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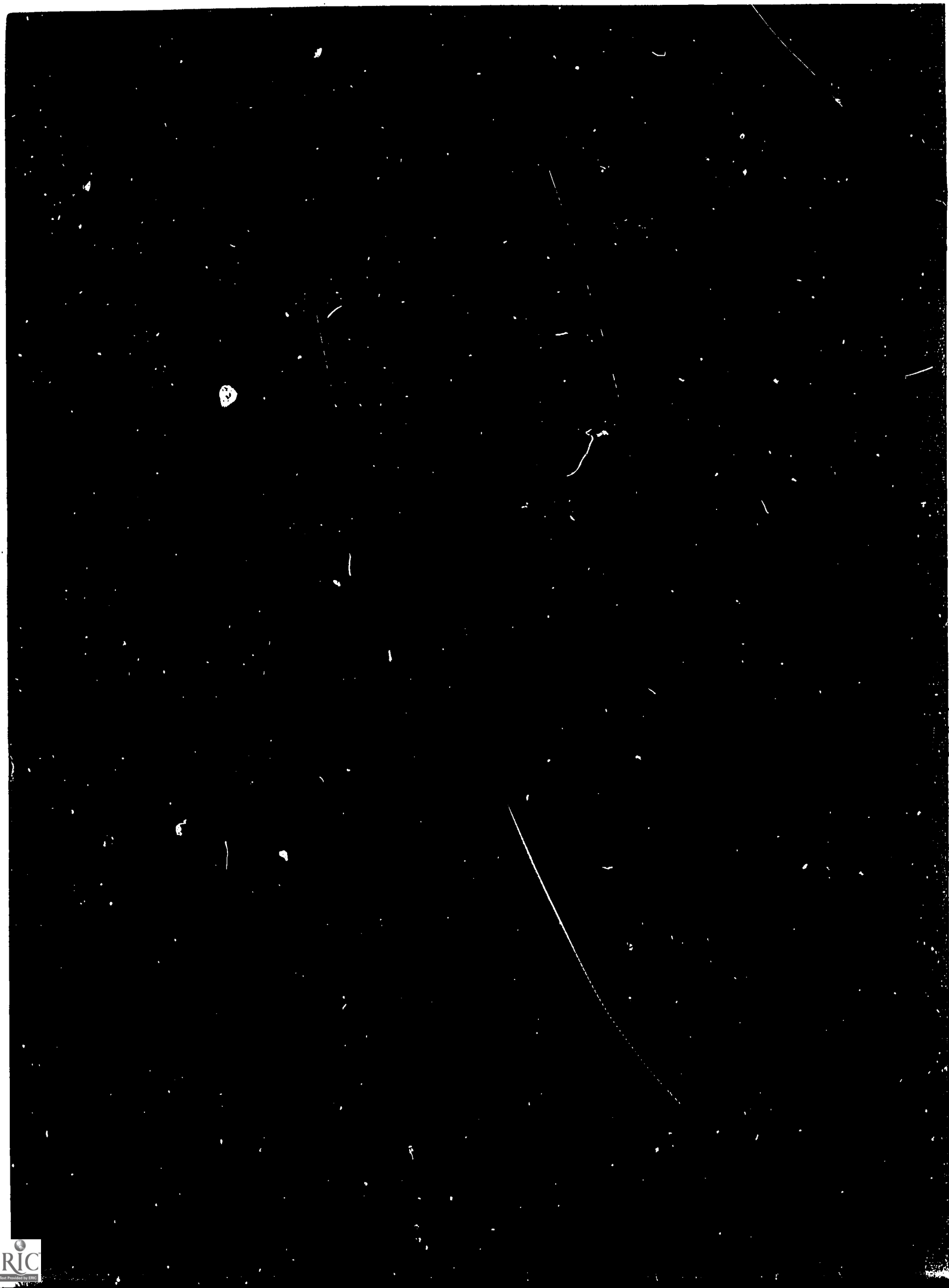
ABSTRACT

To develop a procedure for using occupational supply and demand data in state-level vocational education planning, data from an area skill survey, community colleges, technical institutes, and secondary school class records filed in state offices were sorted by occupation and analyzed for completeness, validity, and usefulness for planning purposes. Enrollment data were used to identify occupations not supported by public training programs and those for which enrollment greatly exceeded reported demand. Completion rates for various types of secondary and post-secondary curruculums were compared. Noting that State Board of Education policies emphasize input and ignore output, the study concludes that followup studies are needed, along with other new efforts to measure output. (Author/BH)



AN ANALYSIS OF WORKER SUPPLY AND DEMAND DATA FOR PROGRAM PLANNING IN OCCUPATIONAL EDUCATION

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PREFACE

Optimum efficiency in occupational education requires that the supply of workers produced by occupational education programs equal the number of trained employees needed in the work force at any particular time. Since curricula cannot be developed on a moments notice, occupational education planners should plan programs far enough ahead that worker supply will correspond to future worker demand.

So far, local and state policies in occupational education planning have not promoted this height of efficiency. In some occupations there are demands that cannot be met, while trained workers in other fields far outnumber the available positions. These discrepancies are wasteful of money, time, and valuable manpower.

In this report, Dr. Williams presents a method for better predicting the demands occupational education will need to meet in the future. The Center wishes to thank Dr. Williams for his work in compiling this unique report. Appreciation is expressed to Dr. J. R. Clary, Jr., Executive Director, North Carolina State Advisory Council on Vocational Education, who reviewed the paper prior to publication. The Center acknowledges the editorial assistance of Mrs. Sue King and the efforts of the entire Center staff in the preparation of this report.

John K. Coster
Director

SUMMARY

This study seeks to develop a procedure for using occupational supply and demand data in the state-level planning of programs in occupational education. Demand data for 107 occupations in North Carolina were taken from an area skill survey, Employment Outlook for Selected Occupations in North Carolina, 1966-1970. Supply data for the same period were collected from community colleges, technical institutes, and records of classes in secondary schools filed in state offices. Supply data are summarized into state totals and sorted by occupation. The two types of data are then analyzed in terms of completeness, essential validity, and usefulness in the planning process.

Enrollment information was useful in pointing out those occupations which are not supported by any public training program and those for which enrollment greatly exceeds reported demand. Forty-four occupations have no pre-employment training programs supplying new workers. Thirty-four other occupations show an excess of enrollees over the reported demand, with the greatest discrepancies occurring in the bricklayer, mechanical draftsman, and auto-truck mechanic occupations.

Completion rates for various types of curricula and other programs are computed, showing a wide range. Secondary programs show the lowest percentage of completions. Less than three per cent of secondary drafting enrollees completed their program, as compared to 28.9 per cent for all secondary enrollees studied. The overall completion rate for all postsecondary curricula is 40.6 per cent. Part-time postsecondary curricula show a completion rate of only 13.1 per cent.

It is concluded that State Board of Education policies and formulas emphasize input and ignore output. Policy options which could lead to more stressing of output and to the implementation of follow-up studies are offered. The absence of follow-up studies prevents measuring the extent to which output of the training system contributes to meeting labor demand and limits the usefulness of the developed procedure.

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Legislation authorizing occupational education usually results from a recognition of the discrepancy between the demand for trained workers and the supply of trained applicants. Programs are then developed to narrow this discrepancy. Planners of occupational education programs need reliable data on both the demand and supply sides of this discontinuity.

Statement of the Problem

The objectives of this study are to (1) obtain and analyze occupational supply and demand data and (2) develop a procedure for using occupational supply and demand data in the state-level planning of programs in occupational education. The scope of the study includes 107 selected occupations in North Carolina during the period 1966-1970. This is a pilot study which, when modified to overcome its deficiencies, could lead to the development of a model procedure yielding continuous information about the number and types of trained workers needed in each occupation in any given state. Such information could help establish base lines useful in making plans for the location, expansion, and curtailment of occupational education programs.

Importance of the Study

Immediate benefits of this pilot study are the availability of demand-supply comparisons indicating the extent to which North Carolina is meeting labor demands through its public occupational education programs, and the identification of additional data needed to refine subsequent studies covering additional occupations.

Prior to 1960, public occupational education programs produced very few trained workers in North Carolina. Since then, occupational education has expanded rapidly through the development of industrial education centers, their evolution into a community college system, and the increase in vocational programs at the secondary level, stimulated by federal funds. The labor market has also changed because of changing technology and the establishment of new industries. Industrial expansion is expected to continue, increasing the demands on the educational system for more trained workers. Because the administrator of occupational education is charged with the responsibility for making programs relevant to the needs of both employers and potential employees, he needs to have available for use figures on labor demand. Because his pre-employment programs are specifically set up to train workers to enter certain occupations, he needs to know the demand figures for each occupation. Educational administrators realize that many of their decisions involve long-term programs or, at least, short-term programs expected to produce long-term effects. It becomes imperative to make decisions in a context in which long-term effects are considered. Too many decisions are made independently

of each other, and in a narrow context. When such decisions are compounded over a period of years, or combined with those in other administrative units, the results are far from satisfactory. Only when the planner has reliable information on both demand and supply can he intelligently use available resources to balance program allocations.

The need for evaluation of occupational education has also received stronger emphasis recently. Measuring the quality of a system and its products has apparently been done seldom, other than to count the number of graduates who were presently employed; but even this count has not been done completely or consistently. In North Carolina the state-level statistical reports are set up to count enrollment (input), not completions (output). No output data compiled at the state level are found. Thus, a major portion of this study is devoted to the compilation of such output data.

The federal government has been committed to move all its operations into a Planning, Programming, and Budgeting System format. Full implementation of this system will place the responsibility for showing program output information on state agencies administering federal funds. Under such a system, output data will be evaluated against pre-determined quantified objectives. To the extent that this study provides the impetus for constructing a model procedure for measuring output, it provides a beginning for the adoption of a PPB system.

Definition of Terms Used

In this study, terms are used according to the following definitions:

Occupational education: Educational programs offered at less than the baccalaureate level to prepare persons to enter an occupation or to help them advance within their occupation.

Curriculum: A planned sequence of courses leading to a degree, diploma, or certificate.

Technical curricula: Those curricula leading to an Associate in Applied Science degree, usually designed for six quarters of attendance by full-time students at the postsecondary level.

Vocational curricula: Those curricula leading to a diploma, usually designed for four quarters of attendance by full-time students at the postsecondary level or two years of half-time attendance by students at the secondary level.

Certificate programs: Those pre-employment programs usually designed for less than four quarters of attendance by full-time students at the postsecondary level. For the purposes of this study, 80 hours was arbitrarily set as the minimum time required in order for a course to be placed in this category.

The Department of Community Colleges: The agency in North Carolina designated to offer postsecondary occupational education through 13 community colleges and 37 technical institutes (as of March, 1969).

The Division of Vocational Education: The agency in the North Carolina Department of Public Instruction designated to offer vocational curricula through the state's secondary schools.

Data Sources and Procedure Rationale

Policy and philosophy statements of the North Carolina State Board of Education emphasize a responsibility for providing training programs which would allow citizens to prepare themselves to fill the jobs expected to become available (Proceedings, 1964). The Department of Community Colleges provides the largest number of these training programs, and, in turn, this is that department's primary responsibility. Within this department, Manpower Development and Training Act (MDTA) courses and New Industry classes are budgeted separately from regular budget programs. The State Board of Education is also responsible for the secondary school occupational courses conducted by the Division of Vocational Education of the Department of Public Instruction.

North Carolina has developed a pattern of relatively heavy state fiscal support for education, with accompanying power over programs through budgetary action. For example, salary schedules and curricula have been developed at the state level. Local institutions and administrative units may supplement state allotments, but may not provide less than the state minimums. North Carolina has a state system for education, rather than a pattern of fiscally autonomous local units. The legislature and state education agencies establish the overall level of operations. Local initiative is encouraged to go beyond this level by providing local resources and is needed for developing new programs and, in many instances, for obtaining state and/or federal resources to carry out these programs.

The 1968 amendments to the Vocational Education Act of 1963 authorized up to $5 million to be spent for national, regional, state, or local studies and projections of manpower needs in any fiscal year (P. L. 90-576, 1968). At the federal level, at least, it is clear that occupational education is offered in response to known needs.

The North Carolina State Board of Education entered into a cooperative agreement with the State Employment Security Commission for the purpose of exchanging information on the demand and supply of trained workers. Such agreements are required by the federal regulations for the administration of vocational education (Public Law 88-210, 1963). The North Carolina Employment Security Commission periodically conducts state-wide surveys of labor demand. The survey results are not published on a county or smaller unit basis, but on an area and state basis. The area boundaries are often not compatible

with the service areas of educational institutions. Through 1968, five area skill surveys were published in North Carolina, the first appearing in 1962. Survey results were disseminated to administrators of occupational education at both the state and local levels, and they have been the chief means by which the State Employment Security Commission has fulfilled its part of the agreement.

Labor force data are usually reported in terms of main occupations, as in the census, or industry groupings. Within most industries, however, a variety of occupations can be found. To say that a specific company needs 200 new workers does not tell the educational planner what courses are needed. Because his primary responsibility is to conduct educational activities, he should be able to obtain economic data from other agencies, rather than subvert his resources into conducting economic surveys. The area skill survey was developed to do this, and Employment Outlook for Selected Occupations in North Carolina, 1966-1970 was chosen as the source of demand data for this study.

Supply data originated from a teacher's roll book and passed from a local administrator to a state office. State reports did not yield unduplicated headcount figures by curriculum. In those programs which enrolled students for two or more years, a student was recounted each year. A student taking four courses was sometimes counted four times. At the state level, the data were processed to answer other questions than those considered in this study. Therefore, state-produced data were used only when local data were not available.

Supply data were collected from four sources--postsecondary curricula, MDTA classes, New Industry classes, and secondary curricula--and sorted by program. Data from those programs which produced workers trained to enter the occupations chosen for comparison are listed in Table 7 and summarized in Table 4, which contains both demand and supply data by occupational groupings.

Limitations of the Study

Both supply and demand data were subject to clerical errors. Three negligible errors were found in the published demand report, which was subject to methodological problems discussed later. Accuracy of the supply data was limited by a few missing records, the use of secondary sources, and the extent to which respondents did not follow the instructions developed for consistent reporting.

The most important limitation was the absence of follow-up information on former students. Neither state agency administering occupational education keeps such records. Even though a student completes a program leading to a specific occupation, he might not be employed in it. Individual high schools and institutions in the community college system keep a permanent record on every student, but frequently this record does not show an up-to-date employment record. It is not known if non-graduates are filling jobs for which they are

partially trained or, perhaps, not trained at all. The comparisons of supply and demand shown in the tables can be used only as an approximation of the degree to which the education system is meeting labor demands.

This study does not account for the contributions to supply from the armed forces, public agencies other than those under the State Board of Education, or non-public organizations. It does not account for time lag in the availability of workers caused by military service, for migration across state lines of trained workers, or for the quality of trained workers, to determine if the worker could successfully fill the position for which he trained.

Organization of the Remainder of the Study

The remainder of this report (1) establishes the rationale for long-range planning in occupational education; (2) emphasizes the need for obtaining detailed data on labor demand by occupation; (3) describes the types of supply and demand data chosen for this study and the problems involved in collecting the supply data; (4) presents an analysis of the supply data; (5) reports trends in program development; (6) compares supply and demand data; (7) makes conclusions about state-level policy that could be inferred from the data analysis; and (8) offers policy options which could lead to the development of follow-up studies and program evaluation procedures.

REVIEW OF THE LITERATURE

Planning in Education has too frequently been thorough only at the classroom lesson-plan level. Money for research and planning activities has seldom been appropriated at the local level and, until recently, was often not available as a continuing item in the state budget. This chapter presents a rationale for long-range planning, especially as it relates to occupational education, and examines the relevance of available demand data.

Rationale for Long-Range Planning

McEachron (1958) cites four objectives for corporate planning, each of which is applicable to education:

> Perhaps the most obvious and correct use of long-range planning is to give a corporation lead time--to enable it to get ready to meet future events--and to do this on an orderly basis rather than relying on some form of crash program. . . .
>
> A second objective of long-range planning, and one that places considerably less reliance on our ability to predict the future, is to integrate a company's actions. . . .
>
> . . .Formal long-range planning is useful in two other ways. One of these is to give perspective to current decisions, to provide something of a background against which we can measure the attractiveness of a given investment or some other decision that carries with it a long-time committment. . . .
>
> And last, but not least, long-range planning can be an important element in administrative control. . . .

Lead time is equally appropriate to the planning of occupational education. It often takes four years to build a facility and recruit and train potential workers after the decision to do so is made. McEachron's second objective has not been met in North Carolina's program of occupational education; in addition to university extension classes, two agencies are responsible to the State Board of Education for conducting programs. The State Board can be considered equivalent to a company's board of directors, but the administrative control function of coordination is not evident. No measures of effectiveness have been developed to determine the value of new ideas and programs.

Other writers emphasize that planning can minimize the surprises and uncertainties of the future and help eliminate mistakes and waste. The lack of planning and the absence of effectiveness measures have invited indiscriminate investments in education which failed to prepare persons for available jobs. Such a situation has tempted decision-makers to invest in programs of particular interest to themselves or a special interest group, to the detriment of the broader public interest.

Clark (1966) cautions that manpower information is only one element in planning. He states that it must be integrated with the philosophy of the system's leaders, the economic and political context in which it operates, and the strategy for implementing programs to accomplish the system's mission.

The need for gathering manpower information which could enhance educational planning has been well documented. The consensus of economists and occupational educators has been that manpower information was needed by the planners, and that it has been woefully lacking. Dorfman (1965) states the problem clearly: "When encountering a knowledge gap, one can (1) proceed on the basis of conjecture; (2) stop to fill the gap; or (3) abandon the problem." This study was conducted in response to the second option, in order that reliance on the first option might be reduced.

Economists have been in the forefront of efforts to gather manpower information and project labor demand. Methodologies are relatively new and still evolving. Even those involved in this work on a full-time basis frequently preface their work with warnings. Swerdloff (1966) recognizes this when he says:

> . . .not even the brightest economists and statisticians, armed with the biggest computer, can predict the future. . . But manpower projections. . .can indicate the direction and magnitude of employment trends. Manpower projections can narrow the range of uncertainty within which decisions concerning the future must be made. The goal of the forecaster is continuously to narrow the uncertainty gap.

Some writers caution that national manpower projections are more reliable than state and local projections because migration is an irrelevant factor. Short-range projections have been more reliable than long-range projections because of migration patterns, location of new industry, and the changing requirements of various occupations have all violated the assumptions upon which long-range projections were based. Others feel that first approximations are accurate enough for planning purposes and that the cost of a thorough, detailed study is not justified by the results. Some also believe that for educational planning purposes it is not necessary to project employment needs for those occupations requiring a short learning period or for those in which formal pre-employment training was not needed (Clark, 1966).

Administrative Levels of Long-Range Planning

Occupational education has shared a dearth of educational planning. State-wide program planning was seldom discussed prior to 1960. Increased expenditures, spurred by federal appropriations, brought the lack of planning to the surface. The need for planning is now accepted, but its depth and administrative levels are not agreed on. Many states

use the master plan concept used by higher education.

The availability of adequate demand data has been a major hinderance to program planning. Institutional administrators and local political leaders usually emphasize local industry needs. The argument is supported by consideration of the interests of potential students, but it is offset by the out-migration of the recipients of occupational education. The local needs argument is recognized by state-level personnel as necessary for ensuring local financial support. Correspondence with three state directors of vocational education in 1967 emphasized the necessity for local program initiation. One respondent wrote, "No master plan of curriculum 'allocations' [at the state level] is needed or wanted, as each school must be sensitive to changing employer and labor market needs" (Struck, 1967).

The trend at the time of writing stressed state-wide planning, usually embodied in a master plan. The landmark study for state planning of occupational education was completed for Illinois in 1960 (V.& T. Ed. in Illinois, 1960). The work projected labor demand for each of 40 occupational groups for the decade 1955-1965 and established enrollment goals for 76 occupational curricula for the academic year 1965-1966. Enrollment goals were based not on Illinois demand data, but on the assumption that "Illinois should set a goal by 1970 which would be equivalent to California's educational load in technical education in 1957. . ." No reason was given for making this assumption, although it was stated that these were to be considered minimum goals. No time-phasing of new programs or construction of institutions was given, preventing a computation of the cumulative system output during the decade under study.

The Florida State Department of Education published a similar work in 1965. (The Florida Study of V-T Ed., 1965). The study made 23 recommendations for improvement in occupational education. The first of these was that the State Department of Education push for the establishment of a continuing inventory of employment and employment needs throughout the state. Projections of employment in some occupations were included. Enrollment projections were not based on available demand data, but on an extrapolation of past enrollment experience. Enrollment projections were given as headcount, but only total secondary and total junior college estimates were given with no sub-totals by occupations.

Oregon and Wisconsin included postsecondary education in their plans for higher education. (Education Beyond the High School, 1966; A Provisional Long-Range Plan for Higher Education in Wisconsin, 1967). Neither articulated secondary and postsecondary occupational education. Neither study included occupational demand data. Oregon projected community college enrollment in terms of high school enrollment. The Wisconsin report referred to a study of projections for the emerging vocational-technical system, but the study was still in progress at this writing.

Other states recently completed similar plans or were engaged in such activity when contacted. Some master plans have been developed by state staffs, and some were contracted with private consulting firms. The major areas of enrollment, facilities, and financing are common to each plan; the degree of specificity varies. A recent state plan for Texas projects enrollments to 1976 for the broad categories of secondary, postsecondary, and adult programs. Short-range projections, through 1971, were given for eight broad program areas: agricultural, distributive, health, home economics, industrial, office, public service, and technical. No mention was made of subcategories, specific curricula, or occupations (Guidelines. . ., 1968).

Concurrent with the predominance of planning being done at the state level, at least one leader in occupational education has written that a state plan was too limited. Venn (1964) advocates planning at the regional and national levels. His arguments include provision for the national interest (backed up by increased appropriations) and an extension of the migration phenomenon beyond state lines.

Both national and state administrations command greater resources and talent for planning than are usually available at the local level. A paradox arises when it is admitted that programs are conducted at the local level. Perhaps time will show that the levels of planning are not mutually exclusive and should be, in fact, coordinated.

The Use of Area Skill Surveys as Demand Data

Prior to 1960, most labor force demand data were not published by detailed occupational listings and were incompatible with categories of programs in occupational education. The relatively new area skill surveys were designed to overcome this incongruence, but they have shown methodological shortcomings.

The federal responsibility for projecting labor demand is delegated to the Department of Labor. The state-level responsibility rests with the Employment Security Commission in North Carolina, and in most other states with an agency having a similar name. To fulfill its commitment under the North Carolina State Plan for Vocational Education, the Employment Security Commission has conducted and published five area skill surveys to date.* These surveys provide both state and local planners of occupational education with more specific

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*North Carolina Study of Technical and Skilled Manpower, June, 1962; Manpower and Training Needs for Medical and Health Service Occupations, September, 1963; North Carolina Study of Manpower Needs in Selected Trade, Finance, Insurance, and Service Industries, 1963-1966, June, 1964; Health Manpower Needs in North Carolina, 1967-1973, December, 1967.; Employment Outlook for Selected Occupations in North Carolina, 1966-1970, December, 1966

information about labor demand than was available before. The broad categories of main occupations are broken down into individual occupations, many of which directly match training programs. Because the first North Carolina surveys were some of the earliest to appear, other states have drawn on the North Carolina experience. Somers (1968) reports that through 1967, approximately 170 area skill surveys were published in 46 states, with others in progress.

The surveys received a mixed degree of acceptance by occupational educators. Correspondence in late 1967 with every state director of vocational education attempted to determine the extent of state-wide planning being undertaken. Eleven respondents indicating that area skill surveys were available as a source of demand data were asked in early 1969 to give their opinion on (1) the value of area skill surveys for use as demand data and (2) the value of keeping an inventory of supply and demand of workers by occupation for use in their planning efforts. Those who responded indicated that area skill surveys had been of help, but only in conjunction with other information. They used them more at the occupational grouping level than for single occupations, and they wrote that information on output from the educational system needed to be greatly improved.

Little technical evaluation of area skill surveys is found in the literature. It is assumed that this is due to the relative newness of the technique, the limited use of the surveys, and the fact that they were developed as a management technique rather than as a theoretical model to be tested by classical research procedures and written up for the literature.

Somers (1968) discusses the availability of labor market data and recognizes the usefulness which area skill surveys could bring to short-run planning. He reports the difficulties involved in obtaining meaningful estimates of needs from employers, who themselves frequently do not forecast their own needs for their own purposes. He examines many of the area skill surveys and determines that some of them are not conducted according to the guidebook provided by the federal office.

Medvin (1967) advocates the replacement of area skill surveys by new techniques in a thorough discussion of labor demand statistics. He cites several limitations of these surveys--complexity, expense, consumption of time, lack of local applicability, and inaccuracy of employer forecasts--as being so severe as to make the procedure not feasible. Relying on the argument that it would be sufficiently accurate to determine the direction of employment changes, he advocates that a less expensive survey be conducted approximately every six months (presumably at the local level), using quarterly unfilled job opening reports as the primary data source. These data would be screened for seasonal trends and compared with the national market as reported in Occupational Outlook Handbook (1966). Unfilled job opening reports have been summarized at the state level and are available for planning purposes, but the use of this technique is not investigated as part of this study.

Other Sources of Demand Data

Several efforts directed toward overcoming some of the difficulties in providing adequate supply-demand data need mentioning. One is the attempt to convert demand data collected by industry groupings into occupational categories. The first draft of such an "Industry-Occupational Matrix" (Bureau of Labor Statistics, 1967) was published for national data in 1967. The appendix includes a methodology for constructing state matrices. The refinement of these procedures could provide a check against area skill survey results.

A second publication proposes a taxonomy for educational activities, including a code assigning a number to every occupational training program known to the researchers working on the project (Office of Education, 1967). Parts of this code form one side of another matrix, devised to convert occupations to educational programs. The use of these matrices allows labor demand data now being collected to be available to occupational education planners in a useful form.

The decennial U. S. Census (1960) classifies the work force into eleven main occupations and reports the numbers employed in each classification. The census includes a more detailed occupational listing than previously reported, but only at the national level.

A different classification system, outlined in the Standard Industrial Classification Manual (1957), lists types of industries. Several projections of labor demand have been made in terms of this system. These data have been of little help to planners of occupational education programs because occupations occurring in more than one industry are not summed across industries. Graduates from one particular curriculum might be employed in a variety of industries. The industry-occupational matrix is constructed using the SIC classification system.

In moving into the Program, Planning, and Budgeting System, the Minnesota Division of Vocational Education has developed a methodology for comparing supply and demand figures for a given year, up to four years ahead of the current year (Malinski, 1968). The educational planner can use this data to predict what percentage of the labor demand in any occupation will be met by his programs. He can then use this knowledge to shift resources where desired. Annual adjustments can be incorporated as new information becomes available. The system is developed in terms of its output, rather than its input. The Minnesota format incorporates the new Office of Education program coding system, in anticipation of the publication of the matrix relating occupational education programs to occupations.

DATA COLLECTION PROCEDURES AND PROBLEMS

This chapter describes the procedures for collecting the data, the difficulties involved, and the way the collected data were organized. The four sources of supply data and the one source of demand data are discussed separately and in combination. The rationale for grouping certain training programs together opposite a single occupation and for combining some of the occupations into a single entry in Table 7 is also developed.

Postsecondary Curricula

An early 1969 listing of curricula offered by the Department of Community Colleges includes 70 Associate in Applied Science degree, 40 vocational, and 17 certificate programs. The distribution of these among the 50 institutions is largely a local matter, resulting in 50 different combinations.

The Statistical Services Division collects end-of-course enrollment reports (Form 33) from each institution each quarter. Form 33 was developed primarily for budgetary purposes and secondarily for pupil accounting purposes. The principal summaries and reports made from these data are reported as full-time equivalencies (FTE) rather than as headcount enrollment. Because this study is concerned with numbers of trained workers, FTE figures are not appropriate. Once two or more classes are added together as FTE, they can not be separated without the primary source document. Quarterly print-outs list headcount enrollments in one section, but the figures are not consistent from quarter to quarter. Second-year and third-year students are counted each year in which they enrolled. An accurate count of the number of enrollees is not possible from Form 33 because in many cases students from different curricula are scheduled in the same classes and reported together.

The Statistical Services Division began its present data collection procedures during the fall quarter of 1966. Earlier data were needed for this study. Information on the number of graduates and the projection of enrollment by curriculum through 1969-70 was not collected by the Statistical Services Division or any other division of the Department of Community Colleges. It was, therefore, necessary to turn to each of the 50 institutions in the system to obtain these data.

Form 1 was designed to obtain all the needed enrollment and graduation data by curriculum, by year. The format was similar to the format of Table 5. Although the format is simple, conversion of existing records to this format was not simple. Forms and instructions for completing them were sent to each institutional president in late September, 1968. In the first week of December, follow-up letters were sent to those who had not responded. By January 15, 1969, completed forms had been received from 28 institutions, and incomplete forms were received from seven others. Telephone calls and other data

sources were used to complete the data collection by February 10, 1969. Thirty-seven institutions returned satisfactory data, three returned all requested data except projections, two returned unusable data, and eight did not respond. Thirteen of the 50 institutions were visited, from one to four days each, depending on the volume of data, organization of records, and help from local personnel.

A few institutions had no enrollment or graduation records from the early years of their operation. Some others did not have records in a usable form. In such cases the files of the State Records Center, Department of Archives, provided information from copies of monthly teacher attendance reports and from quarterly enrollment summaries.

All institutional figures collected on Form 1 were sorted by curriculum onto sheets containing the state-wide report for a particular curriculum. The page totals for each of these sheets are the entries in Tables 5 and 6. Many curricula train workers for occupations not represented in the demand data selected for comparison in this study. This information, although listed in Tables 5 and 6, is excluded from the comparisons. Only data from those years matching the period covered by the demand data are used in the comparisons in Table 7.

Where local institutions did not respond or returned incomplete data, the missing figures were estimated. All estimates were based on partial information: telephone conversations, reports considered as secondary sources, or actual data from preceding and following years. It was assumed that each such estimate would be nearer the true figure than a zero, given that a curriculum was known to have been offered. Some data sent by institutional personnel obviously were not prepared in accordance with instructions provided the respondents. Where necessary and possible, the forms were returned for clarification and correction.

No two of the 13 institutions visited used the same procedures for collecting, recording, and storing enrollment data. Some used a computer, some unit record equipment, some monthly reports from instructors, and some quarterly reports; some relied on registration information. More than one method had been used by many older institutions. Data collected by some previous method were seldom converted into a format consistent with the new method.

All institutions in the community college system were also asked to estimate by curriculum, their capacity for full-time students for the academic year 1970-1971. It was expected that such data aggregated to the state level would be useful in helping planners allocate resources, in that a surplus of existing facilities for a particular program might be used as a factor in deciding not to authorize other institutions to construct similar facilities. Thirteen of the 50 institutions did not report any capacity data, and returns from 11 other institutions were judged incomplete or unreliable. Of those institutions inviting the investigator to come and collect the data, most showed an inability to do more than guess at the capacity figures.

Therefore, the capacity data were not reported and are not considered further in this study.

Postsecondary MDTA Programs

The Department of Community Colleges is responsible for conducting Manpower Development and Training Act (MDTA) programs through its 50 institutions. MDTA is a 90 per cent federally subsidized program designed for unemployed or underemployed persons. Trainees receive a training allowance and are enrolled in classes lasting from six to 48 weeks. The program was initiated in 1963. Classes which were completed before May 1, 1966, were not included in this study because their graduates would have been in the labor force at the time the demand survey was conducted. In fiscal year 1969, 95 classes were projected for North Carolina.

Many MDTA classes train workers for occupations other than those under consideration here. Data were not collected for those other classes.

Enrollment and graduation figures are kept by both the Employment Security Commission and the Department of Community Colleges. For classes underway and classes to be completed by July 1, 1970, estimates of graduates and enrollments were made by the MDTA coordinator in the Department of Community Colleges. Enrollment and graduation figures for individual classes were summed and reported in this study by occupation and by year, in Table 1.

Postsecondary New Industry Programs

The Industrial Services Division of the Department of Community Colleges is responsible for organizing and funding short, intensive training programs for new and expanding industries in North Carolina. Representatives of this agency meet with industrial representatives to formulate a program tailored to meet the company's needs. One of the 50 institutions in the system then conducts the course. This type of class was sponsored by the state even before the Department of Community Colleges was formed in 1963. Classes which were completed before May 1, 1966, were not included in this study because their graduates would have been in the labor force at the time the demand survey was conducted.

Many New Industry classes train workers for occupations other than those under consideration here. Data were not collected for those other classes.

Enrollment estimates by class are kept by the Industrial Services Division. After a projected class has been authorized, the Division does not receive any after-the-fact data on whether the class actually is conducted, whether the estimated enrollment differs from the actual

enrollment, or on the number who completed the course. This information was obtained by the Statistical Services Division of the Department of Community Colleges, where it was collected on Form 33. Because students in these classes were not mixed with others, and because the enrollment volume involved was not prohibitive, enrollments and completions were taken directly from Form 33. In a few cases, estimated information greatly differed from Form 33 figures, and the institution conducting the class was asked for clarification.

For classes underway and classes to be completed by July 1, 1970, estimates of graduates and enrollments were made by the Director of the Industrial Services Division. Enrollment and graduation figures for the individual classes were added and reported in this study by occupation and by year, in Table 2.

Secondary Programs

The Division of Vocational Education in the Department of Public Instruction is responsible for approving curriculum allocations throughout the state, providing course outlines and supervisory services, and collecting enrollment data. The primary report emerging from these data is the annual activity report prepared for the U. S. Office of Education. The format allows students enrolled in a vocational program for more than one year to be counted each year they were enrolled. It does not ask for the number who completed the program.

The annual enrollment report is prepared from monthly attendance reports sent by each high school vocational instructor to the Division of Vocational Education. For this study, it was arbitrarily decided that any student completing the ninth month of the second full year of a vocational program would be considered a graduate. This decision excluded those who attended one of the two years the program was offered and those who attended less than half a day while enrolled in the program. It included those who completed the vocational program but did not graduate from high school for other reasons. When a particular school offered less than the full curriculum, no enrollees were reported as graduated.

Many secondary vocational curricula train workers for occupations other than those under consideration here. Data were not collected for those other classes. Only those years in which graduates matched the period of the demand survey were included in the comparisons.

Incomplete or inconsistent data were referred to the State Supervisor for Trade and Industrial Education. If he could not provide an answer, an estimate was made of the proper number. The estimate of graduates from programs underway at the time of the data collection was based primarily on the record of a particular curriculum in a particular school had shown in previous years.

The Division of Vocational Education also offers Industrial Cooperative Training (ICT) classes in which students from several curricula are grouped together for classroom work but receive shop and laboratory training on the job. Although some ICT students are enrolled in curricula leading to employment in occupations chosen for use in this study, the ICT students were not included in the supply.

No attempt was made to ascertain how many of the secondary enrollees switched from one curriculum to another. Such persons would be double-counted in the enrollment column and counted as non-graduates in each of the curricula. Similarly, no attempt was made to ascertain the number of secondary enrollees who eventually enrolled in postsecondary programs, again causing a double-count.

The secondary drafting curriculum was organized to span a three-year period. The third year offered a choice between the architectural and mechanical fields. A low number of third-year students made classifying all students into these two fields very difficult. In the list of 107 occupations, architectural and mechanical draftsmen were listed separately, so, based on a telephone conversation, it was decided to classify 75 per cent of the drafting enrollees as mechanical (Waters, 1969).

A similar situation was presented by the electricity-electronics curriculum. The Trade and Industrial Division listed 14 different courses in this broad field, so it was decided to classify 75 per cent of the electricity-electronics enrollees as potential electricians and the remainder as potential workers in electronics occupations.

Secondary enrollment and graduation data are shown in Table 3.

Synthesis of the Supply Data

Some of the 107 occupations are grouped together in Table 7 because the training system provides workers who can enter either occupation. The D.O.T. (1965) description of the occupation in these cases does not relate on a one-to-one correspondence to the curriculum description written for the educational program. Follow-up data showing the occupational title of students who completed such programs could either substantiate the groupings made in this study or show a one-to-one relationship. Some D.O.T. descriptions do not provide a sufficient basis for separating graduates of technical curricula from graduates of vocational curricula, although, from the educator's point of view, there should be a definite distinction.

Table 8 shows how these groupings are made, and Table 9 lists occupations for which no new workers are being trained by the educational system.

Supply data from all four sources were totaled for all pertinent years for each curriculum, in respective tables, and then transferred to Table 7. There they were added horizontally to produce total supply for each occupation.

Worker Demand Data

All 107 occupations surveyed in Employment Outlook for Selected Occupations in North Carolina, 1966-70 are listed in Table 7, along with the projected demand for each occupation for each occupational group. Other than corrections for clerical error, the demand figures were not modified or reorganized. This demand study was the fourth area skill survey to be attempted by the North Carolina Employment Security Commission and the second for manufacturing and construction industries. The accuracy of the 1962 demand projections can be evaluated by comparing them with actual 1966 employment figures. Similarly, the accuracy of the survey being used as demand data for this study can be evaluated by comparing it with actual 1970 employment figures when available. Such evaluation could lead to changes in survey methodology in order to make the third such study more accurate.

Somers (1968) reported that few employers responding to area skill survey requests for their worker needs forecast their own needs. This was also a problem encountered in the North Carolina surveys, in addition to the reluctance to divulge accurate figures when available, for fear of competitors' finding out about a company's plans.

In another conversation, it was reported that demand for workers in the construction industry is likely to be inflated by the fact that contractors base demand figures on the expectation of landing certain contracts in the bidding stage at the time of estimating demand. If four contractors simultaneously expect to be awarded the same job, it is possible that all four include the needed workers in their demand estimate.

Methodological problems such as these are of concern to the planner of occupational education, but adjusting for them in future surveys is the responsibility of the Employment Security Commission. The educator is responsible for developing a methodology for accurately counting and predicting the output of his own training system. This has not been done in North Carolina, and, therefore, this study represents the first detailed attempt to relate demand data reported in area skill surveys to supply data.

PRESENTATION AND ANALYSIS OF THE DATA

The collected data are discussed and analyzed in this section in light of the problem statement. Trends are point out here and used in the final chapter to draw inferences. Deficiencies in this approach to comparing supply and demand data are emphasized. Each of the four training sources of worker supply--postsecondary curricula, MDTA classes, New Industry classes, and secondary curricula--is discussed separately. Then, in order to show how they jointly contribute to satisfying reported worker demand, they are synthesized into Tables 4 and 7.

Postsecondary Curricula

Curricula are offered on both full-time and part-time bases. The organization of course offerings is the factor determining whether a particular program is considered a curriculum. Many institutions offer individual courses lifted from curricula when enough students register. Unless the institution intends to offer the full curriculum in a sequential order, and expects the students to think in terms of the entire curriculum, such offerings are not reported. Data for full-time curricula are recorded in Table 5, and data for part-time curricula are recorded in Table 6.

Because technical curricula generally take longer to complete than vocational curricula, technical graduates entering the work force during 1966-70 would have had to enroll a year earlier than their vocational counterparts. Part-time curricula also take longer to complete than full-time curricula; therefore, postsecondary curriculum entries in Table 7 are as follows:

Full-time vocational students:	Table 5, 1965-66 through 1969-70
Full-time technical students:	Table 5, 1964-65 through 1968-69
Part-time vocational students:	Table 6, 1964-65 through 1968-69
Part-time technical students:	Table 6, 1963-64 through 1967-68

The purpose of using these columns of data is to match the date of completion of the training program and the dates covered by the demand data. Asterisks in Tables 5 and 6 denote those curricula lifted and used in Table 7. Postsecondary curricula are preparing workers for only 47 of the 107 occupations listed in the demand data. These are the only ones discussed in the following sections. Figure 1 compares enrollments of the four types of postsecondary curricula, and Figure 2 compares percentages of completion of the same program.

Full-Time Vocational Students

All 1969-70 data and the number of graduates from the academic year 1968-69 are estimated. Of the 1,660 cells of information relating to individual institutions, 184 are estimated because data were

not furnished directly by the institutions. Whenever a figure was taken from a secondary source, or missing, an estimate is made. Enrollment during the five-year period shows continued growth, with predicted completion rates and enrollments for 1969-71 highly optimistic when compared to the trend. In chronological order, enrollments are 1,610, 2,240, 2,469, 2,827, and 3,869. A few curricula dominate the picture; the auto mechanics, machinist, welding, radio and television servicing, air conditioning and refrigeration mechanic, mechanical draftsman, and electrician curricula represent 5,965 (79.3 per cent) of the 7,525 graduates, even though there are 15 other curricula. The leader, auto mechanics, alone accounts for 2,105 (28 per cent) of the 7,525 graduates.

For all 22 full-time vocational curricula compared with the demand data, the annual percentages of completion, in chronological order, are 52.9, 49.7, 49.8, 62.4, and 66.3. The five-year cumulative percentage of completions is 57.8.

Matching the training programs to a particular occupation given in the demand data is not automatic. Reviews of the D.O.T. description and the curriculum guide do not provide an obvious match, and some decisions were made arbitrarily. Matchings are shown in Table 8.

Full-Time Technical Students

All figures for graduates from classes enrolled in the academic years 1967-68 and 1968-69 are estimated. Of the 776 cells of information relating to individual institutions, 75 are estimated, because data were not furnished directly by the institutions. Seventeen full-time technical curricula are related to the demand data. Despite slightly more than doubled enrollment during the five-year period, enrollment in these curricula shows irregular growth. Chronologically, enrollments are 889, 1,447, 1,483, 1,942, and 1,769. Four of the curricula (electronics, mechanical drafting and design, business data processing, and civil technology) graduated 2,234 (74.7 per cent) of the 2,992 graduates from these 17 curricula during the five-year period.

Taken together, the annual percentages of completion from these curricula are 34.7, 35.9, 36.1, 38.8, and 49.5, respectively. The five-year cumulative percentage of completions is 39.7. The fifth-year percentage resulted from estimated retention of students who had been enrolled for only one quarter of a six-quarter program at the time the estimate was made.

As with vocational curricula, some matching of curricula with occupations requires arbitrary decisions. Matchings are shown in Table 8.

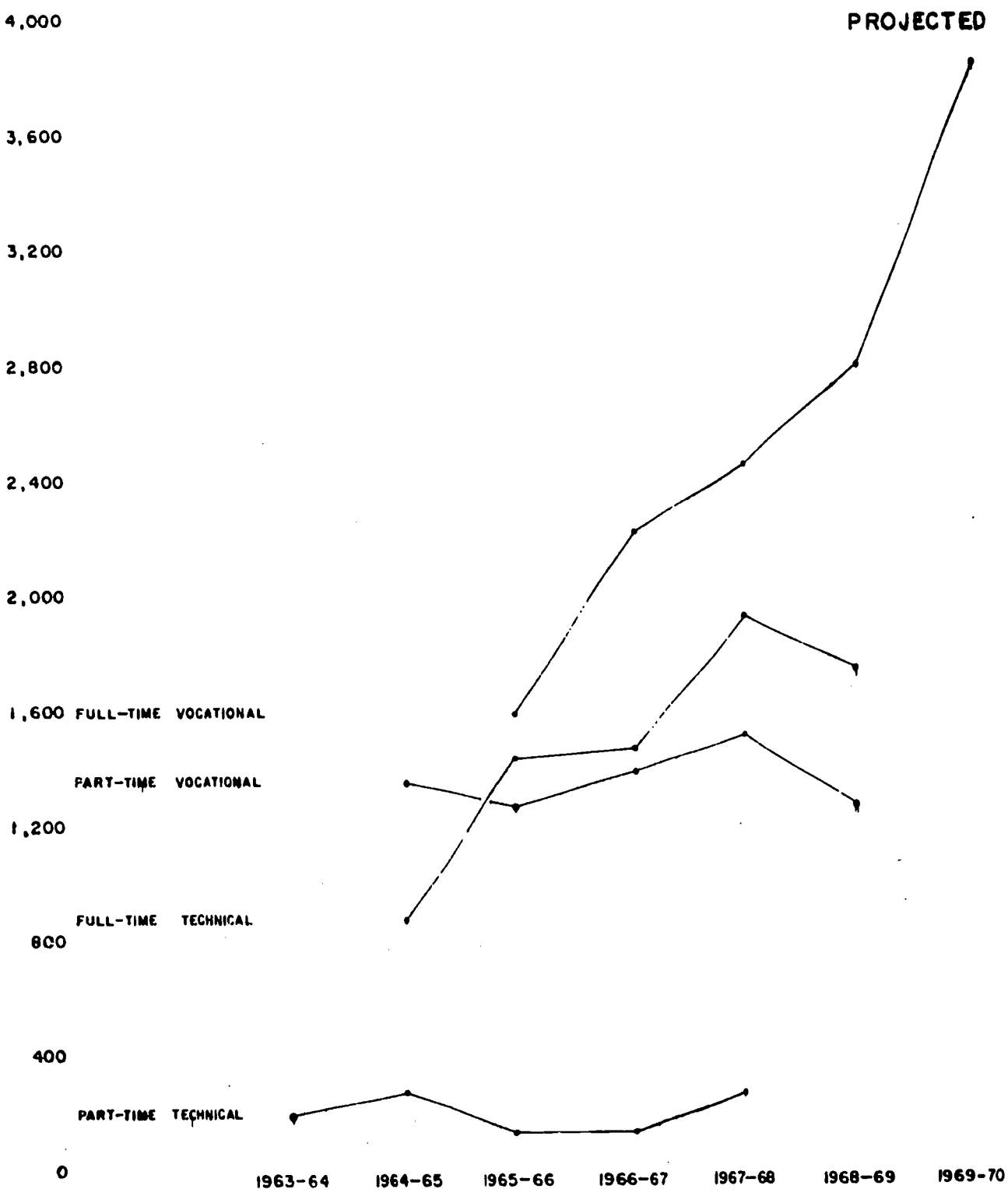

FIGURE 1

ENROLLMENT IN FOUR TYPES OF SELECTED POSTSECONDARY CURRICULA,
NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES

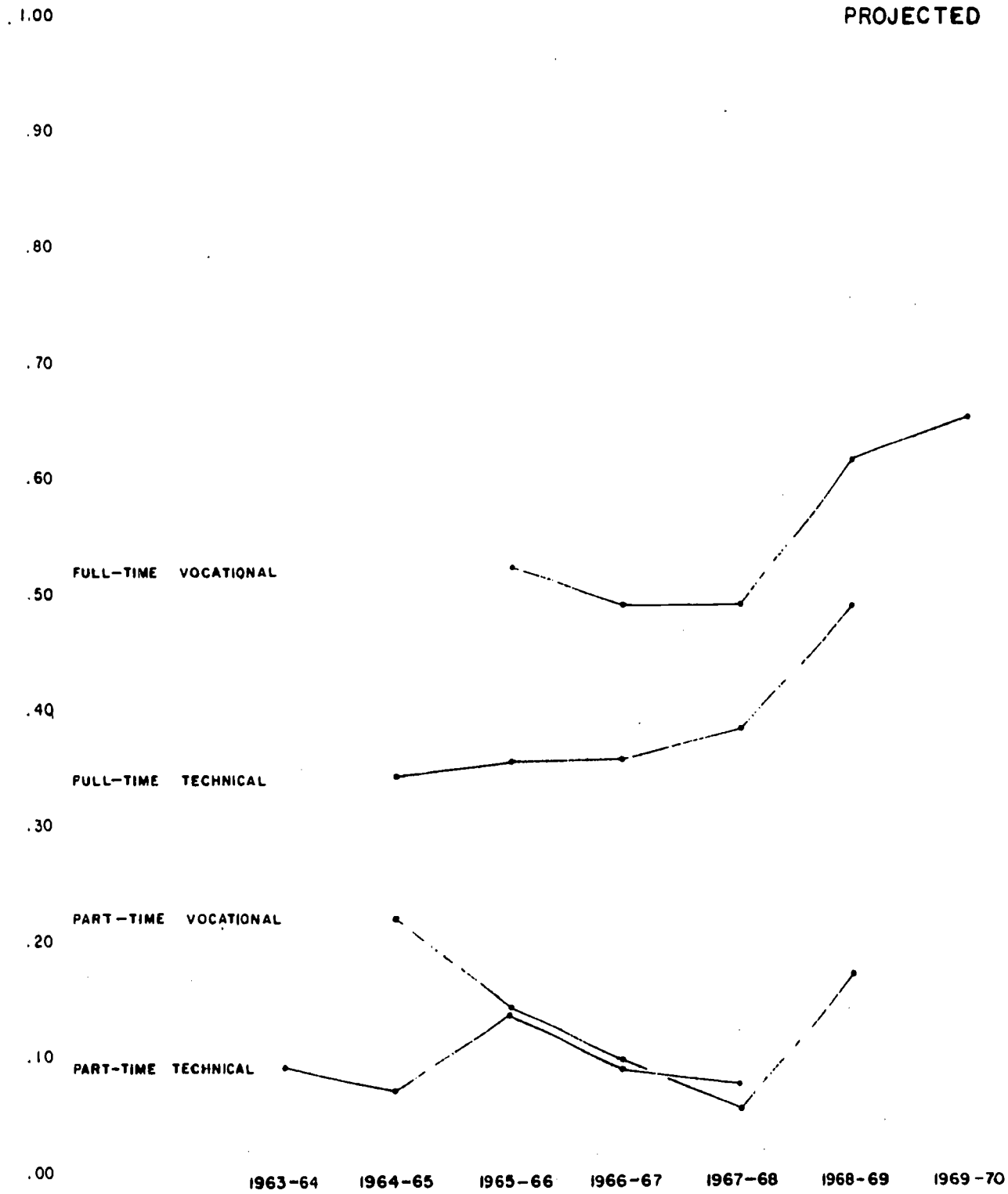

FIGURE 2

PERCENTAGES COMPLETING FOUR TYPES OF SELECTED POSTSECONDARY CURRICULA, NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES

Part-Time Vocational Students

Twenty-two vocational curricula which matched the demand data were offered. In contrast, however, to 13,015 full-time vocational students enrolled, only 6,871 part-time vocational students were enrolled. The numbers of graduates from classes enrolling in the academic years 1967-68 and 1968-69 are estimated, as well as 176 of the 724 cells of information relating to individual institutions.

Enrollment over the five-year period was relatively stable. The fifth-year enrollment was five per cent less than the first year. Chronologically, enrollments were 1,361, 1,280, 1,402, 1,537, and 1,291. When examined curriculum by curriculum, eight of the 22 never enrolled more than 40 new students in any year; three others (auto mechanics, mechanical drafting, and machinist) show a strong decline; and three others (building trades drafting, welding, and masonry) show a strong increase. Upholstering, auto mechanics, and machinist account for 480 (51 per cent) of the 942 graduates from all the part-time vocational curricula.

The annual percentages of completion from these programs, in chronological order, are 22.3, 14.5, 10.0, 5.8, and 17.4, with a cumulative five-year rate of 13.7 per cent. The rate for the fifth year results from estimating the retention of students who were enrolled for only one quarter of what would normally be at least an eight-quarter program.

The matching of training programs with occupations is the same as for full-time vocational curricula.

Part-Time Technical Students

Fourteen technical curricula which matched the demand data were offered. In contrast to the 7,530 full-time technical curricula students enrolled, only 1,052 persons enrolled in part-time technical curricula. The number of graduates from classes enrolled in the academic years 1966-67 and 1967-68 is estimated, as well as 30 of the 150 cells of information relating to individual institutions.

Enrollment over the five-year period is erratic when examined at the state total. Chronologically, it is 204, 284, 142, 143, and 279. No curriculum shows as many as 70 new enrollees in a given year. Only five of the 14 enrolled new students in every one of the five years, and seven never enrolled as many as 20 new students in any year. Of the 95 graduates, electronics and mechanical drafting and design account for 70 (73.7 per cent).

The annual percentages of completion from these programs, in chronological order, are 9.3, 7.4, 14.1, 9.2, and 7.9 with a cumulative five-year rate of 9.0 per cent.

The matching of training programs with occupations is the same as for full-time technical curricula.

Postsecondary MDTA Programs

Table 1 contains all the figures regarding MDTA programs which are pertinent to this study. All figures for 1969-70 and the completion figures for 1968-69 classes are estimated. The table shows a severe cutback in programs after 1965-66, followed by growth and a tendency to train more persons for fewer occupations. Of the 3,573 graduates over the entire five-year period, 2,382 (66.7 per cent) of them represent five occupations: welder, bricklayer, carpenter, auto-truck mechanic, and electrician.

The percentages of completion for each of the five years, in chronological order, are 62.1, 54.2, 59.9, 69.9, and 77.0. The five-year cumulative percentage of completions is 65.7.

Because MDTA programs are organized to train persons for a particular occupation and the contracts name the occupation, the assignment of a class to one of the 107 occupations under consideration presents no problem. Matchings are shown in Table 8.

Postsecondary New Industry Programs

Table 2 contains all the data regarding New Industry classes which apply to this study. All figures for 1969-70 and for completions in 1968-69 were estimated by agency personnel. The table shows continued growth in the number of persons trained for the pertinent occupations. Of the 7,609 graduates over the entire five-year period, 5,491 (72.2 per cent) of them represent three occupations: assembler of electrical accessories, general machine operator, and electronics assembler.

The percentages of completion for each of the five years, in chronological order, are 90.5, 91.9, 99.2, and 97.8. The five-year cumulative percentage of completions is 96.1.

Because New Industry classes are organized to meet the employment needs of individual companies, these programs provide a narrow, intensive training which is sometimes restricted to a single machine or operation. This presents a problem in matching programs with occupations, because the D.O.T. definition of some of the occupations is broader than the training given. The three occupations dominating this method of training are all affected by this problem. The problem is lessened when occupational groupings are studied. Matchings are shown in Table 8.

TABLE 1

ENROLLEES AND GRADUATES OF CLASSES FUNDED THROUGH MANPOWER DEVELOPMENT AND TRAINING ACT (MDTA) CONTRACTS, NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES, FOR SELECTED OCCUPATIONS

Occupation	1965-66		1966-67		1967-68		1968-69		1969-70		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Automobile Body Repairman	88	55	0	0	0	0	60	45	60	45	208	145
Automobile-Truck Mechanic	161	114	92	51	160	94	0	0	160	130	573	389
Bricklayer	488	333	20	8	42	18	80	60	180	150	810	569
Carpenter	364	192	18	10	58	39	80	45	180	150	700	436
Chemical Operator II	20	11	0	0	0	0	0	0	0	0	20	11
Construction Equipment Mechanic	37	25	21	12	0	0	0	0	0	0	58	37
Draftsman, Architectural	22	12	0	0	0	0	70	35	0	0	92	47
Draftsman, Mechanical	21	17	0	0	0	0	0	0	0	0	21	17
Electrical Appliance Repairman	20	13	0	0	0	0	0	0	60	45	80	58
Electrical Appliance Serviceman	15	10	0	0	0	0	0	0	0	0	15	10
Electrician	245	163	0	0	62	50	110	65	60	45	477	323
Electronics Assembler	0	0	0	0	30	28	0	0	0	0	30	28
Electronics Mechanic	0	0	0	0	18	13	0	0	0	0	18	13
Lineman, Construction	37	33	0	0	0	0	20	18	40	30	97	81
Machine Operator, General	135	81	0	0	0	0	0	0	100	60	235	141

TABLE 1 (continued)

Occupation	1965-66		1966-67		1967-68		1968-69		1969-70		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Plumber	155	69	0	0	62	39	40	25	40	21	297	154
Sewing Machine Repairman	21	12	17	13	41	23	40	32	40	30	159	110
Sheet Metal Worker	77	50	0	0	0	0	0	0	40	25	117	75
Tester, Systems	64	42	0	0	0	0	0	0	0	0	64	42
Upholsterer II	0	0	66	23	46	34	60	30	60	40	232	127
Welder	111	60	231	131	227	109	205	180	220	185	994	665
Woodworking Machine Operator II	22	14	18	14	38	23	20	14	40	30	138	95
Totals	2,103	1,306	483	262	784	470	785	549	1,280	986	5,435	3,573

TABLE 2

ENROLLEES AND GRADUATES OF CLASSES FUNDED THROUGH THE INDUSTRIAL SERVICES DIVISION, NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES, FOR SELECTED OCCUPATIONS

Occupation	1965-66		1966-67		1967-68		1968-69		1969-70		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Assembler of Electrical Accessories	157	128	881	832	365	364	375	360	500	490	2,278	2,174
Cabinetmaker	0	0	0	0	4	4	0	0	0	0	4	4
Chemical Operator II	4	4	4	4	0	0	25	25	50	50	83	83
Compression-Molder, Plastics	19	18	0	0	12	12	25	25	25	25	81	80
Coremaker	0	0	0	0	24	24	0	0	0	0	24	24
Draftsman, Mechanical	0	0	6	6	0	0	0	0	0	0	6	6
Electrician	0	0	0	0	2	2	0	0	0	0	2	2
Electronics Assembler	100	100	31	25	431	431	300	290	350	345	1,212	1,191
Extruder Operator, Plastics	0	0	12	12	0	0	25	25	25	25	62	62
Floor Layer	0	0	0	0	5	5	0	0	0	0	5	5
Inspector, Systems	0	0	17	17	0	0	50	50	75	70	142	137
Instrument Repairman I	18	18	0	0	0	0	50	50	75	70	143	138
Knitting Machine Fixer	6	6	0	0	0	0	30	30	50	50	86	86
Loom Fixer	29	29	0	0	40	40	15	15	15	15	99	99
Machine Fixer, Textiles	0	0	21	20	26	26	0	0	0	0	47	46
Machine Operator, General	465	429	165	148	327	324	500	490	750	735	2,207	2,126

TABLE 2 (continued)

Occupation	1965-66		1966-67		1967-68		1968-69		1969-70		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Machinist I	0	0	30	29	0	0	50	50	150	145	230	224
Plumber	0	0	0	0	2	2	0	0	0	0	2	2
Sewing Machine Repairman	0	0	0	0	4	4	10	10	10	10	24	24
Sheet Metal Worker	16	16	78	78	58	52	100	100	150	145	402	391
Tester of Electronic Components	55	50	55	38	0	0	0	0	0	0	110	88
Tool and Die Maker	13	12	18	6	7	7	10	10	10	10	58	45
Tool Grinder Operator	10	10	0	0	0	0	10	10	25	25	45	45
Upholsterer II	21	15	0	0	0	0	0	0	0	0	21	15
Welder	115	95	53	44	0	0	50	50	100	100	318	289
Woodworking Machine Operator	4	4	17	17	7	7	50	50	150	145	228	223
Totals	1,032	934	1,388	1,276	1,314	1,304	1,675	1,640	2,510	2,455	7,919	7,609

Secondary Programs

Table 3 is a state summary of curricula conducted in secondary schools to train persons for the occupations reported in the demand data, for the five-year period covered by this study. The number of graduates from academic years 1967-68 and 1968-69 is estimated. Of the 2,688 cells of information relating to individual schools, 122 are estimated because data were not available. Most of the curricula are offered for two academic years, with students attending the vocational classes three hours per school day. Such a schedule provides 1,080 hours of instruction. The three-hour block is not used in all schools, either a one-hour or two-hour schedule being used for vocational classes. A student under this arrangement does not have the opportunity to complete the 1,080 hours and is not reported as a graduate in this study.

An exception to this time format is the drafting curriculum, spread over a three-year period, for a total of 900 hours. Where the records show that a student completed 900 hours, he is reported as a graduate. The drafting curriculum produces few graduates, as reported in Table 3.

Curricula in the secondary schools are preparing workers for only 14 of the 107 occupations listed in the demand data. Enrollment during the five-year period shows continued growth of at least ten per cent every year, after a jump from the first to the second year of over 100 per cent.

The bricklaying curriculum accounts for 46.1 per cent of all the graduates. The carpentry curriculum accounts for 23.4 per cent. The electricity–electronics and automotive curricula account for 19.6 per cent of the graduates, leaving only 10.9 per cent of the graduates coming from the other ten curricula. Although the drafting curriculum produces few graduates, it enrolled more students than the bricklaying curriculum during each of the last two years of the period studied and 91.1 per cent of the total number of bricklaying enrollees. Of the entire five-year enrollment, 53.5 per cent of the students are represented by these two curricula.

For all 14 curricula, the annual percentages of completion, in chronological order, are 35.2, 25.2, 25.9, 29.6, and 32.1. The five-year cumulative percentages of completions is 29.0. Figures for the 13 curricula other than drafting show annual completion percentages of 36.9, 31.8, 33.2, 41.1, and 44.9, with a five-year cumulative percentage of completions of 38.2.

As with the postsecondary curricula, there is some difficulty in matching training programs with occupations, specifically for the drafting and electrical occupations. The resolution of this problem is implemented when data from Table 3 are transferred to Table 7.

TABLE 3

ENROLLEES AND GRADUATES OF CLASSES
FUNDED THROUGH THE VOCATIONAL DIVISION
NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION, FOR SELECTED OCCUPATIONS

Occupation	1964-65		1965-66		1966-67		1967-68		1968-69		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Automobile Body Repairman	0	0	0	0	0	0	37	12	15	8	52	20
Automobile-Truck Repairman	403	145	490	160	693	255	802	283	981	436	3,369	1,279
Bricklayer	1,453	635	2,710	1,055	2,563	1,145	2,547	1,380	2,799	1,549	12,072	5,764
Cabinetmaker	75	21	132	45	276	64	298	87	232	97	1,013	314
Carpenter	701	221	1,472	459	1,696	597	1,809	735	2,066	911	7,744	2,923
Draftsman, Architectural (25%); Mechanical (75%)	153	0	1,758	43	2,470	120	3,144	39	3,471	48	10,996	250
Machine Operator, General	270	92	229	82	362	68	353	115	328	134	1,542	491
Plumber	0	0	29	20	40	19	45	17	57	30	171	86
Refrigeration Mechanic	19	6	8	7	3	2	0	0	0	0	30	15
Sheet Metal Worker	27	2	22	2	22	1	11	5	16	6	98	16
Tester, Systems (25%); Electrician (75%); Electric Motor Repairman	5	4	7	0	0	0	0	0	10	4	22	8
Electricity-Electronics	205	33	842	80	1,316	165	1,449	387	1,704	508	5,516	1,173

TABLE 3 (continued)

Occupation	1964-65		1965-66		1966-67		1967-68		1968-69		5-Year Totals	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Radio and TV Serviceman	0	0	57	2	0	0	0	0	0	0	57	2
Welder	30	18	68	15	130	41	90	36	101	50	419	160
Totals	3,341	1,177	7,824	1,970	9,571	2,477	10,585	3,096	11,780	3,781	43,101	12,501

Synthesis of Training Programs onto Table 7

Curriculum totals from all four sources of trained workers are taken from their respective program tables and transferred to Table 7 in the Appendix. Where no workers are trained, a zero is entered to emphasize this situation.

The problem of matching training programs to occupations has been discussed. Now a new problem arises. In totaling the four sources of trained workers to obtain "Total Supply," it was assumed that a person completing one type of training program is as qualified to fill a job as one completing a different type of training program. For instance, the occupation "Draftsman, mechanical" contains postsecondary curriculum graduates from both Mechanical Drafting and Design Engineering Technology (with approximately 1,650 hours of instruction) and a class in the New Industry training category (with approximately 850 hours of instruction). Although graduates from both programs may well enter the work force with the same job title, the graduate from the technical curriculum would generally be expected to obtain promotions faster and to have a broader capacity.

This situation of dissimilar training programs leading to the same occupation also occurs in the machine operator-machinist occupation and in the grouped occupational category including systems inspector, electronics components tester, and systems tester.

The four sources of trained workers were summed to arrive at total supply for each row of occupations listed in Table 7. Limitations of the study discussed earlier prevent a row-by-row judgment of the degree to which the demand for workers in each occupation is being met by the training system.

Forty-four occupations (representing a demand for 9,657 workers) have no pre-employment training programs supplying new workers. The extent to which extension courses or spillover from other training programs meet this need is unknown. When compared with the total demand for 61,494 workers, this group represents 15.7 per cent of the total demand. Occupations in this category, each with demand numbers of 700 or more, are pipe layer, cost estimator, cement mason, and pipefitter-steamfitter I.

Twenty-nine other occupations enroll fewer trainees than the demand figures show. If all of these enrollees actually become employed in the occupations for which they commenced training, the occupations will still be short 16,903 workers. Those occupations in this category with an excess of demand over enrollees of 1,500 or more are operating engineer, sheet-metal worker, woodworking machine operator, and upholster (furniture) II. When compared with the total demand of 61,494 workers, this shortage accounts for 27.5 per cent of the total demand.

To the extent that the demand data are accurate, and excluding spillover, 43.2 per cent of the demand can not be met by the training system.

The other 34 occupations each show an excess of enrollees over demand, but the number of the enrollees who actually do satisfy the demand is not known. Neither the number who completed training and are employed in the occupation for which trained nor the number of drop-outs who are employed in the occupation for which they are partially trained is known. The demand for these 34 occupations is 27,880, with 77,646 persons enrolling in courses leading to employment in these occupations. Yet there is no basis for saying that this enrollment yields the 27,880 workers needed. Occupations in this category enrolling 6,00 students more than the reported demand are bricklayer, mechanical draftsman-tool designer, and auto-truck mechanic. Seven other occupational rows show an enrollment exceeding demand by more than 1,500 each.

Thus, while the first two categories of occupations show shortages of 9,657 and 16,903 workers, respectively, the third category shows almost 50,000 enrolled in programs leading to jobs with no reported demand.

Summary of Supply and Demand into Occupational Groupings

The occupations listed in Table 7 are summarized into 15 occupational groupings in Table 4. The grand total shows that more persons are enrolled than the total reported demand and that 57.2 per cent of the reported demand (35,199 persons) complete their training program. For the five-year period, 33.5 per cent of the enrollment is in post-secondary curricula, 6.4 per cent in MDTA programs, 9.3 per cent in New Industry classes, and 50.7 per cent in secondary programs. These enrollments do not reflect the total effort of any one of these sources of trained workers, but only those programs which lead to employment in the occupations reported in the demand data.

The percentages of completion for each of the four sources of supply, for each year, are shown in Figure 3. The overall completion percentage for all enrollees is 41.5. This includes 40.6 per cent of the postsecondary curriculum students, 65.7 per cent of the MDTA students, 96.1 per cent of the New Industry students, and 28.9 per cent of the secondary students. This ranges from 100 per cent of enrollees in the mental processing and foundry occupational grouping (exclusively New Industry) to 12.7 per cent of enrollees in the drafting and design occupational grouping (dominated by secondary programs).

A comparison of supply and demand is again limited to the enrollment part of the supply information. Four occupational groupings each show an enrollment of over 4,000 persons more than the demand data call for: drafting and design, electrical equipment assembly and repair, mechanical and machinery repair, and construction and related.

Two occupational groupings show an enrollment of more than 1,200 persons less than the demand: upholstery and textile machine worker.

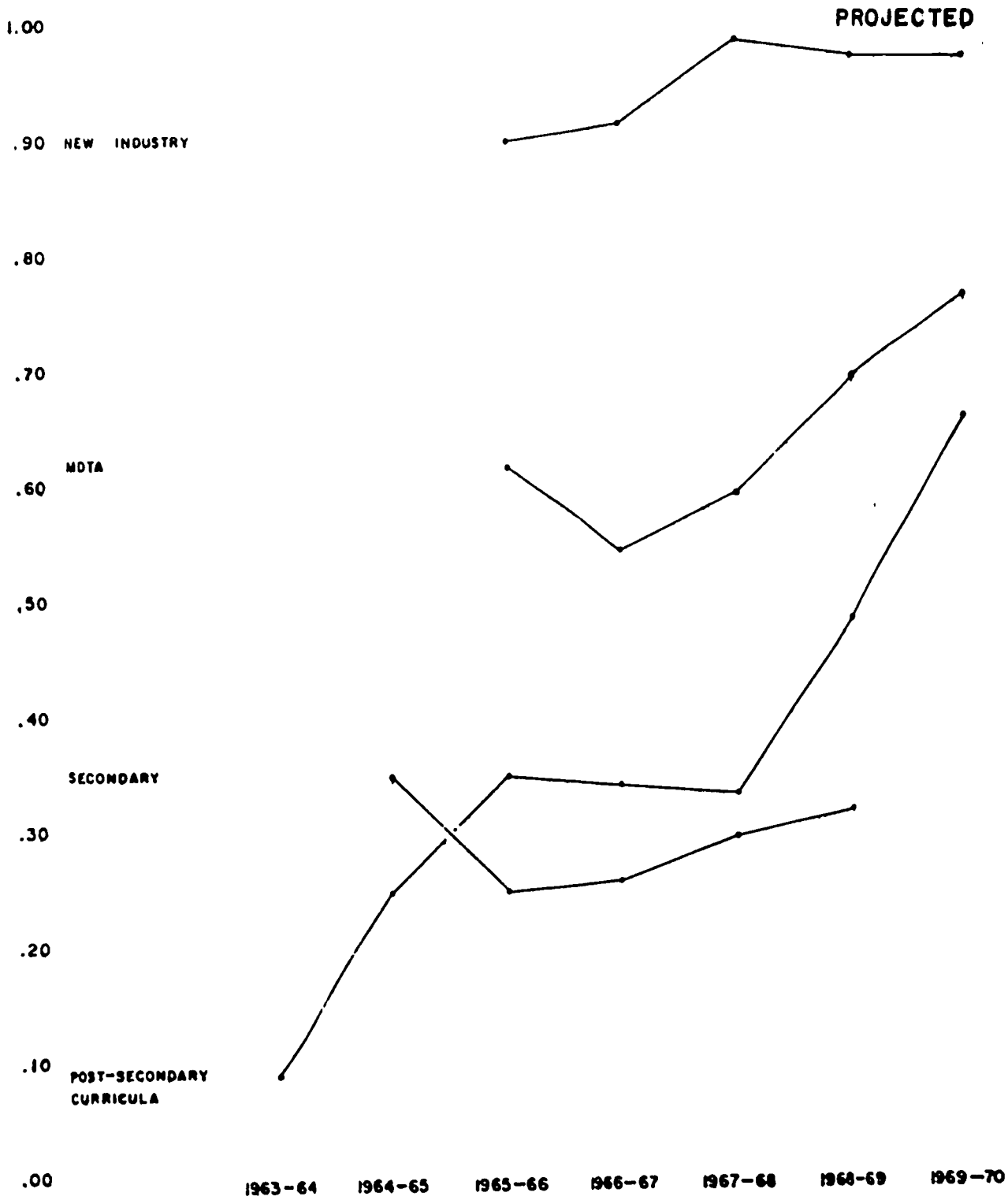

FIGURE 3

PERCENTAGE OF COMPLETIONS, BY TYPE OF PRE-EMPLOYMENT PROGRAM, IN NORTH CAROLINA

TABLE 4

SUPPLY AND DEMAND OF TRAINED WORKERS
IN NORTH CAROLINA, 1966-1970, FOR SELECTED OCCUPATIONAL GROUPINGS

Occupational Group	Post-Secondary Curricula		MDTA Classes		New Industry Classes		Secondary Curricula		Total Supply		Demand	Difference	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr		Excess supply	Excess demand
Drafting and Design	4,487	1,654	113	64	6	6	10,996	250	15,602	1,974	2,089		115
Architectural and Engineering	4,522	1,735	0	0	0	0	0	0	4,522	1,735	3,356		1,621
Mathematics and Physical Science	1,784	545	0	0	0	0	0	0	1,784	545	2,115		1,570
Metal Processing and Foundry	0	0	0	0	24	24	0	0	24	24	583		559
Chemical and Plastic Processing	241	77	20	11	226	225	0	0	487	313	302	11	
Metal Machining and Metal Working	2,752	1,283	235	141	2,540	2,440	1,542	491	7,069	4,355	6,630		2,275
Mechanical and Machinery Repair	6,811	3,136	790	536	24	24	3,359	1,262	10,984	4,958	6,312		1,354
Wood Machinery	0	0	138	95	232	227	1,013	314	1,383	636	4,007		3,371
Textile Machine Work	223	53	0	0	232	231	0	0	455	284	1,822		1,538
Measuring and Controlling Instrument Repair	14	1	0	0	143	138	0	0	157	139	198		59
Electrical Equipment Assembly and Repair	1,643	604	174	128	3,742	3,590	1,299	293	6,958	4,615	1,085	3,530	
Upholstery	363	192	232	127	21	15	0	0	616	334	2,216		1,882
Metal Fabricating and Welding	3,054	1,144	1,319	885	720	680	569	196	5,662	2,905	6,279		3,374
Electrical Installing and Repair	1,299	569	607	427	2	2	4,196	880	6,104	1,878	5,567		3,689
Construction and Related	1,275	565	1,807	1,159	7	7	19,987	8,773	23,076	10,504	18,933		8,429
												3,541	29,836
													-3,541
Totals	28,468	11,558	5,435	3,573	7,919	7,609	43,061	12,459	84,883	35,199	61,494		26,295

SUMMARY AND RECOMMENDATIONS

The purposes of this study were to obtain and analyze data on the supply and demand of workers for selected occupations in North Carolina for the period 1966-1971 and to develop a procedure for planning programs of occupational education at the state level. The extent to which these purposes were accomplished is discussed below, and recommended policy options leading to further refinement follow in this section.

The purposes were partially accomplished. Data not previously collected were collected and organized. Before the initiation of this study, there had been no organized attempt to assemble data showing the output of the training system. Prior emphasis was placed on input--enrollment--and many postsecondary institutions did not have readily available counts of their output by year or by program. This study produced a sufficiently accurate account of what happened and what is expected to happen for the remainder of the five-year period. Follow-up data were identified as the element most needed for evaluating the effectiveness of the system's output.

Unduplicated headcount data from both the secondary and postsecondary programs were obtained and woven together so that a total effort could be examined. For the first time, these program data were aligned with demand data in order to obtain a measure of whether the supply from the training system was adequate.

The procedure was initiated for only manufacturing and construction occupations; health, business, and service occupations were omitted from the study. The absence of follow-up data was the major barrier to the complete accomplishment of the purposes of this study in that only very general judgments can be made without such data.

Some facts concerning the operation of occupational education programs with respect to supply and demand relationships have become clear as a result of this research.

1. The formula for allocating state funds to institutions is based solely on enrollment.
2. The pupil reporting system was developed only to measure enrollment.
3. No procedures exist for measuring output.
4. Fifty different pupil accounting procedures and record-keeping systems are being used.
5. No previous matches of supply and demand data have been made.
6. Few curricula limit enrollment.
7. Previous estimates of completions far exceed actual completions.
8. New Industry programs are conducted to meet an immediate demand and are usually more responsive to sudden changes in demands.
9. No follow-up data are kept on drop-outs or graduates of the occupational education curricula.

Recommended Policy Options

The full accomplishment of the purposes of this study would require more work to be done, hopefully in a manner generalizable to all occupations and to other states. Both the State Board of Education and the agencies responsible to it are constantly faced with policy options, the resolution of which could lead to the establishment of procedures for emphasizing program output and evaluation.

It would seem logical for the State Board to consider a series of policy options which, when taken together, would formulate its position on the need for output information and evaluation procedures. Each of the following items lists two or more options from which the board could consider as its position.

(1) Basis for budgeting:

- a. The current practice of budgeting on the basis of enrollment could be continued.
- b. A substitute formula for budgeting based on program output (quantitative) could be developed and implemented.
- c. A substitute formula for budgeting based on program quality could be developed and implemented.
- d. A substitute formula for budgeting based on any two (or all three) of the factors--enrollment, output, quality--could be developed and implemented.

(2) Adoption of long-range planning:

- a. Long-range (at least five years ahead) planning could be established and used in making program allocation and funding-level decisions.
- b. Program allocation decisions could continue to be made on a short-range basis.

(3) Use of occupational demand data:

- a. Reported demand by occupation could be balanced by enrollment in matching curricula.
- b. Reported demand by occupation could be ignored as a factor in controlling the number of enrollees in the various curricula.

(4) Agency coordination:

- a. The planning of occupational programs could be coordinated between the two agencies under the board's jurisdiction.
- b. The planning of programs could continue to be done independently by the two agencies.

(5) Disposition of part-time curricula:

a. Part-time postsecondary curricula could continue to be funded without regard to effectiveness.
b. Part-time postsecondary curricula could be evaluated and funded based on some measure of effectiveness.
c. Alternative programs which might better meet the needs of those persons who enroll in part-time postsecondary curricula could be developed and tested.

(6) Graduation value:

a. The desirability of having students complete their training program could be emphasized.
b. The desirability of completion could be ignored.

If the State Board of Education were to make a commitment to the long-range planning of occupational education programs, the succession of policy options listed here and the data collected for this study could become the foundation for measuring program effectiveness.

Changes in the present administration of occupational education brought about by the selection of policy options listed here would require additional funds for implementation. Assuming that legislation or board policy requiring additional effort should also provide the resources necessary for carrying out the effort, three possible federal sources of funds for establishing follow-up and evaluation procedures can be considered.

Before passage of the Vocational Education Act of 1963, federal legislation had required local and/or state follow-up studies of vocational enrollees. This was seldom carried out, principally because federal funds were not specifically earmarked for this purpose. The Rules and Regulations for Administering the Vocational Education Act of 1963 contains several sections which could be used as a justification for applying for funds to carry out a follow-up study: 104.13(k), guidance and counseling; 104.13(m), evaluation; 102.20, research, demonstration and experimental programs; and 104.21, state and local supervision. The greatly increased federal appropriations beginning in 1963 now provide the means for accomplishing this neglected activity.

Title V of the Elementary and Secondary Education Act provides for strengthening the services of state departments of education. The Vocational Division of the Department of Public Instruction and the Department of Community Colleges are both eligible for Title V money. Local participation is acceptable, too.

The Bureau of Manpower Administration funds individual and institutional research projects relating to manpower, including occupational education. The initial tie with MDTA programs has been broadened to include a wide range of manpower problems.

SUMMARY

This study was partially successful in developing a procedure for using supply and demand data as a major factor in making resource allocation decisions in occupational education. The two barriers to greater success were the absence of follow-up data and the problems found in matching occupations and training programs. The second of these problems is believed to be near solution by means of a conversion matrix. The solution to the lack of follow-up data depends primarily on commitment and the resources to carry out the commitment. It is believed that the recommendations in this section provide a logical framework for solvirg this problem, too.

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APPENDICES

APPENDIX A

CLARIFICATION NOTES FOR FORM 1

1. Institutions operating in those years prior to the establishment of the DCC system should report as if they belonged to the system since July 1, 1957.

2. College-parallel, MDTA, occupational extension, New Industry, and adult education enrollment are not be to included on this report.

3. List curricula in the order in which they were first offered.

4. Certificate programs (regardless of length) should be reported if they were offered as pre-employment training, but not if they were offered as extension training.

5. This report is <u>not</u> intended to show how many students were enrolled in your institution during a given year, but only first-time enrollees. Students admitted to curricula in advanced quarters should be reported as enrolled in the year in which their class enrolled.

6. A figure showing the graduation of a student who attended more than one year would be reported in the column headed by the year in which he enrolled, not the year in which he graduated.

7. For enrollments in years previous to the adoption of the present program codes, respondents should assign the most appropriate of the current program codes.

8. Special students enrolled in curriculum courses without intending to graduate should not be reported.

9. If a student has been enrolled in a curriculum on both a full-time and a part-time basis, the respondent may report him in either category, but not both.

10. When it is known that a student has been enrolled in more than one curriculum, he should be reported only under the last curriculum in which he enrolled.

11. When it is known that a student has been enrolled at more than one institution in the DCC system, he should be reported only at his last institution, even though he may have attended a previous institution longer.

12. In the early years curricula were offered to full-time high school students on a part-time basis. Such enrollees should be reported in the part-time column.

13. In the early years the length of curricula and the level (vocational or technical) were sometimes changed in mid-year. Such cases should be assigned a program code describing the way they ended.

14. Beginning with the graduation of first-year technical enrollees of 67-68, the graduation of vocational enrolless of 68-69, and the number of enrollees for 69-70, estimate your figures based on your attrition, history, and plans. The number of graduates from part-time curricula in progress will also need to be estimated.

APPENDIX B

GUIDELINES FOR ESTIMATING CAPACITY

1. Disregard student interest, availability of qualified instructors, and availability of current expenses.

2. Assume that the facility will be available for full-time curriculum programs up to fifty hours per week (M-F 8 a.m.-5 p.m., S 8 a.m.-1 p.m.). The number of lab and shop groups which can be accommodated during this block varies by curriculum.

3. Assume your present construction plans, if any, and proceed on the schedule you have set up, regardless of whether they are already funded.

4. Assume enrollment goals for each curriculum will be made in multiples of 4. This will reduce clerical error on my part and should make it easier for you to plan lab and shop section sizes. Where there are alternative curricula which could be expanded to get to capacity, choose the pattern which you would prefer the institution to follow.

5. In the column following 1970-71, list the combined first- and second-year projections of full-time enrollment needed to get to capacity.

APPENDIX C

TABLES 5 - 9

TABLE 5

FULL-TIME STUDENT HEADCOUNT, NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES

Academic Year	1959-60		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Commercial Graphics																					15	12	16	12
Dyeing & Bleaching											21	13	28	20										
Looping	220	129	148	89	64	37	44	27			20	14	25	18	27	20								
Seaming																								
Sew. Mach. Oper.									48	36	37	24	22	14										
Stenography															55	32	41	13	12	6				
*V01 Auto Body Rep.							9	0	9	2	7	0	17	8	36	17	57	29	92	60	140	88	171	120
*V03 Auto Mech.					22	13	119	33	211	97	338	145	439	263	612	299	720	354	785	509	1,004	680	1,165	823
*V04 Aircraft Mech.																			15	0	80	44	90	63
V05 Bldg. Maint.																					17	8	15	10
V06 Bldg. Materials																	5	1						
*V07 Carpentry							4	0	0	0	17	2	40	13	17	6	11	4	34	22	66	46	72	53
V09 Cosmetology							41	23	78	59	66	50	73	61	94	77	120	100	284	248	423	335	448	363
V11 Dental Asst.					13	11	9	8	26	18	66	44	55	33	61	39	61	38	83	61	112	85	134	105
*V13 Diesel Maint.									3	2	12	8	37	25	19	24	47	27	54	35	71	46	78	49
V14 Draft.- Furn.					4	1	6	3																
*V15 Draft.-Bldg. Tr.					6	0	8	2	3	0	24	12	64	35	66	33	73	42	112	78	156	107	172	115
*V17 Draft.-Mech.	3	3	16	11	2	1	21	6	27	12	61	26	125	42	225	88	134	78	159	110	224	156	259	185
*V18 Electrical Inst. & Maint.									41	21	82	44	69	31	93	55	133	66	218	137	303	203	181	275
V20 Farm Machinery					16	8	20	7	9	3	12	3	5	5	11	4	9	5	0	0	0	0	15	12
V22 Graphic Arts-Printing									11	7	17	15	14	9	18	7	15	6	27	13	18	11	18	13
*V24 Air Cond. & Refr.	14	0	21	11	28	16	30	8	69	36	114	46	130	65	163	76	161	84	204	112	216	142	280	192
V25 Sawyer																							20	14
*V26 Heavy Eq. Mech.															19	9	17	9	29	17	33	18	33	18
V27 Lumber Grader																							20	14
*V28 Indus. Maint.																	1	0	3	1	49	27	60	38
V29 Light Construction																	21	13	54	32	60	30	72	54
V30 Med. Lab. Asst.											19	11	30	29	37	27	48	38	67	49	56	42	79	62
V31 Med. Off. Asst.																	10	9	24	15	38	27	66	51
*V32 Machinist	19	1	31	17	26	14	73	28	74	30	185	68	263	157	345	187	361	152	350	227	444	288	545	377
V34 Marine Mech.									7	3	9	5	22	10	30	18	36	5	15	7	30	24	44	28
*V37 Plumbing & Htg.											8	0	0	0	0	0	0	0	7	4	18	11	18	13
V38 Practical Nur.	267	202	310	230	354	266	394	290	425	298	592	458	696	507	752	561	909	683	958	766	1,012	812	1,020	829

TABLE 5 (continued)

Academic Year	1959-60		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
*V40 Furn. Prod. Asst.															12	5	13	11	11	11	15	15	18	18
*V42 Radio & TV Serv.	17	0	14	12	13	7	14	8	48	30	97	58	165	74	171	85	213	100	202	120	291	189	339	241
V43 Radio & TV Broad.																			9	6	30	18	36	24
*V44 Sheet Metal															12	7	4	3	19	5	25	16	26	18
*V48 Tool & Die Making									11	6	16	11	0	0	23	16	25	21	34	30	46	39	53	47
V49 Watchmaking																			5	0	15	3	20	15
*V50 Welding					7	5	48	19	57	26	87	39	153	77	210	108	301	143	312	185	493	322	557	389
*V60 Elec. Lineman															40	25	21	12	21	10				
V62 Farriering																	7	7	10	8	12	10	12	10
*V64 Heavy Eq. Oper.							14	10	26	20	39	34	57	44	78	44	81	49	84	50	86	53	88	56
V66 Hosp. Ward Clerk									88	60	11	8	17	5										
V68 Knit. Mach. Fixer			8	2	0	0	0	0	5	0	32	7												
*V70 Masonry			34	24	0	0	8	4	9	4	29	10	39	14	60	27	77	33	72	47	107	77	107	82
V72 Nur. Asst.											76	60	97	76	49	41	179	119	244	215	256	224	260	228
V73 Oper. Room Asst.																	13	7	11	7	15	11	30	23
*V78 Sew. Mach. Mech.													12	4	19	2	19	4	5	0				
V82 Upholstering									13	10														
V90 Ven. Mach. Maint.																					20	8	20	8
Vocational Totals	540	335	582	396	555	379	862	476	1,298	780	2,094	1,215	2,694	1,639	3,374	1,939	3,943	2,280	4,633	3,200	6,001	4,227	6,857	5,047
Aviation Tech.																					15	8	20	12
Home Econ. Tech.																					15	10	20	16
Med. Records Tech.																					12	8	15	10
T01 Agr. Bus. Tech.							8	1	32	21	69	40	119	67	118	59	162	79	146	87	245	159	286	196
T02 Agr. Chemicals									5	0	12	2	0	0	0	0	10	8	8	5	8	5	11	9
T03 Agr. Eq. Tech.							7	6	13	9	9	4	0	0	10	9	11	5	12	9	23	16	32	22
T04 Veterinary Med. Tech.													12	6	13	4	24	10	24	15	30	20	36	24
*T05 Food Processing															16	0	11	3	16	8	18	10	20	12
T06 Agr. Research																	16	4	27	19	36	25	44	30
T07 Forest Mgt.															74	5	139	57	133	82	169	105	188	122
T09 Ornamental Hort.															28	8	26	12	42	21	66	41	72	47
T10 Poultry & Livestock									12	4	23	9	24	11	15	3	30	6	28	11	36	25	43	35

TABLE 5 (continued)

Academic Year	1959-60		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
T11 Rec. Grounds Mgt.																	4	0	4	1	15	5	65	34
T13 Soil & Water Cons.													16	11	14	8	19	10	21	12	30	15	39	22
T14 Wildlife Mgt.																					10	0	15	8
T15 Primary Wood Util.																							30	18
T16 Accounting											10	0	102	36	221	79	197	96	207	103	320	174	378	222
T18 Bus. Administration											148	52	565	156	1,015	307	1,384	538	1,561	790	1,843	962	2,032	1,138
*T22 Data Processing-Bus.							37	11	53	17	99	32	187	59	246	63	384	128	469	171	536	217	573	295
*T23 Data Processing-Sci.							22	2	17	2	21	5	33	16	31	15	49	20	28	13	36	16	36	20
T25 Hotel & Motel Mgt.																	35	14	24	12	30	17	50	35
T26 Printing Mgt.													14	7	20	4	17	4	0	0	20	12	20	13
T28 Court Reporting															6	3	6	3	12	6	20	13	24	16
T29 Eng. & Tech. Sec.					20	0	31	20	69	42	84	32	50	15	74	28	121	26	84	27	96	34	96	40
T30 Executive Sec.											181	52	490	132	750	200	906	307	1,133	552	1,450	800	1,622	948
T31 Legal Sec.													13	6	21	10	48	14	35	15	68	34	93	49
T32 Med. Sec.													40	13	78	32	162	69	109	53	173	87	210	122
T34 Traffic & Trans.											6	3	41	12	46	19	36	20	23	13	40	22	48	28
*T36 Air Cond. & Refr. Tech.			6	3	8	5	11	7	40	14	44	14	51	22	35	12	29	11	35	13	34	14	36	18
*T37 Chemical Tech.					2	0	5	2	21	2	32	12	38	12	53	11	59	20	37	21	68	43	76	45
*T38 Civil Eng. Tech.	18	9	19	14	36	11	47	19	92	49	95	50	160	70	192	77	230	92	141	92	194	117	203	125
*T39 Electromech.																	8	1	6	0	12	4	16	6
*T41 Architectural Draft.											8	1	30	7	38	17	54	22	99	62	128	78	144	90
*T42 Furn. Draft. & Des.											8	1	15	4	12	11	18	8	11	7	18	10	18	10
*T43 Mech. Draft. & Des.			8	5	41	27	71	24	131	60	196	57	330	121	327	113	391	156	285	147	399	216	464	266
*T44 Electrical Tech.	11	5	20	3	11	6	28	12	12	11	22	8	40	17	31	19	37	16	34	17	48	24	55	28
*T45 Electronics Tech.	56	32	67	45	151	71	191	66	223	84	273	90	408	142	378	143	515	206	411	225	528	298	623	380
T46 Fire & Safety													16	8	9	5	18	14	15	10	20	14	24	18
*T47 Indus. Eng. Tech.															8	0	62	22	71	32	79	52	98	68
*T48 Instrumentation																	14	10	13	10	20	18	20	15
T49 Indus. Mgt. Tech.																					15	10	20	14
*T50 Manufac. Eng. Tech.					6	2	22	10	49	19	37	11	83	22	56	20	41	20	40	18	79	39	86	47

TABLE 5 (continued)

Academic Year	1959-69		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
*T51 Mech. & Prod. Tech.	23	10	33	12	43	20	50	15	51	39	54	27	65	26	53	32	29	18	46	26	60	34	60	34
T52 Sanitary Eng. Tech.											18	12	20	9	24	12	18	10	16	10	24	12	24	12
T54 Dental Hygiene													36	32	66	45	38	22	65	55	109	83	131	97
T55 Dental Lab. Tech.									10	4	12	6	18	10	12	8	13	4	21	14	20	14	24	18
T56 Mental Health Tech.																			18	12	45	35	50	40
T59 Asso. Degree Nur.													80	31	188	95	148	94	213	124	247	154	340	223
T61 Radiologic Tech.																					10	6	15	10
T62 Phys. Ther. Asst.																			5	2	10	4	16	7
T63 Fire Sci. Tech.																	20	0	0	0	0	0	10	6
T64 Police Sci. Tech.																	24	9	59	26	90	39	113	60
T69 Photography					4	2	26	5	35	10	58	11	72	32	81	27	110	43	14	10	15	12	20	15
T70 Commercial Art																			133	79	194	118	233	148
T71 Culinary Sci.																			8	5	20	14	20	14
*T75 Furn. Manufac.													7	2	7	2	11	1	27	13	40	18	44	20
T76 Furn. Des.																			11	9	15	12	20	14
T77 Interior Des.																	32	14	40	36	50	30	60	40
T80 Library Asst.															5	5	10	0	13	5	20	15	20	15
T85 Marine Tech.											15	7	20	12	16	7	22	12	64	52	100	78	100	70
T88 Teacher Aide																			16	2	24	12	28	14
T90 Textile Tech.																					20	8	50	31
T95 Trans. Maint.			12	8	17	12	17	12	16	12	36	16	31	11	17	9	22	6	21	14	25	7	30	13
Technical Total	108	56	165	90	339	156	573	212	881	399	1,570	554	3,226	1,137	4,404	1,526	5,770	2,266	6,134	3,173	8,140	4,484	9,409	5,574
Vocational Total	540	335	582	396	555	379	862	476	1,298	780	2,094	1,215	2,694	1,639	3,374	1,939	3,943	2,280	4,633	3,200	6,001	4,227	6,857	5,047
Grand Total	648	391	747	486	894	535	1,435	688	2,179	1,179	3,664	1,769	5,920	2,776	7,778	3,465	9,713	4,546	10,767	6,373	14,141	8,711	16,266	10,621

*Data transferred to Table 7 .

TABLE 6

PART-TIME STUDENT HEADCOUNT, NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES

Academic Year	1959-60		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
Loom Fixing	22	15	20	8	0	0	10	4	15	6														
Sew. Mach. Oper.											40	28	16	12										
*V01 Auto Body Rep.													10	2	8	0	8	0	40	0	55	4	65	5
*V03 Auto Mech.	163	25	274	42	350	69	252	79	319	62	331	65	212	22	198	13	218	10	179	31	213	52	253	66
V05 Bldg. Maint.																					5	2	10	5
V06 Bldg. Materials																	4	0	1	0				
*V07 Carpentry	18	7	18	1	4	3	15	6	27	7	13	5	25	0	12	0	10	0						
V09 Cosmetology			16	7	10	7	18	2	17	4	32	1	8	0	0	0	0	0	0	0	10	10	12	12
*V13 Diesel Maint.																			5	0				
V14 Draft.-Furn.			18	5	0	0	10	4																
*V15 Draft.-Bldg. Tr.			6	1	11	0	17	3	6	0	10	2	14	4	35	0	96	0	111	19	143	33	155	37
*V17 Draft.-Mech.	217	34	167	36	157	56	119	30	232	47	186	38	184	17	178	10	147	10	67	15	90	29	97	37
*V18 Elec. Install. & Maint.									62	7	71	13	62	6	131	6	89	3	48	3	58	21	83	32
V20 Farm Machinery																							10	5
V22 Graphic Arts-Printing			24	10	23	10	9	6	16	8														
*V24 Air Cond. & Refr.	35	8	56	16	129	36	117	44	115	26	111	21	85	14	110	20	135	13	133	22	135	22	146	25
*V28 Indus. Maint.																			21	6	36	13	51	23
V29 Light Construction																			27	5	30	6	45	10
*V32 Machining	200	59	241	60	228	74	223	39	257	72	158	48	219	41	170	26	126	10	75	22	83	26	87	27
*V37 Plumbing & Htg.																			14	4	16	5	20	6
V38 Practical Nur.																			15	5	20	13	20	17
*V40 Furn. Prod.,Asst.																	70	0	40	2	50	8	60	10
*V42 Radio & TV Serv.	168	48	73	18	144	52	85	14	112	4	136	11	122	9	116	7	128	0	99	9	121	11	154	28
V44 Sheet Metal	11	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	10	15	10
*V47 Textile Prod.																	27	0	21	10	30	12	30	15
*V48 Tool & Die Making	18	10	10	0	0	0	0	0	0	0	14	6	25	2	36	1	23	7	15	3	32	17	32	16
*V50 Welding			21	8	73	39	119	54	169	51	126	20	159	16	253	11	345	6	234	21	214	24	238	31
*V68 Knit. Mach. Fixer	181	34	108	26	91	30	72	18	57	20	31	11	53	21	30	11								
*V70 Masonry					10	7	0	0	12	11	41	8	29	0	43	0	58	0	96	0	100	0	103	0
V72 Nur. Asst.											71	56												
*V78 Sew. Mach. Mech.											32	6	26	4	23	7	2	1						
*V82 Upholstering	47	27	47	17	65	19	78	44	77	44	101	50	55	28	59	28	55	29	93	57	54	32	59	34
V84 Upholstery Cutting	7	5	8	5	11	9	5	1	7	2	13	3	4	2	5	1	8	4	16	12	6	4	8	5
V86 Upholstery Sewing	38	15	33	16	59	27	74	49	62	37	86	52	64	14	56	18	26	16	50	32	38	18	40	19
Vocational Total	1,125	287	1,149	276	1,365	432	1,223	397	1,562	406	1,603	443	1,372	214	1,463	159	1,575	109	1,400	278	1,554	372	1,793	475

TABLE 6 (continued)

Academic Year	1959-60		1960-61		1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
Curriculum	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr
T01 Agr. Bus. Tech.																			3	0	5	5	10	6
T03 Agr. Eq. Tech.																	2	0	5	2	9	5	10	7
*T05 Food Processing															2	0	2	0	1	0	5	1	8	5
T10 Poul. & Livestock															8	0	6	0	5	3	10	5	10	8
T16 Accounting															43	0	17	1	22	4	41	18	58	27
T18 Bus. Administration											49	4	52	6	168	12	330	30	394	45	480	66	547	90
*T22 Data Processing-Bus.					79	8	47	0	0	0	35	4	35	2	51	3	69	3	77	19	95	31	115	41
T25 Hotel & Motel Mgt.																			1	0	8	5	10	6
T28 Court Reporting																	2	0	2	0	10	3	12	8
T29 Eng. & Tech. Sec.			5	0	65	0	0	0	0	0	0	0	0	0	0	0	69	0						
T30 Executive Sec.											69	0	24	0	210	14	384	29	408	31	495	59	563	91
T31 Legal Sec.															8	0	41	0	43	1	55	2	60	2
T32 Medical Sec.															6	0	26	1	40	0	51	1	69	7
*T36 Air Cond. & Refr. Tech.							19	0	4	0	0	0	0	0	0	0	19	0						
*T37 Chemical Tech.	26	5	17	0	4	1	26	7	14	1	0	0	0	0	0	0	8	0	1	0	6	0		
*T38 Civil Eng. Tech.									5	0	11	0	10	0	2	0	7	0	4	0	20	5	20	16
*T41 Architectural									22	4	12	0	0	0	0	0	14	0						
*T43 Mech. Draft. & Des.	21	10	17	1	64	9	33	3	37	10	69	11	60	9	16	2	69	3	30	3	12	4	12	4
*T44 Electrical Tech.											8	0												
*T45 Electronics Tech.	62	20	145	21	241	55	157	25	50	4	40	6	37	9	41	8	47	8	49	12	53	13	73	20
*T47 Indus. Eng. Tech.															31	0	44	8	54	23	68	27	74	33
T49 Indus. Mgt. Tech.																					10	5	10	5
*T50 Manufac. Eng. Tech.											11	0												
*T51 Mech. & Prod. Tech.					11	2	12	0	6	0	15	0												
T55 Dental Lab. Tech.											7	0	6	0	2	0								
T59 Asso. Degree Nur.															21	0	0	0	35	0	24	0	24	0
T63 Fire Sci. Tech.															26	0	15	0	9	0	15	0	15	0
T64 Police Sci. Tech.																	18	0	30	4	30	4	30	4
T70 Commercial Art					12	0	3	0	0	0	0	0	0	0	7	0	1	0	15	0	18	0	25	0
*T75 Furn. Manufac.									52	0	36	0												
T85 Marine Tech.											1	0											1	0
T88 Teacher Aide																			28	0	28	20	40	20
*T90 Textile Tech.									14	0	47	0												
T95 Trans. Maint.											5	0	9	2	0	0	1	0						
Technical Total	109	35	184	22	476	75	297	35	204	19	415	25	233	28	642	39	1,191	83	1,256	147	1,548	278	1,796	400
Vocational Total	1,125	287	1,149	276	1,365	432	1,223	397	1,562	406	1,603	443	1,372	214	1,463	159	1,575	109	1,400	278	1,554	372	1,793	475
Grand Total	1,234	322	1,333	298	1,841	507	1,520	432	1,766	425	2,018	468	1,605	242	2,105	198	2,766	192	2,656	425	3,102	650	3,589	875

*Data transferred to Table 7

TABLE 7

SUPPLY AND DEMAND OF TRAINED WORKERS IN NORTH CAROLINA, 1966-1970, FOR SELECTED OCCUPATIONS

Occupation	Post-Secondary Curricula		MDTA Classes		New Industry Classes		Secondary Curricula		Total Supply		Demand	Difference	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr		Excess supply	Excess demand
Die Designer	0	0	0	0	0	0	0	0	0	0	55		55
Draftsman, Architectural and Structural	1,014	430	92	47	0	0	2,749	63	3,855	540	665		125
Draftsman, Electrical and Electronic	0	0	0	0	0	0	0	0	0	0	252		252
Draftsman, Mechanical; Tool Designer	3,409	1,193	21	17	6	6	8,247	187	11,783	1,403	993	410	
Draftsman, Topographical	0	0	0	0	0	0	0	0	0	0	94		94
Furniture Designer	64	31	0	0	0	0	0	0	64	31	30	1	
Drafting and Design	4,487	1,654	113	64	6	6	10,996	250	15,602	1,974	2,089	411	526 115
Civil and Construction Technician	853	381	0	0	0	0	0	0	853	381	366	13	
Electronics Technician	2,200	841	0	0	0	0	0	0	2,200	841	306	535	
Industrial Engineering Technician; Production Planner; Quality Control Technician	785	215	0	0	0	0	0	0	785	215	2,040		1,825
Instrumentation Technician	199	97	0	0	0	0	0	0	199	97	95	2	
Instrument Man	0	0	0	0	0	0	0	0	0	0	173		173
Mechanical Engineering Technician	268	129	0	0	0	0	0	0	268	129	314		185
Metallurgist, Assistant	0	0	0	0	0	0	0	0	0	0	9		9
Refrigeration Technician	217	72	0	0	0	0	0	0	217	72	51	21	
Architectural and Engineering	4,522	1,735	0	0	0	0	0	0	4,522	1,735	3,356	571	2,192 1,621
Cloth Tester, Garment	0	0	0	0	0	0	0	0	0	0	13		13
Estimator (Cost Estimator)	0	0	0	0	0	0	0	0	0	0	1,046		1,046
Laboratory Assistant (Textile)	0	0	0	0	0	0	0	0	0	0	252		252
Laboratory Tester I (Any Industry)	0	0	0	0	0	0	0	0	0	0	259		259
Laboratory Tester II (Food)	47	11	0	0	0	0	0	0	47	11	72		61

TABLE 7 (continued)

Occupation	Post-Secondary Curricula Enr	Post-Secondary Curricula Gr	MDTA Classes Enr	MDTA Classes Gr	New Industry Classes Enr	New Industry Classes Gr	Secondary Curricula Enr	Secondary Curricula Gr	Total Supply Enr	Total Supply Gr	Demand	Difference Excess supply	Difference Excess demand
Laboratory Tester, Synthetic Fibers	0	0	0	0	0	0	0	0	0	0	74		74
Programmer, Business	1,575	465	0	0	0	0	0	0	1,575	465	301	164	
Programmer, Engineering and Scientific	162	69	0	0	0	0	0	0	162	69	98		29
Mathematical and Physical Science	1,784	545	0	0	0	0	0	0	1,784	545	2,115	164	1,734 1,570
Coremaker	0	0	0	0	24	24	0	0	24	24	42		18
Heat Treater	0	0	0	0	0	0	0	0	0	0	128		128
Molder	0	0	0	0	0	0	0	0	0	0	262		262
Plater	0	0	0	0	0	0	0	0	0	0	151		151
Metal Processing and Foundry	0	0	0	0	24	24	0	0	24	24	583		559
Chemical Operator II	0	0	20	11	83	83	0	0	103	94	127		33
Chemical Operator III	241	77	0	0	0	0	0	0	241	77	79		2
Compression-Molding-Machine Operator (Plastics)	0	0	0	0	81	80	0	0	81	80	15	65	
Extruder Operator (Plastics Material)	0	0	0	0	62	62	0	0	62	62	29	33	
Injection-Molding Machine Operator (Plastics)	0	0	0	0	0	0	0	0	0	0	52		52
Chemical and Plastic Processing	241	77	20	11	226	225	0	0	487	313	302	98 11	77
Brake Operator I	0	0	0	0	0	0	0	0	0	0	243		243
Die Maker, Casting and Plastic Molding	0	0	0	0	0	0	0	0	0	0	29		29
Machine Operator, General; Machinist I	2,511	1,158	235	141	2,437	2,350	1,542	491	6,725	4,140	5,166		1,026
Patternmaker, Metal	0	0	0	0	0	0	0	0	0	0	146		146
Shear Operator I	0	0	0	0	0	0	0	0	0	0	244		244
Tool-and-Die Maker	241	125	0	0	58	45	0	0	299	170	504		334

TABLE 7 (continued)

Occupation	Post-Secondary Curricula		MDTA Classes		New Industry Classes		Secondary Curricula		Total Supply		Demand	Difference	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr		Excess supply	Excess demand
Tool-Grinder Operator	0	0	0	0	45	45	0	0	45	45	298		253
Metal Machining and Metal Working	2,752	1,283	235	141	2,540	2,440	1,542	491	7,069	4,355	6,630		2,275
Air Conditioning Mechanic (Auto Service)	0	0	0	0	0	0	0	0	0	0	179		179
Aircraft-and-Engine Mechanic: Aircraft-and Engine Mechanic (Line Service)	95	44	0	0	0	0	0	0	95	44	4	40	
Automobile-Truck Mechanic	4,698	2,246	573	389	0	0	3,329	1,247	8,600	3,882	2,324	1,558	
Brakeman, Automobile	0	0	0	0	0	0	0	0	0	0	67		67
Construction Equipment Mechanic	98	53	58	37	0	0	0	0	156	90	337		247
Diesel Mechanic	260	157	0	0	0	0	0	0	260	157	680		523
Front-End Man (Auto Service)	0	0	0	0	0	0	0	0	0	0	187		187
Gas-Appliance Serviceman; Refrigeration Mechanic	1,448	574	0	0	0	0	30	15	1,478	589	626		37
Machine Adjuster (Tobacco)	0	0	0	0	0	0	0	0	0	0	87		87
Maintenance Mechanic II	74	34	0	0	0	0	0	0	74	34	1,189		1,155
Sewing-Machine Repairman	138	28	159	110	24	24	0	0	321	162	439		277
Transmission Mechanic (Auto Service)	0	0	0	0	0	0	0	0	0	0	193		193
Mechanical Machinery Repair	6,811	3,136	790	536	24	24	3,359	1,262	10,984	4,958	6,312	1,598	2,952 1,354
Cabinetmaker	0	0	0	0	4	4	1,013	314	1,017	318	1,599		1,281
Woodworking-Machine Operator	0	0	138	95	228	223	0	0	366	318	2,408		2,090
Wood Machinery	0	0	138	95	232	227	1,013	314	1,383	636	4,007		3,371
Cloth Tester, Quality (Textile); Laboratory Tester I (Textile)	109	10	0	0	0	0	0	0	109	10	287		277
Knitting Machine Fixer	114	43	0	0	86	86	0	0	200	129	846		717
Loom Fixer	0	0	0	0	99	99	0	0	99	99	86	13	
Looper Fixer (Hosiery)	0	0	0	0	0	0	0	0	0	0	14		14
Machine Fixer (Textile)	0	0	0	0	47	46	0	0	47	46	589		543
Textile Machine Work	223	53	0	0	232	231	0	0	455	284	1,822	13	1,551 1,538

TABLE 7 (continued)

Occupation	Post-Secondary Curricula		MDTA Classes		New Industry Classes		Secondary Curricula		Total Supply		Demand	Difference	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr		Excess supply	Excess demand
Electromechanical Technician	14	1	0	0	0	0	0	0	14	1	1		0
Gas Meter Repairman and Installer	0	0	0	0	0	0	0	0	0	0	15		15
Instrument Man (Air Transportation)	0	0	0	0	0	0	0	0	0	0	2		2
Instrument Repairman 1	0	0	0	0	143	138	0	0	143	138	180		42
Measuring and Controlling Instrument Repair	14	1	0	0	143	138	0	0	157	139	198		59
Assembler, Electrical Accessories II (Electrical Equipment)	0	0	0	0	2,278	2,174	0	0	2,278	2,174	369	1,805	
Electrical Appliance Repairman	0	0	80	58	0	0	0	0	80	58	19	39	
Electronics Assembler	0	0	30	28	1,212	1,191	0	0	1,242	1,219	380	839	
Inspector, Systems; Tester, Electronics Components: Tester, Systems	1,643	604	64	42	252	225	1,399	293	3,358	1,164	317	847	
Electrical Equipment Assembly and Repair	1,643	604	174	128	3,742	3,590	1,399	293	6,958	4,615	1,085	3,530	
Automobile Upholsterer	0	0	0	0	0	0	0	0	0	0	37		37
Upholsterer II (Furniture)	363	192	232	127	21	15	0	0	616	334	2,179		1,845
Upholstery	363	192	232	127	21	15	0	0	616	334	2,216		1,882
Automobile-Body Repairman	408	204	208	145	0	0	52	20	668	369	966		597
Sheet-Metal Worker	60	31	117	75	402	391	98	16	677	513	2,988		2,475
Structural-Steel Worker	0	0	0	0	0	0	0	0	0	0	194		194
Welder	2,586	909	994	665	318	289	419	160	4,317	2,023	2,131		108
Metal Fabricating and Welding	3,054	1,144	1,319	885	720	680	569	196	5,662	2,905	6,279		3,374
Cable Splicer	0	0	0	0	0	0	0	0	0	0	159		159
Central-Office Installer-Repairman	0	0	0	0	0	0	0	0	0	0	54		54
Electrical Appliance Serviceman	0	0	15	10	0	0	0	0	15	10	144		134
Electrician	1,217	522	477	323	2	2	4,196	880	5,892	1,727	3,391		1,664
Electrician, Automotive	0	0	0	0	0	0	0	0	0	0	115		115
Electronics Mechanic	0	0	18	13	0	0	0	0	18	13	124		111
Frameman (Telephone and Telegraph)	0	0	0	0	0	0	0	0	0	0	2		2

TABLE 7 (continued)

Occupation	Post-Secondary Curricula		MDTA Classes		New Industry Classes		Secondary Curricula		Total Supply		Demand	Difference	
	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr	Enr	Gr		Excess supply	Excess demand
Lineman (Construction, Light and Power)	82	47	97	81	0	0	0	0	179	128	1,206		1,078
Lineman (Telephone and Telegraph)	0	0	0	0	0	0	0	0	0	0	235		235
Station Installer-Repairman	0	0	0	0	0	0	0	0	0	0	137		137
Electrical Installing and Repairing	1,299	569	607	427	2	2	4,196	880	6,104	1,878	5,567		3,689
Bricklayer	622	206	810	569	0	0	12,072	5,764	13,504	6,539	2,495	4,044	
Carpenter; Carpenter, Rough	228	100	700	436	0	0	7,744	2,923	8,672	3,459	7,006		3,547
Cement Mason	0	0	0	0	0	0	0	0	0	0	950		950
Floor Layer	0	0	0	0	5	5	0	0	5	5	193		188
Glass Installer (Auto Service)	0	0	0	0	0	0	0	0	0	0	10		10
Insulation Worker	0	0	0	0	0	0	0	0	0	0	250		250
Oil-Burner-Installation and Serviceman	0	0	0	0	0	0	0	0	0	0	421		421
Operating Engineer	386	240	0	0	0	0	0	0	386	240	2,835		2,595
Paperhanger	0	0	0	0	0	0	0	0	0	0	454		454
Pipefitter-Steamfitter I	0	0	0	0	0	0	0	0	0	0	700		700
Pipelayer	0	0	0	0	0	0	0	0	0	0	1,341		1,341
Plasterer	0	0	0	0	0	0	0	0	0	0	483		483
Plumber	39	19	297	154	2	2	171	86	509	261	1,654		1,393
Tile Setter	0	0	0	0	0	0	0	0	0	0	141		141
Construction and Related	1,275	565	1,807	1,159	7	7	19,987	8,773	23,076	10,504	18,933	4,044	12,473 8,429

TABLE 8

SELECTED OCCUPATIONS
MATCHED WITH PRE-EMPLOYMENT TRAINING PROGRAMS

Occupation	Post-Sec. Curr. Code	MDTA Program	New Industry Program	Secondary Program
Draftsman, Architectural; Draftsman, Structural	T41, V15	X		X
Draftsman, Electrical; Draftsman, Electronic	V16*			
Draftsman, Mechanical; Tool Designer	T43, V17	X	X	X
Furniture Designer	T42, V14			
Civil and Construction Technician	T38			
Electronics Technician	T45			
Industrial Engineering Technician; Production Planner; Quality Control Technician	T47, T50 T75, V40			
Instrumentation Technician	T44, T48			
Instrument Man				X*
Mechanical Engineering Technician	T51			
Refrigeration Technician	T36			
Laboratory Tester II (Food)	T05			
Programmer, Business	T22			
Programmer, Engineering and Scientific	T23			
Coremaker			X	
Chemical Operator II		X	X	
Chemical Operator III	T37			

TABLE 8 (continued)

Occupation	Post-Sec. Curr. Code	MDTA Program	New Industry Program	Secondary Program
Compression-Molding-Machine Operator (Plastics)			X	
Extruder Operator (Plastics Materials)			X	
Machine Operator, General; Machinist I	V32	X		
Tool and Die Maker	V48			
Tool-Grinder Operator			X	
Aircraft-and-Engine Mechanic; Aircraft-and-Engine Mechanic (Line Service)	V04			X*
Automobile-Truck Mechanic	V03	X		X
Construction Equipment Mechanic	V26	X		
Diesel Mechanic	V13			X*
Gas-Appliance Serviceman; Refrigeration Mechanic	V24			X
Maintenance Mechanic II	V28			
Sewing Machine Repairman	V78	X	X	
Cabinetmaker			X	X
Woodworking Machine Operator		X	X	
Cloth Tester, Quality (Textile); Laboratory Tester I (Textile)	T90, V47			

TABLE 8 (continued)

Occupation	Post-Sec. Curr. Code	MDTA Program	New Industry Program	Secondary Program
Knitting-Machine Fixer	V68		X	
Loom Fixer			X	
Machine Fixer (Textile)			X	
Electromechanical Technician	T39			
Instrument-Repairman I			X	
Assembler, Electrical Accessories II			X	
Electrical Appliance Repairman		X		X*
Electronics Assembler		X	X	
Inspector, Systems; Tester, Electronic Components; Tester, Systems	V42	X		X
Upholsterer II (Furniture)	V82	X	X	
Automobile-Body Repairman	V01	X		X
Sheet-Metal Worker	V44	X	X	X
Welder	V50	X	X	X
Central Office Installer-Repairman	V46*			
Electrical Appliance Serviceman		X		
Electrician	V18	X	X	X
Electronics Mechanic	T40	X		
Lineman (Construction, Light and Power)	V60	X		

TABLE 8 (continued)

Occupations	Post-Sec. Curr. Code	MDTA Program	New Industry Program	Secondary Program
Bricklayer	V70	X		X
Carpenter; Carpenter Rough	V07	X		X
Floor Layer			X	
Operating Engineer	V64			
Plumber	V37	X	X	X

*Program available, but no enrollees during 5-year period covered by this study.

TABLE 9

SELECTED OCCUPATIONS NOT
SUPPORTED BY PRE-EMPLOYMENT TRAINING PROGRAMS

Die Designer

Draftsman, Topological

Metallurgist, Assistant

Cloth Tester, Garment

Estimator (Cost Estimator)

Laboratory Assistant (Textile)

Laboratory Tester I, Any Industry

Laboratory Tester, Synthetic Fibers

Heat Treater

Molder

Plater

Injection-Molding Machine Operator (Plastics)

Brake Operator I

Die Maker, Casting and Plastic Molding

Patternmaker, Metal

Shear Operator

Air Conditioning Mechanic (Auto Service)

Brakeman (Automobile)

Front End Man (Auto Service)

Machine Adjuster (Tobacco)

Transmission Mechanic (Auto Service)

Looper Fixer (Hosiery)

Gas Meter Repairman and Installer

Instrument Man (Air Transportation)

Automobile Upholsterer

Structural Steel Worker

Cable Splicer

Electrician, Automotive

Frameman (Telephone and Telegraph)

Lineman (Telephone and Telegraph)

Station Installer-Repairman

Cement Mason

Glass Installer (Auto Service)

Insulation Worker

Oil Burner Installation and Service

Paperhanger

Pipefitter-Steamfitter I

Pipe Layer

Plasterer

Tile Setter