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ABSTRACT

Conducting a survey of manpower training needs of business and industry in Connecticut and identifying elements of a vocational-career information delivery system were the two major focuses of the study described in this report. Content is presented in three chapters. Chapter 1 reviews and analyzes the manpower training needs survey and results. Some of the major findings/conclusions presented are (1) Connecticut's businesses are unable to tell Connecticut's educational agencies what they need in numerical terms from the various training programs administered by the State. Long range needs of private firms are too poorly perceived to be a basis of planning by educational agencies. (2) Although Connecticut's enterprises are critical about the quality of the vocational graduates reaching them, they are unaggressive and probably unled as to the direction to take in addressing the issue. (3) There is no common occupational language employed across the State. Chapter 2 discusses long range manpower forecasting techniques and other approaches and methods for predicting manpower needs. Chapter 3 brings together a number of considerations into a model which incorporates essential elements of a complete career guidance program. The appendixes contain raw data about occupational demand and supply. (SH)

A

FINAL REPORT

ON

A SURVEY OF THE MANPOWER TRAINING NEEDS OF CONNECTICUT BUSINESS AND INDUSTRY WITH SPECIAL EMPHASIS ON THE DEVELOPMENT OF A COMPUTER-BASED MODEL FOR VOCATIONAL-CAREER INFORMATION DELIVERY SYSTEMS

TO

THE CONNECTICUT STATE BOARD OF EDUCATION, DIVISION OF VOCATIONAL EDUCATION AND THE CONNECTICUT BUSINESS AND INDUSTRY ASSOC.

PROJECT DIRECTOR: ARMAND HARTIGAN ZOTTOLA, Ph.D.

RESEARCH STAFF: PAUL TARASUK, Ph.D.
EARL McCOY, M.S.

SUMMARY
OF

A SURVEY OF THE MANPOWER NEEDS OF CONNECTICUT BUSINESS AND INDUSTRY WITH SPECIAL EMPHASIS ON THE DEVELOPMENT OF A COMPUTER-BASED MODEL FOR VOCATIONAL-CAREER INFORMATION DELIVERY SYSTEMS.

Contrary to widespread opinion, the State of Connecticut provides manpower training programs through its educational agencies for the great majority of her businesses and industry. The manpower training needs of significance are generally not of "entrance-level" skills and only irregularly a question to insufficient numbers of graduates. Connecticut's enterprises do have serious manpower training needs in a broad variety of occupations at the higher skill classes of each area and in the form of unmet quality components in the graduates of State educational agencies. Currently, these training needs are largely met by the operation of formal training programs by a large number of firms around the state; of 300 firms surveyed, over seventy-five percent conducted such programs.

These firms are unwilling to accept students on a commercial fee basis who are not in their employ. At the same time however, they are very conscious of the significant cost of running these programs and unanimously call upon the State government to revise vocational-type programs and/or supplement them with more advanced course material. In many occupational areas,

the number of likely candidates for new or revised training programs should be minimally adequate to rationalize action on the part of the educational agencies of the State of Connecticut.

With the exception of her very largest enterprises, firms in Connecticut engage in little manpower planning beyond satisfying their immediate and likely needs. Accordingly, they are incapable of providing State agencies with reliable manpower-needs data for a period beyond twelve months. Informational data relating to near-term employment opportunities must therefore be assembled through annual manpower-needs surveys. Such a survey should be adopted by the State Department of Labor as soon as possible.

Before such a regular survey can be administered, every firm in the State must adopt the job definitions employed by the Federal Government and published by the U.S. Department of Labor as the Dictionary of Occupational Titles. This recommendation is mandatory so that the State can better serve her enterprises, for currently, they lack a common occupational vocabulary and survey returns contain inconsistent information.

The career-guidance function is utterly inadequate in Connecticut. Counselors are generally inadequately trained, over-worked, under-supported and mismanaged. The failure to properly prepare young people for the world

of work explains a large part of the labor market disfunction observed in this study.

The information base available to career couselors is unsatisfactory as far as short-run job opportunities are concerned. This can be corrected by the implementation of annual surveys by the State Department of Labor. The information base available to counselors for the intermediate future is rapidly improving through the efforts of the State Labor Department. Its new ability to forecast long-range manpower needs for local industry with greatly improved reliability is much-needed and welcome. In combination with our recommended annual survey of manpower needs, the State is capable of providing career guidance counselors with the information necessary to their tasks.

Such labor market information can be transmitted efficiently on computers and terminals currently owned by the State and underutilized. We recommend that terminals be located in each of the 17 labor markets identified by the State Department of Labor.

This report identifies data by nature and source which must be more accessible to counselors and the young and recommends that the State government move quickly to deliver this important information where it will do the

most good. A computer-based, career-information delivery model is offered in this study with allied counseling components. Although many of the components in this model exist, it does not reflect the general state of career counseling in Connecticut and we recommend that the State government aid in the implementation of the full model on a pilot basis. Federal funding is available for the implementation of a pilot program and from such, a refined and employable model should emanate for general use in Connecticut.

INTRODUCTION

On July 1, 1975 this study was initiated under the sponsorship of the Division of Vocational Education of the State of Connecticut's Department of Education and the Connecticut Business and Industry Association. The cost-share was approximately $6:1 respectively. Its primary mission was to survey the manpower training needs of business and industry in the State. A secondary objective was to identify the elements of a computer based vocational-career information delivery system. The 2800 members of the Connecticut Business and Industry Association was used as the sample population under the assumption that it was representative of the State's private economic base. This section of the report reviews and analyzes the first phase of the research objectives.

Many of those involved in the development of this study's theme strongly felt that too many of our State's enterprises were engaged in the provision of training programs which should have been provided by the resources of the State Department of Vocational Education directly and by other State agencies in supplementary form. To these then, the ultimate value of the study would be to generate evidence for the addition to or revision of programs run by the State.

Others believed that the State could not provide the best preparation for entrance into a large number of occupations. They believe that the ultimate value of this study will be to gather the information necessary to initiate the 'contracting-out' of students to firms which have developed relevant and efficient training programs.

As the research developed it became clear to the Director and his research associates that the study might also assemble or generate evidence of an educational nature which would eliminate myths and erroneous views widely held in Connecticut. Such views were constantly encountered in the course of the study and generally rested upon poor information, no information or an unawareness of what existed in the way of programs, services or data in this area of public concern.

With these thoughts in mind, the report has been written with a conscious effort to objectively present findings in spite of the prejudgements and preconceptions that colored its initiation. It has also been written with the happy objective of brevity under the belief that extensive reports too frequently find their way onto dusty and ill-travelled shelves, never to be implemented or regarded in policy decisions. Considerable effort has thus been made to report our findings and restrict the analysis to the most reasonable

and defensible language. Appendices contain raw data which can be reviewed and utilized by those specialists who have need for such. Further, the Director is available to those same specialists who might wish to discuss the more specific implications of the survey. Indeed, such discussions and siminars have been numerous even prior to the writing of this final report.

As with most efforts that result in a 'publication' of sorts I wish to acknowledge a number of people who have been supportive of this effort or invaluable resources in seeing it to completion. In the days preceeding its official birth special devotion to its inception came from Dr. Leon Gorski of the Office of Research at Central Connecticut State College and Mr. Walter A. Bialobrzeski, then Acting Associate Commissioner of the Division of Vocational Education. During the active life of the project Mr. A Horowitz, of the Office of Research at the State Department of Labor, Mr. Jay Tepper, State Finance Commissioner and Mr. Eugene Belisle, Director of the State Master Plan for Vocational Education, provided invaluable input without which the report could not be made. Their experience and cooperation made this study an education to me. I hope that the findings are no embarassment to them.

One man, however, rode shotgun on the study and must be singled out for

my gratitude. Mr. Robert Simpson of the Connecticut Business and Industry Association wore many hats, served in ways too numerous to mention and coached this young researcher through difficult moments. His judgement was always judicious and timely; his willingness to listen and evaluate was always appreciated. If there are no objections from the State of Connecticut, I should like to dedicate this report to him.

ARMAND H. ZOTTOLA, PH.D.
PROJECT DIRECTOR

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CHAPTER I

A REVIEW AND ANALYSIS OF THE MANPOWER-TRAINING-NEEDS SURVEY

After some three months of "library research" a survey instrument was developed which is found on the following pages. It was drafted on the basis of much review of similar survey instruments employed around the nation during the past ten years. Great care was taken to correct for language which had proven to be ambiguous in other studies. At the same time information was requested which would tell us something about the presence of a common occupational vocabulary among our sample firms; the information-keeping practices of these firms and simple proofs for consistency in answers. Perhaps the most common problems in occupational surveys of this type conducted around the country relate to these areas of concern and one objective of this study was to develop a survey instrument that could be employed by the State to monitor the training needs of our enterprises on a regular basis.

Our questionnaire went through seventeen drafts before it was sent to other experts for review and further criticism. Its adoption by three other agencies and research teams in Connecticut has further satisfied us as to its good design. It was sent to the 2800 member-firms of the Connecticut Business and Industry Association. Of these, one-tenth responded! This response

FIRM NAME_____ ADDRESS_____
(street)

PERSON COMPLETING QUESTIONNAIRE: _____
(town) (zip)

_____
(name)

_____
(title)

IF THIS IS A BRANCH OF A LARGE GIVE THE NAME AND ADDRESS THE

HOME OFFICE_____

1) WHAT IS THE PRIMARY NATURE OF YOUR FIRM'S BUSINESS?

1)___MANUFACTURING 4)___WHOLESALING 7)___DIVERSIFIELD PRODUCT LINE
2)___FINANCIAL 5)___TRANSPORTATION 8)___OTHER_____
3)___RETAILING 6)___SERVICE (please identify)

2) HOW MANY PEOPLE DID YOU EMPLOY AS OF SEPTEMBER 1, 1975 (full-time only)

1)___1 - 25 3)___51 - 100 5)___251 - 500
2)___26 - 50 4)___101 - 250 6)___500 or more

3) APPROXIMATELY HOW MANY PART TIME EMPLOYEES DID YOU EMPLOY AS OF SEPTEMBER 1, 1975? _____

4) PLEASE GIVE THE APPROXIMATE PERCENT OF YOUR STAFF ACCORDING TO THE FOLLOWING BREAKDOWN. IN THE SECOND COLUMN, THE APPROXIMATE PERCENT OF EACH SKILL GROUP THAT ARE WITHIN FIVE YEARS OF MANDATORY RETIREMENT AGE.

	(percent)	(5 yrs. to retire)
PROFESSIONAL, MANAGERIAL, TECHNICAL		
CLERICAL.....		
CRAFTSMEN & FOREMEN.....		
OPERATIVES.....		
SALES.....		
SERVICE.....		
LABORER.....		

5) DO YOU FEEL THAT THE GOVERNMENT OF THE STATE OF CONNECTICUT IS ADEQUATELY SERVICING YOUR MANPOWER TRAINING NEEDS?

1)_____YES 2)_____NO

6) IF NOT, WHAT TYPE(S) OF OCCUPATIONAL SKILLS WOULD YOU WISH TO SEE THE STATE OF CONNECTICUT PROVIDE THROUGH ITS EDUCATIONAL INSTITUTIONS?
(List either a specific skill or an occupational title; whichever best describes your needs.)

1)_____ 5)_____ 9)_____
2)_____ 6)_____ 10)_____
3)_____ 7)_____ 11)_____
4)_____ 8)_____ 12)_____

(If your response is more extensive, continue on separate sheet of paper and number consecutively beginning with #13.)

7) OF THE OCCUPATIONAL SKILLS LISTED IN QUESTION #6, HOW DO YOUR EMPLOYEES ACQUIRE THE TRAINING? (Insert the number of the skill listed in question #6, after the appropriate entry below.)

1) INFORMAL ON-THE-JOB EXPERIENCE_____
2) APPRENTICESHIP PROGRAMS_____
3) TRAINING PROGRAMS RUN BY YOUR COMPANY_____
4) TRAINING PROGRAMS RUN BY MUNICIPAL SCHOOL SYSTEMS_____
5) FEDERALLY ADMINISTERED TRAINING PROGRAMS_____
6) TRAINING ACQUIRED WHILE SERVING IN THE MILITARY_____
7) TRAINING OFFERED BY PRIVATE INSTITUTIONS_____
8) TRAINING OFFERED BY OUT-OF-STATE PRIVATE INSTITUTIONS_____
9) OTHER (please explain)_____

8) DO YOUR EMPLOYEES, ON THE WHOLE, MANIFEST ANY SPECIAL WEAKNESSES THAT LIMIT THEIR ABILITY TO PERFORM SATISFACTORILY? (Answer in rank-order: 1) being the worse weakness, 2) being the next weakness in importance, etc.)

1)_____POOR READING COMPREHENSION
2)_____UNSATISFACTORY WRITING ABILITIES
3)_____POOR VERBAL/COMMUNICATION SKILLS
4)_____POOR MATHEMATICAL ABILITIES
5)_____UNSATISFACTORY ABILITY TO FOLLOW DIRECTIONS
6)_____APPARENT LACK OF INTEREST IN WORK
7)_____POORLY TRAINED (state specific occupation/skill)_____
8)_____OTHER (Please explain)_____
9)_____NONE

9) DO YOU HAVE ANY SPECIFIC RECOMMENDATIONS REGARDING THE TRAINING PROGRAMS OFFERED BY THE STATE OF CONNECTICUT?_____

10) DOES YOUR COMPANY PROVIDE ANY "IN-HOUSE" TRAINING PROGRAM? IF SO, PLEASE COMPLETE THE INFORMATION REQUESTED BELOW. IF YOUR FIRM WOULD CONSIDER ACCEPTING TRAINEES FROM OTHER FIRMS AND/OR THE GENERAL PUBLIC ON A COMMERCIAL FEE BASIS, PLEASE MARK (x) IN THE LAST COLUMN.

	Skill Provided	Length of Program	How Often Offered	Avg. No. of Graduates	Type of Instruction (x)		
					*OJT	Classes	Other
#1							
#2							
#3							
#4							
#5							

*on-the-job training. (Use separate sheet if more space is required and number)

11) WHAT ARE THE PROBLEMS YOU WOULD ANTICIPATE IF YOUR FIRM WERE TO DEVELOP TRAINING PROGRAMS FOR SKILLS THAT ARE NOT CURRENTLY PROVIDED BY THE STATE OF CONNECTICUT OR YOUR ORGANIZATION? (Identify in rank-order; e.g., 1=biggest problem; 2=next biggest...etc.)

SKILL TO BE HYPOTHETICALLY OFFERED_____

1)_____NUMBER OF TRAINEES INVOLVED WOULD BE TOO SMALL
2)_____COST OF TRAINING EQUIPMENT EXCESSIVE (e.g., capital equipment)
3)_____UNAVAILABILITY OF PROPER FACILITIES
4)_____CURRENT PROFITS COULD NOT COVER COST OF PROGRAM
5)_____COMPANY INSTRUCTIONAL PERSONNEL COULD NOT BE MADE AVAILABLE
6)_____HIGH TURNOVER RATES BY PERSONNEL WHO MIGHT COMPLETE PROGRAM
7)_____OTHER (expl_____

(if more than one training program were to be considered, use a separate piece of paper. Identify the "skill to be offered" and rank anticipated problems. For example: OSHA INSPECTOR: 1)__, 2)_3_, 3)_2_, 4)_1_, 5)__, 6)__, 7)__.)

12) DO YOU PLAN YOUR MANPOWER NEEDS IN ADVANCE? 1)___YES, 2)___NO

13) IF YES, HOW FAR IN ADVANCE DO YOU PLAN YOUR MANPOWER NEEDS?

1)_____1 - 3 months
2)_____4 - 6 months
3)_____7 - 12 months
4)_____13 - 15 months
5)_____MORE THAN 15 MONTHS

14) WHAT CRITERIA DO YOU USE TO FORECAST YOUR MANPOWER NEEDS?

1)_____SALES PROJECTIONS
2)_____CAPITAL INVESTMENT PLANS
3)_____AVERAGE GROWTH OF COMPANY IN RECENT PAST
4)_____FORECASTS OF THE NATIONAL ECONOMY
5)_____FORECASTS OF THE ECONOMY OF CONNECTICUT
6)_____CONSENSUS OF YOUR TOP MANAGEMENT
7)_____CAPITAL/LABOR RATIOS
8)_____ENGINEERING ESTIMATES
9)_____ECONOMETRIC ANALYSIS
10)_____OTHER (Please briefly explain)_____

15) MIGHT IT BE POSSIBLE FOR YOU TO EXTEND YOUR MANPOWER-NEEDS FORECASTS FARTHER INTO THE FUTURE? 1)____YES, 2)____NO

16) IF LONGER-RANGE MANPOWER-NEEDS FORECASTING IS NOT DEEMED POSSIBLE, INDICATE THE FACTORS WHICH WOULD MAKE SUCH FORECASTING DIFFICULT.

1)_____CONSTANTLY CHANGING CONSUMER TASTES
2)_____POOR KNOWLEDGE OF MARKET CONDITIONS IN THE FUTURE
3)_____TOO MUCH RISK INVOLVED
4)_____CONSTANTLY CHANGING PRODUCTION TECHNOLOGY
5)_____MONEY MARKET CONDITIONS CANNOT BE ANTICIPATED RELIABLY
6)_____OTHER (Please explain briefly)_____

17) HOW IS INITIAL CONTACT MADE BETWEEN YOUR FIRM AND YOUR PROSPECTIVE EMPLOYER? (Give approximate percent for each)

1)_____STATE EMPLOYMENT SERVICE
2)_____PRIVATE EMPLOYMENT SERVICE
3)_____GENERAL ADVERTIZING (newspapers, journals, TV, radio, etc.)
4)_____RECRUITMENT AT EDUCATIONAL INSTITUTIONS IN CONNECTICUT
5)_____UNSOLICITED APPLICATIONS TO YOUR PERSONNEL OFFICE
6)_____OUT-OF-STATE SEARCH
7)_____REFERRALS FROM YOUR EMPLOYEES
8)_____OTHER (Please explain briefly)_____

18) APPROXIMATELY WHAT PERCENT OF YOUR PRESENT EMPLOYEES WERE RECRUITED FROM THE EDUCATIONAL INSTITUTIONS LISTED BELOW?

	PUBLIC	PRIVATE	OUT-OF-STATE
1) HIGH SCHOOLS.....	_____	_____	_____
2) TECH/VOC. H.S.....	_____	_____	_____
3) 2/YR. TECH COLLEGES.....	_____	_____	_____
4) 2/YR. COMMUNITY COLLEGES.....	_____	_____	_____
5) COLLEGES/UNIVERSITIES.....	_____	_____	_____
6) SPECIALIZED INSTITUTIONS.....	_____	_____	_____

19) IF YOUR COMPANY HAS EVER WORKED WITH VOCATIONAL/CAREER GUIDANCE PERSONNEL, WITH WHAT TYPE OF INSTITUTIONS WERE THEY ASSOCIATED.

	PUBLIC	PRIVATE
1) ELEMENTARY SCHOOLS.....	_____	_____
2) SECONDARY SCHOOLS.....	_____	_____
3) TECH./VOC. SCHOOLS.....	_____	_____
4) TECHNICAL COLLEGES.....	_____	_____
5) COMMUNITY COLLEGES.....	_____	_____
6) COLLEGE/UNIVERSITY.....	_____	_____
7) CONN. DEPT. OF VOC. EDUCATION.....	_____	_____
8) PRIVATE CONSULTANTS.....	_____	_____

9) OTHER (Please explain)_____

20) PLEASE CHECK THE TYPE OF SCHOOL ACTIVITY IN WHICH YOUR COMPANY PERSONNEL HAVE PARTICIPATED:

1)_____CAREER DAYS
2)_____SHADOWING (Student follows a worker observing his job)
3)_____HOSTING TOURS OF GROUPS OF STUDENTS
4)_____PROVIDING SPEAKERS TO TEACHERS FOR THEIR CLASSES
5)_____PARTICIPATING IN WORK-STUDY PROGRAMS SUCH AS NORTHEASTERN U's WORK CO-OP PROGRAM
6)_____PARTICIPATING IN WORK EXPERIENCE PROGRAMS SUCH AS JUNIOR ACHIEVEMENT, DISTRIBUTIVE EDUCATION CLUBS, ETC.
7)_____OTHER (Please explain briefly)_____
8)_____NONE

21) CAN YOU SUGGEST WAYS IN WHICH YOU WOULD LIKE TO WORK MORE EFFECTIVELY WITH THE PUBLIC SCHOOL CAREER GUIDANCE PERSONNEL IN ORDER TO BRING THE WORLD OF WORK CLOSER TO OUR YOUNG PEOPLE?

_____

_____

_____

_____

_____

_____

22) IF YOU HAVE NOT ANSWERED SOME OF THE QUESTIONS, PLEASE CHECK THE REASONS BELOW: (List the number of the question after appropriate entry.)

1) DATA NOT AVAILABLE_____
2) DATA NOT EASILY RETRIEVABLE_____
3) TOO TIME CONSUMING_____
4) PURPOSE OF SURVEY NOT RELAVANT TO YOUR FIRM'S NEEDS_____
5) DID NOT UNDERSTAND QUESTION_____
6) COMPANY POLICY PROHIBITS DISSEMINATION OF THIS INFORMATION_____
7) OTHER (Please explain briefly)_____

_____

_____

_____

_____

rate is a qualified success.

Analysis of the respondents-by-industry raises some interesting questions about the attitudes and views held by certain industries in Connecticut. Manufacturing firms accounted for two-thirds of the respondents(203). In so far as they are concerned, we received an excellent sample by size (number of employees).

Table I

MANUFACTURING RESPONDENTS BY NUMBER OF EMPLOYEES

47	.....	1 - 25 employees
29	.....	26 - 50 "
29	.....	51 - 100 "
38	.....	101 - 250 "
26	.....	251 - 500 "
34	.....	500 or more employees

Our data on manufacturing responses is valuable because of the obvious cooperation by large and small firms alike. However, returns from every other category of business were inadequate in number to support any reasoned conclusions about training needs on an industry-wide basis. A thorough review of the questionnaire was performed to discover what, if any, language might have frightened away over twenty-five hundred retailers, wholesalers, diversified, financial and transportation-industry firms. No obvious bias was identified. Indeed, less than seven percent of those who returned blank

questionnaires indicated that they did not understand the questions (Q.#22). It is my belief that many felt that the sponsoring Department of Vocational Education had little to offer them in the way of training programs and that completing the questionnaire was a waste of their time. Another possibility is that many firms did not want anyone training their employees but themselves. A third is that many had no training problems! Still, it is unfortunate that they could not share their views, if not their needs. The Connecticut Master Plan for Vocational and Career Education is currently taking shape and the resul of this study have been closely monitored by its Director, Mr. Eugene Belisle. To the extent that this study provides a meaningful data base for significant reform of vocational education programs in Connecticut, an important avenue of input has been lost to firms in the above mentioned industries.

Question #5 was the first query to touch the heart of our interests: "Do you feel that the Government of the State of Connecticut is adequately servicing your manpower training needs?" The overall response was, 79 - yes, 184 - no. Among manufacturing firms, the response was 54 - yes, 150 - no. Approximately seventy-five percent of the sample respondents felt that the State agencies could do a better job regarding their training needs. The

next question requested each respondent to identify the occupational titles/ skill areas in which they wished the State to provide training programs. The following table lists those problem areas (in the respondents language). The next table lists the same occupation/skill-training needs in question by size of sample respondents (number of employees). A final table identifies the programs available currently at the State vocational and technical high schools.

The reader will note that a large number of the occupational/skill areas are served by the schools administered by the State. Further, many of those skills not serviced by State schools are serviced in the secondary or post-secondary schools, both public and proprietary. Finally, Appendix I provides estimates of supply and demand for some of these occupations and skill classes. It clearly indicates that in a number of areas, gross over-production of skills is being generated by school systems, both public and private. On top of these facts is the common knowledge of current high unemployment rates, especially in the manufacturing skill areas.

Table II

Occupational title/skills needed by CBIA members.
By size of firm (number of employees)

	1-25	26-50	51-100	101-250	251-500	500+
skilled machines		1		1	1	1
screw machines	1	3		1		4
plastic molding	1					1
press set-up	4	1	1	5	3	4
machine operators	6	3		4	2	1
machinist	11	10	9	8	3	7
model makers			1			
tool makers	20	4	8	9	7	8
tradesmen					1	
truck driver	1					
heavy equipment operator	1					
machine maintenance	1	2		4	2	1
punch press-set-up & operators	1		1	2		
welders	6	4	1	1		2
milling machine				1	1	
lathes	1	1	1	1	1	1
grinding					1	
N/C maching					1	
telephone skills					1	
mechanical maintenance	2	1	3	5	1	5
inspector training				1		
web pressmen				1		
camera				1		
stripper				1		
pattern makers	1					
mold makers	3			5		
metal working trades	2					2
sheet-metal workers	2	3	2	1		3
plastic injection molding				1		
foremen				1		
secretarial			2	2	1	3
electrical assembler		1		3		1
plumbing assembler		1	1			
general maintenance			1			
electrical repair						2
air conditioning	1					1
instrumentation (½ Reading)		1		3		2
business math	4		2	1	1	3
verbal communication				2		4
plating & metal finishing engineer			1	1		
engravers				1		
chasers (silversmiths)				1		
filing ability				1		
optical polishers				1		
cabinet making	1					
foundry	2				1	
desk clerk	1					
housemaid	1					
plastic set-up men		1				
sewing machine mechanics			1		1	
sewing supervisers			1		1	
pattern makers (dress co.)			1			
electronic assemblers (diagnostics)						1
instrument functions/repair						
mic forecasters		2				

Table II Cont.

	1-25	26-50	51-100	101-250	251-500	500+
basic contr. engineers				1		
engineering drawing	1		1	1		
construction c				1		1
layout inspec		1				
gage inspectors	2	1		2		
millwrights						1
sales administration	3		2	1		
clerical skills	1		2	1	2	16
basic acct. principles				1		
computer operators					3	1
keypunch operators					3	2
header operator			1			
secondary machines			1			
mailing/shipping/receiving/warehousing	1					
engineering aids	1					
water treatment plant operators				1		
electronic technicians	1		4		1	1
environmental technicians			1			1
draftsmen	3		3		1	1
sand casting molders					1	
printers			1	1	2	1
people who can read prints		1	2		1	4
auto body workers	1					
graphic arts specialists						2
industrial maint. electrician	2		2	2	1	
millwright	2	1			1	
carpenters		2	2		2	
training of foremen (manu)	1	1	1		3	
textile machine operators					1	
bulk cooks	1					
"non-medical aids" (nursing homes)	1					
automatic power press operators					1	
pipefitters				1	1	1
senior skilled machine operators	1				1	
sheetmetal fabricators (aero-space)			1			1
N.C. Jig bore			2			1
tap drills						1
turret lathe						1
stonesetters				1		
jewelry polishers				1		
production jewelers				1		
exec/adm. secretaries			2			
upholstery workers		1				
riggers (engineering co.)		1				
metallurgy skills			1			
heat treatment - general			1	1		
engravers		1				
"gridley-screw" mach. operators	1		1			1
cold header operators				2		1
time-study eng.						1
drill operators			1			
chip & grind ops.		1	5	1	2	1
roll operators			1	1		
THE SKILLED MACHINISTS			5	3	2	3
EDP programmers	1				1	4
plumbing designers	2		1			
Ind. Engineers	2					2

Table III

OCCUPATIONAL TRAINING NEEDS IDENTIFIED BY CBIA MEMBERSHIP

Air Conditioning*	Environmental technicians*
Auto body workers*	Exec/Adm. secretaries*
Automatic power press operators*	Filing clerks*
Basic 'accounting principles'*	Foundry workers
Basic construction engineers	Gage inspectors
Bulk cooks*	General maintenance*
Cabinet making*	Graphic arts specialists*
Cameramen*	"Gridley-screw" mach. operators
Carpenters*	Grinders*
Chasers (silversmiths)	Header operators
Chip and grind operators*	Heat treatment-general*
Clerical skills*	Heavy equipment operators
Cold header operators	Housemaids
Computer operators*	Industrial main. electrician*
Construction crafts*	Inspector training
Desk clerk	Instrument function/repair*
Draftsmen*	Instrumentation*
Drill operators*	Jewelry polishers
Economic forecasters	Keypunch operators*
EDP programmers*	Lathe operators*
Electrical assembly workers*	Layout inspectors
Electrical repairmen*	Loomfixers
Electronic assemblers (diagnostics)	Machine maintenance*
Electronic technicians*	Machine operators*
Engineering aids*	Machinist*
Engineering drawing*	Mailing/shipping/receiving/warehousing
Engravers*	Mechanical maintenance*

*Indicates "trades" serviced by State Institutions

Metallurgy skills
Metal working trades*
Milling machine operators*
Millwrights
Model makers
N.C. Jig borers*
N/C machining*
"Non-medical aids" (nursing homes)
Optical polishers
Pattern makers
Pattern makers (dress cos.)*
"People who can read prints"*
Pipe fitters*
Plastic injection molding
Plastic press set-up & operators
Plastic molding
Plating & metal finishing engineers
Plumbing assembler*
Press/set-up men*
Printers*
Production jewelers
Punch press/set-up operators*
Quality control
Riggers (engineering co.)
Roll operators
Sales administration*
Sand casting molders
Screw machine operators*
"Secondary machine" operators
Secretarial skills*
Senior skilled machine operators
Sewing machine mechanics
Sewing supervisors*
Sheetmetal fabricators (aero-space)
Sheet metal workers*
Skilled machinists*
Strippers
Stone setters
Tap drill*
Telephone skills
Teletype operators
Textile machine operators
Time-study engineers
Tinsmiths*
Tool makers*
Tradesmen
Training of foremen (manu)
Truck drivers
Turret lathe operators*
Upholstery workers
"Verbal communication"*
Weaving preparation
Web pressmen
Welders*

CONNECTICUT STATE DEPARTMENT OF EDUCATION
Division of Vocational Education
Hartford

Trade and Industrial Education Opportunities in Connecticut

SHOP NO.	37	10	2	57	13	14	49	42	26	20	4	34	66	33	64	67	31	22	3	9	69	54	58	11	12	36	6	51	60	68	1	15	8	7	41	29	25	21
COURSES OFFERED	AIR COND. & REFRIG.	APPLIANCE REPAIR	AUTOMATIC SCREW MACHINE	AUTOMOBILE BODY REPAIR	AUTOMOBILE MECHANICS	AVIATION MECHANICS	AVIONICS	BAKING	BARBERING	BEAUTY CULTURE	CARPENTRY	CHEMISTRY, INDUSTRIAL	CONSTRUCTION SERVICES	DENTAL ASSISTANT	DENTAL LAB TECHNICIAN	DRAFTING, AERONAUTICAL	DRAFTING, ARCHITECTURAL	DRAFT., CONSTRUCTION DES.	DRAFTING, MACHINE	ELECTRICAL	ELECTRICAL, INDUSTRIAL	ELECTRO-MECHANICAL	ELECTRONICS	FASHION DESIGN	FOOD TRADES	GAS & OIL FIRED BURNERS	GRAPHIC COMMUNICATIONS	HEALTH SERVICES OCCUP.	HEATING & PIPING	INTERNAL COMBUSTION ENG.	MACHINE-TOOL	MASONRY	PAINTING & DECORATING	PLUMBING & FITTING	PRACTICAL NURSE EDUC.	SHEET METAL	VOCATIONAL HOMEMAKING	WELDING
VOCATIONAL-TECHNICAL SCHOOLS																																						
*POST SECONDARY=P.S.																																						
UNIT NO.																																						
55 ANSONIA					X						X								X	X			X								X							
51 BRIDGEPORT					X			X	PS	X	X						X		X	X			X	X	X		X				X	X	X	X	PS			
52 DANBURY		X		X	X	PS				X	X								X	X			X				X				X			X	PS			
53 DANIELSON					X	PS				X	X						X		X	X			X								X	X						
54 HAMDEN				PS	X					X	X			PS	PS				X	X			X	X	X		X				X			X	PS			
55 HARTFORD					X	X			PS	X	X		X	PS				PS	X	X		X	X	X	X	X	X			X	X	X		X	PS	X		PS
56 MANCHESTER					X						X								X	X			X								X							
57 MERIDEN	X				X					X	X								X	X			X				X				X			X		X		PS
58 MIDDLETOWN				X	X					X	X								X	X			X					X			X				PS			
50 MILFORD	X			X			X			X							X		X		X	X	X					X			X				PS		PS
59 NEW BRITAIN	X		X		X					X	X								X	X			X	X	X		X				X			X	PS			
60 NORWICH	X				X					X	X								X	X			X				X				X			X	PS	X		
61 STAMFORD					X					X	X	X		PS					X	X			X		X		X				X			X	PS		X	
62 TORRINGTON	X				X					X	X								X	X			X					X			X							
63 WATERBURY				X	X					X	X								X	X			X	X							X			X	PS			
64 ATLANTIC		X		X	X						X			PS		X			X	X			X								X				PS			

What our survey results indicate, at least at the surface, is that on the quantitative side, most of the training needs identified by respondent firms are being met by the State in terms of training programs with the exception of a small number of "exotic" skills for which the demand is very low...too low to rationalize new program development.

Still, the list of skill training needs is long and written responses which could not be programmed for computer tabulation strongly suggested that company officers were less than happy with the quality of "product" generated by the formal training programs. Numerous conversations with experts who were given the opportunity to examine survey results have led us to the conclusion that the training needs of Connecticut's businesses and industry are in form of unmet quality components and not a simple issue of the number of graduates or the nonexistence of programs. Where the absence of State-sponsored programs is identified, more often than not, proprietary institutions service those particular needs. Admittedly, shortages have been identified (see Appendix I) and the State should be obliged to respond in these cases by increasing the 'scale' of selected programs, but in general, the programs appear to be adequate, at least in name!

As noted however, a large number of occupational/skill areas (111) were

identified by sample respondents as "not provided by the State of Connecticut". In line with these responses, a second survey instrument was designed and mailed to all firms that identified these training needs. The results of that survey are found in Appendix II. They provide preliminary criteria for the revision of programs currently serviced by the Department of Vocational Education.

Our survey did not end with the collection of the above information. Firms were asked to identify the forms through which their employees acquired those skills allegedly not serviced by the State schools. For manufacturing respondents the results were:

Table IV

HOW DO YOUR EMPLOYEES ACQUIRE TRAINING?
(by percent of respondents)

Informal on-the-job experience	65 %
Apprenticeship programs	33 %
Company training programs	27 %
Municipal school programs	11 %
Federally administered programs	2 %
Military program graduates	6 %
Private program graduates	9 %
Out-of-state program graduates	3 %
Other	7 %

One out of four firms operate "schools" within their walls to provide employees with relevant and necessary skills! One out of three cooperate with formal apprenticeship programs. One out of three turn to a wide variety

of training programs offerred by both public and private schools or agencies in their efforts to provide employees with adequate skills. In general, no firm in our sample is likely to be staffed exclusively by the graduates of State institutions. Of course, changing technology and production methods are constant forces in the business community and even the best-equipped and supported training programs provided by State agencies would not likely meet every significant manpower need of our State's enterprises. Still, angry editorial comment by sample respondents reflected a widespread view that the "State could do more to help us!"

When asked to identify problems encountered when firms develop in-house training programs, respondents ranked difficulties on a scale of 1 - 7, where (1) represented the biggest problem encountered and (7) suggested the least significant consideration to firms.

Table V

PROBLEMS EXPERIENCED WITH IN-HOUSE TRAINING PROGRAMS
(by rank order from 1 through 7)

	1	2	3	4	5	6	7
Small number of trainees	41	14	11	9	4	4	1
Excessive cost	10	12	14	3	4	6	0
Lack of facilities	12	8	11	7	5	1	0
Profits too low	37	14	11	7	2	2	0
Lack of qualified Instrs.....	20	34	7	5	6	0	0
High turnover of grads.....	10	21	13	7	5	7	0
Other.....	5	2	2	2	0	0	1

These results are tallyed by the number of firms identifying problems classified. On a weighted basis, the responses indicate that the worst problems commonly experienced are: (1) the small number of trainees; (2) an inadequate profit basis for supporting such programs; (3) the difficulty of providing (available) qualified instructors from the company staff; and (4) unacceptably high turnover rates of graduates of such programs. These problems were to be expected, of course, and they represent sound initial criteria for the take-over of training programs by State institutions where the number of likely training candidates is substantial enough to warrant new programs. As was indicated above, such information (as to numbers) is solicited in the follow-up survey for 111 occupations and will be available for review by officials in the State Department of Vocational Education.

Interestingly, only six firms out of almost 300 indicated a willingness to accept students from other firms into their training programs on a commercial fee basis. The inquiry was raised in the questionnaire in response to an apparently widespread belief that "industry knows best how to train employees." Apparently, because of industrial "secrets" and a general philosophy commonly shared, Connecticut's businesses are not at all interested in going into the training business on a formal commercial basis. Of course, the fact

is that the high turnover rates reported by many firms that do conduct formal training programs represent a 'filtering process' of their graduates into the labor market. De facto then, many of our firms are providing trained personnel for those firms that cannot see their way to structuring formal and costly training programs.

Inconsistency in responding to two questions soliciting information about company-run training programs was uncovered. In question #7, 22 percent indicated that they ran such programs. In question #10, firms were asked to describe those programs in some detail, and 44 percent of the respondents went on record identifying: the skill provided, the length of the program (in hours) how often it was offered, the average number of graduates, and the type of instruction utilized. Such inconsistency appears to be rather common in surveys of this type in view of similar efforts in Wisconsin, New Jersey, Oregon, Michigan and California. As the questionnaires were completed by high-ranking company officials, it is a curious pattern of behavior to say the least.

Before reviewing survey results that relate to a somewhat removed topical area it might be timely to report here on returns that reflect industry views on the quality product of our school systems in Connecticut. Many editorial comments were offered in separate letters, on the margins of the

questionnaires or in the context of answers which allowed respondents to offer extended remarks. An effort was made to foresee this by including in the survey a question that asked respondents to identify general weaknesses that limited the productive performance of their employees. The results are found below and again, the ranking arrangement is from (1) being the worst problem to (9) being the least problematical. The data is in terms of number of respondents.

Table VI

DO YOUR EMPLOYEES, ON THE WHOLE, MANIFEST ANY SPECIAL WEAKNESSES THAT LIMIT THEIR ABILITY TO PERFORM?

	1	2	3	4	5	6	7	8	9
Poor reading	24	16	12	12	2	3	2	0	0
Unsatisfactory writing	13	13	14	4	4	5	4	0	0
Poor verbal skills	25	23	20	9	3	4	0	0	0
Poor mathematical ability	15	19	17	6	9	2	1	0	0
Unable to follow directions	13	29	12	6	5	6	0	0	0
Lack of interest	35	16	8	8	5	3	2	0	0
Poorly trained	21	7	11	1	2	2	7	0	0
Other	8	4	1	7	2	0	1	1	0
None	31	0	0	0	0	0	0	0	0

Such responses clearly indicate that, in the eyes of company officers, the quality of school graduate is unsatisfactory in terms of his general education. Communicative and mathematical preparation is seen to be lacking; in short the 3 R's are not thoroughly taught! On a weighted basis, and most significant, is the observation that the lack of interest in work is probably

the greatest source of dissatisfaction to Connecticut's employers. Poor motivation is likely to generate less-than-maximum effort from employees and its identification in our survey only serves to emphasize the importance of better career-guidance counseling in Connecticut. While the lack of interest in work can be caused by many forces it is more than reasonable to argue that before a young person can "find himself in the work world" he has to "find the world of work". More will be said of this issue in the second section of this report.

Our survey design had to provide information of a background nature for the State of Connecticut's educational agencies if any of the results were to be a basis for the implementation of new or revised training programs of a vocational nature. Any response by State agencies would require more than a knowledge of training needs. As was observed above, rationalized programs require evidence of numerical need and some indication of what that need-level might be in the intermediate future. Accordingly, we solicited information about the forecasting/planning aspects of Connecticut's industries.

Question #12 asked, "Do you plan your manpower needs in advance?" Among manufacturing respondents the return was: 2 - yes, 202 - no! Another case of inconsistency arose when the response to the next question was recorded:

"How far in advance do you plan your manpower needs?" The response among manufacturers was:

Table VII

(N-204) NUMBER OF RESPONDENTS	MONTHS IN ADVANCE
72	1 - 3 months
31	4 - 6 months
31	7 - 12 months
10	13 - 15 months
16	more than 15 months
Total 160	

The inconsistency of response between questions #12 and #13 is very difficult to explain. However, responses to question #14 may shed some light on these strange returns. It asked respondents to identify the type of forecasting criteria/system employed in making manpower-needs projections.

Table VIII

CRITERIA USED IN FORECASTING MANPOWER NEEDS
(by number of firms employing them)
(manufacturing only)

Forecasting Techniques	Number of Firms
1. Sales projections	143
2. Capital investment plans	35
3. Growth of company in recent past	43
4. Forecasts of the national economy	50
5. Forecasts of Connecticut's economy	11
6. Consensus of top management	59
7. Capital/labor ratios	5
8. Engineering estimates	13
9. Econometric models	13
10. Other	11

Obviously many firms employ a number of techniques in their 'planning' of manpower needs. Generally speaking though, only #2 and #9 in the above table

possess a design capability for true long-range forecasting beyond 15 months. Number 4 rests on the use of #9 and such output is not normally available on a regional or state basis. Admittedly projections are made 15 months or more in advance utilizing all of the other approaches, but with generally poor reliability. The distinction too, must be made between analytically detailed "planning" and the simple action of "committing" the future direction of company activity on the basis of reasoned optimism or experience. In later sections of this report we shall comment at length on the state of the art of forecasting. For the moment however, it is the author's opinion that the majority of Connecticut's businesses engage in but short-run "planning" that borders on little more than "reacting to" information that is likely to become "fact" in the near-term. Perhaps a dozen of our very largest enterprises engage in the extensive and complex problems of constructing sophisticated econometric models suitable to detailed planning/forecasting for 2-5 years into the future. As most, however, rely on "planning" techniques that have but very short-term reliability, we reason that the overwhelming majority are incapable of manpower-needs forecasting for a period beyond a year, at best! 14 firms indicated that it would be very difficult-to-impossible to extend their planning further into the future. Fifty-six indicated that they

could do so with varying degrees of difficulty and increasing unrealibility. The following factors were identified in explaining the problems of long-range manpower-needs forecasting (by number of respondent firms).

Table IX

Constantly changing consumer taste	29	firms
Poor knowledge of market conditions	73	"
Constantly changing production technology	26	"
Too much risk involved	30	"
Money markets cannot be anticipated	43	"
Other (miscellaneous)	16	"

On the whole then, Connecticut's businesses are, to be frank, unable to tell Connecticut's educational agencies what they need in numerical terms from the various training programs administered by the State. At best short-run estimates of manpower demand for six to twelve months can be compiled through regularly conducted surveys and the regular services of the State Employment Service. But the long-range needs of our private firms are too poorly perceived to be a basis of planning by educational agencies. That information must come from alternative sources.

A few eyebrows should have been raised in an earlier passage when one read that firms argued that the State was not providing training programs in occupational areas in which State Vocational Technical High Schools have been servicing programs for many years. During the formative period of question-

naire design it occurred to us that many firms might be largely uninformed of training programs administered by the State of Connecticut. Thus, we incorporated some questions designed to shed some light on their employment practices.

One of the first in a series of questions asked company officers to estimate the percent of their employees recruited directly from formal schools. The results for manufacturing were:

Table X

PERCENT OF EMPLOYEES RECRUITED FROM EDUCATIONAL INSTITUTIONS BY TYPE (N=204)

	Public	Private	Out-of-State
High Schools	11 %	0 %	0 %
Tech/voc H.S.	3	0	0
2-yr. Tech. Col.	1	0	0
2-yr. Comm. Col.	0	0	0
Coll/Universities	1	0	1
Spec'ed Priv. Insti. .	0	0	0

Admittedly, this data is subject to multiple interpretation, but if interpreted in the spirit in which the question was written it indicates that most firms tend to employ people who possess some experience rather than recruit directly in an educational institution. The staggering unemployment rates of young workers (18-24 years old) reinforces this conclusion. More importantly, the pattern also suggest that many employers are likely to

have little knowledge of vocationally-oriented programs simply because they have relatively little direct contact with educational agencies. The figures are averaged out here and significant deviation existed in the raw data. Still, we are inclined to believe that firms occupy a somewhat distant position from the school world.

When asked how they made initial contact with people who were eventually hired we collected the following ranking:

1. Advertizing
2. Unsolicited applications
3. Referrals through their own employees
4. State Employment Service
5. Private Employment Service
6. Schools in Connecticut
7. Other
8. Out-of-state-search

On the basis of the percent actually hired, we find that almost seventy percent of all employees working in over 200 manufacturing firms made initial contact through the first three processes in the above column. This pattern is very similar to the pattern observed in studies conducted by the U.S. Department of Labor and suggests that, at least on this count, Connecticut is not unlike the rest of the nation.

Happily, we uncovered a more substantial relationship between firms and schools in terms of participation in programs designed to expose young people

to the world of work. The following table identifies a series of activities and the number of firms participating in them on a regular basis (manufacturing only).

Table XI

(N=203)

Career days.....	72	firms
Shadowing (of workers).....	17	"
Hosting tours.....	94	"
Providing speakers.....	52	"
Work-study programs.....	37	"
Work-experience programs.....	49	"
Other.....	20	"
None.....	30	"

All told, 85 percent of the sample respondents in manufacturing engaged in world-of-work exposure programs of varying degrees of intensity and number. Our data showed a very tight correlation between these types of involvements and the incidence of 'contact' with career-guidance counselors at the secondary school level. Only incidental regular contact was maintained with such counselors beyond high school or at the elementary level of education. Written comments were universally enthusiastic about the need for more direct and meaningful program involvement with all levels of education, especially at the secondary level. However, the attitude appears to be one of waiting for the "other side" to make initial contact for further program development along these lines.

In sum, it appears that while Connecticut's enterprises are critical about the quality of school graduate reaching them, they are unaggressive and probably unclear as to the direction they might take in addressing the issue. Many of the small and medium-sized firms appear to be almost oblivious to many of the programs administered by the State agencies. At the same time these same firms were critical, even angry, with "what the State was not doing." Our larger enterprises engage in a wide variety of programs designed to help students and career counselors in their efforts to grow and serve. They are articulate, well-informed, well-planned and energetic in their spirit of cooperation.

For all practical purposes there is no common occupational language employed across this state. Conceivably, ten firms will identify a foreman by ten different names. Surely a first task to be recommended by us is for the State to adopt the occupational titles employed by the Federal government for its own working purposes and promulgate them throughout the business and industrial community. Until that task is completed, surveys and information collection efforts that are viewed by us as necessary for the future will be hazardous and unreliable.

While we were disappointed by the poor response of non-manufacturing

firms to our survey it would only be fair to point out that for reasons best known to them, they believed the survey to be irrelevant to their needs; forty-four percent said so. For these the State government clearly suffers from an identity image, for they see themselves as 'non-existent' in the eyes of State government. Thirty-seven percent of those who failed to fill out the forms honestly admitted that such data did not even exist in their practice; and twenty-nine percent pointed out that the requested data did not exist in retrievable form. Of the 2800 surveyed, only 28 firms indicated that the request for information was too time-consuming or that they did not understand the questions. Only one firm admitted that company policy prohibited the release of the requested information.

All in all, we felt that CBIA members were responsive and concerned with our study. While we would have preferred to receive fully answered questionnaires from all members, perhaps some value can be found in the knowledge (to the State) that so many classes of industry see the State as impotent regarding their manpower-training needs!

This ends our report on the manpower training-needs survey. The next section of the report addresses itself to the issue of the information needs of an improved career-guidance counseling system.

CHAPTER II

REVIEW OF MANPOWER FORECASTING TECHNIQUES

In the opening passages of this report it was noted that this study might serve certain educational purposes by making readers more aware of the state of the art of a number of areas of concern. In our experience during the past year we have been particularly impressed by the lack of understanding people have of manpower forecasting, thus one reason for the presence of this chapter. It also serves to prepare the reader for our recommendation of a computer-based career-guidance information system to be employed by counselors and administered by the State of Connecticut.

Long-Range Manpower Forecasting Techniques

An essential component to Connecticut's total educational needs is a good and meaningful data base providing both long-range and short-term manpower needs. Such data must be reasonably precise, available on a geographical labor-market basis, and as detailed as possible regarding specific occupational needs. Previous passages in our report have shown a very limited committment by Connecticut's businesses and industry to manpower planning. This fact of life imposes a severe limitation on the sources of manpower data that might be aggregated by State agencies for

long-run analysis or forecasting. In effect, it is very unlikely that such necessary long-range manpower forecast information will come from surveys conducted on a regular basis. Resultingly then, long-range information must come from more complex and sophisticated models. These pages briefly review available techniques for the benefit of the reader.

The Partial Approach

This method tipyfies the most direct approach available by focusing upon individual sectors, industries or occupations. It represents a last-resort, worst-state-of-the-art approach. Generally, one procedes by conducting a survey of the major employers and asking them to project their own labor demand into the future. By making some very convenient assumptions that effectively homogenize the industry the aggregated results of the survey are then interpreted to be representative of the overall manpower picture for that industry. One can extend the implications of initial and localized results geographically to suggest the national need for manpower for a particular industry or a particular area.

The difficulties encountered with this simple and popular approach are massive. The collection and classification of the data is problematical. Respondent-provided data too, may be little more than a reflection of season-

al or current conditions more than anything else. Even worse, employers might totally disregard their own 'forecasts' over time and the ultimate patterns of manpower needs could be quite removed from the "planned responses" generated from the original data. Even at the local level such an approach is hard to dedent (Doeringer, et.al.). Research conducted by The Conference Board in 1968 served to preview the pattern of response uncovered in our study. In Connecticut, only a few of our very largest firms do any serious manpower planning!

There are other problems commonly recognized by professional forecasters. Correctly identifying the universe of establishments to include in the survey for different time periods is one. Then too, as we found or at least suspect, there is the issue of built-in employer biases toward overestimation or underestimation. Authorities on the science of forecasting normally suggest that such an approach is valuable only when limited to short-term, easy-to-identify skill needs (Morton, p.20).

Another version of 'the partial approach' is similar to what urban economists call the "economic base" method. Here, one identifies relationships between the variable in question (say, the number of machinist in the United States) and a variable which is forecast by rather reliable techniques

(say the GNP). If some ratio between the two exists with a degree of constancy in the immediate past, then one simply argues that if the 'independent variable'is assumed to increase by a given percent, then the 'dependent' variable will grow by a like amount. Thus a projected increase in the GNP would warrant the prediction that the demand for machinist would expand accordingly. This method rests upon assumptions that are heroic! Of course, one can get much more sophisticated by employing a large number of variables in making the forecast and projecting maximum and minimum estimates of demand for a particular occupation or skill. However, these estimates are but 'useful'; they are neither adequate nor valid for the forecasting of broad manpower requirements. Each set of variables employed must be limited in number as a matter of practicality and the choice of variable employed can easily be inconsistent in terms of assumptions. In sum then, 'partial analysis' is time-consuming, difficult, inadequate and unreliable for long-range forecasting purposes.

The Planning Approach

Another path to a knowledge of our future manpower needs that is attractive to some involves the adoption of economic goals of a broad nature, the determination of the costs of implementing these goals in the future and

then analyzing the overall economic and manpower requirements necessary to the achievement of these goals. Such an approach at the least helps in identifying manpower constraints and broader limitations inherent in the adoption of economic goals that exceed the endowment of resources. However, goal identification is normally overly aggregative and often ambiguous. Furthermore, the methodology used results in a large amount of double counting and overlapping at every stage of the analysis. Finally, the whole notion rests upon a degree of planning which is probably unacceptable to advocates of 'free market' mechanisms. It is only useful to individual units of the economy.

The Bureau of Labor Statistics Approach

Since the end of World War II the Bureau of Labor Statistics of the United States Department of Labor has engaged in long-range occupational employment forecasting. These projections are developed from independent BLS analyses as well as from information obtained from industry officials, labor organizations, trade associations, professional societies, government agencies and other organizations. The forecasts emanating from the Labor Department are the most detailed and comprehensive ones available, and are heavily relied upon by government decision makers, vocational

counselors, manpower and education planners and by individuals seeking career information. It is thus valuable for us to review the BLS/DOL operations with some detail.

The present BLS long-range manpower forecasting program began in the early 1960's with the formation of the Interagency Economic Growth Project, which represented an effort undertaken by the Labor Department in cooperation with government agencies and private research organizations to develop a comprehensive and integrated framework for analyzing the implications of long-run manpower utilization. One of the first major results of this effort was BLS Bulletin 1536, Projections 1970; Interindustry Relationships, Potential Demand, Employment, which summarized a major phase of the work of the Economic Growth Project. (footnote)

Projections 1970 was an attempt to make consistent conditional projections from 1965 to 1970 of the detailed economic manpower effects which would result from several alternate composition of GNP in the latter year. This bulletin contained four separate 1970 projections: one for the economy operating with an unemployment rate of three percent; one for the economy with a four percent unemployment rate; one for the economy at four percent unemployment with a final demand composition stressing durable goods

(high durables model); and one for the economy at four percent unemployment but with a composition of final demand emphasizing the service sectors (high services model).

In this BLS study the first step in obtaining conditional projections entailed the disaggregation of total GNP into six broad categories; federal government, state and local government, private fixed capital investment, gross private domestic investment, personnel consumption expenditures and net exports. Next, a detailed bill of goods corresponding to each of the assumptions as to the composition of 1970 final demand had to be developed for each of these six categories. In the following step in the process, required output was related to required employment through an interindustry-employment matrix which showed the total employment generated in and by every industry per billion dollars delivery to final demand. Finally, the required levels of employment in each industry corresponding to the alternate compositions of gross national product in 1970 were estimated.

More recently the BLS has extended the work begun in Projections 1970 by projecting the shape of the U. S. economy to 1980 under several different assumptions. Patterns of U. S. Economic Growth contains projections of

the United States economy to 1980 taking account of forecast changes in gross national product, population, labor productivity, interindustry relationships, and prices. Here also the future shape of the national economy and labor force are projected under several different assumptions as to the composition of GNP in the forecast target year. In The U. S. Economy in 1980, the companion study to Patterns of U. S. Economic Growth, these results are developed further and disaggregated into demand for selected occupational categories of manpower resources (footnote).

Finally, Tomorrow's Manpower Needs represented an ambitious attempt by the Bureau of Labor Statistics to incorporate forecast changes in occupational manpower requirements and further into regional employment demands (footnote).

In general, the BLS long-range manpower forecasts are developed in a series of distinct steps; (1) a set of basic assumptions concerning the shape of the social and economic environment in the future is formulated; (2) these assumptions are translated into basic economic parameters such as GNP, labor force, and unemployment; (3) the level of economic activity is translated into total employment requirements and employment by industry; and (4) employment by industry is then broken

down into occupational manpower requirements.

The BLS 1980 manpower forecasts were based on a series of assumptions about the performance of the economy in the coming decade; (1) the labor force will be slightly larger than 100 million; (2) the economy will be operating at full employment (three percent unemployment); (3) the United States will not be fighting a war; (4) the institutional framework of the nation will not be radically changed; (5) basic economic, social, technological and scientific trends will continue at recent rates; and (6) environmental and social programs will absorb an increasing portion of the nation's resources.

Next, the level of economic activity and real GNP in 1980 were estimated by combining projections of total employment with projections of hours of work and output per manhour. Separate projections of these variables were made for the public and the private sectors of the economy.

Once the basic economic variables for 1980 were fixed, detailed industry employment was estimated. Three different methods of doing this were used, depending on the data available, the level of industry detail required, and the characteristics of the industry. Ultimately, however, results obtained from input-output analysis of individual industries

studied, regression equations and qualitative information concerning the technology and structure of the industry were used to determine employment projections for each industry.

Finally, the BLS disaggregated industry employment into occupational employment by developing occupational patterns for each industry for 1980. The occupational struction of each industry was projected from historical statistics and other factors expected to influence occupational structure, such as new technology or changes in products. Employment requirements for most occupations were derived from the projections of total industry employment and the occupational pattern of that industry for 1980; however, for some occupations affected by their own complex set of social and economic variables, BLS analysis of the factors affecting employment was the basis for estimating future requirements.

Three years ago (June, 1973) at the North American Conference on Labor Statistics, Russell B. Flanders, Chief, Division of Manpower and Occupational Outlook, of the BLS offered interested parties some new and exciting news (footnote). He announced that the BLS was becoming involved in the development of state and local matrices and the subsequent use of developing occupational projects on these more localized basis. Thus, the

procedures employed in the Tomorrow's Manpower Needs projections could now be implemented by state employment agencies across the country. Without question, the availability and use of a State matrix will increase the reliability of state and local occupational projections.

The new program will provide a set of 51 individual State (and D.C.) matrices designed to be consistent in format, concept and data base with the Bureau's national matrix. The Department of Labor of the State of Connecticut is now involved in the development of such matrices.

The occupational data base for this program is special tabulations of the 1970 decennial Census. These special tabulations cover, for each State, employment in approximately 425 occupational categories, cross-classified by approximately 200 industrial sectors. In addition, each industrial sector is sub-divided into several class-of-worker categories, such as self-employed, private wage and salary and government workers. Special tabulations can also be obtained for each SMSA with a population of 250,000 or more; in our case that includes the Bridgeport, New Haven and Hartford SMSA's.

The program provides a great deal of occupational data that should prove especially valuable as trend information in the years ahead. The

computer system package being developed will be adaptable to the survey data base. Thus, once the system is completed, our state will be able to use the matrix computer system for sorting, retrieving and manipulating survey results. The matrix system will also furnish to Connecticut, the capability of supplementing the survey effort by providing occupational employment estimates in non-survey areas, such as self-employed. Similarly, the Census-based matrices will make it possible to prepare estimates for occupations not included on all survey documents. For example, the occupation "maintenance electrician" may not be included on some OES questionnaires for industries where only a few such workers are employed. The matrix system, however, will provide an employment estimate for these workers in every industry sector. These estimates can be used to supplement the employment data collected in the survey program.

I might also note that the U. S. Bureau of Labor Statistics can now also provide death and retirement, or replacement estimates for occupations by state for over 400 occupations. Separation rates are now available for males and females and may be used for the purposes of estimated future job openings.

Thus, we can end our review of long-range manpower forecasting methods

here, because the above described federal and state sponsored programs represent the "best available" data for Connecticut. While it is true that other methodologies exist or have been recommended for implementation, many, such as complex input-output models, exist in more or less experimental form and are neither operational nor providing reliable output.

Data currently emanating from the Connecticut Department of Labor in conjunction with data published in the U. S. Department of Labor's Occupational Outlook Handbook represent the best source of long-range manpower-needs information on the most detailed basis. Short-run manpower needs information is another issue.

Short-Run Manpower-Needs Forecasting

As technically complex and costly the business of forecasting our manpower needs for the long term, it may be more challenging to do likewise for the near term. Educators, vocational guidance counselors, government leaders and agency officials are more constantly reminded of the costs of the absence of such information by regular contact with young people whose lives are negatively affected by the absence of reliable information necessary to a reasoned career decision-making process.

What appears to be a simple matter of surveying businesses and industry regarding their near-term manpower needs is not so simple. The difficulties engaged in the use of various methods of short-range forecasting were well explored under "Project Vision: An Experiment With Occupational Needs Projection Techniques" which was conducted by the Wisconsin State Employment Service and published in 1970. Within this massive publication can be found an extended history of trial-by-error attempts to develop a reliable technique for projecting occupational needs in the Milwaukee, Wisconsin SMSA (footnote). Herein is a brief review of their experience with various methods:

1. The Experimental Employer Needs Survey

This approach is based on a modification of the Area Skill Survey technique. The standard skill survey is conducted by means of a prototype mail questionnaire which asks individual employers to forecast their employee requirements for the subsequent three and five years by specific occupations, taking into account both replacement and expansion needs (or contraction as the case may be).

Project Vision offered recommendations after testing this technique for manpower-needs forecasting. Their experiments proved that question-

naires, on the whole, had to be simplified considerably. As the surveys were conducted it became clear that they were too time-consuming and too expensive. The information requested was "ideal", to quote the project report, but at the same time much of it was impractical to obtain. It was costly to the State of Wisconsin as well. They recommended that standard surveys of this type (long-range) be "almost" abandoned and replaced by surveys conducted every two-years that would emphasize occupational trend data in individual plants rather than projections of labor requirements. They further recommended that greater stress be placed on securing knowledge of employers preferred sources of entry-level personnel, untrained or trained, and information regarding their own in-plant training programs. In a closing, almost editorial note, the researchers noted that the inability of employers to use a common, technical occupational language produced a considerable amount of inadvertent misinterpretation on their part. Indeed, literally all knowledgeable parties note that this is perhaps the most basic problem in the survey approach.

2. Other Employer-Based Approaches

The Wisconsin research staff attempted to discover whether the man-

agement plans of employers in specially designed samples would provide information on technological and occupational trends to offer some direction to vocational training in a labor market area.

The "Leading Indicators Experiment" attempted to identify the leading firms which might be among the more progressive and whose occupational mix and projected employment trends might provide information useful for planning. The method involved follow-up interviews with employers included on the mailed skill survey questionnaire. The results were not satisfactory because the 'findings' failed to reveal who the leading firms were!

The "Industry-Expert Approach" secured the desired information by means of interviews with industry experts from a more broadly representative group such as company presidents, plant managers, employment managers, training directors and others. Project Vision was rather enthusiastic about this approach. The qualitative occupational trend information secured for occupations within a specialized segment of an industry was judged to be eminently worthwhile. The research staff recommended that the technique be further developed with the proviso that it only be applied to occupations peculiar to a selected industrial activity; it should not be used in connection with occupations which have a broad industry base.

3. Employer-Based Data as a Means of Identifying Emerging Occupations

Emerging occupations are those in which employment at the moment is small or nonexistent, but which may be expected to increase significantly. No special survey was made, but an analysis of the Experimental Employer Needs Survey results and pretest occupational materials was made which yielded a short list of occupations for which training programs might be usefully designed. Once again, PROJECT VISION's staff reported difficulties encountered with occupational definitions and terminology.

4. The Unfilled Openings-Occupational Outlook Handbook Approach

This approach used data available from selected records of the Employment Service agencies such as unfilled openings, in combination with routinely collected information from other Federal and State agencies. Basic to the technique is the application of the Occupational Outlook Handbook forecasts of national trends in specific occupations. Its chief advantages are the economy of data gathering and the ease of repeating the analytical study at frequent intervals. It does not require gathering new original data, but relies on existing material and expertise in interpreting occupational trends locally in the light of national developments. Although there are certain deficiencies in the methodology, expecially in regard to labor

requirement for occupations not well covered by local Employment Service records, the method was judged to be useful to manpower planners as one of a number of labor market "indicators" provided certain revisions were incorporated so as to adapt data to the local employment situation.

5. The Occupation-by-Industry Matrix Method

PROJECT VISION staff did develop a U. A. BLS matrix to local area industry statistics. The matrix was a cross-classification of industries by occupations, yielding an occupational pattern for each industry "broken out". In terms of detailed future occupational projections, the method was found to have two statistical limitations. One was that the method made no allowance for employment requirements which normally result from worker-replacement needs arising from deaths, retirements, migration and other causes. The other limitation stemmed from the varying definitions of employment used in the basic data derived from the various sources on which the method depends. As we indicated in earlier discussion, such difficulties should no longer present themselves thanks to the work of the Bureau of Labor Statistics during the early 1970's.

PROJECT VISION's final report also dealt extensively with the methods available for the estimation of manpower supplies in the short-run. While

it reviewed some of the "gap" areas for which little or no data was regularly collected, it described the collection of this type of information as largely a problem of cooperation among government agencies at the State and Federal levels.

The report closes with a strongly worded suggestion that States strengthen their efforts to provide educators with more reliable short-term (one or two year) economic forecasts to compliment the long-term data being developed by the BLS.

This report contains recommendations that parallel some offered in PROJECT VISION in this regard and such can be found on the closing pages.

The rationale for reviewing both the long-range and short-range forecasting techniques available here was not simply for the educational benefit of the reader. Our review of efforts in this area conducted around the country have led us to conclude that Connecticut must adopt some short-range survey instrument to delineate the more immediate manpower demands of her business and industrial base. Recent developments in long-range forecasting have raised the "state of the art" considerably, but a serious gap exists in terms of short-range information. To a considerable degree, the practice of vocational career counseling in the State reflects that information gap.

CHAPTER III

A VOCATIONAL-INFORMATION SYSTEM FOR CONNECTICUT

Having reviewed the state of the art of manpower forecasting one can proceed to a more pointed discussion of the career-guidance function in Connecticut, how it is performed and how it might be improved upon. This last chapter attempts to knit together an extraordinary number of considerations into a model which, we believe, incorporates all of the essential elements of a complete career-guidance program. Its offering by us, goes beyond the original objectives of this study, but our broad inquiries lead us to feel that such a model could be developed at this time.

Career Guidance in Connecticut

The choice of work is one of the most important decisions one makes. It determines to a large extent, how time will be spent, who will be chosen as friends, what attitudes and values will be adopted, where one will reside and what pattern of family living will be adopted.

As important as this decision is, it is often made with little thought or assistance. The high school pupil sometimes selects an area of work in imitation of an admired teacher or a popular hero, to resist parental demands, or because it is the first one of which he learns. Generally speaking, the

vocational guidance in the public schools has been a failure. It has not provided youth with the understanding of the economic society in which they will find themselves nor encouraged them to follow an education program which would enable them to compete in such a society.

Nine areas of societal and individual needs have been enumerated by Dr. Kenneth J. Hoyt (Hoyt) as being necessary when considering the framework of career education. These nine areas are the areas in which career education seeks to produce individuals who, when they leave school (at any age or at any level) will be ready to enter the world of work:

1. Competent in the basic academic skills required for adaptability in our rapidly changing society.
2. Equipped with good work habits.
3. Capable of choosing a personally meaningful set of work values that foster in them a desire to work.
4. Equipped with career decision-making skills, job-hunting skills and job-getting skills.
5. Equipped with vocational personal skills at a level that will allow them to gain entrance into and attain a degree of success in our occupational society.

6. Equipped for career decisions based on the widest possible set of data concerning themselves and their educational-vocational opportunities.

7. Aware of means available to them for continuing and recurrent education once they have left the formal system of schooling.

8. Successful in being placed in a paid occupation, in further education or in a vocation consistent with their current career education.

9. Successful in incorporating work values into their total personal value structure in such a way that they are able to choose what, for them, is a desirable life-style.

It is estimated that at the current time, twenty-five percent of the high school students graduate from high school unprepared for either a vocation or for post secondary school training. These students are placed in most schools in what is known as the general track. While students coming out of such a "general track" cannot find a job and persons with such "general" training are becoming increasingly unemployed, there are thousands of jobs unfilled due to lack of trained personnel.

Data also suggests that the broad majority of students (not including the "general track group") are being insufficiently prepared for success-

fully pursuing a career. According to the Connecticut Career Guidance Assessment, Connecticut students are lacking in several specific career-related content domains. Only one-fifth are aware of those jobs for which they can qualify with high school education, or some post-secondary school education. Students usually overestimate the educational requirements for entry into various occupations. The Assessment found, in general, that exposure to existing career education program makes no appreciable difference in performance scores on the 92 items in fifteen career education content domains composing the assessment instruments. It appears that Connecticut has fallen short in its Career Education goals for the following reasons:

1. Institutional reform and committment has failed to take place. School systems typically identify an individual as career education coordinator, allocate that individual with a small working budget and expect the person to become an agent of change.
2. A survey of counselors in Connecticut and the number of high school students served shows a ratio of one counselor to 350 high school students!!! This ratio is approximately 100 students more than is considered the norm for effective guidance and counseling to take

place. A high school counselor does not have time to meet the needs of the students particularly in the areas of personal-social and vocational counseling.

3. A needs-assessment self-study of the Suffield Guidance Personnel showed that according to Category I ..."Seeing students individually" ...the high school counselors spent 24 percent of their time on school related problems, 15 percent on college counseling, 19 percent on scheduling and 4 percent on career selection/counseling. The 4 percent, if representative of the majority of LEA's, would certainly show the low priority given to Career Education by the high school counselors.

4. Local efforts through the Career Education coordinators have been aimed primarily and directly at the student rather than concentrating on a massive effort to retrain the teachers and counselors, who are in the best position to deliver career education. A large part of the blame appears to lie with university graduate training programs in Guidance and Counseling. Typically, in Connecticut, the graduate student is exposed to only one course in the area of Career Education - a general survey course entitled Career Development or Vocational

Guidance. This survey course in no way can substitute for an in-depth study of Career Education as if pertains to the school system.

5. Efforts in Career Education have been conducted largely without adequate access to information regarding the needs of students and labor market data. Individual aspirations have not been compared to existing programs in order to formulate a picture of the changes which are required. A recent supply and demand projection study conducted by the State Board of Education utilizing a 1975 base line shows 42 occupations where the percent of demand to be met by output was below 100 percent; 38 occupations where the percent was equal to one hundred percent and 15 occupations where the percent was over 100 percent. In summary, 57 of the 95 occupations surveyed showed discrepancies between demand and the output from the various training institutions in Connecticut.

It is clear from the reasons listed above that a marriage between the 'world of work' and the educational system is necessary before an effective career education program can be expected in the education sector. This marriage would, of necessity, see a very close collaboration effort on the

part of: 1) the formal educational system, 2) the business-labor-industry-professional-governmental communities and 3) the home and family structure. The Career Guidance Counselor/Specialist is seen as the focal point for the coordination and collaboration of the three sectors suggested above.

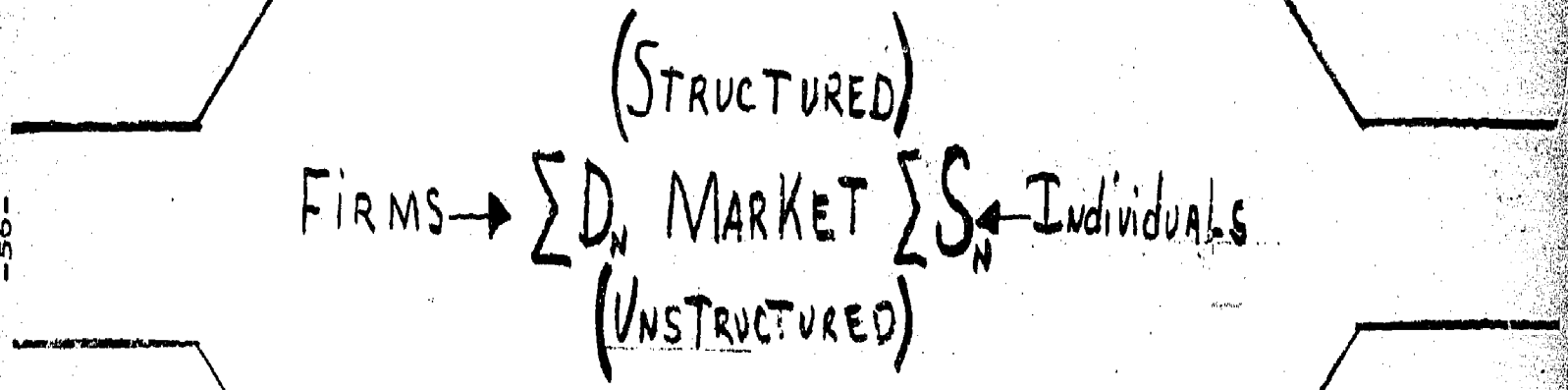
Model Of Current Labor Market

A proper model for future program development should link the supply and demand forces of the market without unduly interfering with its operation. The following page contains a simple diagram which attempts to identify many of the major forces that influence the operation of a labor market. While no effort has been made to systematically weigh the influence of each of these factors, many of them can or have been empirically monitored for years by a large number of manpower economists. The question of the relative influence or role that each plays is not at issue here. Rather the "model" if offered to illustrate the complexity of the workings of our labor markets.

Firms are affected by forces that are both endogenous and exgenous, that is, both internal and external to their operations. Internal forces are of such a nature that a firm normally enjoys some significant degree

INTERNATIONAL ECONOMY
NATIONAL ECONOMY
STATE ECONOMY
CAPITAL MARKET CONDITIONS
CONSUMER PREFERENCES
CURRENT STATE OF TECHNOLOGY
GOVERNMENT REGULATIONS
UNION PRESENCE

SIZE OF LABOR MARKET (GEOGRAPHICALLY)
DEMOGRAPHIC CHAR. (AGE, SEX, MORTALITY RETIREMENT, TURN-OVER RATES, ...ETC.)
NUMBER IN SKILL GROUP
HOURS OF WORK
WAGES OFFERED (REAL, ABSOLUTE, PERCEIVED)
KNOWLEDGE OF JOB CHARACTERISTIC
KNOWLEDGE OF LABOR MARKET



STATE OF INDUSTRY

INTERNAL CAPITAL POSITION

MANAGEMENT ABILITIES

JOB DESIGN

WAGE POLICY OF FIRM

DEGREE OF COMPITITION IN INDUSTRY

GROWTH PLANS OF THE FIRM

GENERAL EDUCATION

VOCATIONAL TRAINING

APTITUDES OF CANDIDATE

STATE OF HEALTH

PERSONAL VALUES OF CANDIDATE

SOCIAL, FAMILIAL AND PHYSICAL ENVIRONMENT

GENERAL PSYCHOLOGICAL CHARACTERISTICS OF JOB CANDIDATE

JOB EXPECTATIONS

of control over them while the opposite is true of external elements. Because of the given presence of all of these forces, most firms should expect to have considerable difficulty in forecasting their manpower needs. In rather exceptional cases, say very capital-intensive enterprises, knowledge of manpower needs might be relatively easy to come by because of very 'fixed' relationships between capital and labor. Still, even here, a significant degree of uncertainty is quite possible as such firms must still contend with operating conditions influences by the exgenous variables. Unless a firm employs a very complex econometric model and is committed to detailed planning as a matter of company policy it is unlikely that it will have a clear picture of the intermediate future, let alone the long-run. Such modelling is expensive, contains numerous identifiable risks and requires the employment of personnel who are members of a very small labor pool. In short, the number of trained and accomplished business forecasters available in the labor market is less than likely demand. Because of these considerations, most companies engage in 'planning' that is very short-term in nature, risky and used for indicative purposes rather than uncompromised future committments.

In a world of such reality, it is improper and unrealistic for any-

one to expect firms to be a valid or reliable source of long-run manpower-needs information. In general, our firms can at best, provide only short-term data about their manpower needs. It is not unfair to say then, that American enterprises approach the labor market hopefully assumming that what ever their skill needs, someone, somewhere, has foreseen such needs and acquired appropriate training at public or private institutions which have also happily developed programs geared to these largely unknown employer's needs.

No one should be surprised to find that many firms have to go into the education business because their skill needs cannot be satisried in the labor market. They design and administer and subsidize both formal and informal training programs which not only reflect unique demands that each firms requires of its employees but also more general types of training. Because of turnover rates of personnel, they indirectly provide trained personnel to rivals or firms in allied industries on a more or less constant basis. Over time, the labor force necessary for the proper conduct of business is trained and filtered out among firms, but the process is costly in many terms and probably painful with some regularity.

The various governmental agencies have completely failed to monitor these practices except for formal apprenticeship programs. Thus, one can only imagine the likely elements of the scenario conducted on a going basis by American industry.

One dimension of employer manpower practices which has been adequately monitored relates to the procedures used by firms in making initial contact with prospective employees. Numerous studies, including our own survey efforts, have uncovered the following pattern with extraordinary consistency.

Although companies advertise for positions almost universally, the largest number of applicants ultimately employed come from unsolicited referrals through their own employees and unsolicited applications "off the street". The least common sources of contact with potential employees are: through state employment services, private employment services and schools in Connecticut, in that order! While many firms do indeed employ well-thought-out rational procedures in screening job applicants, the fact is that an absolute majority of employees are "fitted" to jobs through the most haphazard forces of chance and informality.

In sum, our firms approach the labor market in an ill-prepared manner,

reacting to rather immediate manpower needs and only incidentally integrated with the formal institutional structure that prepares the "supply"! (in the aggregate). The most general exceptions to this summation are the very large, well-planned firms in the State of Connecticut.

Returning to the diagram which was the opening focus of our discussion we find equally complex elements identified as affecting the supply side of our labor markets. Here too, there are a number of forces which can be considered as exogenous or external to the individual. These factors cannot be changed or controlled by individuals and, at best, can only be appreciated, when opportunities for the acquisition of knowledge avail themselves.

Surprisingly, all of the factors identified as external can be or have been monitored and quantified. Literal mountains of data relating to each are published by both federal and state departments and are available at little or no cost. Unfortunately few young people are exposed to such information and, to my knowledge, no computer-based career guidance system yet exists which reasonably incorporates all of these elements of information on visual-aid printouts. Individual knowledge is largely

incomplete, erroneous or ill-considered. Worst of all perhaps, is the shockingly incomplete knowledge that young people have of 'what Americans do to make a living'. The brightest seventeen-year-old would have trouble listing 200 occupations out of the 20,000 plus identified by the Bureau of Labor Statistics. Such limited knowledge of careers makes it more likely that too many will make the same choice of career tracks and produce gluts of skill supplies in some areas and shortages in others. There is no excuse for this state of affairs! The "information gaps" must be tightened up in the face of the horrible current alternatives. Millions of work-years are wasted annually while young people go through a painful trial-and-error education of "fitting themselves" to the labor demands of employers.

The endogenous factors identified in the diagram, at the surface, represent elements that individuals can influence in varying degrees. While behaviorial scientists might debate the source of causation for each, I might only offer this thought; that given a child with a normal endowment of social, intellectual, physiological and social "gifts", a community should be able to develop a young person into a productive, well-adjusted member of the economy. It would be heroic of me to acess

societal efforts in bringing about this happy objective, but in one context comment is desirable.

The monitoring, evaluation and interpretation of much of these elements, as they relate to career decision-making, is ostensibly a function of counselors specially trained for such purposes. It is almost universally held that such counsel is not adequately provided for the great majority of our young people. Career decision-making on their part is commonly a function likely to be performed during early adulthood with little forethought or preparation. Their knowledge of themselves, employer requirements or job characteristics is sadly incomplete. They too apparently assume that at some point in their lives they will have to go to work and then when that day comes, they will simply melt into an organization that pays well, offers rewarding and interesting work and had them in mind when they created the job. They do not know how to look for work; they have an unappreciating attitude about the nature of the marketplace and too many are likely to be crushed by initial experiences that shock their sensibilities, dampen their hopes, reduce their enthusiasim for private industry and feed that mind with convenient rationalizations about how they got there and whose blame it was.

Young people fortunate to be born into homes led by loving, well-informed and well-educated parents undoubtedly make the transition from youth into the labor force with considerably more genteel experiences. But experience through observation readily identifies a constant flow of young adults grasping for economic security and psychological stability during their twenties and early thirties as they sink into this foreign environment.

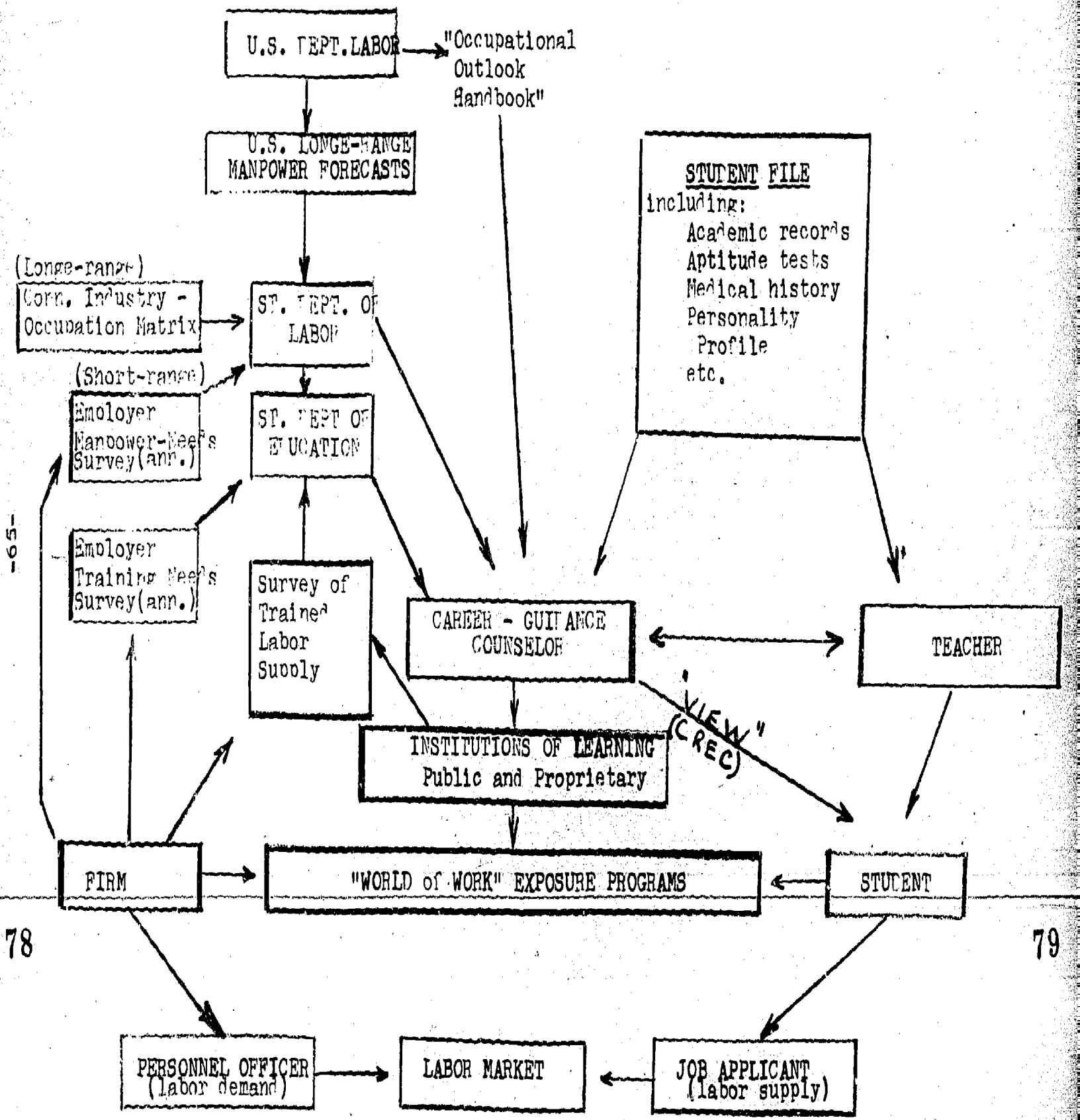
The observable dysfunction of our labor markets makes it hard to believe that the large part of the labor force is content in their work. Forced rationalization that "life is pretty good" must be employed by many simply because the process that brings employer and prospective employee together is a three-ring-circus. Industry pays dearly for the massive mismatching through foregone productivity, profits never realized, low morale that may never surface, or a sense of distrust of "business" so commonly shared (in anger) that it lends itself to the quick acquisition of views and associations that are counter to the free enterprise system. The widely held view that "business is in the business of ripping off thy neighbor" is sown early in the lives of future workers. Surely it is not only false, but damaging in terms that have not been

adequately measured.

The body politic as well as the business community in the aggregate have a need and responsibility to react positively to this state of affairs. Their support and involvement on a continuing basis is essential to a more efficient allocation of human resources through the labor market. Our work has led to the development of the following model which hopefully identifies essential components to the solution.

Our Propcsal

On the following page is found a schematic model which suggests both the major components of a general career-guidance counseling model and a computer-based flow of data necessary for the guidance process. In general it recommends that young people be exposed to career and job information from the early years of their formal education, probably from third grade. The "right side" of the diagram identifies the relationship of the educator, career counselor and student plus the mandate that students be exposed to the world of work through well-thought-out programs. Such programs should become more intensive as a student reaches secondary school age. The teacher is envisioned as a integral part of the guidance function, not only as a source of infor-


U.S. DEPT. LABOR
"Occupational Outlook Handbook"
U.S. LONGE-RANGE MANPOWER FORECASTS
STUDENT FILE
including:
Academic records
Aptitude tests
Medical history
Personality Profile
etc.
(Longe-range)
Corr. Industry - Occupation Matrix
ST. DEPT. OF LABOR
(Short-range)
Employer Manpower-Needs Survey(ann.)
ST. DEPT OF EDUCATION
Employer Training Needs Survey(ann.)
Survey of Trained Labor Supply
CAREER - GUIDANCE COUNSELOR
TEACHER
"VIEW" (CREC)
INSTITUTIONS OF LEARNING
Public and Proprietary
FIRM
"WORLD of WORK" EXPOSURE PROGRAMS
STUDENT
PERSONNEL OFFICER (labor demand)
LABOR MARKET
JOB APPLICANT (labor supply)

mation for the counselor, but also as a guide to the work world most closely related to his professional skills. At elementary grade levels teachers should program experiences which expose the young to such things as: the mechanical elements of jobs, the importance of order and discipline, the elements of discomfort, inconvenience, job satisfaction, rewards and the like. While students can only observe a limited number of jobs being performed, they can come to know the meaning and implications of work. Jobs should be "observed" which well illustrate a broad range of human emotions, skills, values and costs. A one hour exposure to just one of these and other aspects of work should make a more lasting impression that the classic tour of a plant conducted so as to entertain more than educate.

At the secondary grade levels, teachers should begin to refine the "work-world" exposure programs to the apptitudes and traits of students. Here, individualized exposure to occupations should be more prolonged in time. A student with mathematical apptitudes and abilities should be exposed to the large number of occupations where such skill is required. Part-time employment in which mathematical skills are required should be arranged or encouraged for those who manifest such ability. Then too,

information should be provided about the prospects for work in occupations which require such skills. The VIEW system administered by the Capital Region Education Council (CREC) is well adapted to fit these needs.

A constant exposure to the work-world from grades 3 - 12, supported by teachers and proper numbers of certified career guidance counselors, should result in high school graduates admirably prepared to direct their occupational destinies. Every element in our schematic is important. The Student File must be complete and utilized by both teacher and counselor. The work-world programs must be well-thought-out and implemented on a timely basis. The counselors must have student assignees in reasonable numbers and must make full use of all informational sources identified on the left side of the diagram. The schools must be equipped with visual-aid equipment necessary for the utilization of "VIEW-type" systems. Finally, the community outside of the school must possess a lasting committment to the programs which evolve and require their cooperation. In doing so, the community surely becomes a teacher as well.

The left side of our diagram details a computer-based information flow system. Ultimately, all data is received by the career guidance

counselor. The CREC-administered VIEW system is simply offered as an illustration of the kind of information system that might be employed to supplement the work of the professional career guidance counselor. It too, should be 'fed' by the data sources identified in the diagram.

Long-range manpower-needs forecasts emanate from the U. S. Department of Labor (for national data) and the Connecticut Department of Labor's industry-occupation matrix for regional data. Short-run manpower-needs forecasts should be provided by the State Department of Labor through the variety of techniques currently employed plus the use of annual surveys conducted by the Department which utilize occupational definitions employed by the Federal Government. In addition, the State Department of Labor and Education should adopt an annual survey of employer-training-needs such as the one employed in this study. Such information can be channelled through to both public and private institutions and guide the development of training programs. Ultimately, the State Agencies should be able to provide educational personnel with anticipated supply and demand data for both the long-run and short-run. The Occupational Outlook Handbook, published by the U. S. Department of Labor should also be regularly employed in the career guidance function.

Altogether, the model provides guidelines which, if employed intelligently, should vastly improve the preparation of young people for their adult working years. Pilot projects should be financed which employ the model by putting "flesh on the skeleton". With the exception of the regular employer-training-needs-survey, literally all elements of this model exist in Connecticut. The problem is largely one of "packaging". A short statement follows regarding the computer hardware requirements for such a program. It says, in effect, that the State of Connecticut presently enjoys an extraordinary capacity to accomodate these needs!

STATEMENT ON COMPUTER FACILITIES

Computational requirement for the Vocational Information System... The computational requirements needed to implement the VIS programs and its associated data base are generally the same as needed by any other real time data base inquiry- such as reservation systems, motor vehicle registration systems and continually updated inventory systems. Such systems require as many interactive terminal, CRT or typewriter types, as there are inquiry stations; a rather large CPU in terms of speed and memory capability; control by a multiprogramming operating system; and enough disk storage to maintain the required data base.

While the exact nature of any proposed VIS implementation is necessarily tentative and indeed, must be adaptable and expandable in nature, it is possible to ascertain that the State of Connecticut has the computational capability basically already at hand. Connecticut's State Data Processing Center already is running similar data base inquiry systems and thus is familiar with such systems. In addition, the Center's computers are not yet heavily used allowing for future usage such as the proposed VIS implementation. Other than adding disk storage for the data base no hardware changes at the Center should be necessary. Of

course, the interactive terminals at various sites across the State will have to be acquired to the extent those sites do not already have such terminals used for other purposes.

The State Data Processing Center presently is running an IBM 370/158 with two megabytes of memory and an IBM 370/168 with three megabytes of memory. Both computers are controlled by IBM's latest virtual memory operating systems. In additon to the usual card readers, live printers and tape drives, the combined computers have access to twenty-two 200 megabyte disk drives and eight 100 megabyte disk drives - a total of 5,200 megabytes of disk storage with an average access time of 30 milliseconds. This disk configuration can be easily expanded if necessary!

In summary, the recommended VIS proposal should cause no substantial hardware problems for the State. Primarily the major effort needed for the successful implementation of a VIS program will be in the form of proper systems design and development - not the acquisition of computer hardware.

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APPENDIX I

PROJECTED DEMAND AND INSTITUTIONALLY TRAINED SUPPLY OF EMPLOYMENT

BY OCCUPATIONAL GROUP TO 1980

COL. A	OCCUPATION BY INSTRUCTIONAL GROUP	COL.B L or N IND.	COL#1 VOC.ED. PROGRAM GRAD. 1973	COL#2 1975 EMPLOYMENT	COL#3 AV.AN. DEMAND 1975-80	COL#4 AV.AN. VOC.ED. OUTPUT 1975-80	COL#5 AV.AN. OUTPUT LABOR DEPT. PROGRAMS 1975-80	COL#6 AV.AN. OUTPUT 2 YR. IND. COLLEGE '74GRADS	COL#7 AV.AN. PROP. SCHOOL OUTPUT	COL#8 TOTAL AV.AN. OUTPUT	COL#9 AV.AN. SUPPLY-DEMAND BALANCE	COL#10 % OF DEMAND TO BE MET BY OUTPUT	COL#11[1] AV.AN.% CHANGE IN DEMAND (BASE-1975)
LEA, CC UCONN	AGRICULTURE[1]		267	18,300	420	265	12	0		277	- 143	66.0%	2.2%
	On Farm	L	*	10,900	500	180	12	0		192	- 308	38.4%	4.6%
	Agricultural Production	L	*	7,400	- 86	85	**	0		85	+ 171	200.0%	-1.2%
LEA,CC	DISTRIBUTIVE		1,278	232,300	12,480	1,281	**	24	1,258	2,563	-8,612	20.5%	5.4%
LEA,CC	Retailing	L	*	81,000	5,440	1,195	**	0		1,195	-4,245	22.0%	6.7%
CC	Marketing	L	*	60,100	2,880	60	**	0	20	80	-2,800	2.8%	4.8%
CC	Transportation	L	*	47,200	1,700	1	*	0		1	-1,699	-	3.6%
	Real Estate & Finance	L	*	30,900	1,800	0	**	0	714	714	-1,086	39.7%	5.8%
CC	Hotel & Lodging	L	*	7,000	260	20	**	1	75	96	- 164	36.9%	3.7%
	Public Relations	L	*	1,700	96	0	**	0		0	- 96	-	5.6%
	Advertising Agents,Sales Per.	L	*	1,400	102	0	**	0		0	- 102	-	7.3%
	Attendants, Recreation	L	*	1,000	72	0	**	0		0	- 72	-	7.2%
	Attendents, Personal Service	L	*	980	80	0	**	0		0	- 80	-	8.2%
	Remainder[2]			1,000	50	0	**	0	449			-	

CODE

COL. A: Identifies type of public educational institutions involved in training
LEA = Local Education Agency
CC = Community College
UCONN = University of Connecticut
VT = Vocational Technical School
POST-SEC = Post Secondary Program
AD = Adult Education Program
= Technical College

COL. B: Assumed market base of major employment in occupation
L = Primarily local/state base
N = Primarily multi-state, national and international
IND Industry

Asterisks: * = Not available
** = Not offered

NOTE: Data also not available on training programs provided by employers entirely at their own expense, except for state approved apprenticeship training programs, for which figures are included in the "output" shown in Col. 5. Also see footnote relative to Col. 7, indicating incompleteness of data for proprietary schools and hospitals training programs. SEE last page of this table for notes on data in the numbered columns and for the numbered footnotes.

PATION BY RUCTIONAL GROUP	COL.B L or N IND.	COL#1 VOC.ED. PROGRAM GRAD. 1973	COL#2 1975 EMPLOYMENT	COL#3 AV.AN. DEMAND 1975-80	COL#4 AV.AN VOC.ED. OUTPUT 1975-80	COL#5 AN.AN. OUTPUT LABOR DEPT. PROGRAMS 1975-80	COL#6 AV.AN. OUTPUT 2 YR. IND. COLLEGE '74GRADS	COL#7 AV.AN PROP. SCHOOL OUTPUT	COL#8 TOTAL AV.AN. OUTPUT	COL#9 AV.AN. SUPPLY-DEMAND BALANCE	COL#10 % OF DEMAND TO BE MET BY OUTPUT	COL#11[1] AV.AN.% CHANGE IN DEMAND (BASE-1975)
TH[3]		689	55,000	5,340	1,822	340	262	148	2,572	-2,768	48.2%	9.7%
ing	L	**	25,400	2,440	705	**	148		853	-1,587	35.0%	9.6%
s Aide	L	571	15,300	1,300	570	320	0		890	- 410	68.5%	8.5%
al Asst.	L	**	3,300	560	80	16	79	28	203	- 357	36.3%	17.0%
cal Lab Assistant	L	54	2,600	500	90	**	0	70	160	- 340	32.0%	19.2%
Health Aide	L	**	2,600	280	220	**	0		220	- 60	78.6%	10.8%
ipists	L		2,300	44	0	**	0		0	- 44	-	1.9%
th Technol.,Tech.(Ex.Rad.)	L	**	1,500	30	0	**	0		0	- 30	-	2.0%
ological Technician	L	14	1,300	146	30	**	1	50	81	- 65	55.5%	11.2%
ical Technician	L	**	*	*	5	**	0		5	*	-	-
pational Therapy	L	**	*	*	30	**	0		30	*	-	-
ronmental Health Tech.	L	**	*	*	2	**	0		2	*	-	-
al Lab. Tech.	L	42	*	*	40	**	0		40	*	-	-
lation Therapy	L	**	*	*	40	**	23		63	*	-	-
th Service Cluster	L	8	*	*	10	**	0		10	*	-	-
inder[2]			700	12	0	**	11					
ECONOMICS		414	48,900	3,040	415	260	0	10	685	-2,355	22.2%	6.2%
Services	L	270	33,000	1,780	270	260	0	10	540	-1,240	30.3%	5.4%
d Care	L	88	14,000	1,080	90	**	0		90	- 990	8.3%	7.7%
r	L	56	1,900	176	55	**	0		55	- 121	31.3%	9.3%
usekeeper (Ex.Pvt.)	L	**	1,900	176	0	**	0		0	- 176	-	9.3%

CUPATION BY STRUCTIONAL GROUP	COL.B L or N IND.	COL#1 VOC.ED. PROGRAM GRAD. 1973	COL#2 1975 EMPLOYMENT	COL#3 AV.AN. DEMAND 1975-80	COL#4 AV.AN. VOC.ED. OUTPUT 1975-80	COL#5 AV.AN. OUTPUT LABOR DEPT. PROGRAMS 1975-80	COL#6 AV.AN. OUTPUT 2 YR. IND. COLLEGE '74GRADS	COL#7 AV.AN. PROP. SCHOOL OUTPUT	COL#8 TOTAL AV.AN. OUTPUT	COL#9 AV.AN. SUPPLY-DEMAND	COL#10 % OF DEMAND TO BE MET BY OUTPUT	COL#11[1] AV.AN. % CHANGE IN DEMAND (BASE-1975)
FICE		10,611	308,100	21,980	10,625	1,280	0	1,104	13,099	-8,971	59.2%	7.1%
ockclerks, Storekeepers	L	**	10,400	460	0	**	0		0	- 460	-	4.4%
ucation Associate	L	17	8,400	440	20	20	0		40	- 400	9.1%	5.2%
timators, Investigators N.E.C.	L	**	5,200	300	0	**	0		0	- 300	-	5.8%
unter Clerks (Ex. Food)	L	**	5,000	520	0	**	0		0	- 520	-	10.4%
brary Attendants, Assts.	L	6	2,700	220	0	**	0		0	- 220	-	8.1%
okkeeping, Accountants	L & N	1,970	58,000	4,460	1,970	320	26	136	2,452	-2,008	55.0%	7.7%
eno, Secretarial	L & N	2,596	57,600	5,380	2,585	32	165	494	3,276	-2,104	60.9%	9.3%
pv. & Admin. Mgt.	L & N	215	50,500	2,780	225	**	72	4	301	-2,479	11.0%	5.5%
sc. Clerical N.E.C.	L & N	**	25,300	2,460	0	36	0		36	-2,424	1.5%	9.7%
neral Clerk-Typist	L & N	4,747	20,700	1,740	4,800	760	4	92	5,656	+3,916	325.1%	8.4%
ta Processing	L & N	1,060	15,000	680	1,020	18	0	358	1,396	+ 716	205.3%	4.5%
cep'ionists	L & N	**	6,500	580	0	20	0		20	- 560	3.4%	8.9%
lephone Operators	L & N	**	6,200	400	0	**	0		0	- 400	-	6.5%
le Clerks	L & N	**	5,800	440	0	50	0		50	- 390	11.4%	7.6%
atistical Clerks	L & N	**	5,400	320	0	**	0		0	- 320	-	5.9%
mainder[2]		**	24,800	800	0	30	0	20				
CHNICAL		726	20,000	820	735	108	0	116	959	+ 139	117.0%	4.1%
lice Science Tech.	L	91	6,700	150	90	**	71		161	+ 11	107.3%	2.2%
rveying Tech.	L	13	1,100	28	15	**	0		15	- 13	53.6%	2.5%
riculture Tech.	L	33	600	36	35	**	0		35	- 1	97.2%	6.0%
chitechtural Tech.	L	25	*	*	20	**	0)	32	) 92	*	-	-
vil Tech.	L	42	*	*	40	**	0)		)	*	-	-
ectrical Tech.	N	166	3,300	150	165	54	0		219	+ 69	146.0%	4.5%
nuf./Indust. Tech.	N	65	550	4	65	8	0	49	122	+ 118	3050.0%	0.7%
chanical Tech.	N	89	490	4	90	18	20	7	135	+ 131	3375.0%	0.8%

OCCUPATION BY INSTRUCTIONAL GROUP	COL.B L or N IND.	COL#1 VOC.ED. PROGRAM GRAD. 1973	COL#2 1975 EMPLOYMENT	COL#3 AV.AN DEMAND 1975-80	COL#4 AV.AN. VOC.ED. OUTPUT 1975-80	COL#5 AV.AN. OUTPUT LABOR DEPT. PROGRAMS 1975-80	COL#6 AV.AN OUTPUT 2 YR. IND. COLLEGE '74GRADS	COL#7 AV.AN PROP. SCHOOL OUTPUT	COL#8 TOTAL AV.AN. OUTPUT	COL#9 AV.AN. SUPPLY-DEMAND BALANCE	COL#10 % OF DEMAND TO BE MET BY OUTPUT	COL#11 AV.AN. % CHANGE IN DEMAND (BASE-1975)
TECHNICAL (con't.)												
Chemical Tech.	N	40	1,400	58	40	**	0		40	- 18	69.0%	4.1%
Electro-Mech. Tech.	N	14	*	*	15	**	0	10	25	*	-	-
Nuclear Tech.	N	7	*	*	10	**	0		10	*	-	-
Data Processing Tech.	N	98	*	*	100	**	0		100	*	-	-
Indust. Drafting Tech.	N	38	*	*	40	**	0		40	*	-	-
Materials Tech.	N	5	*	*	5	**	0		5	*	-	-
Other	N						0					
Engineering, Science, N.E.C.	N	**	5,900	150	0	**	54	18				
TRADE AND INDUSTRIAL		2,152	482,100	15,480	3,925	3,040	0	1,762	8,727	-6,753	56.4%	3.2%
Building Maintenance	L	49	39,900	2,260	45	**	0		45	-2,215	2.0%	5.7%
Auto Mechanics	L	301	19,100	580	300	220	0		520	- 60	89.7%	3.0%
Food Occupation	L	43	18,800	740	95	500	0		595	- 145	80.4%	3.9%
.CORR. Carpentry	L	288	18,800	340	290	140	0		430	+ 190	126.5%	1.8%
Electrical	L	222	10,000	178	220	138	0		358	+ 180	201.1%	1.7%
Beauty Culture	L	90	8,000	920	90	6	0	532	628	- 292	68.3%	11.5%
Painting & Decorating	L	5	6,600	144	5	12	0		17	- 127	11.8%	2.2%
Dry Cleaning & Laundry	L	11	4,700	340	10	**	0		10	- 330	2.9%	7.2%
Masonry	L	17	3,400	62	20	18	0		38	- 24	61.3%	1.8%
Fashion Design	L	55	2,700	122	55	**	0		55	- 67	45.1%	4.5%
Air Conditioning	L	20	2,700	174	20	8	0	85	113	- 61	64.9%	6.4%
Barbering	L	**	2,100	90	10	**	0		10	- 80	11.1%	4.3%
VT .CORR. Body & Fender Repair	L	82	2,100	44	80	29			109	+ 65	247.7%	2.1%
Appliance Repair	L	25	2,000	80	20	**			20	- 60	25.0%	4.0%
Oil Burner Repair	L	10	*	*	10	34			44	*	-	-
Small Engine Repair	L	10	*	*	90	**			90	*	-	-
Truck Drivers	L & N	**	17,500	240	0	8		521	529	+ 289	220.4%	1.4%
Guards & Watchmen	L & N	**	6,200	360	0	**			0	- 360	-	5.8%

CCUPATION BY NSTRUCTIONAL GROUP	COL.B L or N IND.	COL#1 VOC.ED. PROGRAM GRAD.	COL#2 1975 EMPLOYMENT	COL#3 AV.AN. DEMAND 1975-80	COL#4 AV.AN. VOC.ED. OUTPUT 1975-80	COL#5 AV.AN. OUTPUT LABOR DEPT. PROGRAMS 1975-80	COL#6 AV.AN. OUTPUT 2 YR. IND. COLLEGE '74GRADS	COL#7 AV.AN. PROP. SCHOOL OUTPUT	COL#8 TOTAL AV.AN. OUTPUT	COL#9 AV.AN. SUPPLY-DEMAND BALANCE	COL#10 % OF DEMAND TO BE MET BY OUTPUT	COL#11[1] AV.AN. % CHANGE IN DEMAND (BASE-1975)
RADE AND INDUSTRIAL (con't.)												
See note below)												
peratives N.E.C.	L & N	**	14,500	460	0	8			8	- 452	1.8%	3.2%
avy Equip. Mech.	L & N	**	11,200	400	0	**			0	- 400	-	3.6%
ckers, Wrappers (x. Meat, Produce)	L & N	**	10,800	460	0	**			0	- 460	-	4.3%
afting Occupations	L & N	122	7,700	240	140	34		3	177	- 63	73.8%	3.1%
inting & Lithography	L & N	47	7,700	260	110	68			178	- 82	68.5%	3.4%
umbing	L & N	65	6,800	200	65	172			237	+ 37	118.5	2.9%
remen N.E.C.	L & N	**	27,200	560	0	**			0	- 560	-	2.1%
chine Occupations	N	274	69,200	1,340	295	780			1,075	- 265	80.2%	1.9%
eckers Examiners	N	**	20,100	660	0	**			0	- 660	-	3.3%
chanical Insp./Assembly	N	13	14,900	520	15	28			43	- 477	8.3%	3.5%
ol & Die	N	84	8,700	110	85	134		15	234	+ 124	212.7%	1.3%
ectro-Mech. Assembly	N	42	8,600	260	40	114			154	- 106	59.2%	3.0%
lding	N	45	6,800	154	60	460		215	735	+ 581	477.2%	2.5%
eet Metal	L & N	26	4,300	36	20	36			56	+ 20	155.6%	0.8%
rcraft Mech.	N	17	3,500	142	20	**			20	- 122	14.1%	4.1%
dustrial Electronics	N	182	1,700	40	170	**		152	322	+ 282	805.0%	2.4%
dustrial Chemistry	N	7	*	*	10	**			10	*	-	-
wers & Stitchers	N	**	8,200	440	0	**			0	- 440	-	5.4%
mainder[2]	N	**	86,400	2,320	1,525	100		239				

bove Trade and Industrial occupations are primarily in manufacturing organizations.

COLUMNAR DATA

Statistical Data on Connecticut Students completing Vocational Programs in 1973. State Board of Education

5: Employment Opportunities Related to Vocational Programs, Div. of Vocational Education, 1975

Col. 2: Figures are estimates for 1975, derived from projections to 1980 from 1970 Census base data, adjusted through an Interim Manpower Planning Program by the Office of Research and Information, Connecticut Labor Dept., in cooperation with the U.S. Bureau of Labor Statistics as reported in Connecticut Occupational Outlook, 1970-80, Connecticut Labor Department, Employment Security Division October, 1974.

Col. 3: Computed from source data identified in Col. 2.

Col. 4: Includes Secondary, Post-secondary and Adult programs in Local High Schools, Vocational-Technical Schools, Community Colleges, State Technical Colleges, Hartford Assoc. to Advance the Handicapped and Retarded, Farmington Valley Assoc. for the Retarded, Litchfield County Assoc. for the Retarded, Area Cooperative Educational Services, Oak Hill School for the Deaf, Meriden/ Wallingford Assoc. for Retarded Children, Institute for Living, Society to Advance the Retarded, American School for the Deaf, Manchester Training School, Mystic Oral School, and Dept. of Corrections.

Col. 5: Includes training programs administered by the Labor Department and by local government sponsors. These include the Comprehensive Employment and Training Act (CETA), Prime Sponsor Programs, Apprenticeship Training, Jobs Optional (JOPS), and Work Incentive (WIN).

Col. 6: From data supplied by Commission on Higher Education.

Col. 7: Source: 1975 Survey by the Connecticut Department of Education for the Veterans Administration, covering 93 schools offering 172 courses. 30 schools offering 59 courses are not included because data was not available. These 30 schools included most hospital schools.

Col. 8: Cumulative total of Cols. 4, 5, 6 and 7.

Col. 9: Col. 3 (Average Annual Demand) minus Col. 8 (Total Average Annual Output). Minus sign indicates gap between demand and output.

Col. 10: Col. 8 (Average Annual Output) divided by Col. 3 (Average Annual Demand). Minus sign indicates excess of output (%) over demand.

Col. 11: Col. 3 (Average Annual Demand) divided by Col. 2 (1975 Employment).

Footnotes

1. Substantially different data and projections relative to occupations in "agriculture" are presented in A Survey of Economic Opportunities and Community Resources Having Implications for Programs of Vocational Agriculture in Conn., 1975. Dr. Alfred J. Mannebach, Assoc. Professor Barbara V. Lownds, Research Associate Dept. of Higher, Technical and Adult Education School of Education, U.Conn.

   This study attempts to determine current employment and to project employment opportunities in 1979 for various agricultural occupations; to determine new skills needed; and to identify emerging occupations. The survey covered farms, non-farm agricultural firms and farm/firm combinations which employ one or more agricultural workers. Farms and firms with no paid workers and non-agricultural firms or organizations employing persons with agricultural skills were not included. The sample included 1,089 farms and firms, about 26% of the universe. Based on the survey results, the study predicts a 14% increase in employment of people needing agricultural skills in this area by 1979 (from 21,794 to 24,885) - 11% on farms, 14% in agricultural firms and 16% on farm/firms. Additional replacement needs were put at almost 5,000. Areas identified as needing the most workers were agricultural production and ornamental horticulture.

   Inasmuch as the employment projections in this study vary so substantially from the projections by the State Labor Department - U.S. Bureau of Labor Statistics, differences in basic methodology, including both classification systems and data sources, must be taken into account in using either set of projections for vocational education planning purposes.

2. Occupational categories included in "remainder" for the "demand" projections may not be comparable to the occupational categories from the various "output" sources.

   Only in the Trade and Industrial classification does the "remainder" (30%) constitute more than 18% of the total employment in the classification. The projected 1525 average annual (1975-80) output in the T. & I "remainder" represents graduating local high school student in each of these years, who have been enrolled in cooperative work experience in diversified occupations.

   Among the principal occupations represented in the T & I "remainder" classification are the following:

	Employment 1970	Employment 1980	Total Manpower needs 1970-80
Job & Die Setters	6140	6900	2150
Garage Worker, Gas Sta. Attendant	5630	6690	1780
Filer, Buffer, Sander	4540	3920	890
Telephone Installers	4150	4900	1170
Other Mechanics	3200	3590	1160
Cutting Op. N.C.C.	3100	3350	1360
Excavating Mach. Op.	3060	3310	640
Other Textile Op.	2650	1760	390

	Employment 1970	Employment 1980	Total Manpower needs 1970-80
Painters, Mfg. Articles	2230	2000	230
Stationary Engineer	2050	1860	390
Clothing Pressors	1810	2000	1130
Dressmaker Ex-factor	1480	1500	1050

Source: Connecticut Occupational Outlook, 1970-80
Connecticut Dept. of Labor

3. Further data available from A Study of Educational Programs and Employment Opportunities in Health, 1974, Connecticut Institute for Health Manpower Resources.

The data assembled in this study cannot be directly compared to the Labor Department projections for the following reasons: 1) The CIHMR study covers 68 occupational categories which do not correspond with the 14 categories used by the Labor Department. 2) The 1980 projection for each occupation, both on the supply and demand side is given as a range of likely outcomes, rather than as a specific number. 3) No base year data is provided - just projected supply and demand ranges for 1975 and 1980.

The CIHMR study was based on a survey of major employers and training facilities in the state. Particularly valuable information is presented on hospital training facilities, which are a major source of health personnel who are not included in training "output" figures collected by the Department of Labor, the Department of Education or the Commission on Higher Education. One missing element in the survey's demand projection is non-group private practice employment. The study's conclusion is that overall training facilities match the likely demand for health care personnel. Too many people are being trained in a few fields such as nurse midwife, cytotechnologist, radiologic technician, occupational therapy, recreational therapy, respiratory therapy, and social workers. A shortage of workers may develop in the following fields; nurses aides, dietitians, psychiatric aides, medical transcriptionists, special education teachers, clinical psychologists and nuclear medical technologists. The study also touches briefly on the wider training and employment opportunities for health personnel in the Northeast.

4. Inasmuch as this table relates to employment demand and related training output, it includes only the corresponding data and projections with respect to home economics.

5. The small excess of output of plumbers in relation to demand and the very large excess of welders in relation to demand, as shown in the table are not consistent with other evidence and experience. Plumbing is one of the occupations in which jobs (9) were reported by the State Department of Labor to be unfilled for 30 days beginning October 1, 1975. Welding also showed 4 unfilled jobs. The 30 day unfilled jobs in these occupations in April, 1973 were 0 are 50 respectively. Both sets of figures represent less than the actual unfilled jobs due to under-reporting of vacancies by employers.

The discrepancy in the table stems from a large increase in demand for welders and plumbers, particularly by Electric Boat Company, since the 1970 census and also since the 1975-80 demand projections were prepared by the State Department of Labor. In fact, both occupations, but welders particularly, reflect continuing shortages of trained personnel. Welding was one of the skilled occupations in which unfilled jobs for over 30 days were reported by the U. S. Labor Department at virtually the peak of national unemployment in June, 1975.

6. The excess of output over demand for tool and die makers, as shown in the table, is also at sharp variance with other evidence and experience. Jobs listed in the State Employment Security offices and still unfilled after 30 days were 17 in October 1975 and 107 in April 1973. Tool and die and other skilled and precision machinists were also singled out for mention as representing supply shortages, in the U. S. Department of Labor report on 30 day unfilled jobs in June, 1975. Testimony by employers and employer associations in Connecticut has, for more than a decade, emphasized increasing difficulty of obtaining skilled machinists, or even promising and willing trainees, even to handle replacements in the older-than-average age work force in this field.

   Preliminary inquiry into the reason for the gross disparity between the above evidence and experience and the excess of output over demand as shown in the table, has yielded no adequate explanations. The adequacy of present definitions, classification systems, data reporting and projective assumptions relative to skilled machinists (and "other" machinists) seems to warrant immediate study.