the population surrounding the college.<sup>21</sup>

Employment Service Automated Reporting System. A second population characteristic source is the Employment Service Automated Reporting System (ESARS) utilized by the Division of Employment Security. This records the characteristics of the people who apply for services at DES offices. This system can provide information pertaining to the characteristics and needs of the unemployed and contains such information as the age, sex, and race of applicants and the duration of their unemployment, and the services rendered to them by DES. The information is compiled and reprinted on a case by case basis and is available for the state as a whole and for sub-areas, e.g., the Boston SMSA.<sup>22</sup> Even though such information is retrievable on a micro-basis (see Table I), there are, however, some problems with its usage. As it stands now, the micro-information is recorded for the point of application, which is not necessarily the place of residence of the applicant, since persons may apply at offices not located in their own municipality. For functions needing local based information such as manpower planning this is felt to distort the employment needs of some communities. The suggestion has been made that the zip code of each applicant's home address be included in the information so that cases can also be sorted by residence.<sup>23</sup>

The information is up-dated at frequent intervals throughout the year such that this source can provide a very current supply of information. The comprehensiveness of the service depends upon the number and types of people who seek out DES services. For this reason, this source is unsatisfactory as regards comprehensiveness since not all unemployed persons are covered by unemployment insurance and since not all of those others who are unemployed will avail themselves of DES employment services. However, ESARS would be a source of fairly representative kinds of characteristics that the unemployed have. Since the printouts are made on a case by case basis, categorial disaggregation is not a problem. Some aggregation is made but this is not extensive yet. The information is really only comparable to itself. The compatibility and precision will be relevant mainly to aggregated information. It would appear that proper manipulation of ESARS data could provide a wealth of information on the unemployed in Massachusetts.

Unemployment Rates. A highly important factor in population needs assessment is the unemployment condition in the nation, state or area. In addition, manpower planners use this information as one of the need indicators for fund allocation. On a national level, the Current Population Survey, a monthly sampling of the nation's population, gives an unemployment rate for the nation as a whole. However, this figure is wholly inapplicable to individual state and regions because the small number of households surveyed makes it impossible to assess unemployment for

sub-national areas. There is, however, a standard method for determining state and area unemployment rates performed by the Division of Employment Security every month. This method is based on the following formulae:

$$\text{Employed} + \text{Unemployed} = \text{Workforce}$$

$$(\text{Unemployed}/\text{Workforce}) \times 100 = \text{Unemployment Rate}$$

Employment is measured by industrial location, the numbers of persons employed by businesses, institutions, government, etc. The unemployment figure is arrived at by the number of claims processed by each DES office plus a function of this to account for persons not covered by unemployment insurance.<sup>24</sup> There are some obvious drawbacks to this method, as well as some strengths (see Table I).

The unemployment rate is computed for the state as a whole as well as for sub-regions, e.g., the Boston SMSA. The fact that sub-regional areas have a computation made for them makes it possible to compare the need of different areas within the state. However, some manpower functions, in particular manpower planning, find it desirable to have unemployment figures for smaller areas, even individual cities and towns. For such information, this method would tend to be technically unsound and cause distortion because in smaller areas the place of work locations (giving the employment figure) and the unemployed filing a claim in the office in that location may not equal the actual workforce for that small area. The figure for employment, because of the amount of business or industrial activity, might include many more or fewer people than actually live in the area or

the presence or absence of a DES claims office might cause a higher or lower unemployment figure to appear. Over the large sub-regions, these affects are likely to be cancelled out because the division chosen tend to form commuting areas. The other major drawback of this method is that there is generally no categorical disaggregation such as by age, sex, or race, as this would be difficult to achieve since there would originally have to have been a categorization of the workforce and then recategorization of the claims. This could probably be done occasionally (the ESARS would give unemployment characteristics) but it is unrealistic to do so every month. The suggestion that has been made to circumvent some of these problems is to perform a state-wide household survey similar to the national one.<sup>25</sup> However, this is generally conceded to be far too expensive to be implemented. An alternative method, mentioned at the SMPC, was the practice of deriving unemployment figures for sub-areas by following the state trends and applying ratios of unemployment rates that prevailed in April 1970 (census) to the sub-areas; there are obvious problems with this as the ratios probably do not remain constant over time.

Nevertheless, the present method of computing unemployment rates does provide a sense of the employment condition of the state. There does exist a time series of unemployment data, computed in the same manner, dating back to 1958 and the method also allows comparison with other states since the computation methods are compatible.

There are several sources available then which are applicable to population needs assessment. The census provides a far reaching supply of statistics, although its applicability declines toward the end of the decade. The reporting of the cases of the unemployed served by the Employment Service could provide a large volume of information on the characteristics of the unemployed. However, there is a need for more effective data management and manipulation of this information before it can be effectively utilized. The unemployment rate is another source of population information, although it is necessary to know the structure of its derivation before it can be used knowledgeably. From this discussion it would seem that further work should be done in the areas of: providing effective spot-checks of population characteristics for the years intervening the census (state census, police census, voting list surveys) in order to see if demographic characteristics are changing significantly; utilizing the ESARS data bank to determine the characteristics of the unemployed; and attempting to ascertain group-specific and area specific unemployment rates, perhaps through a study of the structure of the labor force and then relating this to monthly rates or area or group surveys.

## B. Labor Demand Indicators

All four of the manpower functions described have need of knowing where jobs are and where jobs are likely to be. The information is needed on two time dimensions, short-term and long-term, and for two functional levels, immediate job placement and longer-range planning. Two general types of information are produced relating to these needs; these are 1) job vacancy listings which provide information relevant to placement purposes and which when compiled and kept in a time series indicate employment trends and 2) labor demand projections which predict employment figures for long-term dates in the future. The following discussion will indicate why and what sources are presently being used and the adequacy of each one.

Job Vacancy Measures. Attempts to use job vacancy data as a measure of demand for labor are related to a variety of theoretical, policy, and operating interests. On the theoretical level, job vacancies are seen to be the counterpart of unemployment data--the unemployed can be viewed as a pool of labor supply whereas job vacancies would be the pool of positions demanding to be filled--and compilation of a time series of job vacancies are seen to lead to an understanding of the state of labor markets, their changes over time, and the nature of recent unemployment (aggregate demand problems versus structural problems). On the policy and operating planes, job vacancy data are expected to be a significant measure of economic fluctuations and to expedite effective allocation of the labor force by facilitating the



Table II. Labor Demand Indicators

	Retrievability of Micro-Data	Currency	Comprehensiveness	Categorical Disaggregation	Comparability	Compatibility	Precision	Technical Soundness
JOB VACANCY DATA	SD	SD	U	SD	SD	SD	U	SD
Boston Job Bank Quarterly Survey	S	VS	U	SR	VS	VS	U	S
Job Vacancy and Labor Turnover	S	VS	U	SR	VS	VS	U	S
Boston Job Bank (listings)	VS	VS	U	VS			U	
Newspaper Help Wanted Ads	VS	VS	U	VS				
Mass. Manpower Re- quirements to 1975	U	T	SR	U	SR	SR	S	U

referral of the unemployed and by indicating areas for training and retraining programs.<sup>26</sup>

Several specific job vacancy measures have been analyzed using the information features: Boston Job Bank, used for counseling and planning purposes; Job Vacancy and Labor Turnover for Massachusetts and the Boston SMSA, used in identifying labor demand trends; and newspaper want ads, also used for counseling. The Boston Job Bank contains vacancies called in to the Division of Employment Security by employers. The job descriptions are then made available on microfilm readers or as computer printouts to counselees at DES offices and are used for job placement purposes. Boston Job Bank listings are then compiled on monthly and quarterly bases with the purpose of "highlighting labor demand in the Boston SMSA as reflected by the job orders in the Boston Job Bank."<sup>27</sup> It is these compilations that have been used by manpower planners on the state and area level as labor demand indicators. In the Job Vacancy and Labor Turnover booklet, the job vacancies for the Boston SMSA are obtained from a sample of approximately 1,300 firms in the Boston SMSA and job turnover rates for manufacturing industries are obtained from payroll records submitted voluntarily by a representative sample of industrial establishments. The newspaper want ads were seen as another source of job vacancy information relating to the placement of individuals although according to literature on the subject the type and volume of want ads are also used as indicators of economic conditions.<sup>28</sup>

Job vacancy data can only serve the purposes for which it is designed in a limited manner because of data acquisition problems caused by the inherent diversity and variability in the procedure by which job opportunities are made available.<sup>29</sup> As can be seen from Table II, there are two areas in which job vacancy measures are consistently deficient: comprehensiveness and precision.

Job vacancy measures lack comprehensiveness in two ways: first, they are not a complete listing of all jobs available, as some types of employers have their own systems for advertising vacancies, and second, they are not a complete listing of vacant jobs because the nature of internal labor markets precludes people outside certain labor structures from being hired for, and in many cases, even hearing about vacancies in the middle of a promotional structure.

In the first case, there are several factors at work. First of all, some employers who advertise in the Job Bank won't advertise in the newspaper and vice versa. Second, some employers may not use either medium as the types of jobs they have vacant can get filled easily through informal mechanisms, e.g., store-front advertising or word of mouth. Third, and perhaps most important, some vacancies are filled through other formal mechanisms separate from placing the vacancy in the open job market; examples would be vacancies filled by union hiring halls, professional societies, and laid-off workers with call-back privileges.

The second case, the internal labor market problem, has implications extending beyond mere lack of comprehensiveness

for job vacancy measures. Dunlop enumerates several aspects of this problem as it relates to job vacancy data. These include findings that the number of job classifications at which vacancies occur is likely to be a small fraction of the total number of job classifications, that vacancies that are reported are likely to occur at "ports of entry", that many of the reported vacancies will be temporary as opposed to permanent jobs with promotional possibilities, and that the use of job vacancy data for training purposes by external agencies becomes down-graded because it is not possible simply to compare job vacancies with the training of the unemployed because it requires additional training to match people with or prepare them for jobs at other than ports of entry.<sup>30</sup> These other jobs are not or do not get recorded in most job vacancy measures.

The imprecision of job vacancy data is related to the coding schemes devised to categorize occupations (coding difficulties are discussed in the section on occupational information). Basically, the problem is that there are inherent difficulties in comparing job classifications across enterprises. Problems arise in employers or other job classifiers having to classify jobs in the socio-economic context that the codes are predicated on rather than on measures such as job content, skill, responsibility, etc. Very often it is difficult to translate a job title or job description into a classification in any of the coding systems, even those supposedly relating to job content.

Otherwise, these types of information are generally acceptable. For counseling and placement purposes the Job Bank and newspaper listings provided very detailed geographic information and for employment trend purposes they are at least available on an area level. These are current, comparable and compatible with themselves and perhaps with some other sources since the national DOT codes are used. One other disadvantage that has caused problems for planners is that the categorical disaggregation is not as fine sometimes as is desired. There are times when information on certain occupations is desired but the pertinent data cannot be obtained because it is aggregated into a larger category.

Two major implications can be drawn from this analysis of job vacancy information. First of all, both counselors and planners must keep in touch with sources of employment other than those listed publicly, the former in order to have placement contacts and the latter in order to keep abreast of employment trends in these fields. Second, those in planning positions will have to develop contacts or other indicators of measuring demand in specific occupations which are usually lost in aggregated data. This last will have to be accomplished either through performance of additional surveys or better management of the original information.

Employment Projections. A second source of information available for those interested in labor demand is industrial and occupational employment projections. This type of information has become available on the state level only in

recent years and there is a need for continually refining the assumptions and methods used to derive the employment figures. To date, the major subnational projection source applicable to Massachusetts has been Massachusetts Manpower Requirements to 1975, published by the Division of Employment Security. This document was arrived at through regression techniques using the industry-occupation matrix developed by the U.S. Department of Labor (1969), Massachusetts share of industries, Massachusetts employment data from 1960-1969, and time.<sup>31</sup> Both straight-line and curvilinear fittings were used. The theory behind the use of an industry-occupational matrix is that by ascertaining the relationships of particular occupations to the various industries then projected changes in industrial growth and movement will be reflected in a changing number and structure of jobs.

As can be seen from Table II, several aspects of the Massachusetts Manpower Requirements to 1975 are unsatisfactory. First, the data is available on a state-wide basis only. This causes problems for just about every manpower function in question since most of them operate in distinct sub-state regions and desire more geographically disaggregated data. A second problem, which has made this document more of a trend reference rather than an actual predictor, is the questioning of its technical validity by the users. Several of the assumptions, e.g., regarding unemployment, have proven to be untrue. The use of regression against the national industry-occupation matrix may also have caused distortions since the national matrix is inapplicable to Massachusetts

and its cities because the state has a much more mature economy than the nation as a whole with a more highly developed service sector and less manufacturing. A third problem centers around the structuring of occupation data. The occupational groups can be considered "comprehensive" in that all occupations are included; however, there is extensive aggregation of data and use of the category Not Elsewhere Classified, such that the more specific pieces of information desired by manpower and educational planners cannot be gotten hold of. There are potential comparability problems similar to those of the census--incompatibility with other occupational codes since the census coding system is used and changing data structuring over time.

It should be remembered that this is the first such effort on a state level in Massachusetts. The deficiencies of the present work are widely recognized and already there are attempts underway to ameliorate some of them for the next publication. These projections are currently being revised to cover the period 1976-1980 and the matrix is expected to have 265 industries and 400 occupations, whereas the present matrix has only 116 industries and 150 occupations. Also in progress is an attempt to develop a more applicable industry-occupation matrix through sampling techniques which will be retrievable by SMSA.<sup>32</sup> Some of the manpower functions do use projections prepared by other sources, e.g., the Boston Redevelopment Authority and reports prepared at universities and private consulting firms.

For these reasons, the ability to actively use the DES generated employment projections has been greatly diminished. Continuing research needs to be conducted in the areas of state and local industry-occupation matrices, perhaps calculated by methods other than sampling, such as the census, in the methods used to make the numerical projections, and in ways to separate out relatively disaggregated occupational data that is needed for more specific manpower needs assessment.

### C. Occupational Information

The term occupational information covers a broad spectrum of information needs, uses, and measures. The case studies indicated that such data is used for assessing the state of the economy, the skill levels of the general population, and setting priorities (manpower planning), for planning and executing educational and training programs (occupational education and skill training), and for aiding in the assessment of individuals (counseling and skill training). Since there is such a broad scope of needs and issues, the analysis of the state of occupational information can best be looked at by use.

Economic Labor Force Data. Manpower planners are interested in having occupational data for the population as a whole and population sub-sets as an indication of the overall skill levels (high skill, low skill, etc.) of the population



Table III. Occupational Information

	Retrievability of Micro-Data	Currency	Comprehensiveness	Categorical Disaggregation	Comparability	Compatibility	Precision	Technical Soundness
Census, Occupational Data	VS	T	S	SR	U	U	S	S
Dictionary of Occu- pational Titles		T	VS	VS	SR	SR		
Industrial Contacts	VS	VS	U	S	S	S		
Occupational Out- look Handbook	U	S	U	U				

and various sub-groups in order to know where to be able to aim their funding recommendations. In addition, it would be desirable for the process of setting priorities if these skill levels could somehow be related to the skills needed to perform different jobs. This brings up the problem of just how occupational information is currently structured.

Presently in the United States, there are two comprehensive occupational classification systems--the census and the Dictionary of Occupational Titles (DOT)--formulated on the basis of different philosophies. The principal concept underlying the development of the census classification system was the measurement of the importance of various social and economic classes in the United States, e.g., the demonstration of social progress and the advancement of the laboring classes. Therefore, the census classification scheme contains 10 major groupings--professional, managerial, clerical, sales, craftsmen, operatives, laborers, service workers, farmers, and farm laborers--containing more than three hundred distinct occupations. These occupations, however, are not defined by tasks, duties, and requirements, but instead in terms of a very long list containing all the responses from the census form which have been allocated to the various detailed titles.<sup>33</sup>

The second classification system is the Dictionary of Occupational Titles which first appeared in 1939 and now is in its third edition (1965). This system is structured around a coding system designed to give information on groupings,

subject matter or function, and the degree of involvement of these jobs with "data, people and things" (which supposedly indicates the complexity of the job). Again, this system has ten broad occupational groupings--professional, technical, and managerial, clerical and sales, service occupations, farming, fishing, forestry and related occupations, processing occupations, machine trades, bench work occupations, structural work occupations, and miscellaneous, with 21,741 separately defined occupations.

Immediately, it can be seen that there would be difficulty in trying to use these two coding systems together. The census system is aimed at measuring "advances" in the work force based on some notion of jobs being related to socio-economic status, whereas the DOT system is job definition oriented and is much more detailed. From the major categorical groupings of the two systems it is evident that there is some compatibility between the two, e.g., professional and managerial, but almost no compatibility between the blue-collar groupings. However, there does exist a translational manual between the two codes, although it may be of questionable value.

Since, however, the census is the most widely used framework for occupational analysis<sup>34</sup>, manpower service persons desiring such information usually do consult the census as their primary source. It has the advantages of being able to measure small geographical areas and small sub-population groups, although its categorical disaggregation and compatibility problems make it difficult to use with

other occupational information. Some of the job vacancy data described earlier is collected according to the DOT code and so this could provide some skill related information, although it is more demand, not supply oriented, and is subject to the problems described in that section.

The conclusion that can be drawn here is that population skill assessment is a tenuous task at best since the population characteristic information is not geared toward that measure and any attempt to relate census information to other skill measuring systems is of questionable validity because of code translation difficulties.

Occupational Content Data. One of the most important uses of occupational information is in the planning and executing of educational and skill training programs. Persons planning and operating these programs need information pertaining to the specific structure and contents of jobs so that the curricula will be imparting skills that are relevant to occupations in question and that will enable the student to be well-prepared to perform his chosen work.

One of the most obvious sources of such information is the Dictionary of Occupational Titles. However, even though this source is most comprehensive, containing such a tremendous number of job descriptions, with very fine categorical disaggregation, it does contain some drawbacks which limit its usefulness for curriculum development. These are problems of comparability and compatibility, here in the sense of relating to the contents and requirements of jobs actually existing in the present labor market. In some instances,

the DOT descriptions are almost too specific and the actual jobs in practice may have more or different duties associated with them. Another problem is that jobs in different industries, although they are ostensibly the same jobs, may have some different duties because of the particular industrial structure.

An alternate method mentioned both by educational planners and those running training programs is the use of outside contacts knowledgeable in the occupations in question. In occupational education the use of "advisory committees" was cited as a means of attempting to systematize skills, abilities, job requirements, and assessments. These committees would include people familiar with the fields, e.g., practitioners in the health or business industries, who would recommend areas to be included in the curriculum. This helps in balancing academic committees which had sometimes set unrealistic or inexact standards.<sup>35</sup> The person interviewed at the Boston Skill Center also mentioned a similar approach of being "industry-oriented". The idea is to see what the industries in question need in terms of personnel, find out what these standards and job contents are, and then design the curriculum to include the requisite skill training and equipment usage.<sup>36</sup> These methods have the advantage of being industry-oriented so that training and education are oriented toward the outside demand agents. The most unsatisfactory element of this arrangement is that it is highly selective. Usually, only industries and occupations designated as being desirable for education

or training programs are included, so the range of positions for which the specific information is obtained, is relatively small.

A second major need area for occupational content data is individual client assessment. Two separate areas within this need can also be identified: these would be 1) information the client desires in order to know what different occupations entail, and 2) information relating to abilities of the client of the skill requirements and contents of specific jobs. The first is usually performed by providing the client with descriptive material on different occupations. While the DOT job descriptions can be used for this purpose, the task of wading through Volume I in search of the brief descriptions is a monumental task, so usually other less tedious material is provided. A prime example is the Occupational Outlook Handbook (Department of Labor) which carries general descriptions of several hundred jobs, including in the description the nature of work, places of employment, training, and other qualifications, advancement, employment outlook, earnings, and working conditions. A source such as this can give a client an overview of many fields but it is not geo-specific for projections, is not a comprehensive listing of occupations, and is not finely categorically disaggregated. Other similar types of information would be Massachusetts Health Occupation Training and Guide for Young Workers.<sup>37</sup> Essentially, the counselor must present to the client a number of these sources together with more specific job content and employment outlook data in order to produce an integrated picture of the situation.

The principal manner in which the client's skills are related to occupations is through the tests (GATB, Kuder, ABLE) previously described and through use of the DOT "data, people, things" code (last 3 digits of the 6 digit code). These last 3 digits supposedly indicate the complexity of the job and the involvement of the individual with data, people, and things while performing that job. Hence, the counselor, by determining the abilities of the client and/or his past employment experience, theoretically should be able to steer the client toward occupations where he can transfer previously acquired skills or apply the skills indicated by his test scores. While these schemes seem to be theoretically interesting and desirable, there is an indication that there are shortcomings in the DOT coding system such that, in practice, this system may not function as well as planned.<sup>38</sup> Again, the skill relationship problem is not one with objective answers. The client and counselor can use these pieces of information and testing and skill transferability mechanisms, but they must still temper the final decision with a good deal of personal judgment and knowledge based on past experience.

#### D. External Program Information

Some of the manpower functions described must rely on other functions and agencies for the successful execution of their duties. The two prime examples of these are manpower planning and employment counseling. These functions need

information on the purpose, scope, operation, and effectiveness of related agencies and programs. The sources that are available for this type of information are not usually as formal as those previously described. Formerly, under CAMPS, the manpower planners were charged with recommending funding allocations for specified programs, such that the planners were familiar with contents of the programs they were funding. However, with the changing structure of both these programs and manpower planning, it will be necessary for planners to keep themselves abreast of the operations of the variety of manpower-related services that exist. This close view of the situation will become more of an individual planner and agency responsibility and must useful data will depend on how well program evaluations are conducted.

Employment counselors also must be aware of all the options in the large network of manpower and related services. Here again, though, the burden of obtaining relevant, factual information is a more personal responsibility, dictated by the fact that there is no comprehensive guide to such services. In fact, such a guide might not be particularly feasible since programs change and are added and subtracted so that such a venture would soon be out of date. Apparently, a compendium of services was published for employment counselors several years ago, but the cost of preparing it was too prohibitive to keep up-dating it, so it has not been kept current. There are two particular source booklets relating to this field which do provide adequate information for two subsets of manpower-related services. These would be the Directory



of Social, Health, Welfare, and Rehabilitation Services in Massachusetts published by United Community Services and the Educational Opportunities for Adults in Greater Boston (updated yearly) published by the Educational Exchange of Greater Boston.<sup>39</sup> These are examples of guides which are comprehensive within their fields and can provide a wealth of information for referral purposes. In addition, employment counselors usually have standard referral agencies, e.g., Massachusetts Rehab, with which the employment service has built up a good working relationship over the years. Another technique that is necessary and useful is for the individual employment counselor to maintain a file on other agencies and programs thus accumulating a personal resource of pertinent information.

It can be seen from this discussion, that information on outside agencies and programs is not something that planners and counselors can go to a book or pamphlet and look up, as very few comprehensive guides exist or are even feasible. Acquisition of such information tends to be a personal enterprise and the quality of the information will depend on how well the individual is able to research the necessary areas and have his questions answered.

### E. Program Evaluation

Another important information input into decision-making must be the evaluation of the present and past results of the programs with respect to the function's established goals. The principal element in such self-evaluation is measurement of program outputs which would be the Transformation component in the information transfer system. From the interviews dealing with the manpower functions, it became apparent that transformation of program results into meaningful measurements in the weakest component in the cycle, thus adversely affecting the decision-making process in the next iteration. Two reasons can be cited for this deficiency: 1) limited time scope in measuring program results, and 2) administrative difficulties in keeping and obtaining the necessary records to perform the transformation.

One of the difficulties inherent in manpower service delivery is that the benefit of the service may not be immediately evident, in that the greater payoffs, e.g., increased earning power and promotions due to education or training, may not be realized until several years after the individual completes the manpower program. In addition, indirect effects are difficult to evaluate. Although most of the manpower functions do keep records of how many people have received their services, not all make follow-up inquiries as to the individual's progress and, even when this is done, it is usually only performed on a short-term basis (1-3-6-months). An example of this problem is the complaint that since 1962,

between 60,000 and 70,000 people have gone through programs funded through MDTA, but that no one can point to where these people are today.<sup>40</sup> Such a major public expenditure should warrant a major evaluation of program effects to see if it should be continued, revised, or eliminated.

Transformed information that would be relevant to program evaluation would be: numbers of people processed through services in their various categories of programs, measurement of immediate effects of programs, e.g., skills acquired, initial job placement, and measurement of longer term impact of programs, e.g., continued employment, advances, no change, or change in working or employment habits. The first two kinds of information are generally kept by the individual manpower services; however, the last measurements are the ones that bear the most importance to the overall long-term success of the functions, although they are the most difficult to obtain hard facts about.

The difficulties in obtaining this information are related to the administrative apparatus needed to compile the necessary data. First of all, it is very tedious and time-consuming to maintain records on all the people who have passed through a program; second, it often becomes difficult to contact these persons after several years; and third, there must be strict mechanisms for maintaining privacy of information in the record-keeping. This all adds up to few long-term impact evaluations with the result that there is usually no adequate performance basis for program assessment.

#### IV. Summary and Conclusions

Summary. Before drawing conclusions from this analysis, it would be helpful to reiterate briefly the most salient points that have been presented.

First, the public manpower service delivery system includes a network of many separate but related functions which have the goals of enhancing the employability of the individual and meeting the labor supply needs of the economy. The underlying goals are to ease the unemployment problems, and concomitant social and economic problems, of the individual, overall society, and societal sub-groups and to promote economic growth, competition, and efficiency in the private market.

Second, the effective operation of these functions depends on a number of external and systemic internal variables and conditions, such as type of organization, funding levels, political climate, the overall state of the economy, and access to useful information inputs on which to base decisions, the last of which is the topic of this paper.

Third, this information transfer has been analyzed using a dynamic information process, delineating for each manpower function the decisions (with particular emphasis), programs, transformations, and information acquisition and dissemination components. For the cases in question, the discussion of functional decisions have revealed a wide range of decisions including the assessment of individual and aggregate population needs, employer labor requirements, curriculum development, and placement and referral.

Fourth, the information inputs required as sound bases for these decisions are also many and varied, but can generally be categorized into five classifications: population characteristics, labor demand indicators, occupational information, related educational educational, social, and manpower services, and internal transformation of functional program outputs.

Fifth, the analysis, using the information features, indicates that drawbacks exist with most of the present sources of this information, with the problems being related to the data collection methods, scope, data manipulation, and data structuring.

Conclusions. The analysis of information sources presented in Chapter III, together with the information needs discussed in Chapter II, lead to some general conclusions about the role of information transfer in the decision-making processes of manpower services. While global generalizations relating to other services are not possible here, it is conceivable that these conclusions do apply elsewhere, depending on the state of information applicability in those services. It is evident that none of the decisions described (e.g., determination of need, manpower needs assessment, etc.) have available for them a total supply of objective measures relevant to the decision-making process. This lack of objective measures hinders the decision process in the following ways. First, it requires the synthesis of many kinds and qualities of information, including the use of incompatible data sources, reliance on highly qualitative

information (which may be just as important as quantitative information, if not more so, in the light of the inability to collect the necessary data or use some of the existing data sources), and reliance on personal judgment which may or may not be accurate depending on the education and experience of the decision-maker. Second, the lack of objective measures may preclude the use of systematic decision-making processes. In this case, decision-making is not a matter of identifying all the factors of a situation and then maximizing the trade-offs since objective measures do not exist. For example, it is not always possible to project employment in small occupational categories in sub-areas of the state, so in deciding what occupations will be included in curriculum development decisions, there will have to be reliance on less exact information such as general trends and qualitative judgments. This causes reliance on tradition, political pressures, and "high probability" statements (e.g., there is usually a demand for sales and clerical workers since the turnover is high, so we'll train people for sales and clerical jobs).

These problems point to possible means for improving the quality of information. The most important improvement, cited by virtually every interviewee, is improved data management. Data management includes such activities as data gathering, storage, retrieval, and manipulation-- problems with which have been seen to cause difficulties in using the manpower information currently available. The management problems will vary for the information source and

for the needs of the different manpower functions. For example, the community colleges may be interested in internally-generated information on the characteristics of the student body, e.g., who, at what colleges, in what programs, etc., whereas another function needs to manipulate the raw data in the census. Four basic data management improvements which could provide substantial increases in the amount and quality of information available to those wanting manpower information would be: 1) geocoding of information at its source so that it can be retrieved from aggregations and applied to the state or local level; 2) where information formats already exist, e.g., the census, DES information on unemployment, taxable income, business trends, the gathering of such information should be strengthened where necessary in order to ensure high quality of results; 3) attempts should be made to use compatible data structuring schemes for similar data or at least translation schemes should be readily available; and 4) disaggregated data, particularly for occupational information, should not be lost entirely in the aggregation process, but instead be retained in some form, so that persons desiring very specific pieces of information can have access to them. Data management is generally recognized as a problem area and some steps are being taken to ameliorate some of the problems.

A second major area needing improvement is occupational information--the structure, content, and requirements of jobs. As can be seen from the previous discussions, specific occupational information resides in a combination of pub-

lished sources and in the heads of numerous individuals (as evidenced in the use of advisory committees). However, there has generally been dissatisfaction with published information on training times, skill levels, and hierarchies within occupational families. The systematizing of such information is such a monumental task that it would seem that information such as that just mentioned would be more apt to be provided on an incremental basis rather than by substituting a new comprehensive system. Nevertheless, such an alternative is being proposed by Scoville and is based upon hierarchical skill rankings within job families (e.g., health occupations, business occupations).<sup>41</sup> Although such a system appears to be gaining recognition among academics knowledgeable in the manpower field, it is unlikely that it will soon replace the existing stock (DOT) of occupational information. The implication then is that areas in which presently there are "holes" in occupational information should be identified and worked on. Such areas of interest might include training periods, training methods (OJT, external-internal training, etc.), relationships of education to job content, and internal labor markets and "ports of entry".

A third information category which desperately needs improvement is the transformation of program outputs into data suitable for use in decision-making. Agencies and programs will have to make concerted efforts to collect information on their clients or students on a longer-term basis than is currently available so that evaluations of the



programs can be performed. Such transformations are needed not only for program evaluation but also for taking into account the dynamic processes at work in our employment system, e.g., a piece of information that should be taken into account in the decision-making process is the saturation effect that may be caused by continually turning out people trained in specific fields--fields that were once considered growth occupations may be losing their potential because the need has been filled by training/educational programs--with little or no monitoring of this feed-back effect of supply and demand during this time. For example the teacher "shortage" of 1965 turned into a teacher "glut" in 1972.

Suggestions for Future Research. The foregoing discussion points up several areas for further research which would be beneficial for implementing the recommendations for information improvement. Some broad areas would be research in: 1) data management systems--in terms of needs of different functions, time, costs, and the feasibility or desirability of central data banks (the kinds of information desired, format, etc.); 2) interagency communication--ways of facilitating information transfer between functions and agencies such that pertinent information can be shared and so that the information-generators can have a better knowledge of what the information-users need and want; 3) occupational information--research into the areas already described, e.g., training requirements, etc., and also into the feasibility of implementing and making functional the alternative

occupational classification scheme based on job families; and 4) development of mechanisms to measure program outputs and to relate these meaningfully to the decision process.

FOOTNOTES

<sup>1</sup>Interviews with:  
 Mr. Peter Seling, State Manpower Planning Staff,  
 November, 1972;  
 Mr. Martin Kane, Boston Manpower Planning Staff,  
 December 1972;  
 Mr. Nicholas Savenko, Springfield Manpower Planning  
 Staff, December 1972;  
 Mr. Walter Heissenbuttel, Springfield Manpower  
 Planning Staff, December 1972;  
 Ms. Charlotte Meisner, Occupational Research  
 Department, Division of Employment Security, March 1973;  
 Mr. John Watson, Employment Counselor, Division  
 of Employment Security, March 1973;  
 Mr. Daniel Asquino, Massachusetts Board of Regional  
 Community Colleges, March 1973;  
 Mr. Michael Najarian, Massachusetts Board of  
 Regional Community Colleges, March 1973; and  
 Mr. Raymond Thomasini, Boston Skill Center,  
 March 1973.

<sup>2</sup>Marshall C. Yovits and Ronald L. Ernst, "Generalized  
 Information Systems: Consequences for Information Transfer",  
 in People and Information, Harold B. Pepinsky (ed.),  
 (New York: Pergamon Press, 1970), p. 4.

<sup>3</sup>Ibid., pp. 4-6.

<sup>4</sup>Ibid., pp. 6-7.

<sup>5</sup>Ibid., p. 7.

<sup>6</sup>Ibid., p. 7-8.

<sup>7</sup>Ibid., pp. 8-9.

<sup>8</sup>Information on CAMPS prepared from various  
 CAMPS publications, see bibliography.

<sup>9</sup>Daniel E. Deyo, Access to Quality Community College  
 Opportunity: A Master Plan for Massachusetts Community  
 Colleges through 1975, (Boston: Massachusetts Board of  
 Regional Community Colleges, 1967), p. 3.

<sup>10</sup>Ibid., pp. 3-5,7.

<sup>11</sup>Community College Program Enrollment (mimeo, undated).

<sup>12</sup>Deyo, p. 7.

<sup>13</sup>Interview, Mr. Daniel Asquino.

<sup>14</sup>Interview, Mr. Michael Najarian.

- 15 Ibid.
- 16 Interview, Mr. John Watson.
- 17 Interview, Mr. Raymond Thomasini.
- 18 Ibid.
- 19 Interview, Ms. Charlotte Meisner
- 20 Interviews with Mr. Peter Selig, Mr. Martin Kane, and Mr. Nicholas Savenko.
- 21 Interview, Mr. Daniel Asquino.
- 22 Interview, Ms. Charlotte Meisner.
- 23 Interview, Mr. Martin Kane.
- 24 Interview, Ms. Charlotte Meisner.
- 25 Ibid.
- 26 John T. Dunlop, "Job Vacancy Measures and Economic Analysis", in The Measurement and Interpretation of Vacancies, A Conference Report of the National Bureau of Economic Research, (New York: Columbia University Press, 1966), pp. 29-30.
- 27 A Quarterly Survey of Unfilled Job Openings: Boston Job Bank, February 1972, (Boston: Division of Employment Security, Occupational Research Department, 1972), p. 1.
- 28 Dunlop, p. 31.
- 29 Ibid.
- 30 Ibid., p. 36-37.
- 31 Massachusetts Manpower Needs to 1975, (Boston: Division of Employment Security, Occupational Research Department, 1971).
- 32 Interview, Ms. Charlotte Meisner.
- 33 James G. Scoville, Manpower and Occupational Analysis: Concepts and Measurements, (Lexington: D.C. Heath and Company, 1972), pp. 25-26.
- 34 Ibid., p. 24.
- 35 Interview, Mr. Michael Najarian.
- 36 Interview, Mr. Raymond Thomasini

<sup>37</sup>Interview, Mr. John Watson.

<sup>38</sup>Scoville, pp. 21-23.

<sup>39</sup>Interview, Mr. John Watson.

<sup>40</sup>Interview, Ms. Charlotte Meisner.

<sup>41</sup>Scoville, pp. 31-40.

BIBLIOGRAPHY

## Personal interviews with:

- Mr. Peter Selig, State Manpower Planning Staff,  
November, 1972.
- Mr. Martin Kane, Boston Manpower Planning Staff,  
December, 1972
- Mr. Nicholas Savenko, Springfield Manpower Planning  
Staff, December 1972.
- Mr. Walter Heissenbuttel, Springfield Manpower  
Planning Staff, December 1972.
- Ms. Charlotte Meisner, Occupational Reserch  
Department, Division of Employment Security,  
March 1973.
- Mr. John Watson, Employment Counselor, Division  
of Employment Security, March 1973.
- Mr. Daniel Asquine, Massachusetts Board of Regional  
Community Colleges, March 1973.
- Mr. Michael Najarian, Massachusetts Board of  
Regional Community Colleges, March 1973.
- Mr. Raymond Thomasini, Boston Skill Center, Director,  
March 1973.

Boston Manpower Planning Staff. "The Boston Manpower Area  
Council". (mimeo, undated)

Boston Manpower Planning Staff. "Brochure on Boston MAPC".  
(mimeo, undated)

Cooperative Area Manpower Planning System. (summary, inter-  
agency publication, mimeo, undated)

Cooperative Area Manpower Planning System. Interagency  
Cooperative Issuance No. 72-2 (Revision of  
CAMPS), 1971. (mineo)

Cooperative Area Manpower Planning System. Interagency  
Cooperative Issuance No. 73-1, and attachments;  
"National Policy Guides: FY 1973 Comprehen-  
sive Manpower Plans" and "FY 1973 Detailed  
Manpower Planning Guides", 1972. (mimeo)

Deyo, Daniel E. Access to Quality Community College Opportunity:  
A Master Plan for Massachusetts Community Colleges  
through 1975. Boston: Massachusetts Board of  
Regional Community Colleges, 1967.

Dunlop, John T. "Job Vacancy Measures and Economic Analysis,"  
in The Measurement and Interpretation of Job  
Vacancies (A Conference Report of the National  
Bureau of Economic Research). New York: Columbia  
University Press, 1966

Job Vacancies and Labor Turnover: Massachusetts and Boston, SMSA, November, 1972. Boston: Division of Employment Security, Occupational Research Department, 1972.

Johnson, James F. Boston Manpower Development Training Activity, 1964-1970. (mimeo, undated)

Massachusetts Manpower Needs to 1975. Boston: Division of Employment Security, Occupational Research Department, 1971.

Pepinsky, Harold R. (ed.) People and Information. New York: Pergamon Press, 1970.

A Quarterly Survey of Unfilled Job Openings: Boston Job Bank, February, 1972. Boston: Division of Employment Security, Occupational Research Department, 1972,

Scoville, James G. Manpower and Occupational Analysis: Concepts and Measurements. Lexington: D.C. Heath and Company, 1972

U.S. Department of Labor, Manpower Administration, Lawrence Berkeley Laboratory. Summary Manpower Indicators for Quincy ANPB, State of Massachusetts, 1972. (mimeo)

Wortman, Max X., Jr. "The Growth and Continuing Development of Manpower Programs in the Commonwealth of Massachusetts", (mimeo, undated)