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A statewide study of vocational and technical education was initiated to evaluate the present system and recommend a master plan for the development, coordination, and expansion of occupational education. Chapters discuss: (1) Key Issues in Occupational Education, (2) Vocational and Technical Education in Massachusetts and the United States, (3) The Study Methods, (4) The Adequacy of Vocational Education in Preparing Youth fo r Employment, (5) Occupational Education in the Private Sector, (6) The Image of Vocational Education, (7) Teacher Education, (8) Financing of Education in Massachusetts, (9) Educational Media and Vocational-Technical Education, (10) Occupational Education in Massachusetts' Regional Community Colleges, (11) The Economy and Occupational Requirements of Massachusetts, and (12) Recommendations. Recommendations were advanced for improvement in vocational education in areas of: (1) curriculum, (2) comprehensive high schools, (3) organization, (4) institutes for educational development, (5) administration, (6) teacher education, (7) public support, (8) community colleges, (9) financing, and (10) legislation. The appendixes contain the meetings, conferences, and schools visited and tables of supporting data. (DM)

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# OCCUPATIONAL EDUCATION

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Massachusetts Advisory
Council on Education
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Carl J. Schaefer

Jacob J. Kaufman

# OCCUPATIONAL EDUCATION

for

Massachusetts

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# FOREWORD

Two years ago The Massachusetts Advisory Council on Education set about employing its staff and deciding upon its first studies on education in the Commonwealth. On August 24, 1966, Attorney General Elliott L. Richardson, then Lieutenant Governor, wrote to Mr. Norman Rabb, Chairman of The Massachusetts Advisory Council on Education:

> I am convinced that the most urgent priority is an examination of the vocational, occupation, and technical training programs in our total system of tax supported education; the areas in which they overlap, conflict, or complement one another; and a determination of ways in which the various components can best work as productive partners in providing the skills and flexibility required by changing employment needs.

The existence of a vocationally productive citizenry is a requirement of a healthy and prosperous society and of healthy and prosperous individuals. Most occupations increasingly require appreciable formal training as well as the development of skills and understanding of science, technology, and communications. While business and industry train large numbers of employees up to the technical levels, they look increasingly to secondary schools and community colleges to offer occupational training, and they look to these same schools and colleges to bring all workers to a competent level of skills and understanding of science, technology, and communications.

When the Willis-Harrington Commiss, mpleted its studies in 1965, its report observed that many thousands of non-college bound secondary school students graduated without any preparation for jobs. The general program they had followed was often a watered-down duplicate of the college preparatory program, which was irrelevant to their needs as terminal graduates. Not only did the general program fail to provide occupational education, but it was so irrelevant to the needs of students taking it that in 1959 nearly a quarter of those entering ninth grade dropped out of high school before graduation. Good vocational education is not only needed by these youths to prepare them for work but, properly integrated into the high school curriculum, it would produce more relevant education and thus reduce the number of drop-outs.

A problem in coordination exists. The community colleges of the state are conceived of as comprehensive institutions. While the community colleges are developing their vocational programs as rapidly as available funds permit, a second system of post-secondary vocational education is developing on top of the Commonwealth's rapidly expanding system of vocational high schools.

Thus, the Advisory Council on Education determined that the first of its two major studies would be concerned with the State's system of vocational and technical education. In response to the mandate of the Willis-Harrington

Commission "to pull in from all parts of the nation, the finest experts it can find," the Council engaged to conduct this study Dr. Carl J. Schaefer, Chairman of the Department of Vocational and Technical Education at Rutgers - The State University and Dr. Jacob J. Kaufman, Professor of Economics and Director of the Institute for Research on Human Resources at The Pennsylvania State University. The Council is grateful to Northeastern University for collaborating in the study and for housing it. The Council is also grateful to Dr. James F. Baker, Assistant Commissioner of Education for Research and Development, for making available to the study for a third of his time Mr. Ghernot L. Knox, Senior Supervisor in Education.

This study is now completed after ten months of intensive examination of all facets and levels of vocational and technical education. Its findings reveal the strengths one would expect in Massachusetts' educational history and distinction. But the study also reveals that the State and its school systems are not offering nearly enough vocational education; that considerably different types of vocational education should be available, particularly in comprehensive high schools; and that the State needs to reorganize and to expand its agencies for the administration of occupational education.

On behalf of the members and the staff of the Massachusetts Advisory Council on Education and of the Legislators who created it and gave it funds, I present this study to the people of Massachusetts and their political and professional representatives. The recommendations are many and complex, as are the problems. The efforts and the funds required are great, but so is the need. Though it is difficult to document, it is a certainty that all of the funds spent on making vocational education relevant will return to the State and its communities dividends in the form of lowered costs in welfare and unemployment benefits and in increased industry and tax revenues.

William C. Gaige
Director of Research
The Advisory Council on Education

## Preface

The Massachusetts Advisory Council on Education (MACE) initiated a statewide study of vocational and technical education in order to (1) evaluate the present system and, (2) recommend a master plan for the development, coordination, and expansion of vocational and technical education, including recommendations for the preparation of teachers in this area.

The report would be concerned with the following:

(1)The objectives of and a philosophical basis for a comprehensive offering of vocational and technical education in Massachusetts, at the secondary and post-secondary levels.

(2)Some estimates of the changes in and future occupational needs of students and communities and the extent to which vocational and technical education can make adjustments in its programs to meet these needs.

(3)An evaluation of vocational and technical education in Massachusetts in relation to its objectives.

(4)A proposed master plan for vocational and technical education at the secondary and post-secondary levels.

(5)A proposed plan for the preparation of the education of teachers and administrators.

(6)A proposed plan for the organization and administration of vocational and technical education, at the state level.

In order to meet the objectives of this study the report is presented in three parts. Part I, Introduction, presents a discussion of the key issues which are currently under examination by educators, with particular reference to the training of youth for entry into the world of work. This Introduction points to the general directions which vocational and technical education must go if education is to be concerned with the needs, aspirations, and interests of all youth.

Part I also includes an historical survey of vocational-technical education in Massachusetts and a description of the various methods employed in obtaining information and data which provide the basis for the recommendations. The discussion of key issues and of the general direction which vocational and technical education should follow, presented in Part I, is based on a) a series of special studies, which are presented in Part II; b) a seminar at which various social and behavioral scientists presented papers which provided a background for discussion (these papers have been published separately); c) materials which have been published by other persons who have evidenced a strong interest in the occupational preparation of youth; and d) data obtained from various schools in Massachusetts designed to evaluate current vocational education programs.

Part III contains the recommendations which reflect the studies, data, and materials described above as well as various meetings with interested persons and groups.

In conducting this study, obviously, the number of persons who have contributed to the report is virtually endless. A list of persons and groups with whom the authors of this study consulted is set forth in Appendix A. The Advisory Committee to the study, whose membership is listed in the frontispiece was exceedingly helpful in acting as a "sounding board" against which the authors could test their ideas and recommendations. The work of specific persons involved in each of the special studies is acknowledged in each study.

Special mention should be made of William C. Gaige, Director, Advisory Council on Education, who provided support for the Study; Lawrence Fox, Associate Director of MACE, whose advice in many areas was most helpful; and Ghernot Knox, Director of the Massachusetts Vocational Education Research Coordinating Unit, who was responsible for the data collection which appears in Chapters IV, V and VI.

The authors take this opportunity to express their appreciation to Morgan V. Lewis who assisted in various aspects of the study and who has been associated with them for the past four years. He has contributed significantly to their thinking about vocational education.

Finally, the full-time assistance of Kathleen Rice and Rebecca Duff, who acted as research assistant and secretary to the study, must be acknowledged. They were involved in those day-to-day tasks which make a study of this kind possible.

It is probably superfluous to state the usual; namely, that none of these persons is in any way to be held responsible for the analyses, views, and recommendations in the Report. The responsibility falls on the authors.

Carl J. Schaefer
Jacob J. Kaufman

June 1968

# PART I: INTRODUCTION

Chapter I.

# *Key Issues in Occupational Education*

In undertaking the study of vocational and technical education in the Commonwealth of Massachusetts for the purpose of proposing a master plan designed to meet the occupational needs of students at the secondary and post-secondary levels, the investigators have brought to the study a broad approach to education in general and vocational education in particular. Although some may describe these ideas as "prejudices" or "biases," the investigators would prefer to describe them as judgements reflecting first, their training in their own disciplines: vocational-technical education and economics; secondly, the results of their research which was carried on both jointly and independently; and thirdly, their interpretation of the research, experiences, and ideas of others both in education and in the various social and behavioral sciences. It would be fair to state that many of the ideas which permeate this Report reflect the extensive and intensive work carried on in the ten month period during which the investigation was conducted and, in some instances, reflect changes in these ideas based on the uniqueness of the Commonwealth of Massachusetts.

## THE QUESTION OF PRIORITIES

The investigators are fully aware of the simple proposition that society today is confronted with growing demands for governmental expenditures in

such areas as education, welfare, poverty, medical care, etc. The gap between these total demands and the resources available to the various governmental units is ever-widening. As these various programs compete for the so-called "limited buck," it becomes essential to determine priorities not only between education and other programs but also among the various competing groups within education. The competition within education may be among elementary, secondary, and post-secondary (all types) levels. And, within each of these groupings, one would find competition between academic and vocational education at the secondary level. between undergraduate and graduate education at the post-secondary level, and between two-year and four-year programs at the undergraduate level.

Given this competition for limited resources, it is clear that priorities must be established. The priorities can be established only on the basis of comparing the outputs (or objectives or benefits) of various activities with the inputs (costs) of these activities. No longer can the educator lay claim for more resources simply on the grounds that education is "good" and more education is "better." The same argument could be made for other social programs. Nor can vocational educators continue to ask for "more" at the expense of academic educators, or *vice versa*, without relating these extra resources to the achievement of specified goals.

Although the investigators have not conducted any scientific study for the purpose of determining "costs" and "benefits" of the various forms of education offered in the Commonwealth of Massachusetts, it is their judgment that there has been a mis-allocation of resources. This judgment reflects an examination of the research findings of other scholars and their observation of activities and practices in Massachusetts.

When the allocation of resources in the intermediate and secondary levels of education are examined, one finds an over-emphasis on academic education (college preparatory) and an under-emphasis on occupational training. It has been asserted frequently that for grades 7 through 12 approximately 80 per cent of the schools' resources are devoted to academic or a generally watered-down general curriculum, despite the fact that 80 per cent of these youngsters will eventually enter the world of work, either as dropouts or as graduates. Regardless of the precise percentages, the allocation of resources is perverse.

The significant question is how this mis-allocation of resources has developed and continues to be maintained. The answer is five-fold: *first,* there is the general stress on a "college" education fostered by parents and educators, as well as society in general; *second,* there is a tendency to ignore the results of research which reveal that there is a wide gap between the

offerings of the schools and the aspirations, needs, and interests of youth; *third,* there has been a failure on the part of educators to take cognizance of a large group of youngsters (probably 40 to 60 per cent of the secondary school population) whose needs are not being met by either the academic or the vocational curriculum as presently constituted. These youngsters have usually been "trapped" in a general curriculum; *fourth,* education has failed to evaluate appropriately its programs to determine the relationship between the resources employed (input) to the objectives achieved (output) in the form of student performance, behavior, and attitudes; *fifth,* education has failed to recognize the achievements of a variety of experimental programs in various parts of the country which are designed to meet the needs of youngsters by educating them in terms which are relevant to them and useful to the world of work.

For these, and other reasons, it is clear that resources have been inefficiently employed and badly allocated. Efficiency here is meant as the achievement of the goals of education at the least possible cost. Thus, the recommendations in this Report are designed to bring about a more efficient allocation of resources.

But, the question can be asked, what are the particular goals of the educational system? How do we know whether or not they have been achieved? Can achievement of goals be quantified? Can we relate costs to the particular programs designed to achieve the goals?

## THE GOALS OF EDUCATION

It is not the purpose of this Report to spell out the educational goals for the Commonwealth of Massachusetts. Rather, its purpose is to indicate that various interested parties--educators, legislators, and the community--agree upon a set of goals. For it is only when such goals are established can one have the framework around which to judge whether or not the goals have been achieved.

Generally, an educational goal has been expressed in terms of "improving the quality of education." It would be wise to state the objective in more specific terms. Is the objective to have more students accepted into college, or to have the students score higher on standardized achievement tests, or to have more students obtain employment at higher starting salaries, or to have the school receive a higher rating by its accrediting agency?

A statement of the specific objectives in specific terms makes it easier to list and to evaluate the available alternatives. Let us assume that the last alternative--a higher rating--is the goal. There are many ways to achieve a higher rating. One way is to improve the physical facilities of the school. This could be done through refurbishing existing facilities or constructing new facilities. A second way is to improve the quality of the teaching staff. This could be accomplished by in-service training, tuition refund for courses, or salary incentives. A third way is to hire more teachers who could be used either to reduce class size or, by keeping class size the same, to give the teachers more time for preparation. A fourth way is to hire teaching assistants to perform routine tasks. A fifth way is to hire coordinators who would rearrange the instructional process and assign teachers to lectures, practicum, group discussion, tutoring, etc.

As indicated, to achieve the goal of higher accreditation five general alternatives are possible. Some of these might be rejected because they require funds which are not available (new buildings), or because properly trained personnel (teaching assistants, coordinators) are not available. However, the possible alternatives are considered in an explicit manner. Too often the decisions are made without the alternatives even being suggested.

The example is too simple. It assumes that there is general agreement as to the specific goal. The most bitter educational controversies involve the question of which of several possible goals should be pursued. The degree to which the separate goals are mutually exclusive determines the degree of bitterness in the disputes. The way in which the schools are now organized makes it impossible to prepare a majority for college and at the same time to give the disadvantaged the type of assistance they require. Nor is it possible to prepare students for college and also to give specific vocational training of any depth.

Much of the controversy in education arises over such issues. However, it is only rarely that they are stated this explicitly. Instead of a debate over the relative importance of various goals, there is the hue and cry of various interest groups which attempt to mold educational policy to their own ends. This type of pressure is perhaps inevitable in a democracy. But if educators are to assume the role of professionals--a role to which they constantly aspire--they must begin to act in the interest of those they serve. And this group is not the citizens, the taxpayers, or even the school board. It is their students. Educators should be guided in their activities by more than commonly agreed upon values prevalent in their communities. They should attempt to be both agents of social change as well as agents of cultural transmission. As agents of social change they will have to make difficult decisions and be prepared to defend them.

In this Report, for example, it is recommended that a larger investment be made in a Careers Development Curriculum. This curriculum is not consistent with the prevailing emphasis on preparing as many students as possible to go on to college. Any educational leader who ventures to install a curriculum which is apparently at variance with conventional values should be prepared for sharp and serious questioning from his community. Failure to show leadership in such endeavors, however, is a betrayal of the youngsters whose education is his responsibility.

What is the basis for a recommendation that the goal of education be drastically revised and that resources be re-allocated among existing curricula? It is the recognition on the part of the investigators that a continuation of curricula along conventional lines will lead to a sharp division in our society based on class lines or family origins, rather than on the basic potential of the individual. The latter is more consistent with the democratic basis of our society.

## THE QUESTION OF CURRICULUM AND SOCIAL CLASS

The highest priority for society is the education of its young. The educational process is fundamentally designed to transmit a set of democratic values and to provide the basis for, in the words of Thomas Jefferson, "external vigilance for liberty." Examined from this point of view, the institutions in our society for providing this type of education tend to abdicate their responsibilities when they divide youth into "tracks" or "curricula." This is not to imply that there are no individual differences or that there are no different interests of individuals. But it is meant to indicate that individual differences in the learning process should not result in placing youngsters in "tracks" under which they are stigmatized as "second-class" or even "third-class" students.

The tendency in recent years in most states, as a result of the Vocational Education Act of 1963, has been to develop area vocational schools. The reasons for such a development are quite clear. The smaller schools cannot provide vocational training in a variety of subject areas because of size. The solution appears simple: establish an area school that can serve the needs of a larger geographic area and provide the necessary diversification. It is assumed that we thus have an "efficient" use of resources.

But the "efficient" use of resources is not synonymous with "least cost." A resource is used efficiently only if the results (or benefits) tend to exceed the costs. We must also be concerned with output (the student).

The development of area vocational schools tends to establish more firmly a division of our youth along class lines. Middle-class children tend to attend their local schools, to enroll in the academic (college preparatory) curriculum, and to move on to college or some form of post-secondary education. Children of working-class families tend to be moved into the vocational track and to end up in the working-class themselves, being denied the opportunity of upward mobility. These social class distinctions, in the opinion of the investigators, must be minimized.

The educator today is confronted, however, with conflicting objectives: least-cost and variety in the offerings of education versus the blurring of class lines. The conflict can, in part, be resolved by integrating the activities of the "sending" and "receiving" schools for those students who are highly oriented--by motivation and initiative--towards skill training. Those youths who do not have this orientation should remain in the local school and be fully integrated in the school--comprehensive in substance as well as form. Such comprehensive education should, in the words of James B. Conant, provide "a good general education for *all* the pupils as future citizens of a democracy, provide elective programs for the majority to develop useful skills, and educate adequately those with a talent for handling advanced academic subjects. . . ." It is the judgment of the investigators that only because of the small size of many schools, "area" vocational schools should be established to meet the desires of the vocationally "gifted".

Another development which tends to maintain class lines is the establishment of area vocational schools in "suburban" areas where the more affluent, white, lower-middle class families recognize the inadequacies of the so-called comprehensive schools in the local community. There is a tendency for such parents to support financially the development of such vocational schools. However, in the urban areas, where the parents may be from the working class, both white and Negro, the financial ability to support such schools through taxes is quite limited. Thus, there may be a tendency to mis-allocate federal and state funds. The contrasts between the vocational schools in the City of Boston and area vocational schools throughout the Commonwealth are startling.

It is for these and other reasons that it is being recommended that vocational education be fully state supported, that the area vocational schools (to be re-named Institutes for Educational Development) be closely interrelated with the sending schools, and that the sending schools maintain their control over the students. These recommendations are designed to create an

educational system which is comprehensive in substance rather than in form.

## COMPREHENSIVE EDUCATION

All educational efforts attempt to provide a comprehensive education. This is an education in which the students acquire ability in the basic skills of communication, obtain an understanding of the nature of their physical and social environment, are exposed to the culture and history of mankind, and are made aware of their responsibilities as citizens. The debate on how to provide such an education too often centers on the type of school in which it should be housed rather than on the appropriate curriculum.

The advantages claimed for a comprehensive high school stem mainly from the opportunity it provides for youngsters from all segments of the community to mingle together and to come to know and appreciate one another as individuals. It does offer this opportunity, but whether the opportunity is realized is open to question. The track system in most comprehensive schools tends to reflect the class structure in the community. The youngsters from the more privileged homes usually are found in the college preparatory curriculum. The less privileged, less academically oriented youngsters, who have strong occupational motivation, gravitate towards the vocational education curriculum. The others either end up in the general curriculum through default or escape it by taking the vocational education program which they find least unattractive.

Offerings in almost all subject areas are geared to the track system. English, history, mathematics, and science are usually given separately to college preparatory students. Sometimes further fractionalization occurs with such courses as "English for Commercial Use" and "Vocational Mathematics." These courses reflect a desire to interrelate subject areas, to bring relevance to the academic courses, and to match the level of instruction to the ability of the student. All of these are highly worthy objectives. Unfortunately they are in conflict with the goal of the mixing of all students which the comprehensive school is designed to achieve.

Too many people, however, both educators and interested citizens alike, overlook the actual operations of a comprehensive school. Since there is the form of a comprehensive education, they seem to think that it is present in fact as well. The evidence suggests however, that form predominates over substance.

If the comprehensive school, as presently constituted, does not provide a comprehensive education, how can such an education be provided? The Careers Development Curriculum discussed in this Report is an attempt to do so. Its emphasis is on broadening, not narrowing, the options open to the student. The present general curriculum tends to limit not only exploration within school, but also opportunities after graduation. The Careers Develop-

ment Curriculum stresses exploration. Classes are arranged so that the student can follow his own interests as far as they lead him.

Instead of formal groupings for lecture-recitation type classes, the students' work is more individualized. There is more independent work of a laboratory and practicum nature. With this emphasis there could be more contact among students from different programs and curricula. It could be possible, for example, to make a chemistry laboratory available to students enrolled in the College Preparatory Curriculum and the Careers Development Curriculum during the same time periods. The students could work together on projects involving the synthesis of compounds and their application in basic industrial processes, such as refining or metal plating. Such instruction would obviously require considerable planning and coordination, but this type of coordination is the very basis of the Careers Development Curriculum. The teacher's time in the classroom or laboratory is only the top of the iceberg.

When the question is posed in terms of providing a comprehensive education, the issue of the role of the regional vocational school becomes secondary. It is no longer framed as the comprehensive school versus the vocational school. It is instead a question of determining whether a regional school can make a unique contribution to a comprehensive education. It appears that for some students a regional school can make such a contribution.

In any large aggregation of students there will be some who have developed clear vocational goals at an earlier age than others. These students are not numerous. Even in a comprehensive high school of several thousand students, there will only be a few hundred who can specify the particular occupations for which they wish to prepare. It is not feasible for all comprehensive high schools to provide the facilities necessary to give this small minority the training they desire. Bringing all these students together in regional schools, each of which serves several sending schools, can yield adequate numbers to justify specialized programs. The efficiency of this arrangement, and the savings it permits by avoiding duplication of equipment, is obvious.

These unmistakable advantages, however, stand at variance with the democratic virtues claimed for the comprehensive school. How can these mutually incompatible objectives be achieved? The method that most educators advocate is a part-time or "about" system. The youngster spends half of his school time in his home school and half in the regional school. The most common method seems to be a half-day at each school. Other systems such as a day-about or week-about are apparently less common because of their adverse effect upon the continuity of instruction.

This compromise satisfies many of the conflicting objectives, but in attempting to implement this plan other obstacles arise. One is the reluctance

of youngsters to leave their home school to attend the regional school. Part of this reluctance is the natural human tendency to avoid that which is unknown and different. The home school may not offer what the student wants but at least his friends are there and it is familiar. Youngsters are also sometimes reluctant to attend regional schools because it makes them feel less a part of their home school. The time spent out of their home school, both class time and the time taken in traveling to the regional school, often makes it more difficult to take part in extra-curricular activities and to maintain the informal contacts which are the basis of the social life in school.

Another obstacle to the effective utilization of the regional school is the difficulty of coordinating instruction between it and the home school. To what degree should the regional school give instruction in the science and mathematics that are related to vocational skills? How can instruction in history, English, and social studies be related to the students' vocational interests? Often questions such as these are not confronted directly. Teachers in the separate schools work independently of each other and it is up to the students to tie the subjects together.

With obstacles such as these it is obvious why only a minority of students possess sufficient motivation and interest to be willing to overcome them. Yet for these students the regional vocational school does have a role to play in providing a comprehensive education. Since society will have an increasing need for the highly skilled craftsmen these schools will produce, the justification for their existence is clear.

One basic element of a comprehensive educational system is that it gives the students an opportunity to explore before making a commitment, and an opportunity to change after such commitment.

## EDUCATION AND OPTIONS

As indicated, an essential ingredient of an educational system in a democratic society is providing the youth with equal educational and social opportunities. To avail themselves of such opportunities youth must be served in a manner which permits exploration and choice, with the promise that any choice does not foreclose future options.

It is, indeed, unfortunate that probably the single, most important factor influencing the direction of a youngster's life is his family environment, a factor over which he has no control. Thus, any youngster entering the school system with disadvantages which affect his learning abilities is immediately disadvantaged in a relative sense. The equal treatment of youth at this stage of his growth, in the form of equal educational expenditures, would still produce unequal results. It would appear reasonable that any attempt to provide equal educational and social opportunities would require *unequal* expenditures for those youngsters entering school from relatively poorer environments. Such unequal expenditures mean greater *expenditures* for this group.

Concomitant with such resource re-allocation is the necessity that there be a multiplicity of choices and, when a choice is made, that the student not be foreclosed from changing his decision. If, as sociologists and psychologists assert, the future of youngsters is heavily predetermined by family environment it would appear that the schools should utilize every means to open up new vistas for youth. That is, it is essential that the educational system provide, through its curriculum and guidance activities, the means by which the students can off-set these pre-determined factors which influence their decisions. Therefore, significant changes in curriculum are required and a new approach to guidance must be taken.

The curriculum must be radically revised--in all areas--to accept the concept that youngsters have the ability to learn and that they do not need to be "taught." Learning should be based on experiences which are relevant to *them* and not to the teachers. The role of the teacher is to provide the conditions and materials for learning. The student seeks out problems and attempts to solve them on his own initiative.

Guidance should be considered as that function in the school system which assists the student in making his decision and not a device by which the student is channeled into certain tracks on the basis of the decision of the guidance counselor.

In this approach education is no longer a 2x4x6 matrix system--the two covers of a textbook, the four walls of a classroom, and the six class periods in a day. Under this matrix the youngster is fitted into a tight, conforming mold--a school. What is required is a system which adapts itself to the needs, interests, and aspirations of youth.

Unfortunately, in our society a large segment of youth, an estimated 40 to 60%, finds itself "floundering" in school. Who are these youngsters? What are their characteristics? Unless we can answer these questions it becomes difficult, if not impossible, to develop an educational system and curriculum which meets their needs.

## CHARACTERISTICS OF STUDENTS TO WHOM SCHOOL IS NON-RELEVANT

It has been said,

> ...a large segment of our youth finds school difficult and distasteful. Many are general course students with no interest in and little aptitude for academic learning. They have met with more and more difficulty as they go through school, and many face with desperation the thought of four or more years of book work. The rewards of education are remote... Some of these youth may sense the value of education, but feel they can never persist through school. They have been beating their heads against a stone wall for ten years or more. Quitting school may not solve any problems, but it does give instant relief.

> What we are saying, in effect, to many of these low-average youth is 'Look--going through high school is a glorious adventure in learning and growing strong. It's like climbing a mountain; you get to the top, and you get your diploma. But we notice that you have two left feet and can't climb mountains at all well. So if you just sit in class, keep your mouth shut, and don't get into my hair, you'll graduate. We'll *say* you climbed the mountain, even though you didn't really. I suppose there are some other ways up the mountain and some special help we could give you, but we're so busy making hot chocolate for all the mountain climbers that it's better if you just sit there and pretend you're climbing.'[1]

This observation summarizes better than many tables and data what the main problem is that faces education today. Essentially it is a question of finding "other ways up the mountain." Almost everyone who is connected with education would admit that there is a large segment of young people--estimates vary from 40 to 60 per cent of the school-age population--who do not really benefit from their school experiences. This is not a new finding, but the need to find ways to help these youngsters profit from education has acquired a new urgency.

When the need for laborers and unskilled production workers was high there was no need to design a curriculum for those students who had neither the aptitude nor the inclination for the traditional school offerings. These students simply left school and found employment. Several forces in our society have acted to make this option unavailable to young people. Mandatory school attendance laws represent the prime example of these forces. These laws are rooted in the most humanitarian of motives. Unfortunately, they cause many youngsters to submit themselves, five days a week, to school experiences which tend to deny their basic human worth and dignity. Too often the "education experiences" of these youngsters teach only that they are less able and less worthy than their more academically gifted classmates.

Even if there were no school attendance laws, school withdrawal would not solve many problems for this type of young person. The labor market has little need for uneducated workers, and employers have been able to require a high school diploma as a criterion for employment. This is not because the diploma indicates the graduate has learned anything, but because it does indicate certain socialization traits such as willingness to accept authority, habits of attendance and punctuality, and an acknowledgment of the goals of middle-class society. In short, the employer believes, probably with some justification, that the high school graduate will be a good worker.

It is precisely this youngster--the one without any serious personal or

1 J.A. Cullinane, "Improving School Programs for the Educationally Neglected," *Guidance in American Education II: Current Issues and Suggested Action,* Ed. E. Landy and A.M. Kroll. (Cambridge, 1965), p.251.

social handicaps--that the schools have the greatest potential of serving. With a shift in emphasis and a re-allocation of resources, it should be possible to provide them with a useful education.

While all educators are aware of this group of young people, very little research has been done to try to understand them in any detail. What follows, therefore, is impressionistic. It has been acquired from a variety of observations and interviews of these youngsters in connection with other studies which had different emphases, from discussions with educators, and from various articles (such as the one quoted at the beginning of this chapter). While it is not possible to quote specific studies to document each point, there is a widespread consensus which supports them.

It is important to emphasize that this group is not disadvantaged. The confounding of the problems of poverty, school withdrawal, and race causes many people to associate immediately the group labeled as "those for whom school is non-relevant" with the Negro and other groups alienated from society.

The framework in which the problem is considered can be described in terms of a four-fold classification: (1) the college bound, about one-third of a normal school population; (2) those with firm vocational goals, about five to eight per cent; (3) the disadvantaged, about five to ten per cent; (4) those for whom school is non-relevant, about 40 to 60 per cent. This classification does not, of course, hold for all schools. In some large cities, the proportion of the disadvantaged may be over half. In some suburban communities, the proportion of college-bound may be greater than three-fourths. In an average school population the proportions suggested above hold.

Obviously the school experiences for most of the disadvantaged group is also "not relevant," but to combine them with the group which is separated as the "non-relevants" confuses the problem. The disadvantaged could profit from all the suggestions made for non-relevants, but they need all these and more too. The disadvantaged need special help to overcome the sometimes chaotic and always deprived conditions of their homes.

The non-relevants, as a rule, do not need this kind of assistance. They come from relatively stable homes where the necessities, and even some of the extras, of life are provided. The father usually has a regular job. The parents often urge their children to study hard and get a good education, but they do not engage in intellectual activities themselves. The children thus internalize the goal of upward occupational mobility which is reflected in their parents' regular work habits, but they do not see the relevance of traditional academic pursuits to this goal. They see fathers who have steady jobs which yield the money that they someday hope to earn, but they never see these fathers read books, write letters, or work problems in algebra. They ask, in effect, how will the things which the school asks us to do make it easier for us to get jobs? The school answers, in effect, stay in school until you get your diplomas and they will make it easier to get jobs. The

youngsters agree to the bargain. They come to school, stay out of trouble, do enough to get by, and receive their diplomas. Their high school years are mainly wasted.

By bringing relevance to the activities pursued in high school this waste could be largely overcome. And relevance could be introduced by finding topics of interest, by showing the interrelationships among various courses, and by stressing the ways in which the skills that the student learns in high school will be used when he takes a job.

Vocational education has many of these desirable features. Its present organization, however, tends to limit it to a small proportion of students. In its traditional form, vocational education is geared to serve those students with firm occupational goals and average or above-average ability. Unfortunately, there are not many students in our high schools who fit this description. The wide-spread emphasis on a college education as the surest route to a useful and rewarding life tends to cast most of the above-average, and even many of the average students, into the college preparatory curriculum.

A flexible curriculum (as described later), like the general curriculum, serves another function in that it allows the student to defer specifying a vocational choice. Many students at the high school level cannot make such a choice. They have a certain direction and inclination but they cannot specify the particular type of occupation they wish to follow. The selection of a specific program in vocational education involves more of a commitment to a vocational goal than most high school students are able or willing to make. They ask: why spend two or three years learning to do a job that I may not like?

An additional consideration that causes many students to avoid vocational courses is their desire to maintain future options. They probably would not express their reasons in these words, but they are aware that the vocational education curriculum limits the possibilities open to them after high school. Although they are not academically oriented, they feel that going to college would be a "nice thing to do." Many are unwilling to shut themselves off from this possibility. Even many students in the general curriculum hold a vague hope that somehow they will be accepted by a college. These considerations are some of the major obstacles in attempts to attract more students into the traditional vocational education programs.

Is there a curriculum to meet the needs of these youngsters? Can the traditional vocational education curriculum fill this requirement?

## CURRICULUM

Vocational education does have something to offer those students who are presently wasting their high school years by enrolling in the academic or

general curricula. But this potential will not be realized unless vocational instruction, as it is currently offered along traditional lines, is limited to the talented few. What is needed is a new arrangement for a large group of students in the "gray" area who will be given a chance to explore the nature of many occupations--an arrangement which demonstrates the interrelationship among courses and between these courses and future plans, which provides training in broad occupational skills that can be used in a variety of occupations, and, finally, which maximizes the options open to the student after he leaves high school.

Is such a curriculum possible? It is, and it can be offered with relatively minor re-allocations of resources and facilities. The first necessity is a commitment to do something for those students who are usually ignored. Once this commitment is made the necessary procedural arrangements can be organized.

There is one aspect that is essential--teachers of different courses must be given time in which they can meet together to plan the coordination of their instruction. This coordination must be a continuing weekly activity over the entire school year.

The educational process would no longer be seen as teaching, but instead as providing the conditions for learning. Providing these conditions involves tailoring instruction to the needs and interests of the student, rather than forcing the student to adjust himself to a predetermined curriculum. This is, of course, the issue of individualized instruction (or, rather, individualized learning), which receives more lip service and less effort than probably any other aspect in education.

There are many factors which go contrary to the recognition that each individual has his own learning style: state mandated courses, college admissions policies for the evaluation of courses, textbook and course materials designed for uniform instruction, and the teachers' own training and experiences. All tend to perpetuate the customary lecture--recitation forms. These factors also tend to continue the compartmentalization of instruction.

The curriculum being advocated stresses individualized instruction across subject lines. Teachers of the traditional subjects would act as resource persons in their own areas of expertise and would guide the study and activity of the students along self-selected lines of interest. The students would proceed at their own learning rates towards goals they had chosen for themselves.

It is expected that at the secondary level much of this activity would be occupationally-oriented. During the senior high school period most young people are interested in exploring the nature of various occupations. The curriculum being suggested would give them the opportunity to carry out this exploration. Instruction in other subjects could be related to the central theme of occupational exploration.

It is at this stage that the special style of vocational education would make its unique contribution. The youngster who is essentially non-verbal can be shown the utility of reading when reading skills make it easier for him to follow the instructions for a machine he wants to use. He can be shown how a knowledge of certain scientific laws makes it easier for him to solve the particular problems he encounters. He can be shown how to represent some problems in algebraic or geometric terms and he can see the advantages of manipulating them in this style rather than physically. All of these learning experiences can be shown to be immediately relevant to problems he is trying to solve. There is a much higher probability that concepts learned in this manner will be retained and applied in similar situations in the future.

Along with an increase in the relevance of the materials studied, the style of vocational education has several additional advantages. It is project-oriented and the student can experience a sense of accomplishment, which producing useful objects yields. Such a sense of accomplishment this type of student rarely or never experiences in the academic classroom. The instructional process of an occupationally-oriented type by its very nature tends to be individualized. The instructor works with the students individually as they progress at different speeds on different projects. The mood in a vocational shop is informal and relaxed. Rather than requiring the students to sit quietly, they can move about to obtain needed materials or tools. As a final bonus, the instructor, by observing the student's work, can set standards for disciplined work habits and personal responsibility.

All of these features make the *style* of vocational education the base on which the other features of the proposed Careers Development Curriculum can be built. It should be noted, however, that in this curriculum vocational education is seen as the means by which a variety of educational goals are achieved. It is the means, not a goal in itself. The goal of teaching specific vocational skills to highly motivated students is assigned to the vocational preparation curriculum. The special style and features of vocational education are used to bring interest, relevance, and the opportunity for accomplishment to the Careers Development Curriculum.

It is quite evident that the recognition of the main problem of occupational education, or even the development of an appropriate curriculum, is not sufficient to solve the problem. An important ingredient in the process is the utilization of instructional technology and the educational preparation of teachers.

## INSTRUCTIONAL TECHNOLOGY

In the development of a new curriculum, such as one which is occupationally oriented, consideration should be given to the use of instructional technology. But such instructional media should not be utilized as a means of reducing costs, or as a substitute for teaching, but rather as a

means by which individualized learning can take place, based on a set of behavioral and psychological goals.

Instructional technology can also be utilized as a means by which existing resources can be more efficiently employed, recognizing that by efficiency is meant the achievement of a given set of educational goals at the least cost. The release of resources (funds) can then be applied to other purposes.

With the stress in this Report on the need to develop among students certain inter-personal attitudes and behaviors which are central to the educational process and with the emphasis that occupational education can provide the means by which these objectives can be achieved, similarly it is important to utilize various types of instructional media, provided they contribute to these ends.

## TEACHER EDUCATION

To capitalize on the potential inherent in the Careers Development Curriculum it will be necessary to develop teachers who are broadly trained, who are capable of working as members of inter-disciplinary teams, and who have an understanding and sensitivity to the characteristics of the students whom this curriculum is designed to serve. The role of these teachers is not so much to teach as it is to establish a learning environment.

A learning environment is made up of many elements, most of which have yet to be specifically identified. The one principle that is most generally accepted by learning psychologists is that behavior that is reinforced tends to be repeated. The problem then becomes one of providing situations which yield reinforcements. These reinforcements can be classfied as internal and external to the individual. Internal, or self-administered, reinforcements are those which give the feeling of satisfaction to persons when they complete difficult tasks or "put in a good day's work." External reinforcements include the approval and recognition which one receives from others for his efforts.

The usual student, for whom school is not relevant, receives little of either kind of reinforcement for his school efforts. Since he is not academically adept he has little chance to obtain approval from his teachers or classmates. And, since school activities have little intrinsic interest for him, it is a rare occasion when he will feel satisfied about his own work.

The Careers Development Curriculum is an attempt to bring areas of interest into school activities. This should yield more self-administered reinforcement. However, to provide more external reinforcement, it will be necessary to develop teachers who can accept and approve of the students on their own merits. Most teachers evaluate youngsters on their ability to do college work. This standard is, of course, totally inappropriate to the large proportion of students who require an occupationally-oriented curriculum. Teachers who have been oriented to the needs and interests of these students and who are supported by a sympathetic administration can use more appropriate standards.

Both of these elements are essential. Both the teachers and the administration must see the career development curriculum as a means of meeting the needs of students. If these students do not perform as well as others on a standardized test, the teachers should not be pressured to improve this test performance. If the administration applies such pressure, the teachers will subvert the curriculum and use it to teach for the type of student performance by which they (the teachers) are evaluated and if the students do not respond to this type of instruction--and it is obvious they do not--the teachers will tend to reject the students.

This is the cycle that currently prevails in the typical general curriculum. The teacher is required to teach tool subjects by essentially verbal means to students whose main interests and abilities are in other areas. The students do not respond to the teacher nor do they perform well on those standards by which the teacher's performance is evaluated. The administration evaluates the teacher by standards that he (the teacher) can never satisfy, given the mismatch between the curriculum and the students he must teach. The teacher is thus frustrated in his efforts and blames the students for his failure. He thinks that if the students would only try a little harder he could accomplish the goals the administration has set. The students, in turn, are aware of the low regard in which their teachers hold them. They too are bored and frustrated by the materials the teacher attempts to make them study. The cycle of mutually negative interactions is established and maintained largely because of the inappropriate nature of the curriculum.

The emphasis on an occupationally-oriented curriculum may lead some to conclude that the Report recommends that it be taught mainly by vocational or industrial arts teachers. This is not so. The traditional vocational educator--the skilled tradesman--is not necessarily the best qualified for this curriculum. The teacher who is qualified to teach high level skills would be most effectively used in the vocational preparatory curriculum. To provide the type of occupational exploration and familiarization envisioned for the Careers Development Curriculum, a broader, less specialized teacher is needed. An essential part of the education of this type of teacher is training in the ability to work with other teachers in order to capitalize on the opportunities for relevance that the occupational orientation yields to the students.

But even appropriate teacher education is not enough. What is required, in the final analysis, is strong educational administration and leadership.

## STATE ORGANIZATION AND ADMINISTRATION

The Careers Development Curriculum represents a radical change when measured by the usual standards of educational innovation. To implement such a far-reaching change will require persuasive and pervasive administration and leadership. A change of this nature cannot simply be legislated. An administrative framework must be established which can provide the support

and guidance that is needed at the local level to cause the mandated changes to become reality.

In part III of the Report (recommendations) an administrative arrangement designed to supply the required leadership is described. Briefly stated it consists of a Bureau of Careers Development Education under the supervision of an Assistant Commissioner of Curriculum and Instruction who would serve the large percentage of students at the local school level, grades K through 12. In addition, a new Division of Manpower, Research and Development, responsible to both the Commissioner of Education and the Commissioner of Labor, is created and replaces the present Bureau of Vocational Education and is charged with the training and retraining of youth and adults. This Division would be made up of three bureaus: manpower, research, and development.

The Manpower Bureau would be responsible for the regional vocational-technical schools which, it is proposed, would be called "Institutes for Educational Development." The responsibility covers all phases of their operation, including the selection of staff and the content of curriculum. Removing the Institutes from local control can assure that the offerings of the Institutes are up-to-date and reflect broad state and national, rather than purely local, labor market needs. Local school boards tend to be reluctant to train their young people in skills that cannot be used in their own communities because this frequently causes the young people to leave. In areas of declining employment, however, such out-migration is often necessary and desirable from an economic point of view. A state-controlled school is in a stronger position to follow such a policy.

Another reason for establishing state control of the Institutes is to assure high standards of instruction and highly qualified graduates. The vocational education curriculum to be offered in the regional Institutes is seen as an elite program for the highly motivated and qualified youngster. It is anticipated that students in the Careers Development Curriculum may choose to move into a specific skill area in the Institute when their vocational interests and aptitudes have crystallized. The advantages of Institute instruction should be so evident that they will overcome the student's reluctance to make a major vocational commitment. The best proof of the advantages of Institute training would be graduates who obtain good jobs. State control of the training is the surest way of producing such graduates.

The regional Institutes can also provide a natural site for educational innovation. Curriculum specialists from the Bureau of Development can be housed in each Institute and can work with the sending schools in their region to assure that instruction in the home school is coordinated with that in the Institutes. More importantly, they can provide leadership in establishing the Careers Development Curriculum in the local schools.

State control over vocational education, and its influence on the Careers

Development Curriculum, will also provide the basis for appropriate evaluation of the educational activities of the Commonwealth. The Bureau of Research would be in a position to carry on cost-effectiveness studies which provide the basis not only for efficient use of resources but also for innovative programs which must arise when it is discovered that existing programs are not achieving their explicit objectives.

The newly established Division would also be in a position to analyze the needs of the labor market on a state and regional level and to minimize the tendency for local schools to reflect local labor market needs, a point to be discussed in the next section.

## THE NEEDS OF THE LABOR MARKET

The attempts of vocational educators to match their offerings to skill requirements of employers in the labor market are usually based on a rather simple model. It is usually assumed that a survey of employers, or the recommendations of advisory committees, will indicate the skill areas of high demand for which courses can then be designed. Occasionally state and federal projections of skill needs will also be consulted for guidance. But these activities often are conducted only when a program is being established or expanded. Once a shop for a particular skill area is equipped, training in this skill is continued, whether a need is present or not, because of the heavy investment in facilities and equipment.

Many reports indicate that past procedures have not yielded very much congruence between training and job placement. Most skilled tradesmen do not generally enter their occupations through vocational training in secondary school. A majority of the young men who study particular vocational skills in high school do not necessarily obtain jobs after graduation using those skills. In many cities enrollments in the various vocational programs show little relationship to employment patterns. And skill surveys, based on employer interviews, have been rather inaccurate.

These facts are presented not to criticize vocational education, but instead to demonstrate the difficulties inherent in the simple matching model. Vocational educators, no matter how sensitive they are to the needs of their communities, would have a very difficult time matching their programs precisely to these needs. Some of the obstacles that hinder such a match are described below.

One of the first problems that vocational educators must face is that many jobs of the hospital orderly-janitor nature do not attract young people. Distributive education seems to have a problem attracting students because of the conditions of work. The typical entry level job in retailing is salesclerk. This position has a popular image of long hours, low pay, and boring work. In many of the more progressive retail establishments this image no longer is valid, but the popular stereotype causes many youngsters to avoid distributive education. The working conditions of auto mechanics, welders, printers,

plumbers, etc. tend to cause many young people to avoid these jobs as well. Obviously these are factors which anyone must consider when making vocational decisions. They are, however, beyond the control of vocational educators and cause present difficulties in attempting to match vocational programs to local employment opportunities.

A second major difficulty in matching programs with employer needs is the unstable nature of the career plans of young people. At the high school level most young people cannot specify an occupational area. They have assumed certain directions which can be largely accounted for in a 2 by 2 matrix, with the variables being college versus non-college and scientific-technical versus non-scientific-technical. That is, in high school most youngsters are either oriented to going to college or not. And they are either oriented to scientific-technical type activities or not. Changes in these plans tend to be movements out of the college and scientific-technical categories into the other categories.

These general orientations do not provide an adequate basis for very precise vocational decisions. Except for the minority with clear goals, many young men who follow vocational programs in high school seem to be engaging in occupational exploration. They are attempting to find out what various jobs are like and whether or not their interests and abilities are suited to the requirements of these jobs. Consequently, even when there are substantial enrollments in programs with high demand in the labor market, many of these students do not subsequently obtain jobs using the skills in school. They have concluded from their high school experiences that they do not wish to do the type of work for which they studied. Once again this is not said in criticism. The high school years should provide opportunities for exploration. But such exploration could be made more efficient through the Careers Development Curriculum. This, however, is not the issue. This section is simply citing some of the reasons for the difficulties vocational educators have in meeting labor market needs.

The third major obstacle to an effective match is the problem of predicting skill needs at the local labor market level. At present there is no effective way to do this. Skill surveys generally cannot predict needs. Employers can report their job vacancies at the present moment but they are poor at predicting future needs. The nature of most industrial operations does not permit accurate predictions. The changing demand for goods and services and the changing technology to produce these goods and services are frequently not apparent to the individual employer. To complicate the problem, employers can often adjust to unforeseen skill vacancies by shifting workers or production processes.

Elaborate statistical projections are not possible at the local level because neither adequate data nor the technical expertise is available. Even if they were available, a change in one major employer can upset a local prediction while having relatively little effect on a state or regional projection.

All of these factors together with the geographic mobility of young people, restrictive and discriminatory practices in the labor market, and the constraints of minimum wage and child labor laws tend to make the struggle to match vocational programs and local labor market needs an endless, and largely a fruitless, task.

Throughout this discussion, however, the emphasis has been on the difficulties of matching local labor market needs. None of the foregoing should be interpreted to mean that vocational educators should not be aware of labor market needs of a broader nature. Curriculum planners would certainly want to be aware of emerging trends in the state, the region, and the economy. The impact of computers in all areas of industry, the increasing demand for workers in the fields of education, health care, and other personal services, the worsening problems of air and water pollution, to cite but a few examples, all are areas of increased national interest and employment in the coming years.

Vocational educators are as concerned with these trends as any professional group and this discussion is intended to stimulate their awareness and to suggest that a too narrow concern with purely local problems may be self-defeating. Few vocational educators, no matter how hard they try, are going to serve all of the skill needs in their communities. Their more proper and--in the long-run--more profitable concern should be with the needs of their students.

## POST-SECONDARY EDUCATION

To this point the emphasis of the discussion has been, to a large extent, on education at the secondary level. It is appropriate to point out, as some observers of American society have commented, that the term "the educational society" is probably a more apt description than "the affluent society." The vast increase in educational activity has tended to create its own demand. Businessmen use training programs as a means of keeping up with the competition. When young people see their friends and relatives obtaining post-secondary education, they think they are missing something to which they feel entitled. Whether they have the interest or capacity for post-secondary education is not as important to many young people as entering some type of program after high school.

To accommodate this demand there has been considerable community pressure for community colleges. Community colleges have begun to assume the function that land grant colleges used to perform before pressures for admission caused them to become restrictive. Land grant colleges used to--and in some cases still must--accept any high school graduate in their states. As more and more young people are graduated from high school these schools become more restrictive either through admissions policies or by academic dismissals. The community college has been promoted to fill the demand for low-cost education at the post-secondary level for anyone who desires it.

At the same time these trends were acting to produce community colleges, various other forces were focusing the attention of the nation on those individuals who were not equipped to assume productive roles in the labor force. Some of these were workers who had been displaced by technological change. Others were victims of poverty and had neither the skills nor the personal habits required for employment.

Vocational training was proposed as a solution to these problems. Federal money became available through the Manpower Development Training Act and many high school vocational shops and their teachers even now find themselves employed the better part of 16 hours a day. The realization gradually grew that with the accelerating rate of technological change adult training and retraining was going to be a continuing process which could not be conducted on an *ad hoc* basis. Institutional arrangements will have to be set up to provide this training.

Simultaneous with the recognition of the need for adult training and the increased demand for community colleges, the Vocational Education Act of 1963 made federal funds available for the construction and equipping of regional vocational schools. The main function of these schools is to provide vocational training at the secondary level, but they obviously also have a potential to provide post-secondary and adult training. Most states are now debating the respective roles of the regional vocational school and the community college. To what degree should they share facilities, who should hold administrative control, should the courses be trade-oriented or professionally-oriented?

There should be a clear delineation of the community college from the regional vocational school (Institute for Educational Development). This delineation should be on the basis of the educational level of the students to be served. The regional schools (Institutes) should emphasize training for those students--young people and adults--who have yet to obtain the equivalent of a high school education. The community colleges should concentrate on post-secondary education.

This distinction is not based on any judgments as to the relative value of these differing emphases but on an appraisal of the prevailing orientation and expertise in the different institutions. The regional schools are occupationally-oriented. Their staffs are drawn largely from journeymen and craftsmen who are concerned with the practical aspects of their trades. Though community colleges profess to serve all citizens, many of the more established ones have experienced considerable pressure to assume a junior college (baccalaureate) format. This pressure reflects the desire to be able to transfer credits and the added prestige of the baccalaureate emphasis. Vocational instructors who are former craftsmen and who may lack a bachelor's--much less advanced--degree, would not feel confortable in this type of setting nor would they be accepted in most cases.

While the regional Institutes would not be involved in post-secondary

education, they would be fully occupied with the vocational preparatory curriculum, adult training and retraining, vocational rehabilitation, supportive services to their sending schools, and leadership for educational innovation.

## FINANCING

This chapter began its discussion with the question of priorities, recognizing that the demands on the Commonwealth, not only in education but also in other areas, will probably exceed the available revenues. Subsequently, the discussion was concerned with the need to expand certain educational programs or to shift certain emphases in the educational programs. How is the Commonwealth, or for that matter any other state, to meet these increased demands?

First, it is essential that existing educational practices be examined to determine whether the existing funds cannot achieve more, or conversely, whether the same educational objectives cannot be achieved with less money. This may well require a re-structuring of the educational practices as currently carried on and should be a primary function of the recommended Division of Manpower, Research, and Development.

Second, it should be recognized that, as a result of the growth of the economy of Massachusetts, additional revenues can be obtained on the basis of the existing tax structure. In fact, it is estimated that total revenues will rise to such an extent that educational expenditures can increase by about 10 per cent a year.

Third, careful consideration should be given to the criteria on which federal funds are allocated to the states. It is possible that with careful analysis existing state funds might go further.

Fourth, the internal operations of schools can be adjusted over time as demographic changes occur in various communities. And this can be accomplished without necessarily incurring extra costs.

Finally, careful consideration should be given to the question of how much more can be spent on education in Massachusetts, given its economic strength and its historical educational leadership. The extent to which the public is informed of the achievements of its educational system in meeting the needs of its youth and the community is the extent to which additional public support can be obtained.

## PUBLIC SUPPORT

In any discussion of academic versus occupational education the point is usually made that the public views the occupational type of education as "second-class." Parents, it is insisted, want their children to enter--and if possible complete--college. And only a college preparatory curriculum will satisfy the parents.

Yet, in any discussion among professional educators and social scientists there is usually a consensus that the aspirations of the parents are not necessarily the aspirations of their children.

It is clear that if many of the recommendations contained in this Report are to be accepted and carried out this conflict must be resolved. This is, indeed, a great challenge to the professional educators. It is also a great challenge to the state administration which can provide the leadership for an educational program which is consistent with the needs, aspirations, and interests of youth.

## LEGISLATION

To support a new approach to occupational education it will be necessary to obtain legislative action.

A review of the laws of the Commonwealth of Massachusetts reveals many specific changes and amendments, reflecting the desire of the legislature to improve the quality of education and to adapt to changing circumstances. But periodically it is desirable to review these "bits and pieces" to determine the extent to which they reflect a consistent philosophy. In this connection, a codification of the legislation would be appropriate at this time.

In addition, it is desirable that legislation set forth the broad goals of occupational education and give authority to a strong state administration to achieve these goals through the issuance of specific regulations and by administrative actions. This codification should provide the basis for determining the extent to which existing legislation is consistent with educational goals and the extent to which revisions are necessary to accommodate the recommendations in this Report.

## CONCLUSION

This review of the issues in occupational education was designed to indicate the types of problems which had to be explored in any study of vocational and technical education.

In the study it was considered desirable to obtain information on vocational and technical education in Massachusetts. Chapter 2, which follows, explains the various methods employed by the investigators in this connection.

## Chapter II.

# *Vocational and Technical Education in Massachusetts and the United States*

The Commonwealth of Massachusetts has a rich educational heritage of a remarkable record of firsts: first high school, first private school, first state board of education, and first college. It was also the first state to legislate school attendance and to establish teacher-training institutions. Massachusetts led the way in prohibiting school segregation, created the first graduate school of education, and first developed a state-wide vocational education program. It is with this latter achievement that this paper concerns itself, for without the people and places of Massachusetts the history of Vocational and Technical Education in the United States would most likely have gone through a longer period of infancy.

Instrumental or mechanical drawing--a basic course in the school curricula today--appeared first in the country as a school subject under William Bently Fowle of Massachusetts; the area of vocational education for women achieved its major breakthrough under the leadership of Florence M. Marshall and Helen Hildreth. Miss Marshall owned and directed the first American trade school for girls. Opened in 1903 at Boston, the Girls Trade High School recognized as its purpose the instruction of the girl in order "to make her contribute to industrial progress and industrial welfare." Helen Hildreth directed the Women's Educational and Industrial Union and became involved in teacher training. In 1913 she was called to direct the Worcester Trade School for Girls and soon her services were in demand all over the country.

Finally, there was another pioneer effort of Massachusetts by the father of vocational guidance, Frank Parsons, followed in 1909 by Meyer Bloomfield; these two men obtained the cooperation of the Boston School Committee in developing a plan for making vocational guidance effective in the city's schools.

The role and significance of the people and places of Massachusetts in the development of vocational and technical education in the United States is outlined below.

## THE ANTECEDENTS OF VOCATIONAL-TECHNICAL EDUCATION

Vocational-Technical Education in the United States may very well have its antecedents in the ancient medieval institution of apprenticeship. The American colonists in the first half of the 17th Century explained the twofold nature of apprenticeship. On the one hand, children had to be trained in vocationally useful "employments" and, on the other hand, masters had to teach their apprentices a fundamental literacy.[1] In 1642, because there had been "great neglect in many parents and masters in training their children in labor and learning and other employments . . . "[2] the Massachusetts Bay Colony passed a comprehensive apprenticeship law which ordered parents and masters to provide adequate vocational training and instruction in the "principles of Religion" and the "capital laws of the country."[3]

As time passed, however, more and more masters relegated their educational responsibilities to society at large, maintaining that apprenticeship was a source of labor and that the obligation of educating the young in the basic elements should be assumed by the schools. Throughout the 17th Century, having reverted to its initial training function, apprenticeship and the father-son "pick up method" adequately served, for a time, society's manpower needs and provided the young with the opportunity to realize their vocational goals. However, as the 18th Century drew to a close, society's

1 Vincent P. Lannie, "The Development of Vocational Education in America: An Historical Overview," *The Prospectus for Change,* Advisory Council on Education, (Boston, 1968).

2 Charles A. Bennett, *History of Manual and Industrial Education, 1870-1919,* (Peoria, 1937), p.268.

3 Lannie, p.7.

economic structure showed signs of breakdown: old institutions were threatened by change, and by the 1820's a nascent industrialism grew and the time-worn way of life crumbled. Mechanization rendered lifetime skills useless, vocations obsolete, as it replaced the craft-shop with the imposing, impersonal factory. Ills never met before afflicted society as man's relation to his work changed drastically. A new kind of worker was needed for a new age.

Upon the demise of apprenticeship, attempts were made to fill the gap in the form of mechanics institutes and lyceums. Education became the by-word. As early as 1826 Josiah Holbrook published the manifesto of the American Lyceum Movement which called for the furnishing of a universal and practical education.[4] Further, some people were insisting upon the establishment of universities for the nation's farmers and mechanics. The call for help, however, was not answered until 1862 with the passage of the Morrill Act which endowed land and other forms of support for agricultural and mechanical colleges.

After the Civil War the American economy experienced a surge of growth which deepened the social and economic need of the country which in turn witnessed once again the cultural lag in meeting this need. "The colleges had blazed the vocational trail," observes Grant Venn, "but as they advanced the level of their work into highly skilled and professional areas, they left a vacuum in the field of middle-level vocational preparation."[5] The high school, established in 1851 in Massachusetts, was by this time woven into the American fabric. Some referred to it as the "people's college", implying that this unique institution would offer the working man a concrete opportunity for advancement. The high schools failed to play that role. They did not fill the gap left by the colleges: "Politics, pedagogy, and the familiar pressures of tradition and status stood in the way."[6] The need became critical and in the late 19th Century two visionaries welded new ideas from Russia and the Scandinavian countries into a new era for occupational education.

## THE MANUAL TRAINING MOVEMENT

In 1868, under the direction of Victor Della Vos, the Imperial School of Moscow was founded. Because Della Vos realized that the apprenticeship

4 Lannie, p.9.

5 Grant Venn, *Man, Education, and Work,* American Council on Education, (Washington, 1964), p.47.

6 Venn, p.47.

method was fast becoming obsolete, he organized his revolutionary "instruction" shops as a necessary prerequisite before students could enter "construction" shops, where they worked alongside paid workmen in producing marketable goods. Each shop presented a course graded in terms of difficulty, a method which Della Vos was sure would obviate the need for apprentice training in the "construction" shops. In 1876 the Russian system was put on display at the Philadelphia Centennial Exposition. Influenced greatly by what he saw, Calvin M. Woodward opened the St. Louis Manual Training School with the slogan: "Put the whole boy in school, his hands as well as his head." Woodward struck nerve when he observed that "... the excessive dropout rate of the high school was directly related to the traditional classical curriculum."[7] Another great American educator from Massachusetts, John D. Runkle, also perceived the Russian method as the perfect breakthrough he had been searching for. As Woodward said later, Runkle went further and looked deeper into the problem than had Della Vos for "he not only saw shop instruction as an essential element in education of the mechanical engineer, but also perceived its value in general education."[8] Thus, in addition to providing work for the students at Massachusetts Institute of Technology, Runkle opened a new school at secondary grade level to grammar school students who could pass the required examinations. The School of Mechanic Arts, then, is a prime example of the kind of institution which flourished during the era of the Manual Training Movement.

This movement represented a culmination of isolated efforts to promote and improve industrial and technical education. The industrial school idea had taken root as early as 1814 in Boston, Massachusetts, when a group of religious and social workers opened up the Farm and Trades School for the aid of handicapped and culturally deprived children. Each child selected work and study in one of several trades in addition to basic academic courses. In 1829 the older Manual Labor Movement received what Charles Bennett refers to as its most successful experiment in the Andover Theological Seminary at Andover, Massachusetts.[9] Again, in 1835 Bronson Allcott, a Connecticut philosopher-teacher, came to Boston, an environment in which he could put into practice the "radical" ideas of the Great Swiss Reformer, Pestalozzi. Finally, in the early 1870's while Professor Woodward was discovering the value of tool exercise as a speedy means of teaching the mechanical arts, a group of religious workers was insisting that more practical and useful training be offered in the Boston schools. This led to an educational experiment call the "Whittling School" which was cited by Dr. Runkle in his

7 Melvin L. Barlow, *History of Industrial Education in the United States,* (Peoria, 1967), p.36.

8 Barlow, p.39.

9 Bennett, p.183.

famous chapter, "The Manual Element in Education," as an "excellent example of the Russian method of mechanic art education."[10]

Interest in practical education increased to gratifying proportions: the techniques of Runkle and Woodward spread rapidly, and a rash of private Trade Schools, evening schools for industrial workers, and corporate schools sprung up with the fully expressed intention of combining theory and practice. The Worcester County Free Institute of Industrial Science, endowed in 1865, was the first American school to combine theory and practice in the mechanical engineering field. The school, later to be called the Worcester Polytechnic Institute, had an educational purpose which differed from the earlier manual labor experiments in that "it was intended to be just as educational as laboratory work in science."[11]

In spite of the efforts and successes of the Manual Training Movement, however, there was an increasing demand from manufacturers and labor leaders for more practical instruction in the public schools. They believed that "it is the duty of the State to furnish the same character of free . . . training for the productive industries that it is giving to the professions."[12] This was the nature of the protest which gained increasing support at the end of 1880's. The traditional attitude, that there was something inherently evil in providing public instruction in vocational areas, began to be seriously questioned and the burden was upon the schoolmen to question their own prejudices. Over one hundred years earlier in Europe this form of education had been considered fully legitimate and worthy of public and industrial support.[13]

Another issue that emerged in the last decade of the 19th Century was one which seems to have been lost in the wake of the initial phases of the Industrial Revolution. This was the concept of vocationalism which apprenticeship had assumed two hundred years before. For both Woodward and Runkle, Manual Training was not intended to be Vocational Training but rather " . . . it was an attempt to infuse new vitality into old curricula, to rouse student interest in school programs . . . "[14] However, in the 1890's most young people were already deeply involved in their life of work and were sure that education had very little to offer them. In practice, then, manual training was not doing the job.

10 Bennett, p.409.

11 Bennett, p.361.

12 Bennett, p.516.

13 Venn, p.40.

14 Venn, p.49.

As indicated, labor and management were calling for a more efficient means of training the army of workers which they needed and a "new breed" of educators began to criticize manual training as being too narrowly conceived in terms of educating for work. Thus, at the opening of the 20th Century, educators had to come to grips with the pressing problems of public support for industrial training and the key issue of vocationalism.

## THE FORMATIVE YEARS

The decade 1900-1910 was a period of accelerated growth: the population of the United States increased from 76 million to over 92 million; the Gross National Product more than doubled and farm income rose sharply. Against this background came renewed demands from the factories and the farms for more skilled workers. The need for skilled manpower became critical and the country turned to its schools for the supply.

Prior to 1900 there was some attempt to answer the desperate cries for help from management and labor. Dr. Thomas Balliet, superintendent of the Springfield, Massachusetts schools, for example, had unusual success in his evening school of trades to the extent that it brought financial aid from the public treasury and attracted the attention of industrial leaders and school officials" . . . not only in Massachusetts, but wherever the basic facts about it were known."[15] Massachusetts also anticipated the furor over vocationalism, for as early as 1877, at the annual meeting of the American Social Science Association, a report was issued on a "developing school" and "school shops" " . . . . where any boy might go after completing his general education in a public or private school. In this school, by trying one kind of work and then another, he would discover that trade or business he wished to enter."[16] Massachusetts, therefore, with its rich educational heritage and its characteristic daring was the logical place to fight the following crucial battles for Vocational and Technical Education. The Douglas Commission of 1905 was the first skirmish which turned out to be a major victory for the development and acceptance of what can now be called *Vocational and Technical Education.* Governor Douglas of Massachusetts requested that the Commission:

> . . . shall investigate how far the needs are met by existing institutions, and shall consider what new forms of educational effort may be advisable, and shall make such investigations as may be practicable through printed reports and the testimony of experts as to similar educational work done by other states, by the United States government, and by foreign governments.[17]

15 Bennett, pp.511-2.

16 Bennett, p.407.

17 Bennett, p.513.

The report, completed in 1906, chastised the public school system for being too exclusively literary and said that there was indeed a widespread interest in special training for vocations.[18] It further rebuked general education: "'The overmastering influence of school traditions had brought the manual arts into subjugation', so that they too had been 'severed from real life as have other school activities.'"[19] The report, therefore, authorized the establishment of independent industrial schools, provided State aid equal to one-half of the local expenditures for such schools, and established the administration of vocational education through a commission independent of the State Board of Education.[20] It was recommended that the elementary schools offer work [illegible] "elements of productive industry" and that work in the high schools b[illegible] so that the instruction of mathematics, science, and drawing "[illegible] the application and use of these subjects in industrial life, v[illegible] eference to local industries, so that the students may see that these su[illegible]re not designed . . . solely for academic purposes, but that they may b[illegible]ed for the purposes of practical life."[21]

The new commission, under the chairmanship of Paul Hanus of Harvard University and Charles Morse of the Cambridge Rindge School, merged with the reorganized State Board of Education in 1909. Under the leadership of David Snedden, State Commissioner of Education, and Charles A. Prosser, State Director of Vocational Education, this change resulted in the rapid development of a "comprehensive scheme of vocational education in connection with the public schools of Massachusetts which served as a model for study and inspired action by other states."[22]

Thus, the work of the Douglas Commission accomplished three major tasks: first, it capitalized on the growing interest among proponents of manual training to meet the need for trade training by identifying the kind of industrial training necessary and then, by indicating the public school as the appropriate place to fulfill this need. Secondly, under the leadership of the Commission recommended by the report, the Boston school system experienced a reformation which influenced the entire nation so that by 1919 all states provided for compulsory education, recognized the social need of industrial intelligence and considered education, leading directly to employment, as a justifiable goal. Finally, the report clarified the position of manual training as an aspect of the larger problem of industrial education. It survives today as the father of the present-day industrial arts program.

In the same year that the Douglas Commission issued its report two New York educators formed the National Society for the Promotion of Industrial Education. Organized by James P. Haney and Charles R. Richards, the NSPIE would wield by 1910 a powerful coalition of management and labor. Yet,

18 Venn, p.55.
19 Venn, p.55.
20 Bennett, p.539.
21 Bennett, p.515.
22 Bennett, p.517.

despite the fact that they both stood to gain much from the spread of Vocational-Technical education, they were frequently at odds on basic uses affecting this type of education. On June 9, 1906, a meeting composed of manufacturers, educators, organized labor and social workers was held at Cooper Union. The nature of the addresses given that day is exemplified by a Worcester manufacturer, Milton P. Higgins, who said, "Skill is the counterpart of knowledge. Is it too much to expect that through skill given to the workman, there may result a better life, a better citizenship, and also a higher culture?"[23] There was no longer any question about the value of rapidly expanding the means of industrial education throughout the country. The Society appointed a committee under the leadership of Henry S. Pritchett, President of the Carnegie Foundation for Advancement of Teaching, to report on the relation of industrial training to the general system of education in the United States. The Committee sent a copy of its report to the President and Vice-President of the United States, the Speaker of the U. S. House of Representatives, and the U. S. Commissioner of Education, calling attention to "this whole matter of industrial education from the standpoint of our national and economic welfare" urging upon them "the duty of an adequate consideration of this subject by those responsible for the national progress."[24] It was clear that the major thrust of the proponents of vocational education would have to be the launching of a compaign for federal aid. To achieve this end a series of bulletins was published to spread the ideas of the leaders of the movement to all parts of the country.

In 1912, the Society lured Dr. Charles Prosser away from his duties as Deputy Commissioner of Education in Massachusetts to lead the campaign. Largely through his efforts the Society reached its goal when Congress finally passed the Smith-Hughes Act in 1917. The Act promulgated a federal direction and reimbursement law with reference to certain types of vocational education and created a Federal Board of Vocational Education. This was truly the beginning of a new era in Vocational and Technical Education in the United States.

## VOCATIONAL-TECHNICAL EDUCATION: WHAT IT IS TODAY

It is over fifty years since the first federal legislation for vocational education was adopted. During this period Americans have witnessed the cataclysmic events of two World Wars, a great depression, and extraordinary advances in technology. The social and economic needs born in the early days of the Industrial Revolution have remained as great in the face of an even greater technological advance. The United States has continued desperately to meet these needs by means of authorizing approximately 40 million dollars annually in various measures since 1917. The value of vocational education is an overwhelming fact--a fact which prompted Edwin A. Lee to observe, "Never again will American schoolmen be superficially critical of vocational

23 Barlow, pp.52-3.
24 Bennett, p.543.

education."[25] He was referring to its significance during World War II. Yet, as Melvin L. Barlow indicates, within a decade after the end of the war some American schoolmen would tend to forget that vocational education was a basic element in American education. "At this time . . . the over-all success of this country's international effort and a rising economy of full employment were taken to vindicate the work of our educational system and, in particular, reinforce the position of those favoring its general or liberal arts orientation."[26]

The picture changed, however, in 1961 when President Kennedy appointed a Panel of Consultants on Vocational Education (the first since President Wilson appointed the Commission on National Aid to Vocational Education in 1914) to focus on the improvement of vocational and technical education on the high school level, so that the student who does not continue his education beyond high school or drops out before high school graduation will have something to offer in the labor market. In line with the recommendations of the Panel, Congress passed the Vocational Education Act of 1963 which contained major amendments to the Smith-Hughes Act and authorized completely new programs unrestricted by the older legislation. The Act of 1963 also established the goal to make vocational and technical programs readily available to everyone regardless of his age or where he came from. To achieve this goal, Lee Ralson, in his article "Trade and Industrial Education," suggested that at least 60-75 per cent of all high school students should be enrolled in some kind of vocational education course.[27]

The United States has a long way to go. Today in Massachusetts, for instance, less than 25 per cent of the high school population is enrolled in vocational education of any type and less than 8 per cent attend federally aided vocational high schools.[28] Recognizing this serious departure from the hopes of 1963, the Massachusetts Advisory Council on Education has initiated a study of Vocational-Technical Education; its purpose is to evaluate the present system and recommend a master plan for the development, coordination, and expansion of occupational education in Massachusetts, including the preparation of vocational teachers.[29] Decades ago, Theodore Roosevelt said:

> The present system must change . . . My plea is for a tremendous expansion of the vocational, industrial and technical side of education, so that the children will not leave school with a broad smattering . . . of all kinds of knowledge, but . . . shall be prepared to do the work of the future . . . [30]

It is remarkable that over sixty years ago President Theodore Roosevelt could so aptly describe the situation that we face today in the late 1960's.

25 Barlow, p.323.
26 Barlow, p.324.
27 Lee W. Ralston, "Trade and Industrial Education," *American Vocational Journal* (May, 1967), p.43.
28 *Newsletter*, Massachusetts Advisory Council on Education, Jan. 4, 1968, p.2.
29 Newsletter, p.2.
30 *American Vocational Journal*, American Vocational Association (May, 1967), p.54.

## Chapter III.

# *The Study Methods*

In conducting the study of vocational and technical education in the Commonwealth of Massachusetts within the limited period of time available, broadly speaking three approaches were followed: Consultation with interested groups and individuals; the convening of a two-day conference to which various social and behavioral scientists would be invited; the conducting of special studies by various experts in various fields; and, the conducting of a questionnaire survey revealing the experiences of high school graduates and views on vocational education of four groups: employers, teachers, parents, and union officials.

The purpose of this chapter is to explain the various approaches and methods. Part II of this Report contains the special studies referred to and Part III sets forth the recommendations of the investigators. These recommendations, in general, reflect the substance of the thinking and conclusions of interested groups and persons, the special studies, and the questionnaire surveys.

## CONSULTATIONS

The investigators met with a large number of persons and groups in the Commonwealth for the purpose of exploring with them the various issues

described in Chapter I and of soliciting their opinions on occupational education. A list of these groups and persons is presented in Appendix A. A review of this list will reveal the great variety of persons interviewed and the geographic spread of these consultations.

Concomitant with these consultations, the investigators visited a large number of vocational and technical schools. Obviously, not all schools could be visited, but every effort was made to visit representative schools. These schools are also listed in Appendix A. Additional data collected by the study staff are listed in Appendix B.

Finally, and of great importance to the investigators, there were frequent meetings with the Advisory Committee, whose membership is listed in the frontispiece.

## THE SEMINAR

During the early stages of the study it was clearly recognized that over the years a large body of knowledge had developed in the behavioral and social sciences which could be most helpful in the development of a program of occupational education.

To obtain these "received doctrines" in an efficient manner a seminar was conducted to which experts from the various behavioral and social sciences, as well as persons from diverse areas of education, were invited to present prepared papers. These papers and comments were presented for discussion to a cross-section of interested persons in Massachusetts. The papers and comments have been published separately.

It is fair to state that with few exceptions the papers, comments, and discussions were consistent with one general theme: the importance of broadening vocational education. A careful reading of this volume[1] would reveal the extent to which many of the recommendations in the Report are supported by the findings of behavioral and social scientists and educators.

## SPECIAL STUDIES

To assist the investigators in the exploration of specific issues directly concerned with education in general and occupational education in particular in the Commonwealth of Massachusetts, a series of special studies was conducted by a variety of experts. These studies are presented in Part II of this Report.

## QUESTIONNAIRE SURVEYS

The questionnaire surveys were designed to achieve two far-reaching objectives. The first was to evaluate the present system of vocational and

1 *Vocational Education – A Prospectus for Change*, ed. Carl J. Schaefer and Jacob J. Kaufman, Advisory Council on Education (Boston, 1968).

technical education in Massachusetts in terms of the extent to which it is meeting the occupational needs of the students, on the one hand, and the manpower needs of the Commonwealth on the other hand. The second was to examine the image of vocational education held by four concerned groups: employers, teachers, parents and union officials.

In order to achieve the first objective a survey method was employed in three areas. It was felt that the primary indicators of the adequacy and quality of the vocational education programs are reflected in the experiences of their graduates in the labor market. Therefore, a graduate questionnaire was mailed to a random sample of former students who graduated during the past three years. To provide a control group for comparison with the vocational graduates' experiences, comparable groups from the academic (college preparatory) and general curriculum, who did not go on to college upon graduation, were also contacted. This mail sample came from lists provided by randomly selected schools throughout the Commonwealth. In order to assess the total needs of providing vocational-technical education throughout the Commonwealth, the contributions of private vocational schooling and industrial training were also investigated by means of questionnaires. In addition to the questionnaire technique, an interview schedule was used in order to evaluate the schools in terms of four different areas: administration, vocational guidance, the programs and courses, and contact with the community.

The second objective, to examine the image of vocational and technical education, was likewise achieved through a mail questionnaire to samples of parents, teachers, employers, and union officials.

### The School Sample

High schools throughout the Commonwealth were stratified on the basis of their vocational offerings and had to meet the criterion of having at least one area of approved vocational education. Two hundred and forty-eight schools were identified, most of which usually offered business education. These schools, plus all vocational schools of the Commonwealth, constituted the entire population. They were categorized as small, medium, or large in terms of size of enrollment. On a random basis 32 representative schools were selected for the study. A letter was sent to either the school principal or the superintendent of schools asking him to cooperate in the study. Table 3-1 identifies the schools which were contacted and the 30 that supplied usable data in terms of the nature of the school (i.e. comprehensive or vocational) and of size--small, medium, or large. The graduate record cards of a random sample of the school's graduates were obtained from them.

All of the thirty-three schools except one fulfilled their commitment to the study. Approximately 6,320 graduate cards were supplied by the schools out of an initial request for 8,667 cards. As seen in Table 3-2, the rate of

return of the graduate sample from the large schools was significantly higher than that of either the small group or the medium group.

A possible explanation for this discrepancy may be that the large schools were located, for the most part, in highly industrialized urban areas, whereas the small and medium-sized schools were located mainly in the suburbs and rural areas. Frequently, a larger precentage of suburban graduates go on to college. Therefore, it appears likely that the number of "non-college" students in the suburban sample was overestimated.

Table 3-1

School Sample by Size and Type[a]

| High Schools | Vocational Schools |
|---|---|
| **Small (1-200 senior enrollment)** | **Small (1-60 senior enrollment)** |
| Williamsburg | Wareham[b] |
| Murdock[b] | Cole Trade |
| Marshfield | New Salem |
| Barnstable | Silver Lake |
| Ashland | Salem Vocational |
| Ayer | Malden |
| | Holyoke |
| | Gloucester |
| **Medium (201-300 senior enrollment)** | Framingham |
| | Barnstable |
| Whitman-Hanson | |
| Westwood | **Medium (61-110 senior enrollment)** |
| Tewksbury | |
| | Waltham |
| **Large (301-800 senior enrollment)** | Lowell Trade |
| | Quincy Voc-Tech |
| Somerville | McCann Regional |
| Lowell | |
| Brockton | **Large (111-160 senior enrollment)** |
| Cambridge High and Latin | |
| Natick | Boston Trade |
| Lexington | Worcester Boys' |
| | Somerville Vocational |

a Schools randomly selected from the *State School Director, 1968.*

b Data received too late to be included in study.

## The Graduate Sample

This section describes the method employed to arrive at the figures contained in the initial graduate sampling asked of the sample schools. On the basis of senior enrollment data for 1967, obtained from the State Department of Education, the number of graduates in each curriculum for a three year period (1965-1967) was estimated.

**Table 3-2**

**Number of Student Graduate Cards Requested And Per Cent Returned from Schools, by Size of School**

| Size of School | Number of Graduate Cards Requested | Number of Graduate Cards Returned | % Original Sample Requested for Mailing |
|---|---|---|---|
| Small | 2,520 | 1,742 | 61 |
| Medium | 3,117 | 1,929 | 62 |
| Large | 3,030 | 2,649 | 87 |
| Totals | 8,667 | 6,320 | 74 |

The following example illustrates the procedure used in obtaining the sample from each school: School X had a graduating class of approximately 133 students in 1967. Of these, 41 were enrolled in business education and 9 in vocational home economics. To arrive at a figure for college preparatory and general curriculum students, 50 (41 business education plus 9 home economics) students were subtracted from the total of 249 students who were considered representative of that school's college preparatory and general curriculum students. The business education students (41) and the home economics majors (9) were also multiplied by 3. Thus, the school was asked to go back through the files until a total selection included 27 students from home economics, 123 from business education, 125 from the college preparatory curriculum, and 124 from the general curriculum (249 divided by 2). If the desired total was not obtained by the time the 1965 files were reached, the school was instructed to go back two more years to include 1963 graduates. It was assumed that the additional two years would compensate for any gross overestimate of the total number of graduates for the three-year period covered in the study.

This procedure varied slightly for the medium-sized and large schools. The difference was in the ratio technique used for the purpose of achieving comparable sample numbers from each of the three categories. The vocational schools were decidedly easier to handle since only trade and industrial programs were accounted for and, except in the case of the large schools, a 1:1 ratio was employed.

Thus, the schools were instructed to pull graduate records in the predetermined ratios in order to achieve comparable samples of graduates from the general and academic programs, on the one hand, and from the vocational program, on the other. Table 3-3 shows how the initial school sample was selected in terms of the sample ratio.

The completed graduate cards were then used as the basis for sending out the questionnaires.

Table 3-3

## Universe of Graduates 1965-67 And Ratio Used to Select Initial Sample By Curriculum

| School Code Number | Total 1965-67 Graduates | Number in each Curriculum | | Sample Ratio | Number Selected |
|---|---|---|---|---|---|
| 1 | 168 | Aca & Gen | 95 | 1:1 | 96 |
| | | Voc | 72 | 1:1 | 72 |
| 2 | 267 | Aca & Gen | 189 | 1:1 | 189 |
| | | Voc | 78 | 1:1 | 78 |
| 3 | 133 | Aca & Gen | 249 | 1:1 | 249 |
| | | Voc | 150 | 1:1 | 150 |
| 4 | 546 | Aca & Gen | 474 | 1:2 | 237 |
| | | Voc | 72 | 1:1 | 72 |
| 5 | 348 | Aca & Gen | 216 | 1:1 | 216 |
| | | Voc | 132 | 1:1 | 132 |
| 6 | 450 | Aca & Gen | 264 | 1:1 | 264 |
| | | Voc | 186 | 1:1 | 186 |
| 7 | 15 | T & I | 15 | 1:1 | 15 |
| 8 | 30 | T & I | 30 | 1:1 | 30 |
| 9 | 27 | T & I | 27 | 1:1 | 27 |
| 10 | 63 | T & I | 63 | 1:1 | 63 |
| 11 | 81 | T & I | 81 | 1:1 | 81 |
| 12 | 75 | T & I | 75 | 1:1 | 75 |
| 13 | 63 | T & I | 63 | 1:1 | 63 |
| 14 | 78 | T & I | 78 | 1:1 | 78 |
| 15 | 66 | T & I | 66 | 1:1 | 66 |
| 16 | 81 | T & I | 81 | 1:1 | 81 |
| Small Schools Total: | | Academic & General: | 1,251 | | |
| | | Vocational: | 1,269 | | |
| 17 | 660 | Aca & Gen | 411 | 1:1 | 411 |
| | | Voc | 249 | 1:1 | 249 |
| 18 | 729 | Aca & Gen | 531 | 1:2 | 264 |
| | | Voc | 198 | 1:1 | 198 |
| 19 | 552 | Aca & Gen | 552 | 1:1 | 552 |
| | | Voc | 105 | 1:1 | 105 |

## Table 3-3

## Universe of Graduates 1967-67 And Ratio Used to Select Initial Sample By Curriculum--continued

| School Code Number | Total 1965-67 Graduates | Number in each Curriculum | | Sample Ratio | Number Selected |
|---|---|---|---|---|---|
| 20 | 738 | Aca & Gen | 495 | 1:2 | 246 |
| | | Voc | 288 | 1:1 | 288 |
| 21 | 192 | T & I | 192 | 1:1 | 192 |
| 22 | 186 | T & I | 186 | 1:1 | 186 |
| 23 | 213 | T & I | 213 | 1:1 | 213 |
| 24 | 213 | T & I | 213 | 1:1 | 213 |
| Medium Sized Schools Total: | | Academic & General: | 1,473 | | |
| | | Vocational: | 1,644 | | |
| 25 | | | | | |
| 26 | 2,487 | Aca & Gen | 2,286 | 1:9 | 255 |
| | | Voc | | | |
| | | B.E. | 489 | 1:8 | 135 |
| | | D.E. | 66 | 1:1 | 66 |
| 27 | 2,646 | Aca & Gen | 2,460 | 1:8 | 306 |
| | | Voc | | | |
| | | B.E. | 714 | 1:8 | 87 |
| | | D.E. | 99 | 1:1 | 99 |
| 28 | 2,160 | Aca & Gen | 2,058 | 1:8 | 258 |
| | | Voc | | | |
| | | B.E. | 813 | 1:8 | 102 |
| 29 | 1,536 | Aca & Gen | 1,476 | 1:6 | 246 |
| | | Voc | | | |
| | | B.E. | 483 | 1:8 | 60 |
| 30 | 1,515 | Aca & Gen | 1,449 | 1:6 | 243 |
| | | Voc | | | |
| | | B.E. | 531 | 1:8 | 66 |
| 31 | 666 | T & I | 666 | 1:3 | 222 |
| 32 | 666 | T & I | 666 | 1:3 | 222 |
| 33 | 666 | T & I | 666 | 1:3 | 222 |
| Large Schools Total: | | Academic & General: | 1,596 | | |
| | | Vocational: | 1,434 | | |

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Table 3-3

**Universe of Graduates 1965-67 And Ratio Used to Select Initial Sample By Curriculum--continued**

**SUMMARY**

| | Vocational | College Preparatory & General | Total |
|---|---|---|---|
| Small | 1,269 | 1,251 | 2,520 |
| Medium | 1,644 | 1,473 | 3,117 |
| Large | 1,434 | 1,596 | 3,030 |
| TOTALS | 4,347 | 4,320 | 8,667 |

### Private School and Industrial Training Sample

The source of the Private School sample was taken from an unpublished directory supplied by the Office of Secondary Education, State Department of Education. All of the schools listed were sent a survey instrument. The Industrial Training sample (2,500) was selected randomly by manufacturing groups in terms of size: small (less than 100 employees) and large (over 100 employees) from the *Industrial Directory, 1964-65* published by the Commonwealth of Massachusetts.

### The Image of Vocational Education Sampling Technique

The same sample of employers was used to explore the image of vocational education. In order to ascertain the image of vocational education held by teachers, members of the staff who visited the schools left a fixed number of questionnaires with the school principals with the request that they be placed in the faculty inter-school mail at random. Five hundred of these questionnaires were distributed in this manner.

From the first return of the student questionnaires, 500 parents were selected to receive an attitude questionnaire. Union officials were sent 250 attitudinal instruments. These union representatives were randomly selected from the *Director of Labor Organizations,* published by the Massachusetts Department of Labor and Industries, 1967.

## The Graduate Survey Instruments

Each student in the sample was sent a letter describing the study and asking him to cooperate by filling out the enclosed questionnaire. The questions were designed to find out how the graduate felt about his high school and occupational experiences and what education he had beyond high school. A work history covering each job that conformed to the study definition was also included.

The initial mailing (February 19, 1968) yielded a return of approximately 1,800 from the initial 6,320. This was followed by a second mailing. Table 3-4 shows the final results.

**Table 3-4**

**Percentage Response in Student Surveys by School Type and Category**

| School Category | School Type | Total Number Mailed | Response N | Response % |
|---|---|---|---|---|
| Small | High School | 1,165 | 407 | 35 |
| | Vocational School | 577 | 190 | 33 |
| Medium | High School | 1,160 | 404 | 35 |
| | Vocational School | 769 | 239 | 31 |
| Large | High School | 1,980 | 565 | 29 |
| | Vocational School | 669 | 157 | 24 |
| Totals | | 6,320 | 1,962 | 31 |

## Private School and Industrial Training Survey

The purpose of including the industrial and private school sectors was to assist in determining the total needs of vocational and technical education throughout the Commonwealth. The private schools received a cover letter and a questionnaire, the purpose of which was to find out how much private school vocational and technical training was being conducted, in what areas, and at what cost to the student such training was being provided. The industrial training survey was implemented by means of a similar questionnaire. The rate of return from the industrial sector was significantly lower than that of the private schools, as can be seen in Table 3-5.

**Table 3-5**

**Responses in the Private School and Industrial Training Surveys**

| Survey | Total Mailed | Response First Mailing N | % | Response Second Mailing N | % | Total Response N | % |
|---|---|---|---|---|---|---|---|
| Industrial Training | 2,319 | 381 | 16 | 418 | 18 | 799 | 34 |
| Private School | 317 | 229 | 72 | a | a | 229 | 72 |

[a]There was no second mailing sent to the private school sector.

## Visitations

A final method employed in achieving the first objective (the appraisal of the present vocational-technical offerings) was the school visit and personal interview. A member of the research staff visited a designated number of sample schools and some non-sample schools. These visits ranged from approximately two hours in length to an entire school day, depending on the size of the school. Each member was instructed to note his personal evaluation of the school in terms of its facilities and program offerings on a 4-point scale ranging from poor to excellent. In addition, the school official (the principal in most cases) was personally consulted by means of an interview schedule designed to yeild uniform information relevant to the research objectives. These questions included the kinds of changes implemented since the passage of the Vocational Education Act of 1963, the degree of contact with the community, present placement and follow-up procedures and the extent to which advisory committees are utilized.

### Image of Vocational Education Instrument

A standardized attitude questionnaire was distributed among the representatives of the four sectors concerned. The attitude scale was developed by Wenrich and Crowly at the University of Michigan.[2] It consisted of a 26 item Likert (summated rating) scale. The items on this scale were written and tested so that they evaluated the respondent's attitude toward vocational education. The respondent indicated his degree of agreement with a statement on a 5-point scale ranging from "strongly agree" to "strongly disagree." The responses favorable to vocational education were always scored high. The sum of the 28 item ratings was the respondent's score. A high degree of interest was noted in the teacher segment. This is implied in the high rate of return as can be seen on Table 3-6. The only one of the four groups which received a follow-up mailing was the industrial sector.

The resu'ts of these special surveys are presented in Part II of this Report.

**Table 3-6**

**Percentage Response in Attitude Surveys For Four Groups**

| Group | Total Number Mailed | Response N | Response % |
|---|---|---|---|
| Parents | 500 | 149 | 30 |
| Teachers | 500 | 315 | 62 |
| Labor Representatives | 250 | 57 | 21 |
| Industry | 2,500 | 765 | 31 |

2 R.C. Wenrich and R.J. Crowley, *Vocational Education as Perceived by Different Segments of the Population* (Ann Arbor, 1964).

## PART II: SPECIAL STUDIES

The Adequacy of Vocational Education in Preparing Youth for Employment

Occupational Education in the Private Sector

The Image of Vocational Education

Teacher Education

Financing

Educational Media and Vocational-Technical Education

Occupational Education in Massachusetts' Regional Community Colleges

The Economy and Occupational Requirements of Massachusetts

## SPECIAL STUDIES

Part II of the Report contains special studies prepared by various experts in particular areas which would provide background information for the recommendations which follow in Part III.

One basic question which confronted the investigators was whether education in general and vocational education in particular was meeting the needs of students, particularly those who went to work immediately after graduation. Chapter IV presents data relative to this question. It is quite clear from this special study that the schools in general and the vocational schools in particular are not doing the job.

Subsequently, one could ask whether or not the private schools or the industrial sector is meeting this need. Chapter V explores this question and once again the answer is in the negative.

Why is this so? Obviously there has not been adequate support on the part of the public in general or even from the teachers themselves who reveal a lack of understanding of vocational education and who provide little support for it. Chapter IV which deals with the image of vocational education supports this conclusion.

Obviously, if there is to be established an educational system to meet the needs, aspirations, and interests of youth the teachers must play an important role. Chapter VII explores the question of teacher training, pointing to many of the inadequacies in the teacher training programs and indicating the new directions which such programs must take.

To develop broader occupational education programs requires, of course, sufficient funds to support them. These funds can come from the federal government as well as from the Commonwealth of Massachusetts. A second source lies in re-allocation of existing resources, and a third source is in the increased revenues obtained from the natural growth of the economy of Massachusetts. These and other issues are discussed in Chapter VIII.

One question frequently raised is the extent to which educational or instructional technology can be the basis for reducing costs. Chapter IX discusses this issue, stressing that the reduction in cost should be secondary. New educational media should be considered as a "means" for achieving better education and training. Only in this respect should "reduced costs" be considered.

For many persons there is a desire and need for post-secondary education. What is the particular role that community colleges can play in the educational process? To answer this question a special study was prepared and is presented in Chapter X.

Finally, it is clear that in one way or another man must earn a living in our society. In this sense all education is occupational. What are the trends and developments in manpower and the economy in Massachusetts? How can the educational system respond to them? To what extent should it respond? These questions are explored in Chapter XI.

## Chapter IV.

# *The Adequacy of Vocational Education in Preparing Youth for Employment*

This chapter explores the relationship between vocational education at the secondary level and the initial "after graduation" experiences of vocational graduates as compared with graduates from the other two curricula.[1] The questions to be answered include the following: How do graduates of the vocational program fare in an absolute sense: How do they fare relative to graduates of non-vocational programs who have completed an equal number of years of formal education: What happens to graduates from all three programs in terms of post-secondary education opportunities? In addition, the reactions of the graduates to their school experiences were assessed from several attitudinal questions.

To answer these questions, a random sample of .ecent high school graduates of the years 1965 through 1967 was drawn from 30 different high schools. Approximately half of the sample (3,000) were graduates from State-approved vocational programs and the other half were divided equally (1,500 each) from the college preparatory and general curricula. The criterion

1 Economists are showing increased interest in the computation of quantitative estimates of relative costs and benefits attributable to alternative types and levels of education. These techniques require detailed information on program and social costs and benefits. The present study was not designed to meet this objective. "Adequacy" is defined in terms of quantitative and qualitative measures of both subjective and objective types, but relative economic efficiency *per se* was not analyzed. A cost-benefit analysis of vocational education at the secondary school level is currently under way at the Institute for Research on Human Resources at The Pennsylvania State University.

imposed on the college preparatory sample was that the students did not go on to college but, instead, went directly into the labor force. As indicated elsewhere in the Report, a 31 per cent return was received from the mail questionnaires. Needless to say, follow-up studies of this nature are extremely difficult as high school graduates become quickly dispersed.

Section I deals with the attitudes of the graduates in retrospect toward their curriculum choices. Section II analyzes briefly the post-secondary training of graduates and the added investment by them, especially for training of an occupational nature, after they completed their 12 years of public education. Section III describes the initial post-graduate employment experiences in terms of the first three jobs held and the money earned. The summary in Section III, includes a detailed discussion of the entire chapter and provides a basis for the recommendations which are found in Part III of this Report.

### The Respondents

Before discussing the results it should be noted that they are based on a sample return of 31 per cent (see Table 4-1). An investigator is always cautious when interpreting data from this proportion of a sample; however, the general similiarity of the results in this study to other more extensive studies[2] gives confidence that these data accurately reflect the experiences of Massachusetts' high school graduates who directly entered the labor force. There were 986 male and 810 female responses for a total usable response of 1,796. In addition there were 161 returns which had to be rejected because they were too incomplete. The breakout of the vocational curriculum versus the other two curriculum groups that resulted in occupational pursuits was 980 and 816, respectively.

Table 4-2 represents data on the respondents' age and marital status. It appears that those who responded fell mainly into the 18 to 21 year age group, with the 19 year olds dominating. This is called to the reader's attention because it indicates that the graduates had been out of school approximately one year and probably held (at least according to the definition of full-time employment) very few different positions. Such is reflected in the questionnaire responses relative to the second and third jobs held.

The majority of the respondents were single with more of the girls married than boys. It is interesting to note that both the girls and boys from the college preparatory curriculum had the lowest marriage rate.

2 See, for example, J.J. Kaufman, C.J. Schaefer, *et al., The Preparation of Youth for Effective Occupational Utilization,* The Institute for Research on Human Resources (The Pennsylvania State University, 1967); and M.U. Eninger, *The Process and Product of High School T & I Education: The Product,* The American Institutes for Research (Pittsburgh, 1966).

## Table 4-1

## The Sample (Returns)

| Sex | Vocational | General Education | College Prepatory | Total |
|---|---|---|---|---|
| Male | 577 | 138 | 271 | 986 |
| Female | 403 | 97 | 310 | 810 |
| Total | 980 | (235 + | 581 = 816) | 1796 |
| No. of Rejected Questionnaires | | | | 161 |
| Aggregate Total | | | | 1957 |

## Table 4-2

## The Respondent's Age and Marital Status

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | Vocational N=577 | General Education N=138 | College Preparatory N=271 | Vocational N=403 | General Education N=97 | College Preparatory N=310 |
| **Age of Respondents** | % | % | % | % | % | % |
| 18 | 12 | 14 | 23 | 22 | 12 | 27 |
| 19 | 27 | 26 | 38 | 25 | 28 | 32 |
| 20 | 25 | 25 | 21 | 27 | 24 | 26 |
| 21 | 21 | 22 | 14 | 17 | 18 | 11 |
| 22 | 8 | 7 | 4 | 6 | 11 | 2 |
| 23 | 7 | 5 | 1 | 3 | 7 | 1 |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| **Marital Status** | | | | | | |
| Married | 16 | 14 | 7 | 29 | 28 | 12 |
| Single | 84 | 85 | 92 | 71 | 71 | 88 |

Some columns may not add up to 100% due to rounding.

## SECTION I: THE CURRICULUM CHOICE IN RETROSPECT

Curriculum choice is an important factor in the life of any secondary school student. Usually a choice must be made from a series of integrated courses called a curriculum or a track as early as the ninth grade. Traditionally, once a choice is made to pursue either a college preparatory, general, or vocational curriculum, the student is (by his own desires or otherwise) largely "locked in" to the offering until the completion of high school. The student's decision is even more restricted when one realizes that in some secondary schools not even three such choices are offered. For some, the choice is a college preparatory curriculum, irrespective of the student's interest or ability. These conditions are usually found in the smaller schools or in a suburban atmosphere where the prestige symbol of a "post-secondary education" represents a status which overrides the needs of students.

Table 4-3 summarizes the opinions of graduates from each of the three curricula (vocational, general, and college preparatory) that were pursued and which resulted in employment. It should be remembered that these were recent high school graduates over the last three to five years. Each responded from his own experiences.

Relative to Item 1, it is obvious that the lowest percentage to discuss course choices with a guidance counselor was in the vocational group, especially boys. This is particularly unfortunate, for the vocational boy makes a bigger commitment and usually selects a more specific type of training than any other group, even vocationally-oriented girls. The highest percentage (both for boys and girls) was the college bound.

Item 2, in a sense, asks the respondents how satisfied they were with the types of instruction they received. Here the least satisfied group was represented by the general curriculum student. A majority of both boys and girls of the several curricula expressed disappointment in their programs and would not recommend that other young persons starting high school take the courses they did. In both the college preparatory and vocational curricula a significantly greater satisfaction is apparent.

In the case of the vocational and college preparatory groups, it appears that one-fourth of the graduates felt it was harder to take part in school activities because of the courses they were required to study (Item 3). The general curriculum students, in the main, did not feel this was the situation.

It is interesting to note that the college preparatory group felt that they were not looked down on by their fellow students (Item 4), whereas about one out of three vocational and general curricula students reported feelings of condescension. Obviously, such a feeling of "lower status" must have come from the college preparatory group and may have reflected the attitudes of teachers.

Item 5 attempted to assess the school's interest in students who, upon graduation, became employed. In this endeavor, the vocational group (both boys and girls) felt that their schools (or programs) made a good effort to prepare them for eventual employment. The general curriculum and college preparatory groups were not satisfied with their preparation for this similar objective.

Once graduated, the problem was to become employed. Item 6 indicates that even in the vocational group only about one out of two felt that their schools assisted in this endeavor and the other two groups indicated very little effort by the schools to find employment for them.

Item 7 indicates that there was little mobility among any of the graduates in terms of leaving home for work (or other reasons, except the military). In fact, the vocational group appears to be the most localized in this respect with only one out of ten ever moving away from home for more than three months or longer. The females in the sample appear more mobile than the males, a condition which is probably due to marriage.

## Table 4-3

## Curriculum in Retrospect

| Item | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|
| | | Vocational N = 577 | General Education N = 138 | College Preparatory N = 271 | Vocational N = 403 | General Education N = 97 | College Preparatory N = 310 |
| 1. Did you ever discuss your course choice with a guidance counselor? | Yes | 65 | 79 | 80 | 73 | 79 | 78 |
| | No | 35 | 21 | 20 | 27 | 20 | 22 |
| 2. Would you suggest a young person starting high school take the course you took? | Yes | 77 | 39 | 87 | 83 | 49 | 87 |
| | No | 23 | 61 | 13 | 17 | 51 | 13 |
| 3. Did you feel it was harder to take part in school activities because of the course you took? | Yes | 22 | 7 | 28 | 9 | 13 | 20 |
| | No | 77 | 93 | 72 | 91 | 87 | 80 |
| 4. Did you ever feel you were looked down on because of the course you took? | Yes | 33 | 38 | 7 | 26 | 36 | 4 |
| | No | 67 | 62 | 93 | 74 | 64 | 96 |
| 5. Do you think your school made an effort to prepare you to go out and get a job? | Yes | 89 | 49 | 34 | 85 | 57 | 43 |
| | No | 11 | 51 | 66 | 15 | 43 | 57 |
| 6. Did your school help you get your first job? | Yes | 54 | 9 | 10 | 31 | 12 | 10 |
| | No | 46 | 91 | 90 | 69 | 88 | 90 |
| 7. After you graduated, did you ever move away from your home town to another city where you lived and worked (not military) for 3 months or longer? | Yes | 10 | 15 | 18 | 19 | 21 | 24 |
| | No | 90 | 85 | 82 | 81 | 79 | 76 |

## SECTION II: POST-SECONDARY EDUCATION AND TRAINING

Once public education (usually K through 12 grades) has been completed, formal schooling is over for many graduates. If, however, schooling is to be continued, it is usually through one of three channels: 1) public post-secondary offering, i.e. technical institutes, community colleges, and 4 year colleges, 2) private schools, i.e. business, trade, junior colleges, and 4 year colleges, and 3) company conducted or sponsored training programs. Each of these channels could be considered as a means to the betterment of the education and training of the high school graduate. What role each played and the extent to which these resources were used by the nearly 1,800 graduates who responded to the questionnaire represent questions to be explored.

### Post-Secondary Training

About one out of every three graduates (38% boys and 27% girls) availed themselves of some post-secondary training. Of this number the highest percentage (41% boys and 37% girls) came from the college preparatory group, closely followed by the vocational group (35% boys and 19% girls), in turn followed by the general curriculum group (9% boys and 28% girls). (See Table 4-4 Item 1.)

The largest attendance from each of the groups was in public technical institutes and community colleges which attracted about one out of every five recent graduates. And here, as in the other cases, boys attended in larger proportions than girls.

With respect to private post-secondary schooling, both the boys and girls in the college preparatory curriculum attended in the greatest number (about one out of every five). Company-sponsored training programs reached fewer than one out of ten with the vocational graduate taking part in these programs slightly more than the other two groups of students.

There appears to be a substantial investment[3] on the part of the individual student in post-secondary training and education (see Table 4-4). The cost of public technical institute and/or community college education represents the least expensive. Here the majority of students paid $300 or more for their post-secondary program, whereas the majority who went to private schools paid over $500. Company-sponsored post-secondary programs appear to fluctuate in cost to the student with up to a third costing over $500 and the majority of the remainder between $100 and $300.

3 This does not relate to financial sacrifice since no data were obtained of individual or family income during the training period.

## Table 4-4

### Percentage of Total Taking Post-Secondary Training (Per Cent)*

| Item | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | % Vocational (N=577) | %General Education (N=138) | % College Preparatory (N=271) | % Vocational (N=403) | % General Education (N=97) | % College Preparatory (N=310) |
| 1. Did you take post-secondary offerings? | 35 | 9 | 41 | 19 | 28 | 37 |
| | (344 Male Total = 38%) | | | (222 Female Total = 27%) | | |
| 2. Did you attend a public technical institute and/or community college? | | | | | | |
| Yes | 20 | 18 | 20 | 7 | 14 | 16 |
| No | 64 | 65 | 55 | 80 | 75 | 52 |
| Total cost to the student** | | | | | | |
| $100-199 | 25 | 20 | 13 | 26 | 5 | 14 |
| 200-299 | 18 | 17 | 24 | 17 | 24 | 23 |
| 300 and Over | 57 | 63 | 66 | 56 | 71 | 62 |
| 3. Did you attend a private school? | | | | | | |
| Yes | 6 | 6 | 18 | 6 | 7 | 18 |
| No | 86 | 87 | 67 | 89 | 81 | 68 |
| Total cost to the student** | | | | | | |
| $100-199 | 8 | 0 | 0 | 8 | 0 | 3 |
| 200-299 | 8 | 6 | 6 | 8 | 0 | 3 |
| 300-399 | 2 | 13 | 2 | 0 | 6 | 3 |
| 400-499 | 15 | 6 | 12 | 7 | 12 | 3 |
| 500 and Over | 67 | 75 | 80 | 77 | 82 | 87 |
| 4. Did you attend a company sponsored training program? | | | | | | |
| Yes | 15 | 9 | 5 | 9 | 10 | 5 |
| No | 78 | 87 | 93 | 87 | 86 | 91 |
| Total cost to the student** | | | | | | |
| $100-199 | 44 | 25 | 67 | 50 | 75 | 33 |
| 200-299 | 17 | 25 | 0 | 25 | 0 | 0 |
| 300-399 | 14 | 0 | 0 | 13 | 25 | 17 |
| 400-499 | 3 | 0 | 0 | 0 | 0 | 17 |
| 500 and Over | 22 | 50 | 33 | 13 | 0 | 33 |

*The percentages do not always add up to 100. In certain cases there were "other" categories that could not be defined.

**Based only on respondent who reported taking the type of training indicated.

## Post-Secondary Training by Groups

Of those who took post-secondary training, it is interesting to note that the highest percentage among the groups was vocational boys in public technical and/or community colleges and company-sponsored programs. (See Table 4-5.) The college preparatory boys group was attracted largely to the private school (trade and other) and the general curriculum boys represented the lowest percentage of all three groups. In the case of girls, the college preparatory group was attracted the most to the public technical institute and/or community college and private school offerings. Again, the general curriculum group was the weakest in its pursuit of post-secondary education opportunities.

**Table 4-5**

**Comparison of Post-Secondary Training Source by Student Groups (Per Cent)***

| Group | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | Base (N) | % Vocational | % General Education | % College Preparatory | Base (N) | % Vocational | % General Education | % College Preparatory |
| 1. Public Technical Institute and/or Community College | (359) | 51 | 35 | 13 | (238) | 31 | 9 | 59 |
| 2. Private School | (169) | 39 | 10 | 51 | (149) | 27 | 11 | 62 |
| 3. Company Sponsored Training | (142) | 76 | 12 | 12 | (81) | 55 | 15 | 30 |

*Some columns may not add up to 100% because of rounding.

### Post-Secondary Areas of Study

The post-secondary areas should indicate the areas of occupational interest of the three groups of students. Especially for the vocational group, some degree of relationship to the kinds of secondary programs offered could be expected. Table 4-6 shows that 24 per cent of vocational boys continued their study in machine trades subjects and 19 per cent in architecture and engineering. The largest percentage of male graduates from the general curriculum and college preparatory groups continued to pursue post-secondary studies in administrative specialities, closely followed by clerical and sales studies.

With respect to the female graduates, by far the largest percentage from all three groups pursued clerical and sales occupations in their post-secondary studies. The health-related subjects attracted about one out of five girls from the college preparatory group and art subjects were studied by 13 per cent of the general curriculum girls.

### Post-Secondary Training and Earnings

An attempt was made to associate post-secondary training with added earning power, (Table 4-7). In most cases (and here it should be noted that the base numbers (N) are small-probably too small to obtain an accurate measure) there appears to be a slight advantage for those who take additional study as compared with those who do not.

## SECTION III: POST-GRADUATE EMPLOYMENT EXPERIENCES

Upon graduation, the high school student who does not go on to higher education is expected to become a productive member of society through employment. The first experience in seeking a full-time job may be quite tenuous. For this reason, before asking the respondent to indicate the first three full-time positions he held, a "job" was defined as employment for at least three consecutive months or longer and for thirty hours or more each week.

This section reports the types (skill level) of jobs held and compares the three groups of students representing the vocational, general, and college preparatory curricula.

### Jobs Held By Groups

Table 4-8 shows the percentage of students from each of the curricula in terms of four broad occupational classifications: craftsman, service, technical, and operative. The craftsman category included fourteen occupations, such as carpenter, electrician, auto mechanic, plumber, boat builder, welder, etc. The

service category included eighteen occupations, such as beauty operator, air condition and refrigeration repair, radio and T.V., foods, nurses aide, clerical, or typist. The technical area represented five occupations, such as electronics, drafting, secretary-stenographer, agricultural production, engineering, etc.

It should be made clear that a great many occupational areas were not covered in the questionnaire and as a result a substantial number of "other" occupations was reported.

Attention must be called, however, to the fact that when the total sample by groups and by jobs (1st, 2nd and 3rd) was computed, seven out of the eighteen comparisons showed slightly lower hourly wage reported by those who took post-secondary training than by those who did not. This finding seems likely, however, since even the hourly wages reported were technical institutes and/or community colleges, private schools, or company sponsored technical institutes and/or community colleges, private schools, or company sponsored training programs. The extent to which this is a true "pay off" when costs and time are considered is unknown.

**Table 4-6**

**Post-Secondary Areas of Study (Per Cent)***

| Areas of Study | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | % Vocational (N=577) | % General Education (N=138) | % College Preparatory (N=271) | % Vocational (N=403) | % General Education (N=97) | % College Preparatory (N=310) |
| 1. Administrative Specialities | 9 | 24 | 27 | 7 | 8 | 6 |
| 2. Entertainment & recreation | 2 | 5 | 6 | 1 | 1 | 2 |
| 3. Art | 6 | 5 | 4 | 2 | 13 | 6 |
| 4. Writing | 1 | 2 | 2 | 1 | 2 | 1 |
| 5. Architecture & Engineering | 19 | 8 | 16 | 0 | 1 | 0 |
| 6. Health Related | 1 | 2 | 1 | 3 | 5 | 18 |
| 7. Professional, Managerial and Technical | 1 | 2 | 1 | 0 | 1 | 0 |
| 8. Clerical and Sales | 8 | 19 | 16 | 79 | 53 | 51 |
| 9. Services | 1 | 3 | 2 | 3 | 11 | 2 |
| 10. Foods | 2 | 6 | 2 | 2 | 3 | 1 |
| 11. Bench Work | 5 | 3 | 2 | 0 | 1 | 1 |
| 12. Structural | 10 | 8 | 5 | 0 | 1 | 1 |
| 13. Machine Trades | 24 | 9 | 5 | 0 | 0 | 0 |
| 14. Shoe repair or Manufacturing | 9 | 5 | 12 | 1 | 1 | 11 |

*Some columns may not add up to 100% due to rounding.

## Table 4-7

## Comparison of Post-Secondary Employment Experiences (Hourly Wage) by Type of Training

| Post-Secondary Training and Job | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | Public Technical Institute /or Community College | Private School | Company Sponsored | None Attended | Public Technical Institute /or Community College | Private School | Company Sponsored | None Attended |
| **1st Job** | | | | | | | | |
| Base (N) | 79 | 32 | 28 | 84 | 30 | 16 | 18 | 79 |
| Mean | $1.84 | 1.93 | 2.09 | 1.81 | 1.72 | 1.72 | 1.60 | 1.64 |
| Standard Deviation | $.65 | .54 | .50 | .58 | .47 | .43 | .34 | .37 |
| **2nd Job** | | | | | | | | |
| Base (N) | 58 | 26 | 23 | 55 | 16 | 9 | 15 | 56 |
| Mean | $2.04 | 2.20 | 2.50 | 1.94 | 1.95 | 1.77 | 1.83 | 1.84 |
| Standard Deviation | $.50 | 1.05 | .90 | .43 | .67 | .44 | .31 | .42 |
| **3rd Job** | | | | | | | | |
| Base (N) | 38 | 17 | 13 | 36 | 6 | 3 | 9 | 34 |
| Mean | $2.33 | 2.62 | 2.90 | 2.35 | 2.01 | 2.02 | 2.01 | 2.03 |
| Standard Deviation | $.74 | .89 | .76 | .67 | .51 | .10 | .40 | .31 |

## Table 4-8

## Per Cent 1st, 2nd, and 3rd Job Employment

| Occupational Area | Vocational 1st N=515 2nd N=374 3rd N=214 | | General Education 1st N=115 2nd N=93 3rd N=27 | | College Preparatory 1st N=199 2nd N=140 3rd N=73 | |
|---|---|---|---|---|---|---|
| | Male % | Female % | Male % | Female % | Male % | Female % |
| **Craftsman** (14 occupations) | | | | | | |
| 1st Job | 61 | 0 | 29 | 1 | 22 | 1 |
| 2nd Job | 59 | 1 | 28 | 0 | 21 | 1 |
| 3rd Job | 59 | 2 | 28 | 0 | 20 | 0 |
| **Service** (18 occupations) | | | | | | |
| 1st Job | 12 | 61 | 34 | 68 | 34 | 56 |
| 2nd Job | 8 | 56 | 31 | 66 | 31 | 56 |
| 3rd Job | 9 | 51 | 23 | 67 | 21 | 37 |
| **Technical** (5 occupations) | | | | | | |
| 1st Job | 10 | 19 | 8 | 7 | 9 | 7 |
| 2nd Job | 12 | 22 | 4 | 6 | 7 | 10 |
| 3rd Job | 8 | 25 | 8 | 22 | 7 | 16 |
| **Operative** (4 occupations) | | | | | | |
| 1st Job | 4 | 0 | 7 | 1 | 7 | 1 |
| 2nd Job | 5 | 2 | 3 | 0 | 3 | 0 |
| 3rd Job | 1 | 0 | 5 | 0 | 2 | 0 |

In the craftsman category (the area for which vocational education curricula are usually designed) the vocational student group shows a significantly higher percentage of employment than do the other two groups (general and college preparatory). Girls generally are not attracted to this category of occupations. Therefore, there is little to report among any of the female student groups. The percentage of vocational students in the craftsmen category does not appear to fluctuate over the three jobs reported, although the number (N) varies considerably from the first position to the third in each case, because many of the respondents were still in their first and second jobs.

The service occupations category shows substantial involvement for girls throughout all groups and especially within the general curriculum group. In other words, girls, especially in the business, sales, and less skilled office areas, found employment in these types of occupations. But surprisingly there is also the large number of boys (about one out of three), especially from the general and college preparatory group, who were engaged in the service occupational area.

Technical occupations accounted for a significantly smaller percentage of graduates from all groups. It appears that this is where the vocational education group, especially girls, can be found employed. Inspection of the data indicates that the major contribution of girls to this category was in the secretarial-stenographer occupations. This category appears to be less available as a source of employment for all groups even in their second and third jobs.

The operative category consisted of those positions that were of a production and repetitive nature. They represent the smallest percentage of all employment reported by the groups. Many of these jobs are extremely difficult to describe and it is assumed that a high percentage of the "other" responses are represented in this group.

### Hourly Wages By Group

Table 4-9 indicates the mean hourly rate of pay received by the vocational, general curriculum, and college preparatory groups for the first three jobs held. In each case the vocational student, both male and female, received as high if not higher hourly wage rates than did students from the other groups. Especially in the second job held, the vocational pay rate appears to be significantly higher. It is interesting to note that the pay differential is quite constant over all groups for the first three jobs with the exception of the third position for the college preparatory group. The small base figure (N) could account for some inaccuracy in these figures.

### Father's Occupations

One of the most significant influences on occupational choice is the

occupation of the father. Table 4-10 verifies that the majority of fathers of the vocational group for both boys and girls were employed as either craftsmen, foremen, or laborers. However, the majority of fathers of the college preparatory group (boys and girls) was employed in the professional-technical areas. The picture is not quite as clear relative to the general curriculum group. Here there is a more or less even split among the professional-technical, manager-proprietor, craftsman-foreman, and laborer occupational classifications of the fathers.

It is quite clear, however, that there is a close relationship between the father's occupation and the curriculum in which the student is enrolled.

**Table 4-9**

**RATE PER HOUR RECEIVED FOR 1st, 2nd and 3rd POSITION**

| | MALE | | | FEMALE | | |
|---|---|---|---|---|---|---|
| **Jobs Held** | **Vocational** | **General Education** | **College Preparatory** | **Vocational** | **General Education** | **College Preparatory** |
| **1st Job** | | | | | | |
| Base (N) | 120 | 22 | 48 | 87 | 20 | 31 |
| Mean | $1.91 | 1.60 | 1.81 | 1.70 | 1.53 | 1.54 |
| Standard Deviation | $.67 | .52 | .44 | .38 | .34 | .35 |
| **2nd Job** | | | | | | |
| Base (N) | 88 | 16 | 34 | 56 | 15 | 22 |
| Mean | $2.41 | 1.95 | 2.03 | 1.88 | 1.71 | 1.88 |
| Standard Deviation | $.77 | .61 | .60 | .43 | .37 | .58 |
| **3rd Job** | | | | | | |
| Base (N) | 60 | 11 | 17 | 37 | 8 | 6 |
| Mean | $2.50 | 2.33 | 1.95 | 2.06 | 2.04 | 1.75 |
| Standard Deviation | $.64 | .59 | .80 | .32 | .48 | .23 |

## Table 4-10

### Father's Occupation While in High School (Per Cent)*

| Occupations | MALE | | | FEMALE | | |
|---|---|---|---|---|---|---|
| | % Vocational N=577 | % General Education N=138 | % College Preparatory N=271 | % Vocational N=403 | % General Education N=97 | % College Preparatory N=310 |
| Professional-Technical | 12 | 17 | 28 | 15 | 23 | 30 |
| Farm & Farm Management | 2 | 5 | 7 | 1 | 0 | 1 |
| Management & Proprietor | 7 | 18 | 18 | 11 | 20 | 13 |
| Clerical | 3 | 6 | 5 | 5 | 2 | 5 |
| Sales Worker | 4 | 7 | 9 | 6 | 2 | 8 |
| Craftsman; Foreman | 25 | 18 | 18 | 27 | 18 | 21 |
| Operative & Kindred | 6 | 4 | 2 | 4 | 9 | 4 |
| Private Housekeeper | 0 | 0 | 1 | 0 | 0 | 0 |
| Farm Laborer | 1 | 0 | 0 | 0 | 0 | 0 |
| Laborer | 36 | 24 | 16 | 29 | 24 | 15 |
| Unemployed | 4 | 1 | 1 | 2 | 1 | 2 |
| No Response Number | (85) | (15) | (21) | (51) | (15) | (23) |

*Some columns may not add to 100% due to rounding.

## SECTION IV: DISCUSSION AND ANALYSIS

The questionnaires mailed to recent high school graduates of the three curricula: vocational, general and college preparatory resulted in 1,796 responses, or a 31 per cent return. The sample distribution provided an adequate stratification to assure breadth of responses which suggests they are representative of the entire population characteristics.

The data appears to support a conclusion of "pay off" in employment experiences for those students who were graduated from the vocational curriculum ignoring costs, although admittedly the "pay-off" may be small in some cases. That is to say, students who did make a strong enough occupational choice to pursue a vocational curriculum to its completion (graduation) indicated a higher hourly wage rate on all of their first three jobs. They felt more satisfied with their educational experience. They felt better prepared for employment. They were singled out to receive more company-sponsored training. And they were employed more frequently in craftsmen or high-skilled occupational areas. At the same time, these students (vocational) felt a status of condescension while in school, received less help from guidance counselors, and felt that they were deprived from taking part in extra-curricular activities.

The general curriculum student, however, was the least satisfied with his (or her) secondary school education. He recommended most strongly that other young persons should not take the same course. He received the lowest hourly wage and worked more often in the service occupations. Boys especially took post-secondary schooling (as a part-time student) the least.

The college preparatory students were younger - 19 year olds make up the majority. They reported that they discussed their course choice more often with guidance counselors. They suggested more often that young people take the same course that they did. They felt it was difficult to take part in extra-curricular activities. They took post-secondary offerings along with the vocational education student and were enrolled most often in post-secondary administrative specialities. These students were the most mobile in terms of leaving home. They became employed most frequently in the technical areas and received the second highest hourly rate of pay for their three first jobs (the first going to the vocational student graduates.) The college preparatory student reported to be least looked-down upon while in school, to be the least satisfied with his school program in terms of job preparation, and to be the least likely to receive company-sponsored training.

It can be pointed out that these findings are substantially consistent with findings of an earlier study made on a regional basis by Kaufman, Schaefer, *et al*, entitled *The Role of the Secondary School in the Preparation of Youth for Employment.*[4] In addition, this earlier study found a larger share of the lower

4 Kaufman, and Schaefer, p.8-6 to 8-10.

IQ grouping chose the vocational curriculum (not an *a priori* basis for predicting which curriculum group would advance more rapidly within their employment area) and vocational graduates appeared to receive wider job opportunities. Moreover, the Negro graudate from vocational programs had a more positive attitude toward his school and work experience than did other Negro graduates, as well as an advantage in terms of earnings. Even though the vocationally trained Negroes appeared to have realized greater opportunities than Negro graduates from the other two curriculum groups, they were no more willing than others to advise a young person to replicate their experiences. It was further found that the pay of the white graduates exceeded that of the Negroes in all comparisons. The white graduates started at higher average levels and appeared to have received larger increments, although time-adjusted indices of wage increments were too small to be conclusive. While the Negro's pay was always found to be smaller, the male Negro graduates from a vocational curriculum were not in as poor a position, relative to the vocationally trained whites, as were Negro graduates from other curricula relative to their white counterparts. Although the present study did not obtain data on color it is submitted that the findings of the earlier work of Kaufman and Schaefer has a bearing on the present report and its recommendations.

Relative to curriculum choice, it is quite apparent that the father's occupation continues to exercise a great influence on what his offspring takes in school. By far the greatest number of male (and female) college preparation students had fathers with professional and technical occupational backgrounds, whereas students enrolled in vocational education curricula had fathers employed as craftsmen and foremen. This implies that "free choice" of life goals based on individual interests and aptitudes is not entirely irrelevant to the influence of the occupations (and possible schooling) of fathers. How this can be overcome, especially with those students who are "college bound" receiving the most assistance from guidance counselors, is of course a difficult problem.[5] Certainly one solution would be to "overemphasize" or over compensate the guidance involvement for all youth and, especially, employment bound youth in order to have them discover their talents, aptitudes, and interests. In turn, a much clearer picture of children could be presented to parents so they could assist in a more realistic curriculum choice.

Even though there appears to be some "pay off" of vocational education for its graduates, relative to immediate or initial employment, it should be pointed out that there is danger in interpreting this finding too literally. *First,* a very small percentage of all high school graduates are presently being accommodated in the Commonwealth's vocational education programs. Therefore, in some respects, they represent a highly select group of students.

5 Assuming, of course, it is desirable in a democracy to maximize the talents of all youth, irrespective of parental occupational status.

*Second,* there is no marked difference between most of the measures used (including hourly wage) of those who graduated from this program and the other curricula. This implies at least that more needs to be done in expanding vocational education both in quantity and quality. *Third,* arts have not been considered.

The amount of post-secondary or continued study, whether it be technical institute and/or community college, private school, or company sponsored training is encouraging. Approximately one out of three recent high school graduates has continued his education through one or the other of these means. The fact that the college preparatory students (both male and female) indicated the highest rate of post-graduate involvement is not surprising since these individuals probably found both a need for education more in terms of their life goals and the ability to proceed further in their education. The vocational groups' efforts toward additional education, although not as pronounced as the college preparatory group, also appear commendable. The general curriculum group (especially the males) obviously requires improvement. It appears that even after high school, individuals from this group do not see the relevance of education to their experiences and interests. The most important aspect of the whole post-secondary or continuing education question is one of making opportunities of such offerings available to all--those who have recently graduated, the mature adult, persons who need retraining occupationally as well as other types of education and training.

Undoubtedly, the weakest curriculum, at least from the students' point of view, was the general curriculum offering. Here the student is usually left to "shop" (through electives) for courses and teachers that may satisfy his needs while completing high school. The data clearly indicate the dissatisfaction of the graduates from this curriculum as well as their handicaps in terms of employment and earning power. Something more has to be done for these students to help them identify with a life goal, to aid them to immerse themselves in more meaningful education, and to retain a greater number of them in school. They usually represent the largest percentage of drop outs. The commitment to them must be greater than it is at present. It requires the development of an occupationally-oriented program, referred to previously.

Chapter V.

# *Occupational Education in the Private Sector*

The main theme of this Report is that a large number of young people leave public high schools each year poorly prepared to assume a productive place in the economy. To date the schools have been unable to design a curriculum for those young people who lack specific occupational goals and who do not plan to go on to college. Most of these young people thus find themselves in a labor market which has little need for them. The high rates of unemployment and under-employment among young people amply attest to the problems they encounter in finding stable employment.

Many of them naturally turn to private schools and company training programs to obtain the skills they did not receive in high school. Chapter IV indicated that approximately 35 per cent of the young people surveyed obtained some type of post-high school education at other than the baccalaureate level. And these were young people who had been out of high school only one or two years. The figures presented in this chapter indicate that many people obtain post-high school education at considerably older ages.

It was not surprising to find that the Commonwealth, with its long tradition of private schools, had a substantial number of private trade and vocational schools, courses, and offerings. Opportunities abound, especially in the greater Boston area, to acquire occupational preparation through these sources. In a similar manner, but not as easily identifiable, industrial training opportunities are available through a multitude of "in plant" offerings. The

wide variety and substantial resources constituted by both of these private endeavors had to be recognized in any study of occupational education for Massachusetts.

What are some of the characteristics of the kinds of training available in the private sector? In this chapter data from private schools and industrial concerns relative to their training programs are examined. The schools and the major characteristics of the programs are described. The data indicate that there is a variety of private schools offering a wide range of programs. The average school is not large in terms of full-time enrollment. These schools require a substantial investment of the students' time and money and apparently most of their students complete all or a substantial proportion of their programs. Industrial training is likewise given in firms representing all types of industry. Much of this training is at the operative level to prepare a worker to do a specific production job. There are, however, many firms conducting apprenticeship and supervisor-foreman training. The vast majority of industrial training is on-the-job and conducted during working hours.

These findings are presented in detail in the following pages. Before presenting them a word about the sample from which the data were collected is appropriate.

### The Private Sector Samples

Three hundred and seventeen private vocational-technical schools throughout the Commonwealth were selected to receive a questionnaire. Of this total 228, or 72 per cent, responded. The usable sample included eight different categories of schools. This distribution appears in the following table:

**Table 5-1**

**Private School Sample By School Type**

| School Type | N | % |
|---|---|---|
| Trade Schools | 19 | 8 |
| Business Colleges | 21 | 9 |
| Beautician Schools | 24 | 11 |
| Health Occupations Schools | 104 | 46 |
| Technical Institutes | 7 | 3 |
| Correspondence Schools | 1 | * |
| Barbers' Colleges | 6 | 2 |
| Other (not specified) | 46 | 20 |
| Total | 228 | 100 |

*Less than one-half of one percent.

In a similar manner, a questionnaire was sent to 2,500 firms of a random sample of firms drawn from the *Industrial Directory* published by the Commonwealth of Massachusetts and stratified in terms of company size, the small-industry category having 100 employees or less and the large-industry category having 101 employees or more. Approximately 820 responded, and analysis of the data yielded a usable sample of 789, or about 32 per cent, of the original sample. Seventy-seven per cent (608) of the usable returns were in small industry category and 23 per cent were in the large industry category. The usable sample of 789 included twenty different types of industrial endeavors, the distribution of which appears in the Table 5-2. As can be seen, the majority of the industries reporting represent fabricated metal production, printing and publishing, and allied industries. The modal response for the large-industry category is fabricated metal production, but this category also deals heavily with paper and allied products, rather than printing and allied industries.

## Table 5-2

### Industrial Training Sample by Type And Size of Industry (N = 789)

| Type of Industry | Small (N= 608) No. | % | Large ( = 181) No. | % | Total No. | % |
|---|---|---|---|---|---|---|
| Ordnance & Accessories | 5 | 1 | 1 | 1 | 6 | 1 |
| Primary Metal industries | 38 | 6 | 6 | 3 | 44 | 6 |
| Fabricated Metal Products | 120 | 20 | 38 | 21 | 158 | 20 |
| Machinery (non-elec) | 31 | 5 | 13 | 7 | 44 | 6 |
| Machinery (elec) | 22 | 4 | 11 | 6 | 33 | 4 |
| Food & Kindred Products | 49 | 8 | 10 | 6 | 59 | 8 |
| Tobacco Manufacturers | - | - | 1 | 1 | 1 | - |
| Textile Mille Products | 29 | 5 | 13 | 7 | 42 | 5 |
| Apparel, and other finished products | 35 | 6 | 14 | 8 | 49 | 6 |
| Lumber & Wood products | 27 | 4 | 1 | 1 | 28 | 4 |
| Furniture & Fixtures | 18 | 3 | 4 | 2 | 22 | 3 |
| Paper & allied products | 15 | 3 | 20 | 11 | 35 | 4 |
| Printing & allied industries | 82 | 14 | 11 | 6 | 93 | 12 |
| Chemical & allied products | 21 | 4 | 4 | 2 | 25 | 3 |
| Petroleum Refining & related | 2 | - | 1 | 1 | 3 | - |
| Rubber & Misc Plastic products | 29 | 5 | 6 | 3 | 35 | 4 |
| Leather & leather products | 14 | 2 | 6 | 3 | 20 | 3 |
| Stone, clay, and glass products | 11 | 2 | 2 | 1 | 13 | 2 |
| Transportation equipment | 2 | - | - | - | 2 | - |
| Professional, scientific, & controlling instruments; photographic and optical goods; watches & clocks | 19 | 3 | 9 | 5 | 28 | 4 |
| No response | 39 | 6 | 10 | 6 | 49 | 6 |
| Totals | 608 | 100 | 181 | 100 | 789 | 100 |

## SECTION I: THE PRIVATE SCHOOLS

### Size of Schools

Most of the private schools are not large. Over half reported a fulltime and/or part-time enrollment of 50 or under.[1] These figures are shown in Table 5-3.

**Table 5-3**

**Schools by Full- and Part-Time Enrollment (N = 228)**

| Number Students | Full-Time No. | % | Part-Time No. | % |
|---|---|---|---|---|
| 1-25 | 74 | 32 | 32 | 13 |
| 26-50 | 30 | 13 | 8 | 3 |
| 51-75 | 13 | 5 | 9 | 3 |
| 76-100 | 31 | 13 | 8 | 3 |
| 101-200 | 34 | 14 | 9 | 3 |
| 201-400 | 16 | 66 | 6 | 2 |
| 401-900 | 8 | 2 | 6 | 2 |
| 901-over | 6 | 2 | 2 | 1 |

1 Some schools checked both full and part-time hence the figures in the tables exceed 100 percent.

Small enrollments such as those reported in this study are possible only because these schools can specialize along specific skill lines. Public schools programs must attempt to be wider and hence could never continue on such limited enrollments. Even among the private schools, however, there is evidence of variation in enrollment by type of schools. To give a picture of the variation Table 5-4 presents the modal (most frequent) enrollment by type of private school.

**Table 5-4**

**Modal Enrollment by School Type**

| School Type | N | Number of Students | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|---|---|
| Trade Schools | 19 | 1-25 | 6 | 31 | | |
| | | 76-100 | | | 4 | 21 |
| Business Colleges | 21 | 201-300 | 4 | 19 | | |
| | | 1-25 | | | 7 | 33 |
| Beautician Schools | 24 | 26-50 | 10 | 41 | | |
| | | 1-25 | | | 13 | 54 |
| Health Occupations | 104 | 1-25 | 47 | 45 | 1 | 1 |
| Technical Institutes | 7 | 1-25 | 2 | 28 | | |
| | | 201-300 | 2 | 28 | | |
| | | 151-200 | | | 2 | 28 |
| Correspondence Schools | 1 | 1201-over | | | 1 | 100 |
| Barbers' Colleges | 6 | 1-25 | 2 | 33 | 2 | 33 |
| | | 26-50 | 2 | 33 | | |
| | | 51-75 | 2 | 33 | | |
| Other | 46 | 1-25 | 12 | 26 | 6 | 13 |
| | | 51-75 | | | 6 | 13 |

Table 5-4 suggests that as the type of training offered becomes less specialized the number of students enrolled increases. Business colleges and technical institutes offer training that can be used in a wide variety of work settings and as a result have larger enrollments than the more specialized schools, such as health occupations and barber colleges.

## Types of Programs Offered

The questionnaire sent to the private schools listed 99 specific programs grouped into 14 categories.[2] Most of the schools checked two different programs. Table 5-5 shows that the most frequently checked programs were clerical and sales and health occupations. The high percentage of health occupations, however, reflects the high representation of such schools in the sample while the high clerical-sales percentage reflects their wide representation in many different schools. This is shown by Table 5-6 which lists the programs offered by each category of school.

**Table 5-5**

**Types of Programs Offered**

| Classification | No. | % |
|---|---|---|
| Administrative Specialties | 38 | 17 |
| Entertainment and Recreation | 19 | 8 |
| Art Work | 38 | 17 |
| Occupations in Writing | 7 | 3 |
| Occupations in Architecture & Engineering | 14 | 6 |
| Health Occupations | 117 | 51 |
| Misc. Managerial, Technical and Professional | 35 | 15 |
| Clerical and Sales Occupations | 165 | 71 |
| Service Occupations | 27 | 12 |
| Foods Occupations | 6 | 3 |
| Bench Work Occupations | 2 | |
| Structural Work Occupations | 21 | 9 |
| Machine Trades | 6 | 3 |
| Shoe Industry | 9 | 4 |

2 Of the 99 programs listed, 19 were not checked by any school. These were as follows:

Investigation (all types)
Diet Kitchen Work
Milliner
Police Officer
Water and Meter Reader
Firefighter
Watchmaker
Tailor
Leather Sorter
Investment Counselor
Estimator
Medical Assistant
Surgeon's Assistant
Post Office Clerk and Carrier
Building Custodian
Confectioner
Dressmaker
Furniture Refinisher
Stitching Machine Operator

It is apparent in Table 5-6 that there is much variety even within specific types of schools. The schools' designation of themselves into a particular category (Question 1 in the questionnaire) was apparently based on the programs with which they are most involved.

**Table 5-6**

**Programs Offered by Occupational Class And School Category**

| School Category | Courses offered (by occupational class) |
|---|---|
| Trade Schools | Art Work; Architecture and Engineering; Health; Misc. Prof., Manag., & Tech.; Clerical/Sales Occupations; Foods Occupations; Bench Work; Structural Work; Machine Trades; Shoe Industry |
| Business Colleges | Administrative Specialities; Entertainment & Recreation; Occupations in Writing; Misc. Prof. Manag., & Tech.; Clerical/Sales Occupations; Structural Work Occupations |
| Beautician Schools | Service Occupations |
| Health Occupations Schools | Health Occupations; Misc. Professional, Managerial & Technical |
| Technical Institutes | Art Work; Occupations in Arch. & Engineering; Health Occupations, Clerical & Sales; Structural Work Occupations; Machine Trades |
| Correspondence Schools | Other section not specified but assumed to be a cross of most other listed. |
| Barbers' Colleges | Service Occupations |
| Other | Admin. Specialties; Entertainment; Art Work; Writing; Architecture and Engineering; Health Occupations; Misc. Prof., Manag., & Technical; Clerical & Sales Service Occupations, Structural Work Occupations; Shoe Industry; other (not specified). |

## Length of Programs

Table 5-7 indicates that the length of the typical program offered by the private vocational and technical schools fell in the open-ended category 105 weeks and over, i.e. two years or longer of study. Inspection of the data by type of schools, however, shows that most of the 55 schools indicating programs of over 105 weeks were from the health occupations. It is not surprising to find correspondence school (part-time) students also taking programs of 52 weeks or over, but it is rather surprising to learn that the length of private technical institute programs typically runs only 32 to 49 weeks. It can be assumed, therefore, that there are wide differences between private and the public institute offerings either in quantity and quality or in intensity of instruction.

**Table 5-7**

**Length of Typical Full- and Part-Time Program (N = 228)**

| Weeks of Training | Full-Time | | Part-Time | |
|---|---|---|---|---|
| | No. | % | No. | % |
| 1-4 | 1 | - | 1 | - |
| 5-12 | 5 | 2 | 8 | 3 |
| 13-18 | 2 | - | 7 | 3 |
| 19-31 | 28 | 12 | 10 | 4 |
| 32-49 | 35 | 15 | 9 | 3 |
| 50-74 | 50 | 21 | 12 | 5 |
| 75-104 | 32 | 13 | 10 | 4 |
| 105-over | 55 | 24 | 14 | 6 |

## Cost to Student

Table 5-8 shows that the average student who elects to obtain specialized occupational training after high school must be prepared to study for at least one year. He also must be prepared to invest a substantial amount of money, as indicated in Tables 5-9 and 5-10. The amount varies depending on whether the instruction is full-time or part-time, of course, and by the type of school. The modal cost categories in Table 5-10 suggest that the length of the school program and the amount of capital investment needed for instruction are closely associated with the cost of the program.

## Table 5-8

## Length of Curricula Offered by School Type

| Type of School | N | Weeks of Training | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|---|---|
| Trade Schools | 19 | 32-49 | 4 | 21 | - | - |
| Business Colleges | 21 | 50-74 | 12 | 57 | - | - |
| Beautician Schools | 24 | 19-31 | 14 | 58 | - | - |
| Health Occupations | 104 | 105-over | 45 | 43 | | |
| | | 76-104 | | | 1 | - |
| Technical Institutes | 7 | 32-49 | 2 | 28 | 2 | 28 |
| | | 50-74 | 2 | 28 | | |
| Correspondence Schools | 1 | 105-over | - | - | 1 | 100 |
| Barbers' Colleges | 6 | 19-31 | 6 | 100 | - | - |
| Others (not specified) | 46 | 105-over | 9 | 19 | | |
| | | 50-74 | | | 7 | 15 |

## Table 5-9

## The Average Cost Per Student
## Entire Distribution (N = 228)

| Cost | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|
| $ 50-100 | 11 | 4 | 7 | 3 |
| 101-120 | 8 | 3 | 13 | 5 |
| 201-300 | 10 | 4 | 7 | 2 |
| 301-400 | 8 | 3 | 6 | 2 |
| 401-500 | 20 | 8 | 4 | 1 |
| 501-550 | 9 | 3 | 8 | 3 |
| 551-600 | 18 | 7 | 4 | 1 |
| 601-700 | 15 | 6 | 10 | 4 |
| 701-900 | 12 | 5 | 7 | 3 |
| 901-1100 | 13 | 5 | 2 | |
| 1301-over | 56 | 24 | 9 | 3 |

Table 5-10

Modal Cost Per Student by Type of School

| Type of School | N | Cost Full-Time | Cost Part-Time | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|---|---|---|
| Trade Schools | 19 | $1301-over | | 4 | 21 | | |
| | | | 601-700 | | | 1 | 5 |
| Business Colleges | 21 | 901-1100 | | 7 | 33 | | |
| | | | 151-200 | | | 2 | 9 |
| | | | 201-250 | | | 2 | 9 |
| | | | 251-300 | | | 2 | 9 |
| Beautician Schools | 24 | 601-700 | | 8 | 33 | | |
| | | | 501-550 | | | 7 | 29 |
| Health Occupations Schools | 104 | 1301-over | | 34 | 32 | 2 | 2 |
| Technical Institutes | 7 | 1101-1300 | | 2 | 28 | | |
| | | | 701-900 | | | 2 | 28 |
| Correspondence Schools | 1 | 151-200 | | - | - | 1 | 100 |
| Barbers' Colleges | 6 | 551-600 | | 6 | 100 | - | - |
| Other | 46 | 1301-over | | 11 | 23 | | |
| | | | 101-150 | | | 6 | 13 |

## Age of Students

Table 5-11 reveals that it is predominantly young people who take private post-high school training. The youth of the students is most pronounced among those attending full-time. Only a small proportion take training after the age of thirty. There was little variation by type of school. The modal age category for all full-time students was 19 to 24. For part-time students the modal age group was 25-29 for all, except correspondence school where it was 30-34.

Table 5-11

Average Age Distribution of Student Populations of Schools (N = 228)

| Age | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|
| 19-24 | 185 | 80 | 18 | 7 |
| 25-29 | 7 | 3 | 34 | 14 |
| 30-34 | 6 | 2 | 10 | 4 |
| 35-39 | 1 | - | 6 | 2 |
| 40-44 | 1 | - | 2 | - |
| 60-over | - | - | 1 | - |

## Previous Education of Students

Most of the students who go on to private schools are high school graduates. The requirements of the schools, financial as well as scholastic, and the attitudes of the prospective students towards school both act to limit the enrollment of high school dropouts. Only seven per cent of the schools reported that they have students with less than a high school education (Table 5-12). These schools were the beautician and barber colleges, trade schools, and those who did not fit in any of the standard categories, the "others." (See Table 5-13.)

**Table 5-12**

**Previous Education of Student Enrollments**
**(N = 228)**

| Level | N | % |
|---|---|---|
| Less than High School | 17 | 7 |
| High School Graduates | 162 | 7 |
| Jr. College Graduates | 4 | 2 |
| College Graduates | 8 | 4 |
| Combination of Above | 32 | 14 |
| No Response | 5 | 2 |
| | 228 | 100 |

## Completion Rates of Students

The previous educational attainment of their students suggests that the private schools are dealing with a rather select group. Almost all have succeeded in their previous educational endeavors. They voluntarily chose to invest their time and money in additional education. It comes as no surprise, then, that the schools report that most of these students complete the entire program, or a substantial proportion of it, in which they are enrolled. (See Tables 5-14 and 5-15.) The average age for the part-time student is slightly older (25-29) and, like the full-time representation, the individual school categories conform to this mode with the exception of the one correspondence school which appears to have enrollment mainly between the ages 30-34.

## Table 5-13

### Previous Education of Students by School Type

| Level | Trade Schools f | % | Business Schools f | % | Beautician Schools f | % | Health Occ. Schools f | % | Technical Institutes f | % | Correspondence Schools f | % | Barbers' Colleges f | % | Other f | % | Total f | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Less than High School | 1 | 5 | | | 9 | 37 | | | | | 1 | 100 | 3 | 50 | 4 | 9 | 17 | 7 |
| High School Graduates | 12 | 63 | 18 | 85 | 13 | 54 | 85 | 82 | 3 | 43 | | | | | 30 | 65 | 162 | 71 |
| Jr. College Graduates | | | | | | | 1 | 1 | 1 | 14 | | | | | 2 | 5 | 4 | 2 |
| College Graduates | | | | | | | 6 | 6 | | | | | | | 2 | 4 | 8 | 4 |
| Combination of Above | 3 | 16 | 3 | 14 | 2 | 8 | 10 | 9 | 3 | 43 | | | 3 | 50 | 8 | 17 | 32 | 14 |
| No Response | 3 | 16 | | | | | 2 | 2 | | | | | | | | | 5 | 2 |
| Total | 19 | 100 | 21 | 99 | 24 | 99 | 104 | 100 | 7 | 100 | 1 | 100 | 6 | 100 | 46 | 100 | 228 | 100 |

## Table 5-14

### Per Cent Enrollment Completing Courses (N = 228)

| Per Cent | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|
| 1-10 | 5 | 2 | 4 | 1 |
| 11-20 | 4 | 1 | 6 | 2 |
| 21-30 | 9 | 3 | 2 | |
| 31-40 | 3 | 1 | | |
| 41-50 | 5 | 2 | 7 | 3 |
| 51-60 | 3 | 1 | 6 | 2 |
| 61-70 | 16 | 6 | 13 | 5 |
| 71-80 | 45 | 19 | 8 | 3 |
| 81-90 | 43 | 18 | 17 | 7 |
| 91-100 | 70 | 30 | 4 | 1 |

## Table 5-15

### Modal Per Cent of Course Completion by School Type

| Type of School | N | % | Full-Time No. | Full-Time % | Part-Time No. | Part-Time % |
|---|---|---|---|---|---|---|
| Trade Schools | 19 | 91-100 | 6 | 31 | | |
| | | 81-90 | | | 3 | 15 |
| Business Colleges | 21 | 91-100 | 7 | 33 | | |
| | | 81-90 | | | 5 | 23 |
| Beautician Schools | 24 | 81-90 | 8 | 33 | | |
| | | 61-70 | | | 7 | 29 |
| Health Occupations | 104 | 91-100 | 42 | 40 | | |
| | | 1-10 | | | 1 | |
| | | 71-80 | | | 1 | |
| Technical Institutes | 7 | 61-70 | 3 | 42 | | |
| | | 51-60 | | | 2 | 28 |
| Correspondence Schools | 1 | 51-60 | | | 1 | 100 |
| Barbers' Colleges | 6 | 71-80 | 3 | 50 | | |
| Other | 46 | 81-90 | 9 | 19 | 7 | 15 |

The most frequent claim of the private schools is that 91-100 per cent of their full-time students complete their courses. Three of the school categories (trade schools, business colleges, and health occupations schools) exhibit this high record of completion as can be seen on Table 5-15. Part-time students, as might be expected, show a lower modal rate of completion (81-90 per cent). Both of these percentages are quite high as is the 100 per cent figure of the one reporting correspondence school.

A general discussion of these characteristics of private schools is deferred until the final section of this chapter so that the findings can be related to those of the industrial survey.

## SECTION II: INDUSTRIAL TRAINING PROGRAMS

Table 5-2 showed that all the types of industry listed in the industrial training questionnaire were represented in the sample of usable responses received. Just as in the private schools, industrial training's most prominent characteristic is its diversity.

### Types of Programs

The training programs provided by industry are most heavily concentrated at the operative and apprenticeship level. (See Table 5-16.) Most operative training is quite specific and prepares the worker only for particular jobs in the individual company. It lacks transfer value. Apprenticeship training is, of course, much more general and gives the worker a skill he can apply in a variety of settings. The large industries showed a high proportion of supervisory training.

Almost one-fourth of the firms stated that they conducted no training programs. Since, however, they did respond to other questions, it is assumed they understood the question to mean only *formal* training.

### The Setting for Training

By far the predominant setting for industrial training is on-the-job during working hours (Table 5-17). Large firms are more likely to provide in-plant and out-of-plant classes, in addition to on-the-job training. These are supplemental, however, and are not in place of on-the-job training. This figure obviously reflects the greater resources of the large firms which permit such extra training.

The greater resources of large companies are reflected in the amount of money that the firms invest in training. It is apparent from Table 5-18 that the large firms tend to spend larger amounts on training. However, the modal category, among firms reporting costs, is the lowest one $1 to $1,000. About half of the firms either did not wish to or could not provide cost estimates.

## Table 5-16

### Types of Training Programs Offered By Size of Firm (N = 789)

| Training Program | Small (N = 608) No. | % [a] | Large (N = 181) No. | % [a] | Total No. | % [a] |
|---|---|---|---|---|---|---|
| Operative | 179 | 29 | 100 | 55 | 279 | 35 |
| Apprenticeship | 158 | 26 | 50 | 28 | 208 | 26 |
| Supervisory & Foreman | 71 | 12 | 64 | 35 | 135 | 17 |
| Journeyman-Craftsman | 50 | 8 | 15 | 8 | 65 | 8 |
| Sales | 44 | 7 | 27 | 15 | 71 | 9 |
| Other (non-specified) | 22 | 4 | 17 | 9 | 39 | 5 |
| None | 154 | 25 | 18 | 10 | 172 | 22 |

[a] Percentages exceed 100 per cent due to more than a single program reported by most industries.

## Table 5-17

### Setting for Industrial Training by Size of Firm

| Industrial Size | On the Job | | In-plant classes | | Out-of-plant classes | | Other | | During working hours | | Outside of working hours | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Small | 466 | 77 | 22 | 4 | 33 | 5 | 20 | 3 | 457 | 99 | 4 | 1 |
| Large | 161 | 89 | 41 | 23 | 31 | 17 | 11 | 6 | 162 | 97 | 5 | 3 |
| Total | 627 | 80 | 63 | 8 | 64 | 8 | 31 | 4 | 619 | 97 | 9 | 3 |

## Table 5-18

### Cost of Company Training By Size of Firm

| Cost Interval | Small No. | Small % | Large No. | Large % | Total No. | Total % |
|---|---|---|---|---|---|---|
| $ 1- 1,000 | 170 | 28 | 33 | 18 | 203 | 26 |
| 1,001- 2,000 | 41 | 7 | 9 | 5 | 50 | 6 |
| 2,001- 4,000 | 42 | 7 | 7 | 4 | 49 | 6 |
| 4,001- 6,000 | 23 | 4 | 7 | 4 | 30 | 4 |
| 6,001-10,000 | 15 | 3 | 17 | 9 | 32 | 4 |
| 10,001-18,000 | 13 | 2 | 8 | 4 | 21 | 3 |
| 18,000-46,000 | 3 | -* | 10 | 6 | 13 | 2 |
| 46,001-over | 3 | -* | 13 | 7 | 16 | 2 |
| No response | 298 | 49 | 77 | 43 | 375 | 48 |
| Totals: | 608 | 100 | 181 | 100 | 789 | 101 |

*Less than one-half of one per cent.

## Previous Education of Trainees

Company sponsored training is more available to the student who drops out of high school than probably any other form of education. This is reflected in Table 5-19 where approximately one-fourth of the firms report that their trainees had less than a high school education. Little company training is conducted for employees with more than a high school education.

## Table 5-19

### Previous Education of Trainees

| Educational Level | Small No. | Small % | Large No. | Large % | Total No. | Total % |
|---|---|---|---|---|---|---|
| Less than High School | 135 | 22 | 50 | 28 | 185 | 23 |
| High School Graduate | 234 | 39 | 75 | 41 | 309 | 39 |
| Community College Graduate | - | - | - | - | | |
| Tech. Institute Graduate | 9 | 2 | 1 | 1 | 10 | 1 |
| College Graduate | 1 | 3 | - | - | 1 | - |
| A combination of above 3 | 88 | 15 | 41 | 23 | 129 | 16 |
| No response | 141 | 23 | 14 | 8 | 155 | 20 |
| Totals: | 608 | 100 | 181 | 100 | 789 | 99 |

## The Results of Training

The companies were asked to report the usual results of training. The most common result was an increase in pay. (Table 5-20) The student follow-up survey provided some information which tended to confirm the reports of the companies. Although these data are discussed in more detail in another part of the report, the partial results presented in Table 5-21 are of interest. Apparently, for males, at least, there is more "pay-off" from taking company sponsored training than any other type. Among females the differences are not as pronounced.

### Table 5-20

### Results of Training by Size of Firm

| Results | Small No. | Small % | Large No. | Large % | Total No. | Total % |
|---|---|---|---|---|---|---|
| Promotion | 34 | 6 | 14 | 8 | 48 | 6 |
| Increase pay | 209 | 34 | 53 | 29 | 262 | 33 |
| Change in Position | 28 | 5 | 13 | 7 | 41 | 5 |
| Other (not specified) | 19 | 3 | 9 | 5 | 28 | 4 |
| A combination | 189 | 31 | 92 | 51 | 81 | 36 |
| No Response | 129 | 21 | - | - | 129 | 16 |
| Total: | 608 | 100 | 181 | 100 | 789 | 100 |

### Table 5-21

### Relative Pay Scales After Taking Training[a]

| Job Category | Trade School Private Male | Trade School Private Female | Public School Male | Public School Female | Company Sponsored Training Male | Company Sponsored Training Female |
|---|---|---|---|---|---|---|
| 1st Job | $1.93 | $1.72 | $1.84 | $1.72 | $2.09 | $1.60 |
| 2nd Job | 2.20 | 1.77 | 2.04 | 1.95 | 2.50 | 1.83 |
| 3rd Job | 2.62 | 2.02 | 2.33 | 2.01 | 2.90 | 2.01 |

[a] Pay scales presented here represent the mean rate of pay as computed from student survey information.

## SECTION III: DISCUSSION

The major impression one obtains from these data on occupational training in the private sector is one of a diversity of training being conducted in a variety of settings. It appears that these different settings are serving quite different populations. The private schools seem to be catering to relatively well-off young people--those who can afford the tuition and the foregone earnings that this type of training usually requires. Almost all of the private school students are high school graduates. Company-sponsored training programs appear to be directed to quite a different group. One-fourth of the industry trainees did not complete high school and very few of the graduates had any education beyond high school. The immediate application of skills being learned and the non-school atmostphere of on-the-job training may also appeal to those young people who are not school-oriented.

It should also be noted that there appears to be a good relationship between the areas of manpower needs and the private schools' offerings. For example, the health occupations are emphasized as well as some of the service trades by the private school sector. The industrial sector obviously is stressing those areas where an immediate need exists to benefit their output.

While conceding these advantages to private sector training, it must be realized that there remains a sizeable proportion of young people to whom both private school and company training are denied. One must first be hired to profit from on-the-job training and, if one cannot find an employer to hire him, on-the-job training is not a viable alternative. Likewise, if one cannot afford a private school, it is not an alternative. Neither the private school nor the industrial training sector can be looked upon as a very significant source of manpower. The typical private school enrollment is small and the 32 per cent response on a mailing to 2,500 firms indicates that, if more training is being done than reported they are not willing to admit it. Certainly the factor of cost cannot be discounted in this lack of a major contribution by the private sector. The private school tuition rates obviously deter many students; and few companies were spending substantial amounts of money on their training effort.

It cannot be emphasized too much that it is the schools and the public school systems which must bear the responsibility for involving industry in the educational process apart from company-sponsored training programs. While a number of public schools in the present study could cite many situations in which school-industry cooperation were operative, in general, such cooperative efforts were too frequently lacking in the forms of modern physical facilities and up-to-date curricula.

One of the most significant factors investigated was the type of industrial training programs offered. The most frequent type of training for both large and small industries was the category designated "operative training." By

definition, operative training is a very low level entry skill type of program, the duration of which may last as little as a few hours--enough time to teach the basic principles of operation of a certain machine. This would indicate that, in general, the industrial or company-sponsored training programs in Massachusetts are not functioning at an optimal level of providing instruction of a complicated and transferable nature. The fact that most training is on-the-job, during plant time, and at a minimum cost ($1-1,000) is another indication that it is narrow in nature.

It is also interesting to note that 35 per cent of the large industries represented in the sample maintain training programs on the supervisory and foreman level. This is what one would expect from large companies which have the funds available for the expertise and time required for good training programs. However, this kind of program is aimed at the higher echelon of personnel, and most employees are not given the opportunity to take advantage of these more adequate educational programs. Smaller companies, typically, cannot afford extensive and properly operated programs of this type. Therefore, these opportunities do not exist for their employees.

Many industries indicated apprenticeship training as their major thrust (26 per cent). Although apprenticeship is an admirable form of training it usually takes a great deal of time, effort, and money. The results may be excellent but the limitations are obvious--only a very small percentage of the employed are being trained in such a manner.

Most industries in the present sample provide training in an on-the-job fashion and, of course, during working hours. This kind of training is usually very narrow in scope and susceptible to severe limitations. For example, on-the-job training is only useful for those already in the working force; and, typically, such training is not geared toward the advancement of the individual. The individual learns to become efficient in a highly specific job which may become obsolete in a year, given our economy of rapid technological change. More formal training classes by their very nature are broader in scope and can be utilized by the person involved in a highly individualized manner. In spite of its potential, formal classes are offered by only about 16 per cent of the firms in the present sample. The exception to this narrow type of training is the tried and proven apprenticeship program, but it is present in only about one-fourth of the firms and involves few workers in these firms.

## Chapter VI.

# *The Image of Vocational Education**

This chapter deals with the image of vocational education as it is presently reflected throughout the Commonwealth of Massachusetts. An independent study was made of the attitudes of a number of the "public" of vocational education, namely: teachers, parents, union officials, and industry representatives.

Obviously and hopefully one would expect to find after all of these years that the State with the first vocational act (1913) would have achieved a high level of acceptance of this type of education by all who viewed it. One would expect that the product turned out (in the form of graduates) would be well recognized by industry and union officials as being superior to recent high school graduates who did not have vocational preparation.

Unfortunately this chapter must report something less than a good image of the present "brand" of vocational education--at least from the random sample of reasons given by those who responded to the attitude scale used. This chapter, therefore, should be of particular interest to those who are responsible for the vocational program and of particular interest to those who will be involved in implementing the change being recommended.

As stated, one purpose of this study was to determine the image of vocational education reflected by a number of relevant groups including (1)

*The major part of the analysis in this chapter was conducted by Bruce Tuckman, Associate Professor of Education, Rutgers - The State University.

teachers, (2) parents, (3) union officials, and (4) industry representatives. Within two of these groups further comparisons as to the image of vocational education were deemed valuable. Specifically, it was useful to compare the attitudes of parents of vocational students to those of parents of college preparatory students in regard to vocational education. Within the group of teachers additional comparisons were made between teachers of vocational subjects versus teachers of vocationally-related subjects (i.e. related mathematics and science) versus teachers of academic subjects.

The group of teachers polled in this study was teaching at vocational high schools and so-called comprehensive high schools in the Commonwealth of Massachusetts. The number of true comprehensive high schools is relatively small. Therefore, the number of vocational teachers, related teachers, and academic teachers from comprehensive high schools, who were included in the study, is relatively small with the preponderance of all three groups coming from the vocational high schools.

The value of the comparisons to be made in this section of the study is to determine how positive the image of vocational education is among those who prepare the students for jobs--namely the teachers; among those who provide primary guidance for the students--namely their parents; and among those who directly affect the vocational careers of the students upon graduation--namely the unions and industry. If the attitudes of any of these groups are significantly more unfavorable than others, then this would indicate that additional work in public information dissemination and public relations must be done because it is important that all of these groups see vocational education in a positive light.

The results of this study of occupational education in the private sector suggest the inability of the private and industrial sector to provide education and to meet manpower needs in the number required. Although it appears to be doing an adequate job with the populations it is serving, it is not reaching enough persons. This finding makes it more apparent that the public sector of vocational and technical education must become more viable. Opportunities for continued education throughout life itself is the need of the state and this is not now current in either the private school or industrial training sectors.

## Section I: METHOD

In order to determine the image of vocational education, i.e. the attitudes of respondents towards vocational education, a 28-item Likert scale was used. This scale was developed by Wenrich and Crowley (1964) who obtained validity data when using this scale to measure the attitudes toward vocational education of a variety of professional and lay target groups. This scale was, in addition, used successfully in a major study of vocational graduates undertaken by Kaufman, Schaefer, *et al.* (1967)

The scale includes 28 items that deal with such areas as the cost of vocational education relative to its benefits, the product of vocational education, vocational education in the high school versus other high school programs which are seen as competitive, the amount of vocational education to be included in the high school in an absolute sense, the time when vocational education should start, the community value of vocational education, a general evaluation of vocational education, and the support of parents for vocational education.

Of the 28 items on the scale, 14 are intended to be positive toward vocational-technical education, and the remaining 14 are intended to be negative toward vocational-technical education. A person who favors vocational education would agree with the positive items and disagree with the negative items while the reverse would be true for someone opposed to vocational education.

Each respondent is given five choices for each item. These choices are SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree). The respondents indicate their choice by circling one. Table 6-1 shows the number of respondents for each of the four groups and the percentage return among those in each of the four groups to whom the questionnaire was sent.

The percentage return for each group is smaller than would be desirable. This is particularly true for parents of whom only 30 per cent of those contacted returned the questionnaire, union officials of whom only 21 per cent of those contacted returned the questionnaire, and industrial representatives of whom only 31 per cent of those contacted returned the questionnaire. Among teachers a 62 per cent return was obtained which is less than desirable but high in comparison with the other three groups.

On this basis one must take into consideration that the returns do not necessarily represent the typical person in each of the four groups. Those returning the questionnaire could be, in fact, a random representation of the sample. However, it is equally likely that these are individuals who returned the questionnaire because they are interested in recording their very favorable attitudes toward vocational education, because they are interested in recording their unfavorable attitudes toward vocational education, or because they are interested in having their attitudes recorded regardless of what they are. In any of these three cases the sample will be a biased one. No further conclusions can be made about the sample.

**Table 6-1**

**Number of Respondents and Percentage Return Per Group**

| | Teachers | Parents | Union Officials | Industry Representatives |
|---|---|---|---|---|
| Number of Mailed Scales | 500 | 500 | 250 | 2,500 |
| Number of Useable Respondents | 315 | 149 | 57 | 765 |
| Percentage Returns | 62% | 30% | 21% | 31% |

## Section II: RESULTS

The result of a $x^2$ analysis performed on the data appears in Table 2. The data have been presented for the following 7 groups.

(1) Teachers of vocational subjects.

(2) Parents of vocational students.

(3) Teachers of vocationally-related subjects.

(4) Teachers of academic subjects.

(5) Parents of college prep students.

(6) Industry representatives.

(7) Union officials.

*The above listing indicates the order of favorability toward vocational education that was obtained.* The distribution of respondents for each of the 7 groups into favorable and unfavorable categories produced a $X^2$ equal to 34.63 (df = 6) which is significant at better than the .01 level. This significant value indicates that attitudes, in fact, did vary across the groups studied.

Of specific note from Table 6-2 is the fact that the degree of favorability among industry representatives and union officials was substantially less than that of the other five groups. In fact, fewer than one-third of the union officials contacted indicated favorable attitudes toward vocational education; the remainder indicated unfavorable attitudes. Since there is a tendency for attitudes, measured on questionnaires such as the one used in this study, to appear more favorable than in fact they really are, one must conclude that favorability toward vocational education among two-thirds of the union respondents is an overestimate. By comparison to the other groups as well, union officials are not on the whole favorably inclined toward vocational education. However, it must be kept in mind that responses were obtained from only 23 per cent of the union officials contacted.

Among industry representatives, the indication of favorability is only slightly higher than that of union officials but still remains 15 percentage points less than that of teachers of vocational subjects.

Overall, the three groups of teachers were favorable towards vocational education with the vocational subject teacher ranking highest, vocationally-related subject teachers next, and academic subject teachers third among the teacher groups. This ranking among teachers conforms to what one would expect and is consistent with findings in other studies.

Among parent groups, parents of vocational students ranked very high in favorability toward vocational education, while parents of college preparatory students ranked 11 percentage points less favorably. Again, this does conform to what one might expect.

Because the 28 Likert scale items are content items, an attempt was made to study the responses of the seven groups on individual items in order to develop a capsule picture of the bases and details of their attitudes towards vocational education. Since the scale was originally item-analyzed by Wenrich and Crowley (1964) in order to increase inter-item homogeneity and to maximize correlations between each item and the total pool of items, it was anticipated that item spread would be relatively small. What is offered below is a summary of the kinds of responses which highlight and typify each of the groups. Each statement is based on responses to the Likert items which seem to differentiate the group from the other groups. Moreover, a final capsule statement is given of overall reactions to the items since this, in turn, is revealing.

## Table 6-2

### Attitudes Toward Vocational Education in the High School for the Seven Groups as Indicated Across All 28 Attitude Scale Items

| | Favorable* | Unfavorable | |
|---|---|---|---|
| Teachers of Vocational Subjects | 86% | 14% | n = 134 |
| Parents of Vocational Students | 85 | 15 | n = 117 |
| Teachers of Vocationally-related Subjects | 83 | 17 | n = 62 |
| Teachers of Academic Subjects | 79 | 21 | n = 119 |
| Parents of College Prep Students | 74 | 26 | n = 32 |
| Industry Representatives | 69 | 31 | n = 765 |
| Union Officials | 64 | 36 | n = 57 |

$x^2 = 34.63$
$df = 6$
$P < .01$

*Computed as the average across the 28 items of the number of respondents indicating strong agreement or agreement on the positive items and strong disagreement or disagreement on the negative items. Neutral judgments were included with the unfavorable.

### Parents of College Preparatory Students

This group has attitudes toward vocational education which are less positive than those of teachers but more positive than those of union officials and industry representatives. One can detect from their attitudes that these parents view the vocational program and the college preparatory program as competitive and are concerned that their children--the college preparatory students--get at least their fair share in this competition. Thus, they react to the attitude items to indicate that they feel vocational education is too costly relative to its benefits. They indicate that they would rather see this money be put into college preparatory programs. In terms of comparative programs within the high school, they demonstrate in their attitudes that they support the development of other programs rather than vocational education programs particularly if the latter would be at the expense of the former. Overall, they would like to see less vocational education in the high school and they feel that the product of vocational education is "fair"--neither very good nor very bad.

There is one noteworthy area of positive response from this group. The parents of college preparatory students think that vocational education should start earlier because, as they indicate, they believe that youngsters can profit from it at an earlier age. Perhaps this represents an attempt by these parents to support vocational education at educational levels which are less competitive with college preparatory high school level programs.

### Parents of Vocational Students

Parents of vocational students react very positively to vocational education. In fact, this group is equally positive and favorable in its reaction as are the vocational teachers themselves. Greatest support was indicated by these parents for the product of vocational education; that is, the kinds of skills the student has upon graduation from a vocational program and the position this places him in in the job market. Considerable support was given for vocational education programs in the high school as compared to other alternative high school programs.

It is interesting to note that among the less favorable responses given by this group was an indication that there should not be more students in vocational education programs at the high school level. Whether this, plus the fact that these parents did indicate some concern about the cost of vocational education, would indicate that they, too, are concerned, in general, with the problem of the expense of vocational education to the community is not clear.

### Vocational Subject Teachers

There is very little that can be said about this group other than the fact that their attitudes toward vocational education are uniformly favorable. In

fact, on the 28 rating scales, the ratings of this group were ranked either first, second, or third among the seven groups on all but six of the scales. On these remaining six their attitudes ranked fourth or fifth. On this basis, one must conclude that this group gives blanket endorsement to vocational education in the high school--a finding not surprising in the light of the fact that this is the basis by which they earn a living.

### Teachers of Vocationally-Related Subjects

These teachers react to vocational education almost as favorably as did vocational subject teachers. General favorable attitudes are given on almost all items. Only one departure from favorability appeared worthy of note. Related-subject teachers reject the idea that vocational education should begin earlier and accept the idea that students may not be mature enough to profit from it when it occurs. Thus, their reactions to the "earliness" of vocational education represented negative, rather than positive responses. Perhaps related-subject teachers are concerned about having vocational students deal with wider clusters of vocational experiences, among which related instruction might be featured, before being ready to go into intensive vocational training. This attitude would strengthen the position of these teachers in the academic community.

Of further note is the fact that compared to the other groups teachers of related subjects indicated less support for the position of extending vocational education at the expense of basic subject study. This is not surprising since they probably view themselves as providing instruction in the more basic subjects as compared to vocational subjects.

### Academic-Subject Teachers

Among the three teacher groups, academic-subject teachers are less favorable toward vocational education than either related or vocational subject teachers. However, these teachers rank more favorably in their attitude toward vocational education than did parents of college preparatory students, or union or industry groups. On most items, this group gave a response of intermediate favorability. This was consistent with their overall score. Of note, however, are the following observations.

Academic-subject teachers do not feel that vocational education necessarily benefitted the community and they do not react in a particularly favorable manner to the product of vocational education; that is, the student who graduates and the skills he has at his disposal upon graduation. They do not feel that vocational education should begin earlier and, in addition, they feel that the students of these programs lacked scholastic skills, were not prepared to pursue further education, and were not prepared for a wide range of job opportunities. It is likely, based on these responses, that academic-subject teachers favor college preparation as a high school curriculum. Again, this is not inconsistent with the manner by which they make a living.

### Labor Officials

Labor officials were the most negative of the seven groups toward vocational education. In fact, their responses to every item were, by and large, more negative than those of each of the other groups. There was only one item among the 28 to which labor officials indicated at least intermediate approval relative to the other groups. On this item they indicated their general disagreement with the position (relative to the other groups) that students who take vocational education lack many other skills. Perhaps, in reacting to this item, they were defending themselves as "vocational types."

Little else can be said about this group other than the fact that their attitudes toward vocational education are relatively unfavorable. On an absolute basis, however, as Table 6-2 shows, 64 per cent of the union officials who responded reacted favorably. However, when one compares their responses on each item with those of the other six groups, their relative position in almost every case is "seven."

Perhaps union officials see their own apprenticeship programs as competitive with vocational programs and, thereby, react negatively to vocational programs. At any rate, it is important that this group be reached, become informed, and, hopefully, that its attitudes toward vocational education will subsequently change.

### Industry Representatives

Industry representatives reacted only slightly more favorably to vocational education than did their labor counterparts. While labor ranked seventh in favorability on most of the items, industry ranked six in favorability on most of the items. In fact, industry ranked among the lowest two on 24 of the items, while labor ranked among the lowest two on 27 of the items. There were only four items on which industry reactions were slightly positive relative to the other groups. Among these was the indication of their belief that good vocational education programs in public schools attract new industry to a community.

As is true with the union officials, the vocational education community must increase the information of its programs for industry in an effort to improve the attitudes of industry toward these programs.

## SECTION III: GENERAL PATTERNS AMONG THE ITEMS

While the 28 items were originally chosen to record primarily the same attitude toward the object--vocational education in high school--it can be seen by an inspection of the data that attitudes across the items varied rather widely and, in fact, this variation showed some pattern.

Among those items which indicated a general and abstract positive evaluation of vocational education, one which was socially desirable and in no way compromised the respondent, the general response of all groups was positive. However, among those items which contrasted vocational education and other more basic education courses in the high school, a greater preponderance of responses across all groups was unfavorable toward vocational education.

That is to say, respondents, in general, when reacting to this attitude scale are more likely to respond positively on statements of general evaluation of vocational education and more likely to respond negatively on the issue of vocational education versus other kinds of education.

It would surely be desirable from the point of view of vocational education to have a more favorable reaction to its status in the Commonwealth than exists at present when contrasted to alternative high school programs. That this is not generally the case is indicated by the fact that reactions on those items contrasting the two types of programs pointed up the disadvantage of vocational education.

It is also interesting to note that many opinions are not consistent with the facts in terms of the role that vocational education does play.

## Chapter VII.

# *Teacher Education*

Teacher education, or the profession of teaching, for centuries has been recognized as a worthy occupational pursuit. The teacher in his present-day role, however, is being called upon more as an instrument of social change and less as a transmitter of knowledge. Parents, students, governmental officials, business and industry are looking increasingly to the schools to assure acceptable social and behavioral patterns of our future citizens. Teachers are charged with the responsibility of instilling in youth appropriate inter-personal attitudes and behavior. All teachers are expected to be sensitive to and to display a keen awareness of this contemporary thread which runs through the whole fabric of education. And vocational teachers are no exception.

The occupationally oriented program discussed and recommended throughout this Report hopefully provides the vehicle (curriculum) by which these educational goals can be achieved. It is mandatory that teachers become "educators" first and subject specialists second; educators by choice and teachers by training; shapers of human beings as a primary commitment and dispensers of knowledge as a secondary commitment.

## HISTORICAL BACKGROUND

In suggesting a broader approach to occupational education it should be recognized that historically there have been different emphases placed on vocational and technical education. Moreover, it was expressed quite clearly in the early Vocational Education Act (Smith-Hughes Act of 1917) that the brand of vocational education envisioned was directed toward supplying highly skilled manpower. Melvin Barlow, in his *History of Industrial Education in the United States* when discussing this period, states,

> American industry needed mechanics. If manual training was not producing them, then some educational agency would have to do so . . . . It was not expected that a short period of time in the secondary school would produce a skilled mechanic for industry, but it was hoped that a modicum of intensive training, for boys who had selected a particular occupation for their life's work, would facilitate entry into an occupation and speed their progress in an adjustment to the occupation.[1]

Back in the early days organized labor, too, showed concern for the training of complete mechanics. They were opposed to the injustices of narrow training and exploitation which produced "half trained mechanics." (1909)

In other words, vocational education in those days was conceived to produce the future artisan, craftsman, and managerial types as needed by trades, industry, and farming. It was not until sometime later that distributive, business, managerial, and secretarial educations were considered eligible for federal reimbursement.[2]

It can be seen that the stress on educating for a skill was basically a reaction against educating for college. This stress continues to exist, unfortunately, even today despite recent conteracting forces.

Today there has also developed an increased interest in technical education which is a relatively new term. It could be agrued that some parts of all vocations border on the technical and technical education does not deserve a separate definition. The trend, however, is to distinguish technical education from vocational education.

"Technical" carries the connotation of specific knowledge and understanding of the theory or "know how" as compared to the manipulative skill. A bulletin of the American Vocational Association defines technical education as:

1 Melvin L. Barlow, *History of Industrial Education in the United States* (Peoria, 1967), p. 51.

2 Business and office occupations have only been included as part of the federally supported programs since the enactment of the Vocational Education Act of 1963.

> . . . education to earn a living in an occupation in which success is dependent largely upon technical information and understanding the laws of science and technology as applied to modern designs, production, and services.[3]

Technical education must, therefore, be defined in terms of the job or occupation. Normally a person who performs a highly technical job is classified by payroll title as a technician in contrast to a craftsman or tradesman. The technician, then is a

> . . . worker on a level between the skilled tradesman and the professional scientist or engineer. His technical knowledge permits him to assume some responsibility normally assigned by the graduate engineer or scientist. For example, technicians may design a mechanism, compute the stresses, write the specifications, organize the production, and test the finished product.[4]

It should be made clear that there are many varied occupations which require technical education. Among these is a whole array of health occupations, many of which are highly technical. The development of the computer has created a vast number of opportunities for technicians in business, industry, and agriculture.

It is true that vocational education by definition perceives itself today as something more than the mere acquisition of manipulative skills. The U.S. Office of Education, for example, states,

> Vocational Education helps to give definite purpose and meaning to education by relating training to specific occupational goals. It is more inclusive than training for job skills. It also develops abilities, understandings, attitudes, work habits, and appreciations which contribute to a satisfying and productive life.[5]

Despite this definition the fact remains that educators, the public and even parents concentrate on the manipulative aspect of vocational education. Moreover, it is evident that vocational educators themselves have failed to make clear that vocational education need not create a dualism in our educational system. Unfortunately, the evidence of separate vocational schools implies such dichotomy.

It is interesting, historically, to note that in 1914 when the U.S. Congress appointed a special committee to report on the need for federal aid to vocational education the findings were concerned with the waste of human

3 *Definitions of Terms in Vocational, Technical and Practical Arts Education,* American Vocational Association (Washington, 1964), p.20.

4 *Definitions of Terms,* p.20.

5 *Public Vocational Education Programs,* Pamphlet 117, Office of Education, U. S. Department of Health, Education, and Welfare (Washington, 1957) p.1.

resources and, among other things, it was suggested that the Nation could not tolerate the waste of 1) the involuntary idle, 2) the imperfectly employed, and 3) the improperly employed. The discussion on the aspirations of young people tended to emphasize that many youngsters are denied an education other than for college preparation. Relative to the emphasis placed mainly on the college bound, the report stated,

> The rest leave school with inadequate general education and with no special training to fit them for work. Vocational courses are, therefore, needed to attract and hold in school pupils who now leave because they are unable to obtain suitable preparation for useful employment.[6]

Generally speaking, technical education has separated from the vocational education although it is still considered a part of the federally supported program. Such separation is evidenced not only by curriculum, but by physical facilities, teacher preparation, and frequently by the level of instruction. More and more, technical education is being provided on the post-secondary level through the community or junior college organization, thus leaving pre-technical preparation to the secondary schools.

What is needed today is a renewed effort to make the academic experiences relevant to the needs of boys and girls who will be pursuing their technical (technician) preparation during the thirteenth and fourteenth years. Few high schools have furnished such preparation.[7]

## THE TEACHERS THEMSELVES

It is clear that teachers of vocational and technical education are deeply immersed in technology, reflecting in large measure the concern to educate for skills. Assuming one cannot teach what he or she does not know, the "hard stuff" or subject content of the vocational-technical teacher is of a skill or performance nature. To be other than this is to have merely a teacher of pedagogy itself and not one of substance.

The notion of content expertise is not new to vocational education and probably can be best described in terms of the trade and industrial teacher. The founders of vocational trade and industrial teacher education in their early thinking developed this philosophy, which remains with us even today. For example, one of the early federal reports stated,

> It is, of course, essential always that the teacher shall be able to teach, but it does not follow that he shall always qualify as a professional teacher. It is much more important that the instructors of carpentering, for example, at least as regards to

6 *Vocational Education,* House Report 101, U.S. House of Representatives (Washington, 1916, p. 1.

7 The so called Richmond Plan, Richmond, California, has come close to achieving this.

> shop instruction, shall be a competent carpenter than that he shall have attended normal school . . . . This is the prime requisite and all other qualifications are secondary.[8]

This same point was even more vividly displayed when even earlier the National Society for the Promotion of Industrial Education considered the selection and training of teachers for "state-aided schools" for boys and men. In 1914 it said,

> The leader for the teacher's training classes should be a man who brings to the work more than a knowledge of general psychology and the established training methods of traditional schools. He should have a first hand and thorough going knowledge of the social, economic, industrial and educational problems of the industrial and trade school; he should be thoroughly familiar with its methods of organization and administration and with its teaching practice.[9]

In 1923 the Federal Board for Vocational Education suggested in its study, *Program for Training Part Time School Teachers,* which actually alluded to the training of teachers for part-time students, that teachers should possess the following characteristics:

1. A strong abiding sympathy for boys and girls.
2. Resourcefulness and tact in meeting new and difficult situations.
3. Likeability, optimism and enthusiasm.
4. Wide and accurate observations and broad and inclusive experiences.
5. Habits and standards which are acceptable to people and worthy of emulation.

In addition, it was suggested that the teacher have:

1. Mastery of his subject matter.
2. Experience as a wage earner.
3. Understanding of the social and economic principles underlying the institutions of our complex society.
4. And, underscored as *most* essential, adequate experience in the practical work of the occupational field in which the individual is to teach.[10]

8 *The Vocational Summary,* Vol. I, 4, Federal Board of Vocational Education (Washington, 1918), p.15.

9 *The Selection and Training of Teachers for State-aided Schools for Boys and Men,* Bulletin 19, National Society for the Promotion of Industrial Education (1914), pp.23-4.

10 *Program for Training Part-Time Teachers,* Bulletin 85, Federal Board for Vocational Education (1923), p. v.

A more recent study supports the early conjecture of the Federal Board for Vocational Education in that it sets forth the following attributes of a "master" teacher,[11] listed in order of importance:

1. Ability to motivate students.
2. Knowledge and understanding of objectives of vocational education.
3. Knowledge and understanding of the basic principles of learning.
4. Experience in the skills of the specialized area being taught.
5. Ability to express ideas adequately.
6. Ability to demonstrate skills.
7. Knowledge and understanding of related technical theory in specialized area.

At the lower end of the ranking, or of less importance and in descending order, are the following:

1. Knowledge and understanding of the history of education.
2. Knowledge and understanding of services provided, types and locations of community organizations.
3. Knowledge and understanding of keeping records and making reports.

Another interesting idea expressed during those early years is cited by Barlow from an early report which states,

> In the early years the National Society for the Promotion of Industrial Education recognized the need for a sound program of trade and industrial teacher education. Establishment of such a vocational program was proposed by persons who envisioned teacher education was intended to be a "built in quality control" in trade and industrial education; the program could be no better than the teachers.[12]

As relevantly and convincingly as this historical picture portrays the "ideals" of trade and industrial teaching, it is apparent that much more exists to the mastery of a trade or skill in today's work force than mere manipulation or performance. Historically "trade learning" recognized this, even though it was apparently overlooked when vocational education was made a national concern by legislation. In the early apprentice days the need

11 Carl J. Schaefer, *What Makes A Master Teacher* (unpublished), Department of Vocational-Technical Education (Rutgers — The State University, 1963).

12 Barlow, p.208.

for attaining the rudiments of a good basic education was recognized. Today the related technical knowledge that accompanies a skilled trade takes on dimensions of even greater importance than the manipulative skills themselves. To ignore this, as Benjamin Franklin said, "to possess a trade without theory is like a tree without roots."

Admittedly the "theory part" of even present day vocational-technical education is frequently lacking. We are indeed propagating to a great extent "trees without roots" for a large number of graduates from present day vocational programs. Students are frequently inadequately prepared in the rudiments of reading, mathematics, science, social studies, and language arts. What they lack is not the fault of vocational education but of education itself. Education with the occupation goal should be considered the "mission" through which the relevance of education might be achieved.

It is essential, therefore, that the job of educating for an occupation go far deeper than the acquisition of mere manipulative skills. The teachers of vocational and technical education serve as a link to the problem while the teachers of other subjects may be far more important than ever before realized. What is suggested is that there be vocational (at least in orientation) teachers of mathematics, science, social studies, and language arts. Here lies the dimension that has never been fully expanded. Here lies the *team* approach, which utilizes the student's occupational mission and his motivation to want to learn how to read, to compute, to write, and so forth. The so-called "related" teacher then becomes an ever more important link in the processes of education.

Finally, it is essential that a substantial part of teacher education be concerned with the development of inter-personal attitudes and behavior. It should be recognized that it is not possible to require teachers to perform in a manner which is inconsistent with the education and training they themselves receive in teacher education institutions. Just as it is necessary for teachers to understand the students, in terms of their different stages of development, family background, experiences, and interests, similarly they must have an understanding of themselves in the same terms.

## INSTITUTIONS OF TEACHER PREPARATION

It should be self-evident that institutions of higher education are not all alike even as their constituent parts are not alike. Indeed, the underlying philosophy and orientation of faculty can and should vary considerably from institution to institution. Even the degrees conferred carrying the same name do not necessarily assure the same exposure to the content supposedly inherent. Engineering, for example, turns out varied engineer "types," depending on the institution involved. On the one hand, an engineer may well be a practitioner, such as produced by many institutions. On the other hand, the engineer may emerge as a technologist with a science-research orientation.

The institutions themselves have widespread reputations as to the type of product they turn out. If, then, institutions represent distinct and frequently polarized positions, it is virtually impossible to impose a philosophy of education inconsistent with this orientation. That is, not only is their philosophy different, but their resources, faculty, physical facilities, etc. probably cannot be changed. The key, therefore, is to look for an institution which accepts the philosophy of any particular program which is to be implemented and to provide the additional resources to do the job more adequately. This is precisely what is being suggested in this report. If this approach is accepted the following assumptions are relevant:

*1) Differing teacher types and teacher styles are required to meet the needs of youth as they progress through formal education. Teachers, consequently, differ in their interests and abilities to work with boys and girls at various levels of their development.*

*2) Vocational-technical teacher preparation needs are both broad and specific, and no one teacher can be expected to become a master at all levels or in all areas of speciality.*

*3) No one institution possesses either the physical setting, the philosophical orientation, or the staff to meet all of the varied teacher preparation needs.*

*4) Certain faculties accepting these philosophies are able to carry out specific functions better at certain institutions than at others.*

*5) There already exist particular resource and physical facilities within the colleges and universities of the Commonwealth that can make a greater contribution than others toward the preparation of teachers for occupational education in the broadest sense.*

*6) There must be a two-pronged attack on the preparation of teachers for the wide spectrum of occupational preparation. One would focus on preparatory training, and the other on in-service, or continuing, education.*

*7) Probably the most valuable present resource lies in the willingness of teacher educators to continue to work together. Indeed, institutions must cooperate with each other in attacking this problem.*

*8) It is assumed that coordination will be the responsibility of the State Department of Education working in cooperation with the Board of Higher Education.*

## TEACHER PREPARATION IN MASSACHUSETTS

The early federal legislation on vocational education recognized the need for the preparation of teachers [13] and subsequent legislation, including the Vocational Education Act of 1963, provides for both pre-service and

13 The Smith-Hughes Act of 1917 provided for one million dollars for teacher education.

in-service teacher education programs. Nationally there were over 592 vocational teacher education programs during the fiscal year 1965, actively preparing over 70,000 persons as teachers to join the approximately 126,000 vocational teachers already employed. During the same period Massachusetts reported that 4,563 vocational teachers were employed with about 600 in various stages of teacher education preparation (HEW 1968).

More specifically, Massachusetts in the fiscal year 1965 had 103 teachers of vocational agriculture, 77 in distributive education, 63 in health occupations, 1,994 in home economics, 216 in technical, 2,022 in trade and industrial, 33 in guidance and none reported in the office education area. Of this number 1,708 could be counted as full-time teachers with the remainder being supplementary (part time and incidental).

As seen in the Table 7-1, Massachusetts with a larger number of teachers spent but a fraction of what was spent in New Jersey and Ohio on teacher education. The following table summarizes the teacher education effort when these three states are compared.

**Table 7-1**

**Vocational Teacher Education Massachusetts, Ne· ··sey, and Ohio 1964-65[a]**

| State | Number of Teachers | Federal Teacher Education Funds | State and Local Funds | Total |
|---|---|---|---|---|
| Massachusetts | 4,563[b] | 67,871 | 33,422 | 101,293 |
| New Jersey | 2,015 | 125,521 | 162,087 | 287,608 |
| Ohio | 3,300 | 268,898 | 167,992 | 433,890 |

a *Vocational and Technical Education,* Annual Report, Health, Education and Welfare, Office of Education, (Washington, 1965).

b Includes 2,855 part-time and ,ncidental teachers.

## Patterns of Teacher Preparation

Typically two patterns of vocational teacher preparation have been used: the state department of education and the institution of higher education. Originally, and to a major extent, the preparation of trade and industrial teachers, teacher training as it was called, emanated out of the state departments of education. Here, and largely because of the inability of early T and I teachers to be able to seek admission into institutions of higher education (many such individuals did not hold a secondary education diploma), teacher trainers conducted teacher training within the vocational schools themselves and issued "clock hours" credit toward certification requirements. Although this practice is carried on even today for some T and I teacher education programs, it was never fully adopted by the other areas of vocational education, i.e. Agricultural Education, Business Education, Distributive education, and Home Economics. And, in the main, the function of state departments of education in teacher education has generally become one of coordinating the vocational teacher education effort and not one of providing the instruction.

The more acceptable pattern of vocational teacher education, such as is found in most states, is to locate all of the various programs in institutions of higher education--usually the state colleges or universities assume the responsibility for providing certification credit and degree programs of vocational teacher education. In the case of teachers of Agricultural Education, Business Education, Distributive Education, and Home Economics, the common pattern of preparation is through the acquisition of a baccalaureate degree. Frequently in the T and I area, fewer credits are required for certification and the individual is awarded teaching credentials by combining a certain number of years of occupational experience with approximately sixty semester hours of college credit. But even here the trend seems to be for more teachers to complete a full degree program even after they are fully employed as teachers.[14]

Massachusetts is one of the states that has retained the system under which the State Department of Education is responsible for the preparation of T and I teachers, as well as for such offerings usually called special professional training, i.e. the theory and practice of vocational education for the areas of Distributive Education, Home Economics, health occupations, related and academic teachers. In 1967-68 approximately thirty-six classes were conducted, staffed by thirty-eight teacher trainers (or State personnel acting in this capacity) with an enrollment of 714 persons and an expenditure of approximately 43 thousand dollars.[15] In some instances, college credit is granted for taking the courses through special arrangements with Fitchburg State College or Westfield State College. Nevertheless, most vocational

14 It is estimated that about 50 per cent of trade and industrial teachers complete their baccalaureate degrees.

15 Date supplied by The Massachusetts Bureau of Vocational Education, April 1, 1968.

teachers in the T and I area qualify for a certificate by means of being screened into the program on the basis of eight years of trade competency (sometimes attested to by an examination) and the completion of a program of 260 clock hours of teacher education (140 including supervised practice teaching through a program called Part I and 120 hours of a Part II program). This program is described as follows:

**The 260 Hour Course for Vocational Teachers[a]**
**(Trade and Industrial)**

| Part I | Clock Hours |
|---|---|
| What vocational education is | 2 |
| Types of schools | 2 |
| Analysis of a trade for purpose of making out a course of study | 25 |
| The relative order of theory and practice | 2 |
| Interest and interest factors | 4 |
| Related work, trade-technical work, etc. | 12 |
| Methods of instruction and the art of teaching | 15 |
| Lesson planning and demonstration teaching | 40 |
| Classroom management, discipline, etc. | 2 |
| Organization | 8 |
| Supervised practice teaching | 18 |
| Use of visual aids as teaching devices | 10 |
| Total | 140 |

| Part II | Clock Hours |
|---|---|
| History of Vocational Education | 4 |
| Philosophy of Vocational Education | 2 |
| Objectives of Vocational Education | 4 |
| Trade Analysis | 9 |
| Lesson Planning and Demonstration Teaching | 11 |
| Adolescent Psychology | 18 |
| Adolescent Teaching Techniques | 4 |
| Character Training | 6 |
| Lesson Planning and Demonstration Teaching | 8 |
| Teacher's Ethics | 2 |
| Selection of Related Work | 18 |
| Lesson Planning and Demonstration Teaching | 13 |
| Class and Shop Management | 2 |
| Teaching Techniques | 3 |
| Tests and Measurements | 2 |
| Guidance and Counseling | 2 |
| Building Good Will for Vocational Education | 2 |
| State and Federal Laws and Regulations | 10 |
| Total | 120 |

a Taken from *Circular of Information, Qualifications of Candidates,* State College, Fitchburg, in cooperation with Division of Vocational Education, 1961.

The acquisition of a Bachelor of Science Degree in Education (Vocational) is made possible by a program located at Fitchburg State College and conducted in cooperation with the State Division of Vocational Education. The program consists of 120 semester hours credit as follows:

| Area | Semester Hours Credit |
|---|---|
| 1. Vocational Education<br>(Required courses 32 credits)<br>(Electives 10-32 credits) | 42-46 |
| 2. General Education | 58-58 |
| 3. Trade and Teaching Experience<br>(Up to a maximum of 20 credits) | 20- 0 |
| Total | 120-120 |

It is estimated that on a part-time basis and carrying an average of 12 semester hours per year it takes approximately eight years for an individual to acquire a bachelor's degree under this plan.

The majority of other vocational teachers (with the exception of distributive education) is produced through the regular programs of the state colleges, i.e. Home Economics at Framingham State College and the University of Massachusetts, Agricultural Education at the University of Massachusetts, and Business Education at Salem State College. Distributive Education teacher training has not as yet been fully implemented, but plans are under way to establish a program at the University of Massachusetts which will service the entire New England region.

**Qualifications of Teachers -- Endorsement**

Bulletin 326 sets forth the "qualifications of teachers--all fields." First among these qualifications is the following:

> The distincitve qualification for shop, distributive, farm, and home-making teachers is the possession of a minimum number of years of work experience in the trade or occupation in which the candidate proposes to teach. . . .
>
> The work experience required must have been within a period which would give it current value as determined by a committee of eligibility in the State Department of Education . . .
>
> In ordinary circumstances, candidates for teaching positions in shop and related subjects who have not fulfilled the Teacher-

> Training requirements will not be approved when fully qualified candidates are available. Teachers appointed prior to completion of the Teacher-Training requirements must complete within a time set by the State office those requirements.[16]

Authority is granted to the State Department of Education to provide for the establishment and maintenance of classes for the training of teachers for State-aided vocational schools under section 18, chapter 74, of the General Laws. This section states,

> *Classes for training teachers in continuation or vocational schools (AM. 1952, 630, sec. 10).* With the approval of the Commissioner, under the direction of the State Board, towns or districts through school committees or trustees for vocational education, may establish classes for training teachers for continuation schools, or vocational schools established under sections 1-22 inclusive, which classes shall be subject to said sections, so far as consisted herein. The Commissioner, under the direction of the State Board, may establish and maintain classes for training such teachers.[17]

The minimum qualifications of teachers vary extensively according to the area of speciality, age, occupational experience required, general education, technical education, professional education, teaching experience, personality, and sex as well as type of teacher, i.e. shop, related, academic, part-time, full-time, evening school, etc. A brief summary as to the more basic requirements follows:

**Agricultural School and Departments:**

Age: 21-44 all
Occupational Experience: 8 years except for academic and related-1 year teaching experience.
General Education: Completion of secondary school or equivalent-academic and related, college graduation.
Technical Education: Special Course work for agricultural teacher; 2-8 years experience for farm mechanics teacher; special course for evening school teachers-academic and related specific courses or subject major.
Professional Education: 100 clock hours of teacher education.
Teaching Experience: Not required.
Personality: Sound health and physique, neat, etc.
Sex: A man for boys' classes, a woman for girls' classes.

16 *Information Relating to the Establishment and Administration of State-aided Vocational Schools,* Revised, bulletin 326, The Commonwealth of Massachusetts, Division of Vocational Education (Boston, 1951), pp.21-41.

17 *Generai Laws Relating to Education,* The Commonwealth of Massachusetts, Department of Education, 1961, Number 1, p. 118.

**Distributive Education Part Time Co-operative Schools:**

Age: 21-44 all (except academic teacher 21).
Occupational Experience: 3 years of approved D.E. experience or 2 years of D.E. teaching experience and/or special training may be substituted for 2 years; related teacher 1 year successful teaching experience; academic teachers meet requirements of local school regulations.
General Education: Graduate from an accredited institution of college grade.
Technical Education: 1 year of special technical training may be substituted for occupational experience.
Professional Education: Completion of 150 hours of approved teacher training courses.
Teaching Experience: Not required.
Personality: (same as Agricultural)
Sex: No restriction.

**Distributive Occupations Education Part Time and Evening Schools:**

Age: 24 years--no upper limit.
Occupational Experience: 3 years - substitution of special training for 2 of 3 years; evening school 2 years of approved D.E. experience.
General Education: Graduation from an accredited institution or college; evening school graduation from secondary school.
Technical Education: 1 year of special technical training may be substituted from occupational experience.
Professional Education: Completion of 60 hours of approved teacher education courses.
Teaching Experience: Not required.
Personality: (same as for Agricultural)
Sex: No restriction.

**Day Household Arts Schools:**

Age: 21-40 if college graduate; 25-40 if 1 year of technical and professional training.
Occupational Experience: 2 years of practical occupational experience or equivalent and/or 4 years of successful experience as a dressmaker, milliner or homemaker for homemaking teacher; knowledge of homemaking for related technical teacher; at least 1 year successful teaching experience for academic teacher.
Technical Education: College graduate from a household arts course or 1 year of special technical and professional training in addition to occupational experience for homemaking teacher; college graduate for related technical teacher; college graduate for academic teacher.

Professional Education: Completion of 60 hours of teacher education courses for all.
Personality: (same as for Agricultural)
Sex: Woman as teacher for girls' or women's occupations.

**Practical Art and Handicraft Classes (women and men):**

Age: 21 minimum.
Occupational Experience: Dressmaking - 4 years experience; food - 4 year experience; handicrafts-4 years experience; home furnishings and decorations-4 years of experience; home nursing-2 years experience; millinery-4 years experience.
Academic Training: Completion of at least 2 years of secondary school or equivalent.
Special Technical Training: Dressmaking-completion of approved instruction in the technique and art of dressmaking; food-completion of approved instruction of at least 200 clock hours; handicrafts, home furnishing and decorating-completion of 60 hours of approved instruction.
Technical Training: Home Nursing-graduation from an approved hospital; millinery-completion of approved instruction in the techniques of art of millinery.
Professional Education: Completion of approved courses, 80 clock hours of teacher education including 20 hours of supervised practice teaching.
Personality: (same as for Agricultural)
Sex: No restrictions.

**Day Industrial Schools:**

Age: 24-40 shop teacher, and related; 21-40 academic teacher.
Occupational Experience: Shop teacher-8 years full time experience, vocational student receives full equivalency for years in program, college or technical school graduate ½ time, licenses sometimes required; related teacher-same as shop teacher; academic teacher-none.
General Education: Shop teacher-completion of secondary school or equivalent; related teacher-same as shop teacher or graduate of a technical institute of collegiate grade; academic teacher-graduate of accredited institution or college. (related teacher--or at least 2 years of practical experience or 1 year of practical experience)
Technical Education: Shop teacher-preference is given to approved special courses for improvement in trade; related teacher-sufficient knowledge of specific trade or occupation; academic teacher-same as related.



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Professional Education: Shop teacher-completion of 120 clock hour teacher training course plus 20 hours of supervised teaching (Part I) and 120 hours of Part II related teacher-same as shop; academic teacher-60 hours of teacher training courses.

Teaching Experience: Shop teacher-not required; related teacher-1 year of successful experience; academic teacher-at least 1 year of successful experience.

Personality: (same as for Agricultural)

Sex: Men as teachers for men and boys, women as teachers for women and girls.

**Evening Industrial Schools:**

Age: Shop teacher - 24 minimum no maximum; related and academic the same.

Occupational Experience: Shop teacher-same as for qualified teacher in Day Industrial School; related teacher-same as Day Industrial School; academic teacher-none employed.

General Education: Shop teacher-completion of elementary school course or equivalent; related teacher-same as shop; academic teacher-none employed.

Technical Education: Shop teacher-none required; related teacher-none required; academic teacher-none employed.

Professional Education: Shop teacher-15 hour teacher training course; related teacher-15 hour teacher training course; academic teacher-none employed.

Teaching Experience: Shop teacher-none required; related teacher-none required; academic teacher-none employed.

Personality: (same as for Agricultural)

Sex: Men only

**General Vocational Departments:**

Age: Shop teacher-same as Industrial Schools; related teacher-same as Industrial Schools; academic teacher-same as Industrial Schools.

Occupational Experience: Shop teacher-at least 1 year of approved experience in industry (graduation from a State Aided Day Vocational School may be accepted in lieu of experience or same as unit trade shop teacher; related teacher-same as qualified shop teacher.

General Education: Shop teacher-graduation from an approved teachers college or training school or same as unit trade shop teacher; related teacher-same as shop teacher; academic teacher-graduate of an accredited institution or college.

Technical Education: Shop teacher-preference is given for approved special courses in improvement; related teacher-same as shop teacher; academic teacher-sufficient knowledge of occupations involved.

Professional Education: Shop teacher-completion of 260 clock hours of teacher education (Parts I and II); related teacher-completion of 60 clock hours of teacher education courses; academic teacher-60 clock hours of teacher education courses.

Teaching Experience: Shop and related teachers-not required; academic teacher-at least 1 year.

Personality: (same as for Agricultural)

Sex: Men as teachers of men and boys and women as teachers of women and girls.

**Continuing Education of Teachers (In-service Improvements)**

Massachusetts has made provision for the continual updating of its vocational teachers through regulations regarding professional improvement. In the main, these regulations set forth the requirements for the professional improvement on a yearly basis and consist of the following:

**Teachers in State-aided Vocational Schools.**-- At the beginning of each year the instructor fills out a "professional improvement proposal" in which he states the work he proposes to do during the coming year. His local director then approves the type of work and subsequently certifies that such improvement has been received.

**Teachers in Day Industrial Schools.**-- These teachers must present evidence of maintaining command of their trades and trade knowledge by employment in, or approved contact with, the trade of not less than 30 clock hours per year at least once during every two years of service. The trade contact requirement may be fulfilled, however, by approved attendance at the summer conference, provided that the instructors attend the specific classes which apply to their particular trades. A minimum of 30 class hours is required when formal courses are proposed as the only professional improvement for any year.

**Teachers in Practical Art Classes for Women.**-- Each teacher proposes some form of professional improvement every year. The minimum amount is 15 class hours. Teachers taking the teacher-training course before or during their first year of service may offer the teacher-training course for professional improvement for the first year of service.

**Teachers in State-Aided Distributive Education Schools.**-- All teacher-coordinators in part-time cooperative distributive education schools are required to complete a minimum of 30 hours of approved professional

improvement work during each year of service. When professional improvement and teacher-training classes are operated concurrently, teachers who complete the teacher-training course may submit this program in lieu of the professional improvement requirement. In addition to the yearly professional improvement requirement, all teacher-coordinators must complete, over a ten year period, a minimum of 160 hours of approved work experience in the field of distribution.

**Teachers of Vocational Agriculture.**-- Professional improvement certificates are granted annually to all teachers successfully completing an approved program in such areas as farm experience, technical courses, methods of teaching agriculture, general education, and types of research or community service.

### Teacher Preparation Methods

**Full-time, part-time.**-- The method of preparing vocational teachers as set forth in the preceding section is both on a full-time and part-time basis. Agricultural Education, Business Education, Distributive Education, and Home Economics Education teachers are recruited from the recent (usually new) high school graduates and placed in full-time four year college programs. These students, usually "in residence," are enrolled in the normal program of basic education, liberal arts, major field, and elective requirements. The method of providing such course work to the full-time student is well known.

In the case of the part-time student, it frequently has been the accepted practice to provide duplicate course work similar to the full-time student but on an extension education basis – providing the courses on and off campus. Nevertheless, the principle of extension education classes being held at any and all locations (such as in a vocational school) has generally given way to their location on campuses and at centers which reflect an atmosphere of higher education. In other words, when extension education is so located, the part-time student becomes more of a student and the "learning atmosphere" is improved. Vocational teacher preparation has responded to this approach much more today in the location of extension education centers than it did some years ago.

In the case of Massachusetts the pre-service offering for the T and I teachers is presently conducted at six centers: Worcester, Hyannis, Weymouth, Andover, Waltham, and Westfield. It should be noted that in the T and I area the basic principle followed is that prospective teachers come to the preparation program already having acquired their skill or trade competency as attested to by eight years (in the case of Massachusetts) of required occupational experience. With roughly fifty different occupational areas in which to teach, it always has been thought that the establishment of preparatory shops or laboratories in a formal sense on campuses is not feasible. This is why credit (college or certificate) is usually given for the acquisition of trade skills or competencies (as the major field of knowledge)

even though it is acquired prior to entering the teacher preparation program. Most states recognize and make provisions for awarding such credit.

**The Cooperative method.**--Although not new to the preparation of vocational teachers, cooperative education has been a force whose potential has been fully realized. Limited numbers of programs, in various forms, are being conducted for the preparation of trade and industrial teachers at the University of Illinois, Purdue University, Southern Illinois University, University of Michigan, Rutgers - The State University, Ferris State College, and other similar institutions. This approach has not spread as yet to any great extent to the other vocational teacher preparation. As Roy L. Wooldridge states,

> Cooperative Education [as it is known today] was founded at the University of Cincinnati in the School of Engineering in 1906 . . . its first period of growth from 1906 to 1942 was moderate but steady. Eight out of ten institutions that began the program continued its operation, and by 1942 there were thirty successful programs. [It is worth noting that] Even the severe depression of the 1930's, when jobs were difficult to find, failed to halt the growth of cooperative education . . . with post-war conversion, cooperative education resumed its growth and in the period from 1946 to 1966 the number of participating colleges and universities rose from 29 to 95.
>
> There are several reasons for this accelerated growth, for one, many educators, previously committed to orthodox curricula, began to accept the work-study principle as a valid and creative force in higher education; for cooperative education has successfully met the tests of time and performance over a long enough period to win approval as academically sound . . . the reciprocity between higher education and industry is fundamentally rooted in the requirements of our complex technology. Business and industrial leaders have become increasingly aware that the colleges and universities are the primary source of future leadership. Therefore, they have become concerned with the quality of higher education and with academic standards. In effect, industry must look to higher education for the trained minds capable of managing an expanding and involved economy.
>
> At present, in 1966, there are at least 125 institutions of higher education offering some type of work-study programs to their students . . . the extension of cooperative education into many professional fields reflects acceptance by educators of the idea that work experience should be part of a students total education. Even the generalist in liberal arts can enhance his education through periods of guided employment in the world beyond the campus. Such productive employment under realistic

> competitive conditions in a real-life adult-dominated environment will provide the student with insights that will enrich his educational experience . . .[18]

This statement certainly sets the stage for a greater role for this method of education in the preparation of vocational teachers than heretofore realized. Surprising also is the fact that it should have taken this long for the advantages of the cooperative method to be recognized for providing vocational teachers when vocational education itself was one of its early proponents in the preparation of secondary school students in skills and knowledge.

## EVALUATION AND DISCUSSION

The discussion of the preceding section on teacher preparation gives a clear picture of the effort which is being put forth in Massachusetts to prepare traditional, vocationally or technologically oriented teachers. What has not been reported is the vacuum that exists in the preparation of teachers in general and, more specifically, teachers who are needed to make education more relevant to a greater percentage of boys and girls (as well as adults). This suggests, in part, that those vocational teacher education programs as well as the teachers themselves may not be the best equipped to deal with the large proportion of students who see no challenge to the present school offerings whether they be enrolled in the vocational, general or academic curriculum.

It is quite evident that the present programs of vocational teacher preparation in the Commonwealth have concentrated on the regulatory aspects of the programs. Qualifications and endorsements are quite clear, even to the extent of being complex. A plan for pre-service and in-service teacher education does exist and its parameters are spelled out in some detail. The record keeping and yearly approval aspects for the individuals who are involved in in-service and pre-service education (it has been previously pointed out that these numbered approximately 4,500) must represent a sizeable endeavor. Yet, there is superficiality about the entire plan.

The preparation of an educator by means of a mere 260 clock hours of classroom instruction (not usually for college credit) and the task of keeping him up-dated through 30 to 60 clock hours experience each year in technology obviously falls short of the aim of preparing teachers as professionals. Equated with semester hour college credits, this would amount to five to eight courses (3 to 2 credits each) of work. This is what is expected of Unit Trade Shop teachers and, in some cases, shop teachers of General Vocational Departments. Other teachers in the main are required to have collegiate preparation as well as a certain number of vocational teacher training courses (usually 60 clock hours). Immediately the question can and

18 L. Roy Wooldridge, *Cooperative Education and the Community Colleges in New Jersey*, A Report on the role of cooperative education in higher education, National Commission for Cooperative Education, Inc., in cooperation with the New Jersey Governor's Conference on Education, April 2, 1966.

should be asked, "Why has not the vocational course work, at least for the collegiate seeking individual, been incorporated as part of his regular college program and carry proper credit?" The courses desired for these individuals, as well as for others, probably consist of 1) The aims and objectives of vocational education, 2) A methods course, and 3) A curriculum course.

In addition, the stringency of certification requirements can not be eliminated from criticism. The assumption that years of occupational experience, extending up to 8 years in Massachusetts, automatically assures some degree of occupational competency is not necessarily valid. In some instances, eight years might be excessive, particularly if an examination is given. If, indeed, such an examination were considered valid, thought might be given to a reduction in the requirement of eight years.

The age requirement virtually eliminates those over 40 from holding several teaching positions. It is difficult to understand this requirement today when the life cycle is increasing and so many vigorous teachers are still found in their mature years. Certainly consideration should be given to the elimination of the upper limit of the age requirement.

The need for a change from clock hour credits to college level credits has been referred to several times. It would appear that even a certification program should encompass a minimum of 42 college semester hours of credit (18 professional, 18 general, and 6 student or supervised teaching).

Another requirement which appears to be irrevelant to the objectives of teacher preparation is that of specifying "men as teachers of boys and women as teachers of girls."

It is quite apparent that vocational teacher preparation in Massachusetts requires significant revision in order to provide greater depth at a collegiate level. It is also quite evident that there is little, if any, provision for the training of teachers for a careers development curriculum. In the sections that follow specific proposals are set forth for changes in or adoption of such curricula.

### Teacher Preparation for the Careers Development Curriculum

An even greater vacuum exists in the preparation of teachers for the occupational or careers development program. Although the details of this curriculum (at the high school level) have not been fully developed, several assumptions, however, are made about the characteristics of this teacher: 1) he must be more of a humanist than a technologist; 2) he should have the ability to teach and/or review basic skills, i.e. reading, writing, arithmetic, etc.; 3) he should have some knowledge and performance skill to teach the clusters of occupations, i.e. building construction, transportation, agriculture, business, distribution, health occupations, etc.; and 4) he should have courses in the fields of sociology, psychology, and economics. These require a special type of teacher - one yet to be developed. Probably the prototype

under-graduate teacher education program for these individuals should include the following:

### CAREERS DEVELOPMENT TEACHER PREPARATIONS[a]

**Basic Education (3 courses each)**

| | | |
|---|---|---|
| Social Science | Public Speaking | U.S. History |
| English | American Literature | Human Development |

**Major and Supplemental (approximately 20 courses)**

| Occupational Cluster Teacher | Related and/or Academic Teacher |
|---|---|
| Fulfilled by 2 years occupational experience plus shop work (3-6 courses in the area of speciality) | Math, Social Studies, Language Arts, Science Major (30 credits) |
| Intern Teaching Experience | Intern Teaching Experience |
| Principles of Guidance | Principles of Guidance |
| Introduction to Counseling | Introduction to Counseling |
| Teaching of part-time co-operative programs | Teaching Reading Improvement<br>Remedial Reading |
| Principles and practices of careers development education | Principles and Practices of Careers Development Education |
| Educational Psychology | Educational Psychology |
| Personality Assessment | Personality Assessment |
| Emotionally and Socially Maladjusted | Emotionally and Socially Maladjusted |
| Developmental Psychology: Adolescent and Adult Years | Developmental Psychology: Adolescent and Adult Years |
| Student Teaching | Student Teaching |

**SUPPLEMENTAL**

| | | |
|---|---|---|
| Psychology | Sociology | Measurement and Evaluation |
| Guidance | Economics | Labor Studies |

**Free Electives (10-12 courses)**

Liberal Arts and Humanities, such as Art, Music, History, Political Science, Anthropology, Philosophy.

[a]It is anticipated that between 48 and 50 courses would constitute the curriculum.

**Basic Education.**--The basic education offerings represent general education and will usually be taken during the first year of work.

**Major and Supplemental.**--As can be seen the major represents two options, one the "cluster occupations" teacher and the other a related and/or academic teacher. In the former this individual must possess a knowledge of the various skills and performance in the occupations being taught. Therefore, the experience requirement, as well as specialized course work, is essential. For the related subject and/or academic teacher the remedial teaching methods as applied to science, mathematics, language or communicative skills, and social studies are emphasized through formalized preparation (major subject area).

In addition, for both teacher options, an *intern* teaching experience early in the program is suggested as part of the preparation. Such an experience (not to be misinterpreted as student or practice teaching) should be in terms of involvement with the type of student population anticipated, previously described as not disadvantaged but as having found education not relevant to his experiences.

Practice teaching should involve a "team" approach with the occupational cluster student teacher being the "team" leader. It will be necessary under this plan to have cooperating schools that accept this philosophy utilized as student teaching centers.

**Free Electives.**--Free electives should require at least four courses chosen from the Liberal Arts and Humanities with the rest of the electives being entirely free. Here the prospective teacher should be encouraged to enroll in those courses that will enable him to understand and to communicate with students and to be concerned with attitudes, inter-personal relations, work habits, self-concepts, etc.

It is suggested that the Careers Development Program of teacher preparation be instituted in or through reorientation of the several teacher preparation programs, i.e. home economics, business, agriculture, etc. that already exist at the State colleges and State university.

In terms of the preparation of vocational teachers, those teachers selected to staff the technology-oriented programs of the Institutes for Educational Development (which are discussed in Part III of this report), it would appear that a more "in depth" treatment is in order. Such treatment, along with the nearly 600 students so involved, should give way to an approved collegiate level program. Ideally, the program should be both of an in-service and pre-service type and include college work as follows:

## THE VOCATIONAL TEACHER PREPARATION CURRICULUM[a]

**Basic Education (3 courses each)**

| | | |
|---|---|---|
| Social Science | U.S. History | English |
| Public Speaking | Human Development | American Literature |

**Major and Supplemental (approximately 20 courses)**

| Skill Subjects Teachers | Related and/or Academic Teachers |
|---|---|
| Occupational Competency (30 credits) | Mathematics, Science, Language Arts, Social Studies (30 credits) |
| Task Analysis | Task Analysis |
| Principles and Practices of Vocational Education | Principles and Practices of Vocational Education |
| Occupational Principles and Practices | Occupational Principles and Practices |
| Methods of Teaching Shop and Related Subjects | Methods of Teaching Shop and Related Subjects |
| Student Teaching | Student Teaching |

**Supplemental**

| | | |
|---|---|---|
| Psychology | Guidance | Philosophy |
| Sociology | Measurement and Evaluation | |

**Free Electives (10-12 courses)**

Liberal Arts and Humanities such as Art, Music, History, Political Science, Anthropology, Philosophy.

**Basic Education.**--The basic education offerings will essentially constitute the first year (3 consecutive quarters) of work. Each course would be taken for three quarters and "day students" would not be expected to "co-op" during this period. The content is basic to the entire program and meets the needs of the "new breed" of vocational educators.

**Major and Supplemental.**--Under the major, courses largely become "core" subjects for *all* vocational majors whether they are skill subjects or related and/or academic teachers. In the case of occupational competency, the skill subjects student will be preparing to take a comprehensive examination in the area in which he is to teach. Such an examination will consist of a related

a For a more detailed report see *Teacher Preparation for Vocational-Technical Education,* Northeastern University, June 1968. It is anticipated that between 48 and 50 courses constitute the curriculum, as do others, in the Northeastern pattern.

technical phase and a manipulative phase. These examinations must attest to the acceptable level of proficiency at usually a journeyman or experienced worker level. Related and/or academic subject teachers will be required to demonstrate proficiency in the areas of either science, mathematics, language arts, or social studies through appropriate course work.

Practice teaching is envisioned as a "team approach" with students in the skill subjects teaming up with as many of the related and/or academic practice teachers as possible to go to a school as a group for the "team" experience. Certain key schools that will accept this team philosophy will of course have to be utilized as the major student teaching centers.

The supplemental courses support the educational major. It is here the program can be expanded should it be desired.

**Free Electives.**--The free electives should require at least two courses selected from the Humanities, with the rest of the electives being entirely "free." Here the student should be encouraged to broaden his education in the liberal arts.

It is suggested that this program could be implemented in an institutional setting, such as that at Northeastern University, and include the acquisition of occupational competency through the Cooperative Education Plan.

### Pre-secondary Teacher Preparation

In addition to the teacher education program already discussed, there is a need to sensitize even elementary level students to the whole area of modern technology. Elementary teacher preparation must, therefore, share in this responsibility. It would be highly desirable for the present and future elementary teacher to be exposed (as part of pre- or in-service teacher education) to the concepts of technology for children. In addition, students at the junior or middle-school level need to understand occupations and the opportunities that lie in store for them in the world of work. Teachers at this level, especially those in Home Economics, Industrial Arts, and Business Education should relate their efforts more effectively to the guidance and counseling function. Preparation of such teachers in the concepts of "introductions to occupations" and group guidance should take on added emphasis throughout teacher preparation programs.

### Graduate Level Programs

At the present time there are no adequate graduate programs in Massachusetts specifically designed to accommodate vocational and technical teachers. It is suggested that the following two-optional M. Ed. offerings be considered.

**Master Teacher Preparation.**--This option should be concerned with the preparation of a superior teacher (master) while pursuing the Master's Degree. The curriculum for this option should consist of the following:

## VOCATIONAL-TECHNICAL MASTER TEACHER PREPARATION

Open only to students with one year of experience in approved vocational-technical teaching, or with the approval of the Department.

Required Core -- must be completed by all master teacher students.
- Research in Vocational-Technical Education: Survey and Methods. . .
- Curriculums and Materials for Vocational-Technical Education. . .
- Evaluative Procedures (elect one of the following)
  - Evaluation of Student Progress
  - Educational and Psychological Measurements

## AGRICULTURAL EDUCATION

Required Core as above

Background electives in other curricula (2)*
- Current Concepts of Vocational-Technical Education
- Externship in Science and Technology (1-2)

Electives in subject matter or other courses (1-2)
Master's Thesis Study (2)
or
Master's Project in Agricultural Education and
Elective as approved by adviser (1)

## BUSINESS AND OFFICE EDUCATION

Required Core

Background electives from other departments (2)
Specialization in Business and Office Education
- Electives (1-3)
- Content (1-2)

Independent Study (1-2)
Master's Thesis Study (2)
or
Master's Project in Vocational-Technical Education and
Electives approved by adviser (1-3)

## DISTRIBUTIVE EDUCATION

Required Core as above

*Parentheses indicate number of courses and at least 6 credit hours of work must be outside the vocational major.

Background electives in other curricula (2)
Current Concepts of Vocational-Technical Education
Externship in Science and Technology (1-2)

Electives in Subject matter or other courses (1-2)
Master's Thesis Study (2)
or
Master's Project in Distributive Education and
Elective as approved by adviser (1)

## HOME ECONOMICS EDUCATION

Required Core as above

Background electives in other curricula (2)

Studies in Home Economics (1-3)

Electives as approved by adviser (1)
Master's Thesis Study (2)
or
Master's Project in Home Economics Education and
Elective as approved by adviser

## TECHNICAL EDUCATION

Required Core as above

Background electives in other curricula (2)

Externship in Science and Technology (1-2)

Electives in subject matter or other courses in
technical education as approved by adviser (1-3)
Master's Thesis Study (2)
or
Master's Project in Technical Education and
Elective as approved by adviser (1)

## TRADE AND INDUSTRIAL EDUCATION

Required Core as above

*Background electives in other curricula (2)
Current Concepts of Vocational-Technical Education
Externship in Science and Technology (1-2)

Electives in subject matter or other courses (1-2)
Master's Thesis Study (2)
or
Master's Project in Trade and Industrial Education and
Elective as approved by adviser (1)

**Coordination and Supervision.**--The area of coordination and supervision becomes the "first" step in producing future administrators for vocational-technical education. The M.Ed. degree should emphasize this concern through the following course work:

## VOCATIONAL-TECHNICAL COORDINATION AND SUPERVISION

Open only to students with at least two years of experience in vocational-technical teaching, coordination, or supervision, or with the approval of the Department.

Introduction to School Administration

Curriculum Development in the Secondary School

Administration and Supervision of Vocational and Practical Arts Education

Curriculums and Materials for Vocational-Technical Education

Organization and Teaching of Part-Time Cooperative Programs

Current Concepts of Vocational-Technical Education

Research in Vocational-Technical Education: Survey and Methods

Internship in Vocational-Technical Coordination and/or Supervision

Elective as approved by adviser (1)
Master's Thesis Study (2)
or
Master's Project in Vocational-Technical Coordination and/or Supervision and

Electives as approved by adviser (1)

With respect to graduate (M.Ed.) work for the Careers Development (cluster) Program, the following curriculum is suggested:*

*Developed by John L. O'Brian, *The Development of a Master Teacher Training Curriculum for Teachers of Occupational Level Training Programs,* 1966, under O.E. Grant, No. 6-85-047.

## THE M.Ed. CAREERS DEVELOPMENT TEACHER

### The Curriculum

**SUMMER SESSION**

Orientation Workshop
(Three Credits)

**FALL SEMESTER**

Psychology: Inter-personal Behaviors and Attitudes
(Four Credits)

Seminar in Urban Society
(Four Credits)

Field Experience
(Four Credits)

**SPRING SEMESTER**

Seminar in Learning, Development, and Measurement
(Four Credits)

Educational Processes for Careers Development Program
(Four Credits)

Educational Practicum on Careers Development Program
(Four Credits)

**SUMMER SESSION**

Professional Issues Seminar
(Three Credits)

Integrating Option
or

Master's Project
(Three Credits)

Evaluative Paper
(No Credit)

One or more of the state colleges should move directly into this type of offering.

Lastly, it is strongly suggested that an advanced degree offering (Ed.D.) be made available to outstanding and academically talented vocational educators throughout the Commonwealth and the New England region. Consideration for the centering of such an offering should be given to the University of Massachusetts, Harvard University, or Boston University. It would be hoped that this advanced offering would produce a broadly conceived educator who would be competent to administer, to conduct research, or to teach. The following suggests such a program. The credits are semester hours of work with the major in vocational-technical education and the minors (selected areas of course work) in administration, research or college teaching.

It is essential that the various colleges and universities offering undergraduate and graduate programs coordinate their curricula and requirements in a manner which would permit students to progress through their educational programs with a minimum of conflict.

The curriculum for a vocational-technical doctoral major would be as follows:

## VOCATIONAL-TECHNICAL DOCTORAL MAJOR

**CORE**
**18 HOURS**

Within the 30 master's credits and the 18 core credits, a minimum of one course in each of the following 6 core areas must be taken:

1. Vocational-Technical Education
2. Educational Foundations
3. Psychology
4. Sociology
5. Economics
6. Research Methods

**SELECTED AREA COURSEWORK**
**18 HOURS**

Emphasis in one of the following areas:

1. Administration
2. Research
3. College Teaching

**INTERNSHIP**
**6 HOURS**

**DISSERTATION STUDY**
**12 HOURS**

All of these suggestions represent a massive attack on teacher education. This is required if the education of youths and adults is to succeed in becoming more relevant. Specific recommendations on teacher education are specified in Part III.

Chapter VIII.

# *Financing of Education in Massachusetts**

## INTRODUCTION

Traditionally, expenditures for education depended mostly on the ability and willingness of the local community and state legislature to commit fiscal revenue for educational purposes.

Responsibility for the control of education was given to the state governments by the tenth amendment of the federal Constitution. Most state constitutions also reflect this. In Massachusetts, for example, Chapter 5 Section II reads, "The duty of legislatures and magistrates in all future periods of this commonwealth, is to cherish the interests of literature and sciences, and all seminaries of them; especially the university of Cambridge, public schools and grammar schools in the towns . . . ."

The delegation of this mandate from legislatures to the local communities with respect to control of education, personnel, quality of programs, and level of expenditure varies from state to state. This is especially evident when dealing with the legislature's power to tax for educational purposes. The variation runs from extreme examples of Delaware and Hawaii where most expenditures for education come from state taxes, (about 75 per cent), to New Hampshire and Nebraska where most expenditures for education are covered by local and community taxes, (about 85 per cent). (See Appendix 1.)

*This chapter was prepared by Manuel Zymelman, Graduate School of Education, Harvard University.

In the last 30 years, the federal government became a major factor in influencing the total level of expenditures on education for the states.

Regardless of its source, aid to education can be classified into two broad groups:

*General Purposes Grants* are grants that can be spent at the discretion of the local authorities. *Specific Grants* are those that can be spent only for specific purposes. These two types of grants in turn can be either flat or equalizing. Flat grants are distributed generally in accordance to Average Daily Attendance, number of teachers, number of classrooms, and so on. Equalizing grants are based on the theory that the income level of each community is not the same and, therefore, poorer communities have to be subsidized to a greater extent in order to offer a minimum standard of education. Flat grants and equalizing grants have been used for many years in several states but were formulated and analyzed explicitly in two major works on which much of the existing legislation is based: *School Funds and Their Apportionment,* New York Teachers College (Columbia University, 1906), by Ellwood P. Cubberley, and *Financing of Education in the State of New York* (New York, 1923), by George D. Strayer and Robert M. Haig.

Cubberley put forth the following goals: "The duty of the state is to secure for all as high a minimum of good instruction as is possible, but not to reduce all of this minimum; to equalize the advantages to all as nearly as can be done with the resources at hand; . . . to encourage communities to extend their educational energies to new and desirable undertakings".[1]

Then he explained the rationale for state support: "Any attempt . . . at equalizing burdens is clearly impossible under a system of exclusively local taxation. Some form of general aid is a necessity . . . ."[2]

In order to achieve these goals he favored distribution on the basis of Aggregate Daily Attendance, (average daily attendance multiplied by length of term), and the number of teachers employed. A meager fund of 5 per cent was also set up to provide some relief measure for the poorer districts, as long as the districts showed that they were doing their utmost to raise as much tax revenue as possible. Cubberley's plan is almost entirely a flat grant plan--at the present, the basis of state aid by about one-fourth of all the states. The plan has no equalizing approach to aid to education. The basic objective of Strayer and Haig was equalization: "The state should insure equal educational facilities to every child within its borders at a uniform effort throughout the state in terms of the burden of taxation; the tax burden of education should, throughout the state, be uniform in relation to tax-paying ability, and the provision of the schools should be uniform in relation to the educable population desiring education . . . ."

1 Ellwood P. Cubberley, *op. cit.,* p.17.

2 Ellwood P. Cubberley, *op. cit.,* p.54.

The essence of this plan is that there should be uniformity in the rates of school taxation levied to provide the satisfactory minimum offering.[3]

The "foundation program" or Strayer-Haig plan can be expressed as follows:

$$Ai = F\,Ni \cdot TWi$$

Where: Ai is the amount of support aid.

F is the amount of funds per unit of education recipient necessary to provide a "minimum" prescribed level of education.

Ni is the measure for the number of children that receive this education in the district or community.

T is the rate of taxation which the richest community would have to apply to its wealth in order to get its foundation program.

Wi a measure of wealth of the district to which the tax rate is applied.

In most cases, since the property tax is the major source of local revenue, W represents the local taxable property.

It can be seen that with this approach the richest community does not receive any aid while all others receive aid in inverse proportion to the assessed property value and in direct relationship to the number of children in the public schools and the "minimum amount" fixed for expenditure per child.

This equalization approach with different variations[4] is the basis for most existing equalizing state-aid programs.

## DEVELOPMENT OF STATE AID IN MASSACHUSETTS[5]

Most educational aid in Massachusetts until 1884 was of the general type of flat grants. For example, in 1835 (St. C. 138 S1) aid to towns was distributed on the basis of number of children age four to 16, provided that the town itself spent at least the amount of aid (one dollar per child a year), on education. Later, in 1846 and 1849, the amount was increased to $1.5 per child between the ages of 5 through 15.

The first hint of an equalizing aid bill appeared in 1884. The legislature provided that towns with not more than $500,000 of current assessed value receive $300 and the remainder according to the number of children. Those with higher assessed value would receive smaller sums. In 1891, it was

3 Strayer and Haig, *op. cit.*, pp.173-75.

4 See Paul R. Mort, Walter C. Reusser, John W. Polley, *Public School Finance*, (New York, 1960).

5 Some historical parts of this section are based on Ralph Levine's *The State School Education Formula in Massachusetts,* Chapter I. Qualifying paper, presented to the Harvard Graduate School of Education (Cambridge, 1967).

provided that aid be given in relation to the town's tax rate for schools as proportion of total tax rate.

In 1919 a special Commission to investigate the educational system of the Commonwealth, responding to Cubberley's recommendations, called for the distribution of the General School Fund on the basis of the number of teachers, their salaries and their credentials, and also called for increased aid to poorer counties.

The recommendations were adopted (St. 1919, C. 363). For example, Section 3 of Part I provided $200 for every teacher with a degree from an approved normal school who earned at least $895 a year, and $100 to $150 for less qualified teachers.

Part II of the law provided for the distribution of income from the School Fund on the basis of assessed valuation with the poorer communities getting larger amounts. Most of the legislative revisions in subsequent years dealt mainly with raising the initial amounts provided by this act.

Not until 1948 did Massachusetts enact a fully equalizing bill (St. 1948 C. 643). The law stated, "The foundation program shall be an amount of one hundred and thirty dollars for each person between the ages of seven and sixteen . . . which amount shall be increased or decreased by one dollar for each one hundred million dollars, or major fraction thereof." In addition, "the amount of such grant shall be fifty per cent of the amount by which the foundation program exceeds the product of each one thousand dollars of the equalized valuation of such town multiplied by six." Total aid for a town could be therefore calculated as follows:

$$A_i = \frac{(F + e)\, N_i - 6W_i}{2}$$

where: F is the foundation program per person and equal to $130,

e is the increase of decrease of valuation of property over time in hundred millions of dollars,

N is the number of children between the ages of 7 through sixteen,

i indicates a given town.

With no change in valuation nor increase in property, the maximum amount of aid per child could be only $65. This was small compared with actual cost but higher than the aid provided before the Act was passed.

An interesting feature of this formula was the inclusion of the term "e" to take into account a dynamic factor, the increases in the valuation of property. This was especially important because the law provided that, "The equalized valuation of a town for the purposes of this chapter shall be the valuation established by the General Courts, for if no such evaluation is made, the last preceding valuation made for the purposes of apportioning the State Tax . . . " This feature became valueless, however, when valuations remained the same for many years.

In 1963 a new Act (St. 1963. c 660) attempted to remedy the situation somewhat by updating the valuation of property. Since it was felt that a complete updating of the valuation from 1945 to 1961 would result in a too costly foundation program, a compromise was struck by assuming that "e" (the valuation in hundred millions of dollars) was composed of 75 per cent of the 1945 valuation and 25 per cent of the 1961 valuation. Since the increase of the valuation was of $15.6 billion, 25 per cent of this valuation was $3.9 billion and the subsequent aid formula was as follows:

$$A_i = \frac{(130 + 39)\, N_i - 6W_i}{2}$$

$$= 84.50\, N_i - 3\, W_i$$

The maximum amount of aid per child became $84.50 compared with $65 before the new law was passed.

The introduction, for the first time, of a sales tax in 1966 brought several drastic changes in the distribution of aid. The distribution of collected state revenues as prescribed in Chapter 58, Section 18 A, amended by Chapter 14, Acts of 1966, provides that 80 per cent of the Sales and Use Taxes collected shall be credited to the local Aid Fund to be distributed annually for reimbursements of special educational programs and the General School Aid Fund under the provisions of Chapter 70, as amended.

The School Aid Program as formulated in Chapter 70, amended by chapter 14 Acts of 1966, is computed in the following manner:

1) The local average equalized valuation per school attending child is computed.

2) The value obtained in 1 is computed as a per cent of the average equalized valuation per school attending child for the state as a whole. This gives the "valuation percentage."

3) The school aid percentage is obtained by multiplying the valuation percentage as calculated in 2 by 65 per cent and subtracting the result from 100 per cent.

4) School aid is obtained by multiplying reimbursable expenditures by the school aid percentage.

There are, however, four limitations that constrain the total amount of aid as calculated in 1 through 4. These are as follows:

a) Reimbursable expenditures cannot exceed 110 per cent of the state's average reimbursable expenditures per child in "Net Average Membership." (See definition in Section 5 of Chapter 70 in Appendix 2.)

b) On the other hand if reimbursable expenditures fall below 80 per cent of the "State Average of Reimbursable expenditures per child in "Net Average Membership" in computing state aid, a figure of 80 per cent per child is used.

c) Total school aid computed and the amount of federal aid received cannot exceed 75 per cent of reported reimbursable expenditures and aid received from the federal government.

d) The amount of school aid to any community should be at least 115 per cent of the amount received in 1965 under provisions of Chapter 70 plus any grants and reimbursements paid under Chapter 69, 71, and 74.

The other major sources of State Aid to the local community at present are as follows:

**School Building Assistance** established in accordance to Chapter 645, approved June 17, 1948, and its amendments, whereby the State assists, in different degrees, the planning and meeting of the costs of new buildings.

**School Lunch Program** under provision of Chapter 548 and subsequent amendments.

**Aid to pupil transportation** under provision of Chapter 71, Section 7A, 7B, and 8A.

**Special classes for deaf pupils.** Under provision of Chapter 69, Section 28.

**Special classes for blind children.** Under provision of Chapter 69, Section 33.

**Instruction for speech handicapped and hard of hearing.** Under provision of Chapter 69, Section 29.

**Audio Equipment for the physically handicapped.** Under provision of Chapter 69, Section 29C.

**Recreation programs for the physically handicapped.** Under provision of Chapter 69, Section 29D.

**Sight saving classes.** Under provision of Chapter 69, Section 32.

**Instruction of mentally retarded children.** Under provision of Chapter 71, Section 46.

**Instruction of physically handicapped children.** Under provision of Chapter 71, Section 46A.

**Transportation of physically handicapped children.** Under provision of Chapter 71, Section 46B.

**Instruction of certain emotionally disturbed children.** Under provision of Chapter 71, Section 46H.

## DEVELOPMENT OF FEDERAL AID TO EDUCATION

Federal aid to education has become a major factor in determining the absolute level of educational expenditures. At the present time there is hardly any program in education that is not affected by federal assistance. (See Tables I, II, and III.)

## Table I

### Public and Private Expenditures for Education 1935,1950,1964*
### (All Figures in Millions of Dollars)

| | FISCAL 1935 | | | | FISCAL 1950 | | | | FISCAL 1964 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Federal | State and Local | Private | Total | Federal | State and Local | Private | Total | Federal | State and Local | Private | Total |
| **Public** | | | | | | | | | | | | |
| **Current Expenses** | | | | | | | | | | | | |
| Primary & Secondary Schools | 27 | 1,706 | -- | 1,733 | 68 | 4,638 | -- | 4,706 | 616 | 16,840 | -- | 17,456 |
| Higher Education | 34 | 145 | -- | 178 | 97 | 562 | -- | 659 | 1,322 | 1,950 | -- | 3,272 |
| Veterans' Education | -- | -- | -- | -- | 2,689 | -- | -- | 2,689 | 63 | -- | -- | 63 |
| **Construction** | | | | | | | | | | | | |
| Primary & Secondary Schools | 42 | 115 | -- | 157 | 5 | 1,014 | -- | 1,019 | 68 | 3,300 | -- | 3,368 |
| Higher Education | 30 | N.A. | -- | 30 | 11 | 305 | -- | 315 | 200 | 350 | -- | 550 |
| **Private** | | | | | | | | | | | | |
| **Current Expenses** | | | | | | | | | | | | |
| Primary & Secondary Schools | -- | -- | 370 | 370 | -- | -- | 524 | 524 | -- | -- | 2,160 | 2,160 |
| Higher Education | -- | -- | | | | | 922 | 922 | -- | -- | 3,451 | 3,451 |
| Construction | -- | -- | 25 | 25 | -- | -- | 282 | 282 | -- | -- | 703 | 703 |
| TOTAL | 133 | 1,965 | 395 | 2,493 | 2,870 | 6,518 | 1,728 | 11,116 | 2,269 | 22,440 | 6,313 | 31,023 |

*Department of Health, Education & Welfare

## Table II

**Per Cent Distribution of Expenditures for Education, by Source**

| Fiscal year | Federal | State and Local | Private |
|---|---|---|---|
| 1935 | 5.3 | 78.8 | 15.8 |
| 1950 | 25.8 | 58.6 | 15.5 |
| 1964 | 7.3 | 72.3 | 20.3 |

Tables I and II reveal the increasing role of the federal government in education. The important change, however, occurred in the character of federal aid. (See Table III.)

## Table III

### Per Cent Distribution of Federal Funds for Education — and Related Activities* 1945-1967

| Fiscal Year | Elementary Secondary | | | Higher Education | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Federally Impacted Areas | School Lunch Milk | Other[1] | Research Development | Student Assistance | Veterans Education | Facilities | Other[2] | Other[3] | Amounts in millions of dollars |
| 1945 | 4.73 | 15.94 | 7.54 | 38.41 | 1.71 | 3.67 | N.A. | 10.66 | 17.32 | 291.5 |
| 1950 | .21 | 3.50 | 1.56 | 2.56 | .23 | 53.60 | 1.77 | .57 | 37.57 | 3.210.7 |
| 1955 | 14.07 | 11.10 | 7.15 | 9.18 | 2.95 | 27.77 | 3.43 | 1.14 | 23.17 | 1.523.7 |
| 1960 | 11.32 | 13.07 | 9.67 | 19.31 | 10.27 | 10.69 | 12.76 | 1.54 | 11.30 | 2.324.1 |
| 1965 | 7.11 | 7.79 | 9.41 | 21.47 | 13.00 | 4.92 | 18.08 | 5.17 | 17.39 | 5.482.8 |
| 1967 | 2.24 | 4.52 | 25.20 | 15.52 | 11.89 | 2.54 | 14.94 | 5.04 | 18.06 | 9.207.9 |

1 Includes titles III V-A and X of NDEA and public land revenues for schools.
2 Includes special institutional grants.
3 Includes vocational-technical training, both regular and for veterans, adult education agricultural extension services Library aid.

*Calculated from data of U. S. Office of Education.

To understand better the reasons underlying the changes a brief historical summary of federal legislation in education is presented.

Early legislation dates back to 1785 when *The Survey Ordinance* adopted by the Congress of the Confederation reserved land in every township for the endowment of schools in the same township. The *Northwest Ordinance* of 1787 stated: "Schools and the means of education shall forever be encouraged . . . "

However, major legislation did not appear until 1862 when the *Morrill Act* created the "Land Grant Colleges." The original Act authorized grants of 30,000 acres of land for each U. S. representative and each U. S. senator to which every state was entitled in 1869. The proceeds from the grants were to be used for the support of colleges.

In 1890 the *Second Morrill Act* authorized grants for the effective development and operation of the colleges. Changes were introduced in 1907 (Nelson Amendment), 1935 (Bankhead Jones Act), and other legislation (S3450 - Public Law 86-658) increasing annual authorization to $14,500,000 in 1962.

A major landmark in special education was the *Smith-Hughes Act* of 1917 (PL 64-347) that authorized grants to the states for vocational education below the college level. Under this Act permanent appropriations (not subject to congressional approval) were made to the states. The amount provided was initially about $7.2 million a year and still remains in effect.

Other acts supplementing the *Smith-Hughes Act* of 1917, such as the *George Reed Act* of 1934, were superseded by the *George-Barden Act* of 1946 (PL 79-586) otherwise known as the *Vocational Education Act.* It authorized, besides the sums appropriated by the Smith-Hughes Act, a sum of $10,000,000 a year in grants to states for vocational education in agriculture and a series of grants on a dollar for dollar matching basis.

In 1940 the *Lanham Act* prepared the ground for the *Impacted Areas Bill* by authorizing aid for construction and maintenance of facilities for schools in areas where military presence was strongly felt.

The impact of the *GI Bill of Rights of 1944* was unprecedented in its scope. At one time it was 94 per cent of federal expenditure for educational purposes. (See table III.) About 7.8 million veterans received education between 1945 and 1955 at a cost of $14.5 billions.

The *Impacted Area School Aid* (PL 815 and PL 874) of 1950 provided grants for areas "impacted" by tax-free federal properties. PL 815 provides payments for school construction and PL 874 for maintenance and salaries of teachers. These amounts are proportional to the number of children living on federal property or whose parents worked on federal property. The importance of this program is reflected by an expenditure between 1951 and 1965 of more than $3.5 billion which was disbursed to all of the states.

(Massachusetts received approximately $71 million during these 14 years.) In 1950 Congress established the National Science Foundation (PL 81-507) whose budget grew from $15 million in 1950 to $420 million in 1965.

A major commitment of federal funds was made to aid general education under the *National Defense Education Act of 1958* (PL 85-864). It was designed to improve the teaching of science, mathematics, and languages at all levels of education.

The law that committed a billion dollars for its program was extended to June 30, 1968. In 1963 Congress passed a bill (PL 88-204) providing federal aid for classroom college construction with an authorization of $1,195,000,000 for three years. A *Housing Act* authorized in 1950 was extended in 1961 with approximately $1.2 billion through 1965.

In 1965 Congress enacted the Higher Education Act (PL 89-329) authorizing $804,305,000 for student aid and colleges.

The first general aid bill to education, the *Elementary and Secondary Education Act* was enacted in 1965 (PL 89-10) authorizing 1.3 billion for the first year. The bulk of this amount, $1.06 billion, went to aid school-districts with impoverished children. This bill was amended and appropriations were expanded in 1966 (PL 89-750). These laws constitute the cornerstone of educational legislation until 1967. Many other important legislative measures aiding education are included in special program legislation, such as anti-poverty programs, Worker Training and Retraining, Lunch Programs, Library Services, Medical education, and so on.

Most of the proposals in the 1967 Presidential Educational Message were enacted into law and called for an increase of about $1 billion over fiscal 1967. It is a long way from the $291.5 million appropriated in 1945.

**Vocational Education Legislation in Massachusetts**

Massachusetts has a long tradition of supporting vocational schools. At present reimbursement by the Commonwealth is made for three types of expenditures:

a) Maintenance of schools (Not for original investment in buildings and equipment);

b) Payment of Claims for tuition of Non-Resident Pupils in State aided vocational schools;

c) Transportation.

The basis for reimbursement procedures is given in Chapter 74 of the General Laws. The amendment passed in 1967 requires that the state reimburse cities, towns, and districts for one half the net maintenance of approved vocational schools. Net maintenance is defined as the total sum raised by local taxation and expended for the maintenance of the school, less

the amount of receipts from sources other than local taxation. These other sources are mainly federal grants.

### The Federal Programs in Vocational Education

The interest of the federal government in aiding education, as mentioned above, started initially with the Smith-Hughes Act of 1917. The major thrust of this program was to aid and enable states to establish vocational education in the public schools below college level. The appropriations were to be used for the support of payment of personnel teaching agricultural, trade, home economics, and industrial subjects. Provision was made also for the training of teachers for vocational programs.

The George Barden Act of 1946 introduced, among other measures, the concept of matching grants and also two different areas for which support was to be available: distribution subjects and subsequently, in 1956, fisheries. It also allowed states to spend the monies for a variety of purposes including administration, guidance, counselling, and so on.

In 1956 the *Health Amendment Act* (PL 84-911) in Title II and III, appropriated funds for the training of nurses, technicians, and supervisors of the health industries. This Act was expanded with the *Nurse Training Act* of 1964.

Title VIII of NDEA Act of 1958 also provides funds for vocational training on a matching basis. This program was extended to June 1968.

A major piece of legislation was enacted in 1963 (PL 88-210), the Vocational Education Act of 1963, which expanded most vocational programs. The measure provided $806 million over the fiscal years of 1964-68 and $225 million a year thereafter. It also provided $150 million over 1965-68 for work study programs. The funds were to be distributed to the states on the basis of per capital income and required matching expenditures of state funds.

Other programs that provided funds for vocational training were the *Area Redevelopment Act* of 1961 and *Manpower Development and Training Act* of 1962. The main purpose of these acts, however was to provide assistance to people who were unemployed and sought retraining.

## EXPENDITURES ON EDUCATION IN MASSACHUSETTS

In the last seven years Massachusetts has experienced an increase in per capita income, expressed in current dollars from $2,459 to $3,271. In constant dollars (adjusted for changing prices) the increase of per capita income was approximately 2.6 per cent a year. The increase in aggregate personal income in constant 1957-59 dollars was approximately 4 per cent a year. (See Table IV.)

## Table IV

### Personal Income in Massachusetts, 1960-1967*
### (billions of dollars)

| 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 |
|---|---|---|---|---|---|---|
| 13.1 | 13.6 | 14.3 | 14.9 | 15.8 | 16.3 | 17.6 |
| Personal Income in 1957-59 dollars (billions of dollars) | | | | | | |
| 12.7 | 13.05 | 13.56 | 13.9 | 14.6 | 14.8 | 15.5 |

*Statistical Abstract of the U. S. 1960-67

At the same time there was an increase in total general expenditures by the state and local governments in Massachusetts. The proportion of these total expenditures to aggregate personal income increased from 12.62 per cent in fiscal year 1960-1961 to 14.64 per cent in 1965-1966.

This increase was due not only to a major effort of state and local governments as reflected in higher revenues as a proportion of personal income, but also to an increase in federal transfers of funds to state and local government. (See Table V.)

**Table V**

**State and Local Government Expenditures in Massachusetts 1960-1966***

| Fiscal Year | 1960-61 | 1961-62 | 1962-63 | 1963-64 | 1964-65 | 1965-66 |
|---|---|---|---|---|---|---|
| | (millions of dollars) | | | | | |
| Millions of $ | 1,527 | 1,647 | 1,781 | 1,902 | 2,188 | 2,315 |
| General State and Local Expenditures as per cent of Personal Income | | | | | | |
| | 12.62 | 12.10 | 12.57 | 12.36 | 13.40 | 14.64 |
| Federal Revenue to States as per cent of Personal Income | | | | | | |
| | 1.16 | 1.19 | 1.39 | 2.13 | 1.75 | 2.00 |
| State and Local Revenue as per cent of Personal Income | | | | | | |
| | 10.46 | 10.91 | 11.18 | 10.23 | 11.65 | 12.64 |

*Government Finances 1963-64, 1964-65, 1965-66. Annual Reports, Bureau of the Census, Department of Commerce.

It can be seen that in Massachusetts state and local revenues as per cent of personal income went up from 10.46 per cent in 1960-61 to 12.64 per cent in 1965-66, while the federal share went up from 1.16 per cent to 2.00 per cent during the same period.

The composition of these expenditures also changed markedly during this period. Expenditures on education rose from 26.3 per cent in 1960-1961 to 30.8 per cent in 1965-66.

This trend follows the general national trend wherein expenditures by state and local government on education rose during the same period from 36.1 per cent to 40.1 per cent. (See Table VI.)

**Table VI**

**Per Cent Distribution of Expenditures by Purpose in Massachusetts***

| | 1960-61 | 1961-62 | 1962-63 | 1963-64 | 1964-65 | 1965-66 |
|---|---|---|---|---|---|---|
| Education | 26.3 | 28.7 | 30.3 | 28.7 | 29.7 | 30.8 |
| Highways | 16.0 | 14.6 | 13.9 | 14.6 | 14.7 | 12.2 |
| Public Welfare | 11.5 | 12.0 | 11.8 | 11.7 | 11.3 | 11.3 |
| Health and Hospitals | 9.6 | 9.6 | 9.6 | 9.3 | 9.1 | 9.0 |
| All Others** | 36.6 | 35.0 | 34.4 | 35.7 | 35.1 | 36.1 |

**Per Cent Distribution of Expenditures by States, by Purpose, Average U. S.**

| | 1960-61 | 1965-66 |
|---|---|---|
| Education | 36.1 | 40.1 |
| Highways | 18.2 | 15.3 |
| Public Welfare | 11.5 | 8.2 |
| Health and Hospitals | 7.3 | 7.1 |
| All Other** | 29.9 | 29.0 |

*Government Finances, *op. cit.*
**Includes Administration, Police and Fire Protection

This table shows, however, that Massachusetts is still lagging behind the national average as far as expenditures on education are concerned. Even by introducing a corrective factor because of higher private expenditures on education in Massachusetts, (about 20 per cent of all elementary and secondary school children attend private schools), and assuming that

expenditures per pupil in private schools is the same as in public schools, Massachusetts still falls behind the average of all of the states with similar per capita income. With this correction the share of education in total expenditures would be about 34.8 per cent, still much lower than the national average of 40.1 per cent.

The differential is probably greater because the national average does not take into account expenditures for private schooling.

The pattern of expenditures and revenues of the last several years provides a basis to venture some general comments about future developments. Increases in expenditures on education can come about by either faster growth of income available for taxation, higher tax rates, increased federal aid, change in the composition of expenditures, or any combination thereof. (See Appendix 2.)

On the basis of the model presented in Appendix 2, it is estimated that over the next five years the rate of growth of total expenditures will be about eight per cent. If it is assumed that expenditures for education will continue to rise with respect to other expenditures as they have in the past, the share of educational expenditures will continue to increase in the future at two per cent per year. It can be seen that expenditures on education can expand about 10 per cent in real terms.

As noted previously, this is a short term forecast because elasticities vary with time and with higher ranges of income. It is doubtful if elasticity of local and state revenues can continue at the same heights indefinitely. And, of course, federal expenditures can change radically with new legislation.

### Expenditures on Vocational Education

The share of vocational training expenditures has been growing in the past few years. In 1965-66 expenditures for vocational training were 5.05 per cent of total state and local expenditures on elementary and secondary schools. In 1966-67 it rose to 5.27 per cent. In absolute terms, expenditures on vocational education rose from $26,436,835 in 1965-66 to $32,217,447 in 1966-67, an increase of 21.86 per cent. In real terms, however, the increase was about 16.8 per cent.[6]

The composition of current expenditures (excluding construction) also changed from 1965-66 to 1966-67.

6 The index of prices by which expenditures were deflated was calculated using the index of median teachers' salaries weighted by the cost of teaching as proportion of total costs, and the index of cost of living weighted by the proportion of all other costs except teaching in total costs. Using 1963 = 100 the index is as follows:

1964 = 102.9
1965 = 106.3
1966 = 109.3
1967 = 115.9

## Table VII

### Distribution of Expenditures of Funds for Vocational Education in Massachusetts by Program*

| Program | Year 1965-66 (per cent) | Year 1966-67 (per cent) |
|---|---|---|
| Agriculture | 5.63 | 3.53 |
| Distribution | 1.37 | 1.63 |
| Health | 2.64 | 2.46 |
| Home Economics (Homemaking) | 5.24 | 5.21 |
| Home Economics | 2.54 | .9 |
| Office | 23.34 | 37.26 |
| Technical | 6.75 | 4.43 |
| Trade and Industry | 52.11 | 44.2 |
| Fisheries | .04 | .03 |
| Miscellaneous | .11 | .18 |

*Calculated from data provided by Department of Vocational Education, Massachusetts.

Vocational programs enjoy, in general, greater federal support than other major educational programs. Distribution of expenditures in accordance with different federal legislation can be seen in the following table.

## Table VIII

### Expenditures of Funds for Vocational Education in Massachusetts By Purpose and Source*

| Year | 1965-66 | | | 1966-67 | | |
|---|---|---|---|---|---|---|
| | Amount (000 dollars) | Federal % | State & Local % | Amount (000 dollars) | Federal % | State & Local % |
| All Acts | 26,436 | 19.4 | 80.6 | 32,217 | 17.3 | 82.7 |
| Vocational Act 1963 | 20,467 | 20.2 | 79.8 | 27,673 | 16.5 | 83.5 |
| Smith Hughes Act | 1,584 | 11.3 | 88.7 | 1,120 | 16 | 84 |
| George Barden Act | 4,384 | 18.5 | 81.5 | 3,423 | 23.8 | 76.2 |
| Title II Health | 170 | 48.9 | 51.1 | 228 | 36.5 | 63.5 |
| Title III Technical | 557 | 44.8 | 55.2 | 528 | 47.3 | 52.7 |

*Calculated from data provided by Department of Vocational Education, Mass.

## Table IX

### Distribution of Current Expenditures of the Different Programs in Vocational Education by Sources*

| Program | 1965-1966 | | | 1966-1967 | | |
|---|---|---|---|---|---|---|
| | Amount ( 000 dollars) | Federal % | State & Local % | Amount ( 000 dollars) | Federal % | State & Local % |
| Agriculture | 1,055 | 12.6 | 87.4 | 860 | 18.4 | 81.6 |
| Distribution | 258 | 29.9 | 70.1 | 399 | 44.8 | 55.2 |
| Health | 495 | 28 | 72 | 600 | 36.4 | 63.6 |
| Home Ecomonics (Homemaking) | 983 | 22.6 | 77.4 | 1,268 | 15.2 | 84.8 |
| Home Economics (Gainful) | 477 | 16.3 | 83.7 | 220 | 25.9 | 74.1 |
| Office | 4,371 | 16.8 | 83.2 | 9,066 | 8.8 | 91.2 |
| Technical | 1,264 | 45.3 | 54.7 | 1,080 | 49.6 | 50.4 |
| Trades and Industry | 9,759 | 10.6 | 89.4 | 10,755 | 14 | 86 |
| Fisheries | 8 | 22.5 | 77.5 | 9 | 43.9 | 56.1 |
| Other | 512 | 28 | 72 | 45 | 100 | ---- |
| Total | 18,692 | | | 24,300 | | |

*Calculated from data provided by the Department of Vocational Education, Mass.

The discrepancy between the tables is due mainly to construction costs which were about $7 million in 1965-66, of which the federal government contributed $1.4 million, and $7.5 million in 1966-67, of which the federal government contributed $1.6 million.

A cursory examination of these tables shows that there is no pattern of behavior of the shares of each program in the total and that in order to be able to forecast future expenditures on vocational training it is necessary first to know which program will expand relative to others. The best approach is to determine the demand for graduates from the different programs, the cost of producing these graduates, the particular federal aid that can be available to cover the costs, and on the basis of this information, to determine the local effort. This local effort, in turn, can be measured against other educational programs and total educational programs against all other types of government expenditures.[7]

## Conclusions Derived from the Analysis of Expenditures on Education in Massachusetts

The last six years present a record of an accelerated rate of increase in state and local expenditures. This trend is not unique to Massachusetts but conforms to the national trend. These expenditures are covered by revenues from the federal government and from local and state governments. The latter consists of property tax as sales taxes, income taxes, and so on. The argument advanced here is that for the short run, about 5-6 years, this trend is expected to continue.

However, even with the same proportion of support provided by the federal government, this trend cannot go on indefinitely because it is doubtful that taxpayers will be willing, after a certain point, to continue to increase the share of government expenditures in relation to disposable income.

7 Assuming that total educational expenditures for programs are already fixed, i.e., allocation was already determined by the legislative process, the extra local effort for vocational training can be determined in the following way:

$$\Delta E_{lv} = \sum_{i=1} (1-\alpha_i)\, C_{si}\, \Delta S_i \leq \beta \Delta B_e$$

$\Delta E_{lv}$ = Extra local effort for Vocational Training.

$\alpha_i$ = Share of Federal Support of Program i

$C_{si}$ = Cost per Student in Program i

$\Delta S_i$ = The increase of students in Program i

$\beta$ = Share of Vocational Training in Local Educational Budget

$\Delta B_e$ = Increase in educational budget

given all but one of the variables can be determined or adjusted to any variable to fit available resources.

Income elasticity of taxation, the response of taxes to income, will probably go down in the long run, assuming of course that the same pattern of state expenditures will continue in the future. This may not be so if the state would take over some of the current private expenditures in such areas as higher education, and health services. A shift of some of these expenditures from the private sector to the public sector will undoubtedly increase the income elasticity of taxation, because people might be willing to have a smaller share for disposable income as long as they know that some of the goods or services they purchased before will be available at no cost or more cheaply. For example, if there is an expansion of higher education at lower tuition rates, people who formerly put away money or spent money for sending their children to private institutions might be willing to pay higher taxes, since their net income left for other goods and services may not go down at all or may go down very little.

As far as specific expenditures on education are concerned, their rate of growth may continue even though the income elasticity of taxation may go down, if there is a shift of expenditures in the state and local governments from other sector expenditures into education. It could be argued that there is a limit to the amount of resources which can be shifted from one sector to another. One can only shift realistically the increments of the budget, since it is politically difficult that administrative programs, once established, can be cut down in absolute terms. There is of course always one great unknown, namely the contribution of the federal government which is not so much a function of local political pressure. Although income elasticity for federal taxation is about one, or a little higher than one, the possibility of shifting resources from one program to another is much greater since education is such a small part of the federal budget. In the local budget it is about 40 per cent, therefore, the latitude is much smaller. As to the sources for state and local taxation it is useless to stress the burden of the different types of taxation. There is no doubt that local governments will not be able to rely much longer solely on property taxes for their major source of revenue. In Massachusetts the sales tax is more closely linked to income, displacing in importance property taxes. There is no question that what matters for the voter and consumer is the net amount of money that he is left with, and the "free" services that he obtains from the public sector. How these taxes are raised in the long run is inconsequential. If the burden becomes too great on dwelling owners, politicians will certainly feel it, and they will have to turn to other sources of taxation. In the case of industrial property and rentals, there exists the possibility of an immediate shifting of the burden on income earners. But one must bear in mind that different types of taxation cannot be completely out of line with other states: otherwise it may influence future development of industries and employment. The Massachusetts situation is not special and is similar to the general trend in local and state taxation all over the country. Each state has a different pattern of local and state taxation, and therefore what is important is the combined effect of these taxes. As far as expenditures for vocational training are concerned, until the

present the proportion of vocational education expenditures was comparatively small in the educational budget; therefore, a decision to expand this type of training will not run counter to other decisions. If a relatively high expansion rate of this type of training is envisaged there is no way of extrapolating expenditures into the future without knowing the number of people who will be trained and the type of training to be offered, since costs vary so much among different types of training.

Here, more than in other types of educational programs, a simple cost analysis will not convey the actual burden on the communities. The net burden on the community will be approximately the actual cost minus federal support minus state support. State support is constant - 50 per cent of the net cost - but federal support varies with the type of program. For example, assume that the extra cost per student in program A is $1,000 a year while the comparable cost of program B is $700. This does not mean that the burden assumed by the community is smaller in case B rather than A. If federal support in case A is 50 per cent while in case B it is only 15 per cent the actual cost to the community is for A: (1000-5000) x .5 = 250 per student actual cost to the community for B: (700 - 105) x .5 = 297.50 per student. Other problems such as scale of operations, districting of the schools, numbers of students from outside the local community, and different combinations of the variables will render different results and have different impacts on local community.

## Appendix 1

### Ranking of States on Revenue Receipts From Various Sources, 1965-66*

| Estimated Per cent of Revenue Receipts for Public Elementary and Secondary Schools from Local Governments, 1965-66 | | Estimated Per cent of Revenue Receipts for Public Elementary and Secondary Schools from the State Government, 1965-66 | | Estimated Per cent of Revenue Receipts for Public Elementary and Secondary Schools from Federal Government, 1965-66 | |
|---|---|---|---|---|---|
| 1. Nebraska | 86.9% | 1. Delaware | 75.5% | 1. Alaska | 27.5 |
| 2. New Hampshire | 83.2 | 2. Louisiana | 69.2 | 2. Arkansas | 20.0 |
| 3. Iowa | 81.8 | 3. North Carolina | 65.9 | 2. Mississippi | 20.0 |
| 4. New Jersey | 74.4 | 4. New Mexico | 65.5 | 4. South Carolina | 17.3 |
| 5. Illinois | 71.3 | 5. Hawaii | 61.5 | 5. South Dakota | 17.0 |
| 6. South Dakota | 71.0 | 6. Georgia | 61.4 | 6. Alabama | 15.4 |
| 7. Kansas | 70.1 | 7. Alabama | 60.8 | 7. Kentucky | 14.2 |
| 8. Wisconsin | 68.8 | 8. South Carolina | 59.7 | 8. Oklahoma | 14.1 |
| 9. Massachusetts | 68.3 | 9. Washington | 58.3 | 9. New Mexico | 13.6 |
| 10. Ohio | 67.6 | 10. West Virginia | 52.1 | 10. Arizona | 13.3 |
| 11. Colorado | 66.4 | 11. Kentucky | 52.0 | 11. Georgia | 12.0 |
| 12. North Dakota | 66.3 | 11. Texas | 52.0 | 12. North Carolina | 11.8 |
| 13. Oregon | 65.6 | 13. Nevada | 51.9 | 13. Tennessee | 11.7 |
| 14. Vermont | 65.4 | 14. Alaska | 51.4 | 14. Hawaii | 11.2 |
| 15. Montana | 64.1 | 15. Mississippi | 51.0 | 15. Virginia | 11.1 |
| 16. Connecticut | 62.0 | 16. Tennessee | 49.5 | 16. Maine | 10.8 |
| 17. Rhode Island | 60.8 | 17. Utah | 49.0 | 17. Massachusetts | 9.6 |
| 18. Maryland | 60.6 | 18. Florida | 48.8 | 18. Florida | 9.4 |
| 19. Maine | 60.2 | 19. New York | 44.2 | 19. Utah | 9.0 |
| 20. Missouri | 59.7 | 20. Michigan | 43.9 | 20. Colorado | 8.9 |
| 21. Indiana | 57.8 | 21. Arkansas | 43.4 | 21. Missouri | 8.5 |
| 22. Oklahoma | 56.6 | 22. Wyoming | 42.0 | 22. Kansas | 8.3 |
| 23. Minnesota | 55.6 | 23. Pennsylvania | 41.7 | 22. Vermont | 8.3 |
| 24. California | 55.0 | 24. Virginia | 39.4 | 24. Nevada | 8.2 |
| 25. Idaho | 54.0 | | | 25. Montana | 8.0 |
| | | UNITED STATES | 39.1 | 26. Oregon | 7.9 |
| UNITED STATES | 53.1 | | | | |
| | | | | UNITED STATES | 7.8 |
| | | 25. California | 38.5 | 27. North Dakota | 7.6 |
| | | 25. Idaho | 38.5 | 27. Rhode Island | 7.6 |
| 26. Wyoming | 51.7 | 27. Minnesota | 38.0 | 29. Idaho | 7.5 |
| 27. Pennsylvania | 51.2 | 28. Indiana | 37.1 | 30. Wisconsin | 7.4 |
| 28. Arizona | 50.4 | 29. Arizona | 36.3 | 31. Maryland | 7.3 |
| 29. Michigan | 50.0 | 30. Connecticut | 32.8 | 32. Nebraska | 7.2 |
| 30. New York | 49.8 | 31. Maryland | 32.0 | 32. West Virginia | 7.2 |
| 31. Virginia | 49.5 | 32. Missouri | 31.8 | 34. Pennsylvania | 7.1 |
| 32. Utah | 42.1 | 33. Rhode Island | 31.6 | 35. Texas | 7.0 |
| 33. Florida | 41.8 | 34. Oklahoma | 29.4 | 36. Minnesota | 6.5 |
| 34. Texas | 40.9 | 35. Maine | 29.0 | 36. California | 6.4 |
| 35. West Virginia | 40.7 | 36. Montana | 27.9 | 38. Wyoming | 6.3 |
| 36. Nevada | 39.9 | 37. Ohio | 27.4 | 39. Michigan | 6.1 |
| 37. Tennessee | 38.7 | 38. Oregon | 26.5 | 39. New Hampshire | 6.1 |
| 38. Arkansas | 36.5 | 39. Vermont | 26.2 | 39. Washington | 6.1 |
| 39. Washington | 35.6 | 40. North Dakota | 26.1 | 42. Louisiana | 6.0 |
| 40. Kentucky | 33.8 | 41. Colorado | 24.6 | 42. New York | 6.0 |
| 41. Mississippi | 29.1 | 42. Wisconsin | 23.8 | 44. Delaware | 5.7 |
| 42. Hawaii | 27.3 | 43. Illinois | 22.9 | 44. Illinois | 5.7 |
| 43. Georgia | 26.6 | 44. Massachusetts | 22.1 | 44. Indiana | 5.7 |
| 44. Louisiana | 24.8 | 45. Kansas | 21.6 | 47. Connecticut | 5.1 |
| 45. Alabama | 23.8 | 46. New Jersey | 21.2 | 48. Ohio | 5.0 |
| 46. South Carolina | 23.0 | 47. Iowa | 13.5 | 49. Iowa | 4.7 |
| 46. North Carolina | 22.3 | 48. South Dakota | 11.9 | 50. New Jersey | 4.5 |
| 48. Alaska | 21.1 | 49. New Hampshire | 10.7 | | |
| 49. New Mexico | 20.9 | 50. Nebraska | 5.9 | | |
| 50. Delaware | 18.9 | | | | |

*Ranking of the States, National Education Association Research Division [Jan., 1966].

## APPENDIX 2

## A MODEL FOR MAKING SHORT TERMS FORECASTS FOR EDUCATIONAL EXPENDITURES

For a short term forecast the following simple model can be formulated:

$E_t$ is total expenditures by state and local governments;

$E_1$ is revenue raised by state and local governments; and,

$E_f$ is the federal contribution to local and state governments.

One can assume that personal income is an indicator of wealth, consumption, and income to which one can apply property taxes, sales taxes, and income taxes, respectively. Local revenue is therefore a function of personal income. In the short run it can also be assumed that the elasticity of local revenue with respect to income remains constant:

$$e_{1y} = \frac{\frac{\Delta E1}{E1}}{\frac{\Delta y}{y}} \quad (1)$$

One can also assume that federal contributions towards expenditures are a function of local contribution towards expenditures and that elasticity of federal contributions with respect to local contributions remains constant in the short run.[1]

The formula becomes as follows:

$$e_{f1} = \frac{\Delta Ef / Ef}{\Delta E1 / E1} \quad (2)$$

1 Elasticity of federal support changes with the character of local expenditures. If, for example, local expenditures expand mostly for areas where federal aid is very small, elasticity of federal aid with respect to local effort will go down. Conversely, if the share of programs is in the areas where federal funds are plentiful, elasticity will go up. In our case we assume that the elasticity of federal expenditures takes into account the shift of expenditures over the last 5 years, from highways, for example, into education. However, if there is a plan to expand some programs above and beyond the historical trend, then the elasticity coefficient should take into account these particular expansions. A more complex model relating different programs expenditures to federal aid can easily be derived using this simple model here presented.

Total expenditures in year t can therefore be written in the following way:

$$E_t(1+r_t)^t = E_f(1+r_f)^t + E_l(1+r_l)^t \qquad (3)$$

$E_{t_o}$ is total expenditures at the beginning of the period

$E_{f_o}$ is federal expenditures at the beginning of the period

$E_{l_o}$ is local expenditures at the beginning of the period

$$\frac{E_{t_o}}{E_{t_o}}(1+r_t)^t = \frac{E_{f_o}}{E_{t_o}}(1+r_f)^t + \frac{E_{l_o}}{E_{t_o}}(1+r_l)^t \qquad (4)$$

$$\text{If } (1+r_t) = y,\ \frac{E_{f_o}}{E_{t_o}} = \alpha,\ \frac{E_{l_o}}{E_{t_o}} = \beta$$

We can write $$y^t = \alpha(1+r_f)^t + \beta(1+r_l)^t \qquad (5)$$

From (1) and (2)

$$y^t = \alpha(1+e_{fl}\, e_{ly}\, r_y)^t + \beta(1+e_{ly}\, r_y)^t$$
$$r_t = [\alpha(1+e_{fl}\, e_{lyry})^t + \beta(1+e_{ly}\, r_y)^t]^{1/t} - 1$$

From data of the last 5 years (1961-1966)

$e_{fl} \cong 2.8$, $e_{ly} \cong 1.8$, $r_y \cong .04$ in real terms

$\alpha \cong .2$ $\beta \cong .8$

## Chapter IX.

# *Educational Media and Vocational-Technical Education**

The modern concept of instructional technology differs vastly from the old notion of "audio-visual aids" in education. In many schools audio-visual aids, more often than not, have put undue emphasis on projection equipment and related gadgetry and have included a few films and similar materials which were used as enrichment to the normal curricula, or were used to fill in on a day when the regular teacher was absent.

The modern concept of instructional technology not only involves the use of the newer media such as television, programed instruction, computer-assisted instruction, film loops with cartridge-loading projectors, and information retrieval by dial access; it also includes a systematic approach to the analysis of instructional problems and the application of technology to the solution of these problems in various ways for different types of learners, under a variety of circumstances. This is sometimes referred to as "the systems approach to teaching and learning."

An important thing to remember about instructional media is that they are means to ends. They can provide the instructional means to achieve a wide variety of educational ends, whether this be through the effective instruction of large groups of learners or by providing a means of highly individualized learning for students.

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Instructional technology has now been developed to a sophisticated level. It is supported by extensive research; and today's educator cannot afford to be ignorant of its potential or to avoid its use in attempting to solve the pressing educational problems of the present and the future.

## PROBLEMS FACING VOCATIONAL AND TECHNICAL EDUCATION

### Instructional Programs

In the past, even though vocational and technical education has often involved extensive use of tools and similar equipment, there has been relatively little systematic use of instructional media as a means of stimulating and improving learning or of providing learning opportunities for increasing numbers of students with a wide variety of interests.

Several recent studies have pointed out some of the major problems facing vocational and technical education today. One of these is the need for much more flexibility in programs in order to serve a wide range of learners' interests as well as to meet the rapid changes occurring in the labor market.

In this context Kaufman, Schaefer, and Lewis *et al,* say, "Reports of various commissions have taken cognizance of the fact that 'inflexibility' of vocational programs is one of the most critical problems facing vocational education."[1]

The authors also indicate the need for improved guidance for students entering vocational education and in placing students in appropriate jobs. They say, "By any criterion, guidance, as currently carried on, was one of the major weaknesses found in this study of vocational education." This same study draws attention to the need for a wider range of vocational and technical education for girls. The authors also stress the need for breadth of training rather than emphasis on the attainment of one specific skill. In their conclusions they state,

> Many experiments have been and are being conducted for the purpose of developing new methods for teaching youth preparing to enter the labor force after graduation . . . . These developments, in general, have been ignored by vocational educators.[2]

### The Disadvantaged and Vocational Education

In a recent study Kaufman and Lewis focus attention on the problems of the disadvantaged in our society. They go so far as to say, "The major

1 Kaufman, J.J., Schaefer, C. J., Lewis, M. V., Stevens, D. W., and House, E. W. *The Role of the Secondary Schools in the Preparation of Youth for Employment.* University Park, Pennsylvania, Institute for Research on Human Resources, The Pennsylvania State University, 1967, pp. 1-3, 12-6, 13-3.

2 Kaufman and Schaefer, *et al.,* p.13-3.

domestic problem facing our nation is one of finding ways of helping those with disadvantaged backgrounds to take a more active part in its economic life."[3]

They go on to point out that appropriate vocational education could do much to assist in solving this problem, but that the typical vocational course requires average or above average skills in reading and computation:—skills that are often lacking in those from disadvantaged homes.

Furthermore, such students often have backgrounds which make it difficult for them to adjust to the requirements of the middle-class orientation typical of most school environments.

### The High School Dropout

Another related major national problem is that of the high school dropout. In their study of the effects of the school environment and its educational programs on high school dropouts, Kaufman and Lewis (1968) conclude, "the school is often rejected because of its lack of relevance to the life of lower-class adolescents."

The study suggests that cultural deprivation is a major factor leading to high dropout rates in lower-class schools. This deprivation often has resulted from retarded verbal ability and limited frames of reference for such adolescents which make it almost impossible for them to adapt to typical high school situations.

It is clear that major challenges face vocational educators if they are to play an effective role in preparing adolescents for productive roles in society.

It is the thesis of this paper that instructional technology can do much to assist in solving these problems.

## RESEARCH ON INSTRUCTIONAL MEDIA

During the past 20 years there has been a considerable volume of research on the effectiveness of instructional media for stimulating various kinds of learning and for serving a wide variety of educational needs. The decade from 1945 to 1955 was characterized by extensive programs of research on instructional films, many of which were sponsored by the military services.

This research clearly demonstrated that films could be used effectively for teaching performance skills, facts and principles, and for modifying certain kinds of attitudes. In many instances, films were used to speed up learning, as

3 Kaufman, J.J. and Lewis, M.V. *The School Environment and Its Influence on Educational Programs for High School Dropouts.* University Park, Pennsylvania, The Pennsylvania State University, 1968, p.27.

Kaufman, J.J. and Lewis, M.V. *The Issues, Evaluation, and Potential of Vocational Education in Pennsylvania.* University Park, Pennsylvania. The Institute for Research on Human Resources, The Pennsylvania State University, 1967, p.84.

for instance in the classical study by Vander Meer in which it was found that the use of films in training lathe operators resulted in savings of time and reduction of rejects.[4]

Other studies showed that the way in which a film is produced has a considerable effect on learning. Ash and Jaspen demonstrated that a slow rate of development in a film with interspersed practice could increase learning over that produced by films with normal rates of development.[5] Roshal showed that the angle from which a task is photographed can have an effect on learning and that a 'subjective' camera angle (from the learner's viewing point) is more effective than the typical 'objective' camera angle in teaching certain kinds of skills.[6] Still other studies showed that facts and principles could be taught as well by films as by teachers using demonstration materials but without films.[7]

The film research is well summarized by Hoban and Van Ormer,[8] Reid and Mac Lennan,[9] and Miller.[10]

The period from 1954 to about 1964 was characterized by a considerable amount of research on the use of television for the stimulation of learning in more or less formal classroom situations. Much of this research was initially sponsored by private foundations (notably the Ford Foundation) and later by the U.S. Office of Education under Title VII of the National Defense Education Act of 1958.

A substantial portion of this television research was devoted to comparisons between televised teaching and regular classroom teaching. In most of the carefully controlled studies where the *same teachers* taught by television and by the conventional method, there were no significant differences between the learning of the comparison groups that were subjected to the two methods (e.g. Carpenter and Greenhill,[11] Stickell.[12]) However, it is

4 Vander Meer, A.W. The Economy of Time in Industrial Training: An Experimental Study of the Use of Sound Films in Training Lathe Operators. *J. Educ. Psychol.*, Vol. 36, 1945, pp. 65-90.

5 Ash, P. and Jaspen, N. *The Effects and Interactions of Rate of Development, Repetition, Participation on Learning from a Film.* Technical Report SDC 269-7-39, University Park, Pennsylvania, The Instructional Film Research Program, The Pennsylvania State University, 1953.

6 Roshal, S.M. *Effects of Learner Representation in Film Mediated Perceptual-Motor Learning.* Technical Report SDC 269-7-5, University Park, Pennsylvania. The Instructional Film Research Program, The Pennsylvania State University, 1949.

7 Vander Meer, A.W., 1945.

8 Hoban, C.F., Jr. and Van Ormer, E.B. *Instructional Film Research 1918-1950.* Technical Report SDC 269-7-19. University Park, Pennsylvania, The Instructional Film Research Program, The Pennsylvania State University, 1950, p. 7-27.

9 Reid, J.C. and Mac Lennan, D.W. *Research in Instructional Television and Film.* Washington, D.C., U.S. Government Printing Office, No. FS 5,234,34041, 1967.

10 Miller, N.E. (Ed.) *Graphic Communication and the Crisis in Education.* Washington, D.C., National Education Association, 1957.

11 Carpenter, C.R. and Greenhill, L.P. *An Investigation of Closed-Circuit Television for Teaching University Courses.* Report No. 2, University Park, Pennsylvania, The Pennsylvania State University, 1958.

12 Stickell, D.W. *A Critical Review of the Methodology and Results of Research Comparing Televised and Face-to-Face Instruction.* Doctoral Dissertation, The Pennsylvania State University, 1963.

interesting to note that much larger groups were served by television than were taught by the regular methods. Thus, television was shown to have advantages for the instruction of large groups of students.

In many studies conducted in the public schools, comparisons were made between the learning of groups of students taught over television by an outstanding teacher who was given much time and support to develop the course, and whose efforts were supplemented by local classroom teachers, and groups of students who were taught by other teachers in regular classroom situations.

It is obvious that such studies are not highly controlled, but it is interesting to note the results as summarized by Schramm.[13] Of 393 studies, 255 reported no significant differences in learning between groups taught via television and those taught directly; 83 studies favored the television groups and 55 favored groups taught in the conventional way.

Emphasis in recent years has been on the *development* of new applications of media rather than on basic research. There is, however, ample evidence that students can learn from the new media, that new media can be used effectively for teaching facts and principles as well as performance skills of many kinds, and that where emphasis is placed on visual presentations (as in some films and television programs) learners with lower than average verbal abilities learn better from these media than they do from highly verbal presentations.

Hoban and Van Ormer summarize this latter aspect of learning as follows:

> In some cases, . . . teaching with a film . . . seems to bring about a greater increment in learning among those of lower [verbal] intelligence than it does among those of higher intelligence. However, this greater increment does not increase their total learning to the extent that it surpasses that of the average or superior groups.
>
> The few studies that have been made with semi-literate adults indicate that suitable films can bring about a definite increase in learning for these groups.[14]

The studies mentioned in this section have covered a wide range of subject matter with learners ranging in grade levels from elementary school through the university. Most of the regular academic subjects have been treated as well as such skill areas as reading, physical education, typewriting, simple and complex assembly tasks, driving, electronics, and so forth.

There is no doubt that instructional media can be used to stimulate many different kinds of learning. The next section of this report will focus attention on the application of media to the solution of various kinds of instructional problems.

13 Schramm, W. (Ed.) *Educational Television the Next Ten Years.* Stanford, The Institute for Communications Research, 1962, p. 54.
14 Hoban and Van Ormer, 1950.

## THE USE OF MEDIA FOR THE INSTRUCTION OF LARGE GROUPS

### Instructional Television

Much of the earlier media research demonstrated the feasibility and effectiveness of using media for the teaching of large groups of students. Thus, with the aid of well planned series of films or by means of instructional television, outstanding teachers and other learning resources can be extended to large numbers of students, either gathered in one place (as in an auditorium), scattered over several classrooms (as in a closed-circuit television system), or in widely scattered locations (as for instance in different schools or at home) when broadcast television is used. In addition, outstanding teaching resources, recorded on film or video tape, can be shared among school systems through direct exchange, by borrowing from regional libraries or by broadcasting.

The use of media for large group instruction is often a very efficient way of showing demonstrations and of communicating facts and principles to many learners at one time, but in most situations it is necessary to complement it with other instructional methods and situations.

For example, televised presentations to large groups are often followed up by practical work in the laboratory, or shop, or by discussion sessions in which learners have the opportunity to apply what they have learned.

It is often asserted that films and television are "passive" methods of instruction and that there are no opportunities for the learners to respond and interact. Unfortunately, this is often true in typical films or television presentations, but it does not have to be so.

It is quite practical to build into films and television lessons opportunities or requirements for learners to interact with what they are learning. For example, a principle in arithmetic can be discussed, developed, and illustrated in a television program, and then a series of short-answer problems can be presented on the screen for immediate solution by the learners. An appropriate amount of time is allowed for the learners to respond to each problem and the teacher then indicates what the correct response should be, and in this way the learner gains immediate knowledge of results. Or television can be used in a shop or laboratory to teach students an assembly task, a trouble-shooting procedure, or a quality control process. An overall orientation or demonstration can be given, with emphasis on safety precautions if necessary. During this time the students watch carefully.

Then the demonstrator goes through the procedure a second time and pauses after each step while each student completes this step by working with equipment on his shop bench or laboratory work station. This process of instruction with interspersed learner participation is continued until the procedure is completely demonstrated. The whole process may be repeated if necessary, following which the learners try it on their own. A shop instructor can then give additional help to individual students who may need it.

Television can be used very effectively in a large classroom or auditorium as a demonstration magnifier. To accomplish this, a small television camera provides close up views of demonstrations that are magnified on the screens of multiple television receivers or on a large projection television receiver, so that all learners have a "front-row" view.

In selecting equipment for televising instruction, it is important to choose equipment that is appropriate for the kind of task to be performed.

Where substantial segments of instruction are to be transmitted to students in scattered locations, or where such instruction is to be recorded on video tape, it is usually necessary to have at least two studio-type cameras with zoom or multiple lenses and view finders. This equipment need not be as elaborate as that required for broadcasting, but it should yield high quality images and be connected to monitors and a switching console so that an operator can view the output from each camera and select the appropriate camera shot for each part of the instruction. Sometimes it is desirable to add a third camera for films and slides. Of course, adequate lighting and sound equipment will be needed.

If a video tape recorder is used, it need not necessarily be of the broadcast type, but it should be such that good quality tapes are produced which are interchangeable on other machines of the same type.

At this stage of development this recommendation suggests the use of the better quality video tape machines that use tape 1" wide. For magnifying demonstrations in a large classroom or shop, a simple industrial type of camera can often be used with quite satisfactory results.

**Films**

Films are invaluable for bringing the outside world into the classroom and for providing a dimension of realism and relevance that is all too often lacking in many teaching and learning situations.

Applications of principles or processes in real life situations and new developments in business or industry can be captured on film in an exciting, graphic way. Many industries are making such films for informational purposes, and often they are available for school use without charge. It simply takes a little effort to locate them and to use them effectively in the curriculum. One useful source of information is Horkheimer and Diffor.[15]

**35mm Slides**

Today, with automatic 35mm cameras, individuals with a minimum of technical photographic knowledge can make excellent color slides which are an inexpensive but excellent means of bringing many aspects of the outside world into the classroom, and making it graphically available to the students. All too often this medium is overlooked.

15 Horkheimer, M.F. and Diffor, J.W. *Educators' Guide to Free Films.* Randolph, Wisconsin, Educators Progress Service, 1966.

### The Overhead Projector

A relatively new device that is finding increasing use in the classroom for group instruction is the overhead projector. This device projects transparent materials up to 10" x 10" in size onto a large screen. The light output is such that these projectors can be used in fully-lighted rooms.

The teacher may use the projector in a fashion similar to the chalk board by writing with a wax pencil on transparent acetate material. Or illustrations and diagrams may be reproduced on transparent acetate from books and other source materials, using a simple office copying machine. More elaborate transparencies invoiving art work, graphic layouts, and overlays, perhaps in several colors, can be purchased from publishers, or produced within the school with the aid of some professional staff help.

Transparent meters, circuit boards, chemical reactions and the like can be set up on the stage of the overhead projector and enlarged on to the screen for the benefit of large (or small) audiences. Schultz[16] gives a number of suggestions on the use of the overhead projector in technical education.

### Conclusions

The use of media for large group instruction is widely known and fairly extensively applied, particularly in the teaching of academic subjects in public schools and colleges.

The military services have made considerable use of television and films for the technical training of large groups of trainees; but use in technical and vocational schools has been quite modest and there are many opportunities for extending good teaching to larger numbers of learners through the use of these media.

## THE USE OF MEDIA FOR SELF-INSTRUCTION

While the research and development work of the period 1945-1960 focused primarily on the use of media for large group instruction, the work with media since 1960 has been directed largely towards individual learning or the self-instruction of learners.

This has considerable importance for all levels and types of instruction and particularly for vocational and technical education.

It means that certain common elements of many subjects can be taught to quite large groups with the aid of films, television, slides, transparencies and so forth, and then the individuals in these classes can pursue areas of interest in depth on their own. Or the slower learners can repeat certain aspects of instruction in order to raise the level of their comprehension or to increase the quality of their performance in a skill area.

16 Schultz, M.J. *The Teacher and Overhead Projection.* New Jersey, Prentice Hall, 1965.

This emphasis on self-instruction can also develop habits of independent learning which will enable the students to carry on a lifetime of learning during which new concepts, information or skills will need to be acquired from time to time.

This section of the chapter will consider some of the developments of media for self-instruction or individual learning.

### Instant Playback Television

It should not be assumed that television is applicable only to the teaching of large groups. The comparatively recent development of inexpensive, portable video tape recorders using ½" wide tape and small television cameras opens up many possible uses of television for individual learning.

Such equipment is now being used extensively for the improvement of skills such as public speaking or for many different kinds of athletic activities such as gymnastics, tennis, golf, dance, etc. The individual learner is videotaped while performing the skill and the tape is instantly played back so that the learner can study and correct his own performance.

Another application of this type of television equipment is for the review of television tapes of various lessons. Since the video tape machine can be operated by the individual learner, it is quite feasible to have available a library of video tapes for purpose of review or further exploration in various subject areas.

Such video tape machines have considerable potential for individual on-the-job training. Video tapes demonstrating how to perform a task, trouble shooting procedures, etc., can be prepared; the individial learner runs the tape at the job location, studies each step of the operation as shown on tape, then performs it himself on the actual equipment.

No vocational or technical school can afford to be without several of these video tape machines and a supply of tape.

### Films for Self-Instruction

There have been two major developments in connection with the instructional uses of films during the past few years which make films excellent for many kinds of self- instruction of learners at all levels.

The first of these is the development of film projectors which can be operated easily by learners themselves. These projectors are of two general types:

(1) The self-threading projectors of the regular reel type. These are now available both for 8mm and 16mm film and no student or teacher has any excuse now for not being able to project films!

(2) The cartridge-loading projectors. These are usually for 8mm films

and are available in silent and sound film models. The films are in the form of an endless loop which is encased in a plastic cartridge. These range in capacity from 4 or 5 minutes up to 20 or 25 minutes showing time. To operate the projector, the cartridge is simply inserted into the projector and the switch turned on to start the machine. When a cycle has been completed, the film is immediately ready for another showing. Such cartridge films are extremely useful for repetition of short sequences.

The second major innovation in instructional films is the development of the single-concept film. This is a type of film which deals with a single, cohesive aspect of a subject. It may be a chemistry experiment, how to make a microscope slide in biology, how to perform a backhand drive in tennis, how to adjust a circular saw safely, how to use a micrometer, and so forth.

Many of these single-concept films are now available and are packaged in instant-loading cartridges for self-instructional use by the learner. The Technicolor *Source Directory* lists over 5,000 single-concept film loops, some of which deal with subjects in the areas of vocational and technical education.[17] The number of films available in these latter fields is unfortunately quite small, at present, but there is considerable potential for future development.

A technical-vocational department should be able to produce some of its own 8mm film loops, and could provide experience for some of its students in making this type of film.

### Audio-Tutorial Instruction

The development of the language laboratory has been relatively recent. This is a self-instructional method based on the use of audio tape for providing high quality models of spoken foreign language for learners to emulate; the method provides for much drill and repetition. Some language laboratories have provision for the learners to record their own efforts and to compare them with the models presented on tape.

In the last three or four years there has been an extension of the concept of the language laboratory into other fields for the self-instruction of learners in laboratory or practical work. At the Pennsylvania State University, for example, this method, sometimes referred to as the audio-tutorial method, is used to teach laboratory work in botany and geological science.

The method is described by Westerfeld.[18] A series of small booths or carrels is each equipped with an audio tape recorder, with head set, other appropriate apparatus (in the case of botany a microscope, etc.), specimens,

17 Technicolor. *Source Directory Educational, Single-Concept Movie Loops in Instant Loading Cartridges.* 1300 Frawley Drive, Costa Mesa, California, 1967.

18 Westerfeld, W.F. *The Audio Tutorial Laboratories.* University Park, Pennsylvania, Botany Department, The Pennsylvania State University, 1967.

and other materials. The laboratory instruction is pre-recorded on tape, and each student is individually guided through a series of laboratory exercises ranging from the simple to the complex.

On instruction from the tape recorder he sets up apparatus, makes observations, and measurements, conducts experiments, etc. He may be asked from time to time to look at a single-concept film loop which will show him visually how to perform a certain operation.

The advantage of the method is that the laboratory can be kept open all day and even into the evening; students can sign up to come in at any convenient time. They can repeat the laboratory exercise or parts of it at will, and the use of head sets leaves both hands free for manipulative work.

The audio-tutorial method is often used as a complement to large group instruction; it would appear to have considerable potential for use in vocational and technical education.

**Dial-Access Instruction**

Another approach to the application of technology for individual instruction is the use of learning carrells with dial-access to instructional materials.

In its simplest form this consists of rows of booths or carrells set up in the fashion of a language laboratory. The carrells are connected to a central source of information which can be dialed by students using a telephone-type of dial system.

At present such systems depend principally on audio information pre-recorded on magnetic tape. A large number of tape machines (program sources) are located at a central point. Each week the program offerings are advertised and students come to a carrel and dial the programs they need. These carrels can be located at different points in a school building, such as the library, or learning resources center, special classrooms, and other locations.

While this idea originated principally for language instruction, the dial-access system is being expanded to encompass many other fields such as literature, speech, theatre, the sciences and so forth. It could certainly be used for technical and vocational education where individual learners could be given instruction in audio form "on the job" so to speak.

Recent developments of dial-access systems also include instruction recorded on video tape which can be dialed by the learner as he needs it.

**Programed Instruction**

Although the basic principle of programed instruction goes back to the days of Socrates whose students were often taught by posing to them a series

of questions and giving them knowledge of results, this approach to individualized learning has been subject to much research and development in the 1960's.

Programed instruction is not so much a method of instruction as it is an instructional process. It involves a careful analysis of learning objectives and then the development of a series of short problems or "frames" which the learner attempts to answer. Immediately following his effort to answer a problem, the learner is given knowledge as to whether he is right or wrong. Then the next problem is presented. Each learner proceeds at his own speed and is given general tests of achievement at intervals so he can assess his own progress.

Some programs are "linear," that is, every learner goes through the same series of steps or frames. Other programs are "branching" in that, depending on responses to specific questions, learners are branched through additional material if necessary. Thus, the fast learner goes through the material quickly and with few branchings. The slower learners are branched frequently and thereby receive repetition and additional instruction.

Programs are generally tested on sample groups of learners, whose performance is analysed and used as a basis for revision and improvement of the program. Thus, development of a good program is truly empirical.

Many programs are available in printed book form, with or without pictures. More complex programs, perhaps involving slides, short films and audio material may be presented on a teaching machine. These are described by Glaser.[19]

While increasing numbers of programs are becoming available from publishers,[20] in some fields it is necessary for educators to develop their own programed materials. This is not difficult to do. Useful guides to the planning and preparation of programed materials are to be found in Lysaught and Williams,[21] and Markle.[22]

Programed instruction would appear to have many applications in technical and vocational education, and indeed it has been successfully used for these purposes by the military services.

### Computers and Instruction

This is the era of the computer, which is finding many applications in education. In fact, school systems today can hardly afford to be without access to a computer. Computers have many administrative applications in education: for scheduling courses for students, for grade recording and

19 Glaser, Robert. *Teaching Machines and Programmed Learning II.* Washington, D.C., Department of Audio Visual Instruction, National Education Association, 1965.

20 See *Programmed Instruction Guide.* Northeastern University, Boston, 1967.

21 Lysaught, J.P. and Williams, C.M. *A Guide to Programmed Instruction.* New York, John Wiley, 1963.

22 Markle, Susan. *Good Frames and Bad: A Grammar of Frame Writing.* New York, John Wiley, 1964.

reporting, for purchasing, handling payroll and so forth. In addition, increasing numbers of students need to be trained in computer programing and in the maintenance of computers and peripheral equipment. Thus, there is a special place for computers in vocational and technical education.

In the section, the discussion will be focused principally on computer-assisted instruction or CAI as it is commonly called.

The computer can be regarded as a teaching machine *par excellence.* Properly programed, it is capable of storing vast amounts of information and of displaying this information to learners in various ways. It can be programed with a considerable number of branching routines, and, depending on a learner's response to a question or problem, he can be guided through new material appropriate to his individual needs or level of comprehension. Thus, each individual learner could take a different path through a given body of material.

In addition, the computer can be programed to keep a record of every step each learner takes, and the analysis of this information can yield much data about the learning processes of different individuals.

There are several configurations of equipment now available which permit learners to interact with a computer. The most commonly used has been a typewriter terminal by means of which the individual learner responds to questions which the computer presents to him also via the typewriter.

More recently, random access slide projectors and audio tape recorders have been added to the typewriter terminal in order to present diagrams, pictures and sound in addition to printed material.

Current hardware developments incorporate even more sophisticated terminals which include in addition to the typewriter, a video and audio display (like television), and a film and slide display. The learner can respond to these displays with a "light pen." By pointing with this device, at one alternative of a multiple choice question for example, the computer will record the response, tell the learner whether he is correct or not, and then display the next appropriate frame. With present special purpose computers, a number of such terminals can be served at one time.

The development of programs for CAI is time consuming and rather costly. It may take as long as two man-years to develop and refine a program. To date, there are relatively few tested, completed programs available, but much research and development work is in progress.

One solution to the cost problem of CAI may be to develop mobile CAI units, housed in semi-trailers, with special programs and to have these move from school to school on a scheduled basis.

Perhaps the best summary of the present state of development of CAI is that given by Mitzel:

> "Computer-assisted instruction, of all the new educational technologies, is in flux and cannot be stabilized with respect to hardware, author languages and teaching strategies for a few more years . . . . Universities like Penn State, engaged in carefully

planned research activities, need time and funds to investigate and consolidate what they are learning about CAI before being forced to evaluate its ultimate application in education."[23]

This section has focused principally on the ways in which instructional media can be used to expand learning opportunities for large groups of students, or for highly individualized instruction of learners.

As was stressed at the beginning of this chapter, instructional media are only means to ends. The next section will concentrate on identification of ends or learning objectives and how to achieve them.

## THE SYSTEMS APPROACH TO TEACHING AND LEARNING

Many schools have acquired educational media, but all too often these are used in a very limited way, largely because they are not conceived of as an integral part of an overall system which is designed to achieve specific learning objectives.

The development of the processes involved in programmed instruction has focused attention on what is called "empirical course development," or more broadly, the systems approach to teaching and learning. Much has been written recently on this subject. Several good recent references are "Instructional Materials: Educational Media and Technology,"[24] and "Technology and Curriculum Planning."[25] Each of these two publications contains many additional references.

This approach begins with a task analysis, or a careful formulation of learning objectives, not expressed in terms of content but in terms of desired behavior on the part of the learner. In other words, what should the learner be able to do as a result of exposure to a specific unit of instruction or an instructional program?

An analysis of objectives in this way should not only include a consideration of teachers' objectives; it should also include learners' objectives. The curriculum designer should constantly ask, "Why should the learner be able to do this as a result of this course?" Much content is included in a course or curriculum for traditional reasons, and the question of educational *relevance* for the learner is often ignored.

Bloom, et al.[26] and Krathwahl, et al.[27] provide a classification of various kinds of learning objectives. Mager,[28] Mager and Beach,[29] and Walbesser[30]

23 Mitzel, H.E. *Experimentation with Computer-Assisted Instruction in Technical Education.* Report R-9, University Park, Pennsylvania, The Pennsylvania State University, 1968.

24 "Instructional Materials: Educational Media and Technology," *Review of Educational Research* (entire issue) Vol. XXXVIII No. 2, April 1968.

25 "Technology and Curriculum Planning," *Audio Visual Instruction* (entire issue). Vol. 13, No. 3, March 1968.

26 Bloom, B. (Ed.) *Taxonomy of Educational Objectives: Handbook I: Cognitive Domain.* New York, Longmans, Green, 1956.

27 Krathwahl, D.R. (et al.) *Taxonomy of Educational Objectives: Handbook II Affective Domain.* New York. David McKay, 1964.

28 Mager, R.F. *Preparing Instructional Objectives.* Palo Alto, California, Fearon, 1962.

29 Mager, R.F. and Beach, K.M. *Developing Vocational Instruction,* Palo Alto, California, Fearon, 1967.

30 Walbesser, H.H. *Constructing Behavioral Objectives.* College Park, Maryland, Bureau of Educational Research and Field Services, University of Maryland, 1968.

describe procedures for developing learning objectives in behavioral terms.

In this writer's opinion, the careful analysis and formulation of learning objectives in terms of learners' needs and desired behavior can do more to improve instruction than any other single development.

After objectives have been carefully established, appropriate tests are developed to assess the degree to which students are able to achieve the specified behavior. One of the weakest areas in school curricula is that of testing or evaluation. Except where rather traditional academic subjects are concerned, it is unlikely that standard published tests will be suitable for this purpose. Rather, special tests will be needed that are reliable and valid tests of the specified objectives.

At this stage, it is appropriate to think about content that is appropriate to the objectives and about methods of instruction. The methods of instruction will depend upon many factors. They should be based on sound learning principles that give attention to motivation, learners' interests, practice, and reward or reinforcement.

In addition, the methods chosen will be affected by the learning situation--whether the learners can be taught certain aspects of the subject in large groups, whether individual study is desirable and can be used. The balance between theory and practice must be considered.

It is likely, as a result of these considerations, that the resulting instructional system will involve a combination of methods rather than a single method and will include a range of instructional media.

Actually the traditional method of teaching students in groups of 25 to 30 may be good from the teacher's viewpoint, but it may be very poor for the learner. Learners should be prepared for a lifetime of learning, and they need to be exposed to a wide variety of learning situations including large group instruction at one extreme and independent, self-instruction at the other. They should be weaned from dependence on a teacher progressively as they advance through their schooling.

The next step in the systems approach is to test the developed instruction with a representative group of learners, using the tests already prepared. The results of this testing are then analysed and weak parts of the instruction are identified and revised, after which further testing is undertaken and the course or program is ready for general use.

This procedure has become more or less standard practice in developing programed instruction for computer-assisted instruction. So far it has had only limited application in the regular curriculum or in technical or vocational schools. On the other hand, the military services are beginning to use this approach fairly widely. This writer was an advisor to the Air Force on the development of such a multi-media course in electronics. Behavioral objectives for each lesson were spelled out in detail, tests developed, and the lessons were tested and revised until satisfactory performance standards were achieved.

Thus, if effective use is to be made of educational technology, it must involve appropriate "soft ware" as well as "hardware," and much attention in

the future needs to be given to a systematic approach to the design of instruction and the development of multi-media learning situations.

A further discussion of this subject can be found in the report of a national seminar entitled *Educational Media in Vocational and Technical Education,* edited by Cotrel and Hauck.[31]

## THE ADMINISTRATION OF INSTRUCTIONAL MEDIA

During recent years the major problems schools have faced with respect to instructional media are not the acquisition of equipment but the reluctance of teachers to use media and the general lack of know-how in making systematic, effective use of media as a part of an overall curriculum designed to achieve specified learning objectives.

### Media Institutes for Teachers

Unfortunately, most teachers have had little training in the use of instructional media, in the analysis of learning objectives and the design of lessons or learning situations which maximize the use of media both for large group instruction and for individual learning.

However, remedies are now at hand for such problems. First, many colleges and universities offer regular programs of instruction in instructional media for teachers. Secondly, there is a large number of special summer institutes each year which focus on educational technology and its effective application. These are designed specifically for experienced teachers who wish to update themselves, or for those who desire to become media coordinators in school systems. Many of these institutes are sponsored by the Office of Education under Title XI of the National Defense Education Act.

The Educational Media Council[32] publishes an annual directory of Summer Session Courses on Educational Media from which teachers can select institutes appropriate to their needs.

### Instructional Services

Even enthusiastic and prepared teachers or motivated learners can make little effective use of educational technology without adequate supporting services to acquire and maintain suitable equipment, to assist in the planning and production of appropriate instructional materials, and to make it easy for teachers and students to use such equipment and materials.

Many schools and colleges are now establishing organizations with the staff, facilities and space to provide these kinds of services. Such an organization may have learning and media specialists, experts in making films, slides, projectuals and graphics and in producing television lessons. While many good instructional materials (especially films) can be purchased, many others need to be produced locally to meet local needs.

31 Cotrell, C. J. and Hauck, E. F. (Eds.) *Educational Media in Vocational and Technical Education.* Columbus, Ohio, The Center for Research and Leadership Development in Vocational and Technical Education, The Ohio State University, 1967.

32 Educational Media Council. *1968 Directory of Summer Session Courses on Educational Media.* 1346 Connecticut Avenue, N.W., Washington, D.C. 20036.

Furthermore, students can be employed in the production processes and in the operation and maintenance of equipment. This provides not only an involvement in teaching situations, but it gives students training in skills which are in heavy demand. Vocational and technical schools have a great opportunity to capitalize on this situation.

The Instructional Services Center should be readily accessible to teachers, should have a service orientation and a reasonable operating budget.

A number of useful suggestions on the local production of learning materials is included in *Audio Visual Instruction* for April 1968.[33]

### Learning Resource Centers

As mentioned earlier in this chapter, an important trend in the use of media is for individual self-instruction. This use of media allows individual students to pursue their interest in depth, on a self-instructional basis.

Such a plan requires appropriate facilities for proper use. School libraries or shops can be converted into Learning Resources Centers. Not only are books, or typical equipment available, but films, slides, TV tapes, etc. can be readily available for use by students. Such a center may have dial-access equipment, which permits a student to dial a lesson or some special information he needs.

In shops there may be work benches equipped with audio-tutorial equipment, video tape playback monitors, or cartridge-loading film projectors. In such an environment, a student can learn new skills or information as he needs it.

### Organization of the School Schedule

One of the principal barriers to individualized learning and to the effective use of media is the rigid organization of schools' daily schedules of classes. Students are obliged to move in lock step; they have limited time to visit a library or other special resource center.

A few innovations in the organization of the school day and the structuring of classes are gradually being introduced, providing much more diversified learning opportunities for individual students.

For example, in some schools, once each day, four classes come together for a period. During this time, media may be used for large group instruction in an auditorium by one of the teachers or by a visiting resource person, or the four teachers may act as a team in jointly presenting a lesson on an appropriate topic.

On other days, most of the students in the combined groups may go to the learning resources center for individual project work, or small group projects, while the four teachers work with those who need special help.

In a vocational-technical program, the shop areas may have self-instructional arrangements set up in the shop or in small adjacent areas so that all students may get some uniform, basic instruction and then be split up for self-instruction using appropriate media and other resources.

33 *Audio Visual Instruction,* Vol. 13, No. 4, April 1968.

In any event, classrooms and shops should be designed so that media can be effectively used. For some uses of media, attention must be given to adequate room darkening, acoustical treatment, ventilation, and projection arrangements. In other instances, room darkening may not be necessary. It should be noted, however, that most school buildings are poorly designed from the viewpoint of learning in general and for the use of media in particular.

In Summary, the effective application of media in school systems requires a number of conditions:

(1)A sympathetic and imaginative administration.
(2)Teachers who are trained in the use of educational technology.
(3)Specialized supporting staff with resources and budget.
(4)The development of appropriate materials, courses or lessons, empirically tested.
(5)An environment in which learners can use the media and materials on an individual self-instructional basis, as well as having them available to teachers for large group instruction.
(6)A school day which is organized to permit and encourage such flexible, instructional arrangements.

## EDUCATIONAL TECHNOLOGY AND THE DISADVANTAGED

### Assisting the Non-Verbal Learner

In the opening sections of this chapter, reference was made to research studies that indicate the nature of the special learning problems of the disadvantaged and the school dropout.

Several of these studies point out that such students often have limited verbal and reading skills because of poor home background, but many have excellent non-verbal abilities including ability to see spatial relationships, mechanical skills, manipulative skills, and even oral skills.

For such students the typical high school program appears to be non-relevant, and many have had difficulty in adjusting to it. As a consequence, they may have had unhappy encounters with teachers towards whom they have developed aversive attitudes. However, given an appropriate program of studies, appropriate materials, and sympathetic treatment, such students can become highly motivated, effective learners.

What role can educational technology play in helping these students to learn?

(1)Many such students have an interest in technology and much skill with technical equipment. They are, therefore, inclined to adapt to its use quite readily.
(2)Non-verbal materials such as films and television may assist such students to learn more effectively than the typical methods that depend on talk and textbooks.
(3)Many such students have developed an aversion to teachers. They may well find self-instruction, using media, a non-

threatening learning situation which presents a challenge to which they can respond effectively.

(4) The availability of such media can bring the outside world into the classroom, and give more relevance to instruction.

(5) The use of media for self-instruction can provide considerable flexibility in the learning situation so that individuals with differing needs can each pursue his own particular interests in depth.

### Special Applications of Media

Special applications of media may be particularly relevant in guidance of such students. Films of job situations in various fields may help such learners to develop new kinds of job interests, and they can learn how to function on the job in a vicarious way before being actually confronted with the work situation.

Similarly, tests of learning can be made much more interesting and reliable for such learners if they are presented in pictorial form rather than in written form. For example, life-like problems can be presented on video tape or sound film for students to diagnose and solve. Such problems can vary from simple ones showing a sequence of steps and asking what comes next, or asking why someone is doing a particular task incorrectly, to rather complex trouble-shooting problems, or human behavior situations which the student is asked to analyse.

## GENERAL CONCLUSIONS

Educators have made little use of educational technology in the ways described in this chapter. The opportunities are great, especially in the fields of vocational and technical education. The costs may appear to be high, but the unit-cost can be low if sufficient numbers of students are available and use the systems.

The use of educational technology in the ways indicated can not only improve instruction but can provide greatly expanded individualized learning opportunities for students, especially for the non-verbal, disadvantaged learner.

Significant changes in the present mode of operating vocational and technical schools will be needed in order to realize these potentials.

Chapter X.

# Occupational Education in Massachusetts' Regional Community Colleges*

The purpose of this chapter is to study the proper role of the regional community colleges in Massachusetts in meeting the needs for technicians and other kinds of semi-professional personnel in business, industry, medicine, and a variety of service fields.

The chapter includes some background information needed to understand the developing community college movement nationally and to set the rationale for the community college movement in Massachusetts. Information is also presented on vocational education, i.e. programs eligible for financial support from the federal government under the provisions of the Vocational Education Act of 1963 (Public Law 88-210) and its predecessors, in order to assess past performance in the Commonwealth in comparison with the national effort of selected states.

## HISTORICAL BACKGROUND

Some authorities trace the history of the junior college movement back to the middle of the nineteenth century. In recent years, since 1917, it has been easier to follow the development of these institutions because their enrollment has been recorded by the United States Office of Education in the **Digest of Educational Statistics.** In the year 1917-1918, approximately 4,504 students were enrolled in 46 junior colleges throughout the United States. In

* This chapter was prepared mainly by Kenneth A. Brunner, Professor and Chairman, Department of Higher Education, Southern Illinois University, Carbondale, Illinois.

1920 the first national junior college conference was held and the following year the American Association of Junior Colleges was organized.

At the beginning, privately supported two-year institutions were more numerous and enrolled more students. In 1925-26 the enrollment of the public institutions overtook that of the private segment and in 1941-42 the number of public institutions predominated, 231 to 230.[1] The most recent available data show 479 public and 276 private two-year colleges enrolling 1,192,000 and 139,000 students respectively.[2]

In contrast, data for the same year (1966) for Massachusetts indicate that the private two-year institutions and not public-supported institutions dominate: 1) in number of institutions, 22 private to 14 public, and 2) in enrollment, 16,057 in privately controlled two-year colleges and 13,387 in public community colleges.[3]

Early authorities regarded the junior college as the upward extension of secondary education for two (13th and 14th) years. Since the second world war, junior colleges have more commonly been identified with higher education. There has also been strong sentiment in favor of terming tax-supported institutions community colleges, rather than junior colleges. However, at the present time both usages are interchangeable. In part, the move to new terminology is intended to recognize that the functions of these two-year institutions are broader than the early-day responsibility to provide two years of education parallel to that offered in the freshman and sophomore years of liberal arts colleges. Today, many of these public institutions also accept the responsibility for providing occupational preparation through one-year certificate programs and two-year programs which lead to the awarding of an associate degree, but which are not specifically designed as transferable courses to four-year colleges. As recently as 1953 a study of 302 community colleges revealed that 80 per cent of the occupational programs (at that time referred to as "terminal" programs) were concentrated in five per cent of the institutions studied.[4] Since that time, and particularly in the last five years, the American Association of Junior Colleges

1 Kenneth A. Simon and W. Vance Grant, *Digest of Educational Statistics*, 1967 ed., U.S. Department of Health, Education, and Welfare, OE-10024-67 (Washington, 1967), p. 75.

2 *Opening Fall Enrollment in Higher Education, 1966*, Department of Health, Education, and Welfare, OE-54003-66 (Washington, 1967), pp. 7, 109.

3 The Department of Education of the Commonwealth of Massachusetts lists (see addendum A) 15 private junior colleges and 14 public junior and community colleges "which have authority from the General Court or from the Massachusetts Board of Collegiate Authority to use the title "junior college" and/or to confer associate degrees." Thus, it is apparent that an additional seven private two-year institutions in Massachusetts are counted in United States Office of Education statistics. These are junior colleges or business and other kinds of semiprofessional schools not coming within the scope of the foregoing definition. See H.E. W. 1967, pp. 22-3, 28-9, 58-60.

4 Gail Shannon, "Terminal Programs in the Public Junior College," *Educational Research Bulletin*, Ohio University, V. 32, 1 (Jan. 1963), pp. 7-10.

has been giving strong leadership to broaden programs so as to increase and enlarge the role of community colleges in occupational education. A foundation grant enabled the association to add to its staff four occupational education specialists, to publish an Occupational Education Newsletter, and to hold a number of regional conferences throughout the nation which deal with various aspects of occupational education in junior colleges.[5]

## THE COMMUNITY COLLEGE MOVEMENT IN MASSACHUSETTS

Massachusetts, like other eastern states, has depended heavily upon the private sector to provide higher education. Even in the areas of occupational education this has been the case.[6] Until the recent surge of young people from the high schools not yet ready for the labor market and not able to gain access to increasingly over-crowded and selective four-year colleges, this was an acceptable arrangement in Massachusetts. By 1958, however, the need to establish a system of public community colleges in the Commonwealth was recognized when the General Court adopted a recommendation of a State Needs Commission and passed the enabling legislation for the Regional Community College System.[7] Berkshire Community College in Pittsfield was the first to enroll students in September 1960. At the time the field work for this paper was conducted, the twelfth institution was being welcomed into the system, Springfield Technical Institute, to be renamed Springfield Technical Community College.

For those interested, details about legislative action are included in the Deyo report. Fiscal autonomy, like that previously granted the University of Massachusetts and the State Colleges, was granted to the Board of Regional Community Colleges in Chapter 737, Acts of 1964. The Willis-Harrington Act, Chapter 572, Acts of 1965 assigned post-high school education approval to the Board of Higher Education and defined the duties of the Board of Regional Community Colleges to include planning, establishing, and maintaining regional community colleges in the Commonwealth. Under the Act, the Board of Higher Education has a coordinating responsibility for the

5 *Emphasis: Occupational Education in the Two-Year College,* American Association of Junior Colleges (Washington, 1966); Norman C. Harris, *Technical Education in the Junior College: New Programs For New Jobs,* American Association of Junior Colleges (Washington, 1964); Albert J. Riendeau, *The Role of the Advisory Committee in Occupational Education in the Junior College,* American Association of Junior Colleges (Washington, 1967).

6 Similar data were published for 1956, 1957 and 1958. Data for 1959, 1960 and 1963-64 were gathered but not published except in summary form in various Federal publications, inciuding *Digest of Educational Statistics.* See Ken August Brunner, *Guide to Organized Occupational Curriculums in Higher Education, 1962,* Department of Health, Education and Welfare, Office of Education, 770, OE-54012-62 (Washington, 1965).

7 Since this study adequately summarizes the recent history in Massachusetts, with recommendations for action, readers are encouraged to review it carefully. See Donald E. Deyo, *A Summary Report: Access to Quality Community College Opportunity. A Master Plan for Massachusetts Community Colleges Through 1975,* Massachusetts Board of Regional Community Colleges (Boston, 1967).

Board of Regional Community Colleges, but the latter board depends upon the General Court for its authority and funding. In fact, the General Court makes decisions on appropriations for each individual community college separately without necessarily conferring with the staff of the Board of Regional Community Colleges. Thus, the individual regional community colleges must maintain lines of communication not only with the Board of Regional Community Colleges but also with members of the General Court. Once funds have been appropriated for capital construction, each community college must also work under the supervision of the Massachusetts Building Authority, an additional communications responsibility.

All colleges are presently operating in renovated facilities, usually former high school buildings of some age. Building programs, though underway for three community colleges, are moving rather slowly because of the multiple clearances required.

The Board of Regional Community Colleges designates its chief executive officer as president and its chief liaison officer for legislative relations as executive director. Each of the community colleges is headed by a president and each is organized somewhat differently below the president, although each has its own "advisory board." Information about occupational education in the regional community colleges will follow a description of vocational education in the Commonwealth which has special pertinence to this paper.

## ASPECTS OF VOCATIONAL EDUCATION

Throughout Massachusetts there are a number of private business schools, trade schools, and independent vocational schools which offer programs in electronics, automobile mechanics, radio and television servicing, and other specialized fields. Information about these schools is difficult to obtain and evaluate because they are not included in recurring, systematic statistical surveys either by the United States Office of Education or by any Massachusetts agency. In general, it is enough to say that they meet the needs of limited numbers of students by providing highly specialized training programs to prepare for fairly specific jobs, and that education in the broader sense, which includes socio-humanistic studies, is not usually a factor in their curriculum planning; even when included, it is very much secondary to their goal of rapid development of marketable job skills.

Data on federally-funded vocational education programs are available on a regular systematic basis. Some of these data will be used to compare performance in the Commonwealth with that of selected states and the nation generally.

Figure 1 shows Massachusetts' relative ranking among the states in 1965 in total vocational education enrollment, preparatory and extension (or

supplementary), and in each of seven categories of programs.[8] Recognizing the fact that Massachusetts ranked tenth in population in 1965, its rank of twenty-seven in total vocational education enrollment suggests that, overall, it was not enrolling its share of students in federally-supported vocational education programs. Only in one field, trade and industry, did it enroll close to its share of students, ranking fifteenth.

Under the provisions of the National Defense Education Act of 1958 (NDEA), the federal government was authorized to provide matching funds to the states for training highly skilled technicians in defense-related occupational areas. At first the programs which developed were identified as "area vocational school programs" or "Title VIII technician training programs," but came to be generally known as "technical education programs." In this way, they are distinguished from the old-line vocational programs in agriculture, distributive education, trades and industry, and home economics. Although some of the foregoing programs included high school graduates among their students, the majority have been post-secondary level courses and programs.

The NDEA technical education programs from the beginning in 1959 have enrolled more post-secondary than secondary students in their full-time offerings. Extension (or supplementary) courses, i.e. those offered at night or in the late afternoon for persons already on the job, have not been clearly identified at either the secondary or post-secondary level. The 1964 report refers to these classes as "adult supplementary" and the 1965 report as "adults-preparatory and supplementary." Thus, the data may not be strictly comparable with those of prior years when preparatory programs, including those for adults, were reported in the "secondary" or "post-secondary" classifications rather than in the one for "extension classes."[9] Total enrollment in adult or extension classes in technical education was 130,000 in fiscal year 1965 with 95,700 enrolled in the usual preparatory curricula in technical education, of which 71,800 were in post-secondary classes.[10]

Several comments from the most recently published report on federally-funded vocational and technical education programs indicate the pertinence of this area of education to this chapter:

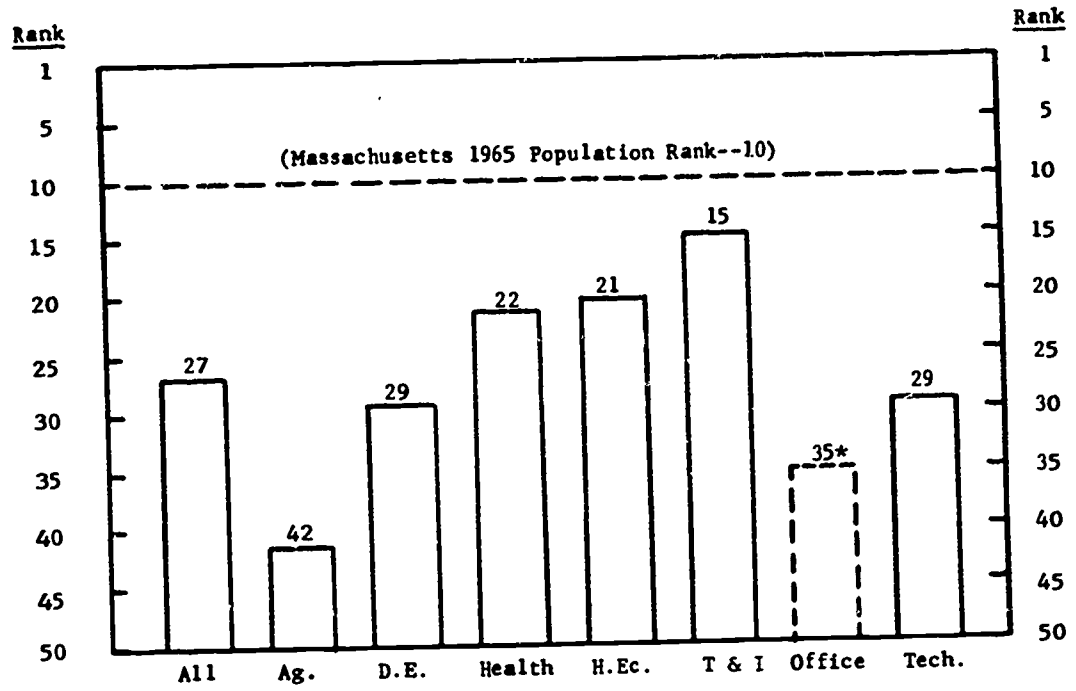
> Most of the technical education programs require 2 years of rigorous study at the post-secondary level. The training prepares youths and adults for study at the post-secondary level. The training prepares youths and adults for highly skilled technical

8 The most recent published data are for 1965. See H.E.W. 1968.

9 Also, in recent years, the terminology is changing to recognize what were previously identified as technical education programs as vocational-technical programs under Title III of the George-Barden Act. This is nothing really new. The Vocational Education Act of 1963 (Public Law 88-210) made permanent NDEA Title VIII which technically added Title III to the George-Barden Act.

10 H.E.W. 1968.

Figure 1 Massachusetts' Rank Among the States in Vocational and Technical Enrollment in Fiscal Year 1965 [a]




*Note: Sixteen states, including Massachusetts, reported no enrollment in Office Occupations.

aSource: Vocational and Technical Education, Annual Report/Fiscal Year, 1965. Washington: U.S. Department of Health, Education, and Welfare, OE-80008-65, 1968, p. 32.

occupations assisting professional personnel in specific fields of applied science (engineering, scientific, medical and health services).

Most of the technical programs were offered at the post-secondary level. Employers now seek the more mature and better prepared 2 year college associate technician in contrast to the past practice of employing high school graduates with some technical or pretechnical preparation.

Table 10-1 provides a basis for comparing technical and other vocational education enrollment since the 1959 NDEA Title VIII programs were launched in Massachusetts with six other states and with the aggregate United States. Two states, Connecticut and New York are neighbors of Massachusetts. New York has developed a system of public community colleges and technical colleges to meet her need for occupational education. Connecticut has a coordinated statewide system of public technical institutes and vocational schools for some occupational education, but has been heavily dependent upon private institutions for a variety of occupational education programs as well as for other kinds of higher education. Missouri, closer to Massachusetts in total population (ranking thirteen), has until recently depended upon regular or comprehensive secondary schools for providing vocational education programs. The State of Washington was chosen because it represents the state which has given the largest higher education role to public institutions. Its junior colleges alone have provided a larger proportion of that state's graduates from occupational programs than have the combined public and private institutions for Missouri and most other states with a greater total population. North Carolina and Virginia rank 11 and 14, respectively, in total population and are just beginning to use statewide community college systems for their technical education programs. North Carolina's community college system has been developed from a statewide system of industrial education centers similar to Connecticut's system of technical institutes and regional vocational schools. Virginia originally had nine area vocational and technical schools in operation under supervision of the state education department as well as four technical institutes which were units of one of the state colleges or universities. The new system is combining these somewhat diverse institutions under the supervision of a recently established Department of Community Colleges. Because these recent developments are not yet reported in publications of the United States Office of Education, the information in Table 10-2 does not accurately reflect the current situation, but the data are useful in noting the differences among the seven states (and the similarities) with respect to the types of institutions which enrolled students in vocational and technical education programs supported by federal funds.

Massachusetts is the only state which located all of its federally-funded vocational education programs solely in secondary schools. In contrast,

Missouri, North Carolina and Virginia located none of their programs in purely secondary vocational-technical schools, although each did use the resources of their comprehensive high schools for this purpose. Of the selected states, Missouri, New York and Washington are the chief users of community or junior colleges for vocational education programs. Since 1965, it is clear that North Carolina and Virginia have moved to this kind of post-secondary institution rather than that shown in Table 10-2.

A reference to Table 10-1 will reveal that there were increased enrollments each year in both technical and other vocational education programs for the entire United States. None of the seven selected states exhibits these enrollment patterns. North Carolina dropped from 1964 to 1965 in technical education enrollments, but showed increasing enrollments each succeeding year in other vocational programs. Technical education enrollments in Massachusetts, Missouri, and New York increased each succeeding year, but each state showed some fluctuation in other vocational enrollments. **When the population factor is taken into consideration, the relatively inadequate enrollments in Massachusetts are clearly revealed. Even states with smaller populations than Massachusetts consistently enrolled more technical students.** In recent years, New York has enrolled five and seven times as many students as Massachusetts, with only three and one-half times the population.

Only when the post-secondary preparatory enrollments are examined, a somewhat different picture emerges. It is these enrollments which are more likely to be in programs similar in level and content to those of institutions of higher education, particularly community colleges. A breakdown of preparatory enrollments is not available for 1959, but, with that exception, Table 10-3 shows the distribution of the technical education enrollments among extension (supplementary) classes, secondary preparatory, and post-secondary preparatory curricula for the same seven states used in Tables 10-1 and 10-2, and for the aggregate United States.

From this additional information several interesting observations can be made. In Washington, 90 per cent of the technical education enrollments were in extension classes in the first five years, but with a falling off in 1964 and 1965. Connecticut's post-secondary enrollments in the recent years are somewhat less than those for Washington with a similar population, and approximately the same as North Carolina (except 1965) which has a population almost as large as Massachusetts. **Again, Massachusetts lags behind the others, although enrollments in technical education programs in Massachusetts are relatively balanced among the three categories of extension classes, and secondary and post-secondary preparatory curricula.**

It is understood that in 1966 and 1967, the regional community colleges received federal vocational education funds, but data from other states are not available for comparative analysis.

## Table 10-1

**Enrollment in Federally supported technical and other vocational education programs in selected states and aggregate United States, 1959 through 1965[a]**

| State | Population (in millions) | | Enrollments (in thousands) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Technical education | | | | | | | Other vocational education | | | | | |
| | 1960 | 1965 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 |
| Connecticut | 2.5 | 2.8 | 8.9 | 6.7 | 8.3 | 4.4 | 5.7 | 7.8 | 9.3 | 20.6 | 16.2 | 22.8 | 26.4 | 26.8 | 25.3 | 24.4 |
| Massachusetts | 5.1 | 5.3 | 0.6 | 0.8 | 1.2 | 1.4 | 1.6 | 1.6 | 1.7 | 68.7 | 64.4 | 66.4 | 68.0 | 70.9 | 70.4 | 70.3 |
| Missouri | 4.3 | 4.5 | 0.2 | 0.9 | 1.4 | 1.5 | 1.8 | 2.1 | 2.4 | 66.4 | 62.5 | 65.5 | 66.0 | 70.0 | 67.8 | 79.1 |
| New York | 16.8 | 18.0 | 1.0 | 1.7 | 2.6 | 3.3 | 6.2 | 9.0 | 13.2 | 207 | 196 | 185 | 192 | 239 | 323 | 448 |
| North Carolina | 4.6 | 4.9 | -- | 1.1 | 1.6 | 2.0 | 3.3 | 5.9 | 4.8 | 128 | 134 | 142 | 164 | 171 | 182 | 195 |
| Virginia | 4.0 | 4.5 | 1.2 | 0.6 | 0.7 | 0.7 | 1.4 | 2.3 | 1.9 | 100 | 101 | 106 | 106 | 115 | 113 | 187 |
| Washington | 2.9 | 3.0 | 4.5 | 9.8 | 10.0 | 11.3 | 13.8 | 10.8 | 9.6 | 110 | 96.6 | 96.3 | 111 | 111 | 111 | 134 |
| Aggregate U.S. | 179 | 194 | 49 | 101 | 123 | 149 | 185 | 221 | 226 | 3652 | 3667 | 3733 | 3924 | 4032 | 4345 | 5205 |

[a] *Digest of Annual Reports of State Boards for Vocational Education*, U. S. Department of Health, Education, and Welfare — Office of Education (Washington, 1959, 1960, 1961, 1962, 1963, 1964, 1965). (Some have slightly different titles, but are essentially the same reports.)

## Table 10-2

### Number of schools offering vocational education, by types of institutions and in selected states and aggregate United States, fiscal year 1965[a]

| State | Grand total | Vocational technical (secondary) area or regional | Vocational technical (secondary) local | Technical vocational (post-secondary) | Community or junior college | University or college | Regular or comprehensive secondary school | Combination secondary-post secondary vocational technical school |
|---|---|---|---|---|---|---|---|---|
| Connecticut | 104 | 14 | -- | 4 | -- | 1 | 85 | -- |
| Massachusetts | 133 | 57 | -- | -- | -- | -- | 76 | -- |
| Missouri | 405 | -- | -- | 3 | 16 | 2 | 371 | 13 |
| New York | 787 | 62 | 29 | -- | 17 | -- | 679 | -- |
| North Carolina | 716 | -- | -- | 12 | 2 | 2 | 700 | -- |
| Virginia | 553 | 9 | 10 | 6 | 2 | 4 | 517 | 5 |
| Washington | 299 | -- | -- | 10 | 17 | -- | 272 | -- |
| Aggregate U.S. | 16890 | 294 | 100 | 225 | 319 | 70 | 15,741 | 130 |

a *Vocational and Technical Education, Annual Report/Fiscal Year 1965.* U. S. Department of Health, Education, and Welfare, OE-80008-65, (Washington, 1968). Adapted from table 4 on page 25 — a table which is new in this series of reports. Another column is included in the source, "Under Contract: private school(s), institution(s), association(s), government(s) offering programs." Eleven were listed for aggregate U. S.; none for the states included in this table.

Table 10-3

## Enrollment (in thousands) in Federally supported technical education programs, by extension, secondary preparatory, and post-secondary preparatory classes, in selected states and aggregate United States, 1959-1965[a]

| State | Extension classes | | | | | | | Preparatory curricula 1/ | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Secondary | | | | | | | Post-secondary | | | | | |
| | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 |
| Conn. | 7.3 | 5.4 | 6.7 | 2.6 | 3.3 | 4.7 | 6.7 | 1.6 | 1.1 | 1.4 | 0.5 | 0.9 | 1.1 | 1.2 | 0.2 | 0.2 | 1.3 | 1.5 | 2.1 | 1.3 |
| Mass. | -- | 0.4 | 0.6 | 0.8 | 0.9 | 0.9 | 0.7 | 0.6 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 |
| Mo. | 0.1 | 0.8 | 1.2 | 1.2 | 1.3 | 1.2 | 1.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.7 | 1.1 | -- | 2/ | 2/ | 0.1 | 0.2 | 0.3 |
| N.Y. | -- | 0.2 | 0.1 | 0.2 | 0.9 | 3.6 | 6.1 | 1.0 | 1.5 | 2.4 | 3.1 | 5.3 | 5.5 | 7.1 | 2/ | 0.1 | 0.1 | -- | -- | -- |
| N.C. | -- | 0.5 | 0.7 | 0.5 | 1.6 | 3.6 | 4.4 | -- | 2/ | 0.2 | 0.1 | 0.1 | 2/ | 2/ | 0.6 | 0.7 | 1.3 | 1.5 | 2.0 | 0.4 |
| Va. | -- | -- | 2/ | 2/ | 0.7 | 1.3 | 0.8 | 1.2 | -- | -- | 2/ | 2/ | 2/ | 0.1 | 0.6 | 0.7 | 0.7 | 0.7 | 0.9 | 1.0 |
| Wash. | 4.2 | 9.0 | 9.0 | 10.1 | 12.0 | 8.5 | 7.0 | 0.3 | -- | 2/ | 2/ | -- | -- | -- | 0.8 | 1.0 | 1.2 | 1.8 | 2.3 | 2.6 |
| Aggre. U.S. | 29 | 68 | 84 | 96 | 109 | 129 | 130 | 19.2 | 7.3 | 11.8 | 13.0 | 19.7 | 20.8 | 23.9 | 25.6 | 27.4 | 40.0 | 56.2 | 71.7 | 71.8 |

1/ A breakdown of preparatory classes is not available for fiscal year 1959.
2/ Less than one-tenth of one percent; *viz.* less than one hundred enrolled.

a *Digest of Annual Reports of State Boards for Vocational Education.* U. S. Department of Health, Education, and Welfare — Office of Education, (Washington, 1959, 1960, 1961, 1962, 1963, 1964, 1965). (Some issues have slightly different titles, but are essentially the same reports.) Heading in the 1964 report for extension classes reads, "adult supplementary" and in the 1965 report, "adults — preparatory and supplementary."

## Occupational Education
## in
## Massachusetts' Regional Community Colleges

### Table 10-4

**Approximate Percentage Distribution of Transfer and Occupational Program Enrollments in Massachusetts' Regional Community Colleges, Fall, 1967[a]**

| College | Transfer % | Occupational Percentage | | | |
|---|---|---|---|---|---|
| | | Bus. Sec'l. | Engr. Tech. | Health | Service |
| Berkshire | 60 | 23 | 12 | 5 | -- |
| Bristol | 58 | 29 | 8 | -- | 5 |
| Cape Cod | 78 | 22 | -- | -- | -- |
| Greenfield* | 53 | 20 | 4 | 10 | 12 |
| Holyoke | 47 | 40 | 9 | 4 | -- |
| Massachusetts Bay* | 58 | 35 | 2 | 4 | -- |
| Massasoit | 66 | 29 | 5 | -- | -- |
| Mount Wachusett | 47 | 46 | 7 | -- | -- |
| Northern Essex | 39 | 49 | 12 | -- | -- |
| North Shore* | 66 | 28 | 5 | -- | -- |
| Quinsigamond | 57 | 30 | 5 | 7 | -- |
| Springfield | -- | 30 | 44 | 23 | 3 |
| Total* | 52.5 | 32.4 | 9.3 | 4.4 | 1.3 |

*Does not add to 100 per cent because of rounding off.

a Board of Regional Community Colleges.

Because these colleges operate fairly independently, even though part of a system, the data are difficult to compare. This is especially true for the "terminal" students who are equivalent to their total enrollment in occupational programs.

**It seems clear that almost without exception the community colleges have relegated occupational education to a minor role.** Enrollments in the business-secretarial curricula are good in comparison to those in transfer programs, but other programs have hardly scratched the surface. The biggest problem seems to be the inability to obtain the use of adequate physical facilities and equipment in order to expand offerings in a variety of occupational curricula.

Several of the community colleges have worked out a cooperative arrangement with nearby regional vocational schools. Students enroll in the community college for liberal arts courses and take occupational preparation in the regional vocational school. For the time being, this may be the only

way for the community colleges to expand their occupational education to any degree.

Unfortunately, in a number of regions, the regional vocational schools seem to be in deliberate competition for students with the community college. Such haphazard planning and duplication of effort cannot be allowed to continue. A plan to provide occupational education of a post-secondary nature as well as a greater commitment to this type of education must emerge.

## THE COMMONWEALTH OF MASSACHUSETTS
## DEPARTMENT OF EDUCATION

Junior Colleges which have authority from the General Court or from the Massachusetts Board of Collegiate Authority to use the title "junior college" and/or to confer associate degrees.

### Private Junior Colleges

| | |
|---|---|
| **Bay Path Junior College | Longmeadow |
| Becker Junior College | Worcester |
| **Bradford Junior College | Haverhill |
| *Chamberlayne Junior College | Boston |
| **Dean Academy and Junior College | Franklin |
| **Endicott Junior College | Beverly |
| Fisher Junior College | Boston |
| Franklin Institute of Boston | Boston |
| **Garland Junior College | Boston |
| **Lasell Junior College | Auburndale |
| Leicester Junior College | Leicester |
| *Mount Ida College | Newton |
| **Pine Manor Junior College | Wellesley |
| Wentworth Institute | Boston |
| **Worcester Junior College | Worcester |

### Public Junior and Community Colleges

| | |
|---|---|
| **Newton Junior College | Newton |
| Quincy Junior College | Quincy |
| **Berkshire Community College | Pittsfield |
| Bristol Community College | Fall River |
| **Cape Cod Community College | Hyannis |
| Greenfield Community College | Greenfield |
| Holyoke Community College | Holyoke |
| **Massachusetts Bay Community College | Watertown |
| Massasoit Community College | No. Abington |
| Mount Wachusett Community College | Gardner |
| North Shore Community College | Beverly |
| Northern Essex Community College | Haverhill |
| **Quinsigamond Community College | Worcester |
| Springfield Technical Institute | Springfield |

*No authority to confer associate degree.

**Accredited by New England Association of Colleges and Secondary Schools.

## Chapter XI.

# *The Economy and Occupational Requirements of Massachusetts**

Massachusetts can be considered the economic center of New England, with almost half the total regional employment within one state. Even though the region suffers from a great variety of locational handicaps -- high transport costs, tax rates and cost of living, distant markets, poor soils and bad weather[1] -- it has successfully competed in national markets. Although its major advantage was a headstart which was only an historical accident, it now possesses many man-made advantages -- external economies and increasing specialization in high skill, technically oriented, labor-intensive industries.

The greatest industry in the region was started in the early Nineteenth Century with the building of a spinning frame on Rhode Island. "With this event, the economic history of New England was revolutionized, for the region possessed every gift necessary for the manufacture of textiles: available waterpower, the proper degree of humidity --, an adequate labor supply and excellent ports...."[2] At the same time New England prospered by supplying textiles, shoes, hand-tools and weapons to the large market created by westward migration.

*The data and analysis for this chapter were prepared by Professors Morris Horowitz and Irwin Herrnstadt, Department of Economics, Northeastern University and by Anne F. Brown, Research Assistant, Institute for Research on Human Resources, The Pennsylvania State University.

1 Robert W. Eisenmenger. *The Dynamics of Growth in New England's Economy 1870-1964*, Chapter II (Middletown, Connecticut: 1967).

2 Edward T. O'Donnell. "Historical Patterns and Recent Trends in Employment" *Monthly Labor Review* (March 1957), pp. 11-17.

Soon, however, each newly developed section of the country built its own manufacturing establishment, and instead of waterpower, steam became the prime source of power. New England, therefore, found it difficult to maintain its share of the market. The textile industry was most severely hit, declining by 39.5% between 1939 and 1956, causing much localized unemployment. However, other manufacturing industries continued to prosper and, consequently, employment today rests upon a broad base of well diversified manufacturers.

The object of this chapter is to demonstrate how the changing economic structure of Massachusetts affects occupational requirements. First, past industrial and demographic trends will be examined in greater detail and then related to recent occupational experience. Secondly, several of the available projections of population and employment will be considered, so that some idea of future occupational requirements can be obtained. Finally, the implications of the projections will be discussed, in particular taking account of the ability of the existing educational system to supply the necessary skills.

## Section I: THE RECENT INDUSTRIAL AND DEMOGRAPHIC EXPERIENCE

### (a) Population Trends

**Table 11-1**

**Decennial Rates of Increase in Population, Massachusetts, New England and the United States, 1870-1960.***

| | Percentage Change | | |
|---|---|---|---|
| | Massachusetts | New England | United States |
| 1870-80 | 22.4 | 15.0 | 30.1 |
| 1880-90 | 25.6 | 17.2 | 25.5 |
| 1890-00 | 25.3 | 19.0 | 20.7 |
| 1900-10 | 20.0 | 17.2 | 21.0 |
| 1910-20 | 14.4 | 12.9 | 15.0 |
| 1920-30 | 10.3 | 10.3 | 16.2 |
| 1930-40 | 1.6 | 3.3 | 7.3 |
| 1940-50 | 8.7 | 10.4 | 14.5 |
| 1950-60 | 9.8 | 12.8 | 18.5 |

**The Dynamics of Growth in New England's Economy, 1870-1964,* p.60, Table 10.

Since 1870 the growth of population in Massachusetts has generally been less than that of the United States as a whole. It has, however, followed the national trend with a rapid population increase at the end of the nineteenth century and a slowing down in the "Thirties." Massachusetts was affected more than the rest of the United States by the depression in terms of population growth, with only a 1.6 per cent increase between 1930 and 1940.

A distinct pattern can be seen when comparing the rate of population increase of Massachusetts to that of New England. Whereas the former was growing faster than New England as a whole during the end of the nineteenth century and early twentieth century, the reverse has occurred since the 1920's. This is associated with the spread of urbanization.

**Table 11-2**

**Population in Massachusetts, New England and United States, 1920-50.***

| | Thousands | | | | | |
|---|---|---|---|---|---|---|
| | Massachusetts | | New England | | United States | |
| | Total | % Urban | Total | % Urban | Total | % Urban |
| 1920 | 3,852 | 90.0 | 7,401 | 75.9 | 105,711 | 51.2 |
| 1930 | 4,250 | 90.2 | 8,166 | 77.3 | 122,755 | 56.2 |
| 1940 | 4,317 | 89.4 | 8,437 | 76.1 | 131,669 | 56.5 |
| 1950 | 4,691 | 84.4 | 9,314 | 75.2 | 150,697 | 64.0 |

**New England Economic Almanac 1957* Public Information Department, Federal Reserve Bank of Boston. (Boston, 1957), p.8.

Table 11-2 shows that although urbanization in the United States as a whole has grown, it has declined in Massachusetts. But whereas the proportion of urban population in the United States in 1920 was only 51.2 per cent it was 90 per cent in Massachusetts -- the differential has therefore been reduced. New England remained fairly constant with an urban population of 75 per cent, so that the decline in Massachusetts probably coincided with a corresponding increase in other New England states and a rise in suburbanism rather than real urbanism.

## Table 11-3

### Population and Labor Force in Massachusetts, New England and United States, 1960*

| | Thousands | | |
|---|---|---|---|
| | Population (April) | Labor Force (Annual Average) | Labor Force Participation Rates (percent) |
| **Massachusetts** | | | |
| Total, 14 and over | 3,740 | 2,129 | 56.9 |
| Males, 14 and over | 1,768 | 1,376 | 77.8 |
| Females, 14 and over | 1,972 | 754 | 38.2 |
| **New England** | | | |
| Total, 14 and over | 7,582 | 4,331 | 57.1 |
| Males, 14 and over | 3,628 | 2,833 | 78.1 |
| Females, 14 and over | 3,955 | 1,499 | 37.9 |
| **United States** | | | |
| Total, 14 and over | 126,277 | 69,877 | 55.3 |
| Males, 14 and over | 61,315 | 47,468 | 77.4 |
| Females, 14 and over | 64,961 | 22,410 | 34.5 |

*Denis F. Johnston and George R. Methee "Labor Force Projections by State, 1970 and 1980" *Monthly Labor Review,* October 1966, pp.1149-1152.

The female labor force participation rate is usually higher in urban areas because of the higher proportion of service industries, where there are more opportunities for jobs both full and part-time, requiring female labor. This is clearly the case in Massachusetts. However, the total labor force participation rate has not increased by as much, because of the lack of variation by region of the male participation rate, which is the largest component of the total.

## Table 11-4

### Unemployment as a Percentage of Civilian Labor Force, 1950 and 1960.*

| | Percentage | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Male | | Female | |
| | 1950 | 1960 | 1950 | 1960 | 1950 | 1960 |
| Massachusetts | 5.8 | 4.2 | 6.4 | 4.3 | 4.4 | 4.0 |
| New England | 6.1 | 4.6 | 6.7 | 4.4 | 4.8 | 4.9 |
| United States | 4.8 | 5.1 | 5.2 | 5.0 | 4.6 | 5.4 |

**The Dynamics of Growth in New England's Economy 1870-1964.* p.72, Table 14.

In 1950 Massachusetts and New England had a higher rate of unemployment for males than the United States as a whole. This was probably caused by the severe decline in textile employment. But the position had been reversed by 1960. The male unemployment rate for the United States had hardly changed, but the rates for Massachusetts and for New England had declined rapidly. A decrease in unemployment can indicate one of two things: either the supply of labor has been reduced (by a slowing down of population growth, a decline in the participation rate, or increased migration) or the demand for labor has increased. From the available evidence, the most likely explanation is a buoyant demand for labor, growth in other industries offsetting the textile decline with some reduction in labor supply in comparison with the United States as a whole.

## Table 11-5

### Non-farm Employment by Industry, Massachusetts and New England, 1950-65.*

| | Thousands | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Massachusetts | | | | New England | | | |
| | 1950 | 1955 | 1960 | 1965 | 1950 | 1955 | 1960 | 1965 |
| Nonagricultural Total | 1,761 | 1,818 | 1,910 | 2,019 | 3,344 | 3,547 | 3,708 | 3,997 |
| Manufacturing Total | 716 | 701 | 698 | 666 | 1,469 | 1,484 | 1,452 | 1,459 |
| Durable Goods | 268 | 294 | 325 | 318 | 616 | 710 | 738 | 771 |
| Nondurable Goods | 448 | 407 | 374 | 348 | 853 | 774 | 714 | 689 |
| Nonmanufacturing Total | 1,045 | 1,117 | 1,212 | 1,353 | 1,875 | 2,063 | 2,256 | 2,538 |
| Construction | 73 | 77 | 78 | 88 | 142 | 163 | 164 | 184 |
| Transport and Public Utilities | 117 | 119 | 106 | 106 | 215 | 218 | 200 | 200 |
| Trade | 353 | 368 | 387 | 418 | 623 | 670 | 709 | 778 |
| Finance, Insurance, and Real Estate | 77 | 88 | 100 | 109 | 139 | 163 | 185 | 204 |
| Services and Miscellaneous | 217 | 243 | 296 | 365 | 380 | 435 | 528 | 643 |
| Government | 208 | 221 | 246 | 269 | 377 | 415 | 470 | 530 |

**Employment and Earnings Statistics for States and Areas 1939-66. Bulletin No. 1370-4.* U.S. Department of Labor. Bureau of Labor Statistics. New England Regional Office. (Washington, July 1967), pp. 335-40. *Employment in New England 1947-61,* and *New England Employment Revised Series 1961-66.*

Employment trends in Massachusetts were very similar to those of New England as a whole. Much of the postwar growth was in the service industries, government and trade, and to a smaller extent in finance and insurance, construction and electrical machinery (the latter particularly in Massachusetts). There has been an absolute decline of employment in manufacturing, but only in the non-durable goods sector. In New England, this decline was partially offset by the growth in the durable sector. However, even in the expanding manufacturing industries, growth was much less than the growth in the non-manufacturing sectors. It should be noted that a lack of employment growth does not necessarily mean a lack of industrial growth, for it can be compensated for by increased technology. However, for the purpose of this appendix, the concern is with employment rather than actual output.

Four industries accounted for the bulk of the net decline of employment in Massachusetts: textiles, leather, and transportation and public utilities. Whereas in 1919, 38.5 per cent of employment in the United States in textiles was in New England, by 1956 this figure was reduced to 15.5 per cent. Table 11-6 shows the position in 1960 of employment in Massachusetts and New England.

Agriculture and extractive industries are of very little importance in Massachusetts or New England, because of the rugged terrain, infertile soils, and lack of significant minerals. Service industries (including construction, trade, government, etc.) which are generated by large population clusters are the largest employers of labor. Almost half of the total New England employment is in Massachusetts, and a little more than half of all the employment in service industries in the region is contained in Massachusetts. To a certain extent Massachusetts, and Boston in particular, may be acting as a service center for some of the neighboring states. The importance to Massachusetts of the electrical machinery industry is also clearly demonstrated.

## Table 11-6

## Employment, Massachusetts and New England, 1960.*

| | Thousands | | | | |
|---|---|---|---|---|---|
| | Massachusetts | | New England | | Massachusetts |
| | Number | Percent | Number | Percent | as Percent of New England |
| Agriculture, Forestry and Fishing | 26 | 1.3 | 93 | 2.3 | 28.0 |
| Mining | 1 | 0.0 | 4 | 0.1 | 25.0 |
| Manufacturing | 709 | 35.5 | 1,479 | 36.7 | 47.9 |
| Textile Mill Products | 52 | 2.6 | 125 | 3.1 | 41.6 |
| Lumber Wood Products, except furniture | 6 | 0.3 | 33 | 0.8 | 18.2 |
| Paper and Allied Prods. | 34 | 1.7 | 73 | 1.8 | 46.6 |
| Chemicals and Allied Prods. | 18 | 0.9 | 35 | 0.9 | 51.4 |
| Rubber and Miscellaneous Plastics Products | 34 | 1.7 | 62 | 1.5 | 54.8 |
| Leather and Leather Products | 56 | 2.8 | 105 | 2.6 | 53.3 |
| Primary Metal Industries | 21 | 1.1 | 55 | 1.4 | 38.2 |
| Fabricated Metal Industries | 50 | 2.5 | 116 | 2.9 | 43.1 |
| Machinery, except Electrical | 66 | 3.3 | 162 | 4.0 | 40.7 |
| Electrical Machinery | 110 | 5.5 | 167 | 4.1 | 65.9 |
| Transportation Equipment | 33 | 1.7 | 119 | 2.9 | 27.7 |
| Other Manufacturing | 227 | 11.4 | 427 | 10.6 | 53.2 |
| Service Industries | 1,264 | 63.2 | 2,459 | 60.9 | 51.4 |
| Total Employment | 2,000 | 100.0 | 4,035 | 100.0 | 49.6 |

*_Projective Economic Studies of New England._ U. S. Army Engineer Division, New England Corps of Engineers. (Cambridge, 1964-5).

## SECTION II: A. RECENT OCCUPATIONAL EXPERIENCE

### Table 11-7

### Distribution of Employed Workers in Major Occupational Groups, Massachusetts, 1950 and 1960.*

| | Percentage | |
|---|---|---|
| | 1950 | 1960 |
| Professional | 10.2 | 12.8 |
| Management | 9.6 | 8.1 |
| Clerical | 14.9 | 16.3 |
| Sales | 7.6 | 7.3 |
| Craftsman | 15.2 | 14.0 |
| Operatives | 26.2 | 21.8 |
| Services | 9.9 | 10.0 |
| Laborers | 5.6 | 3.9 |
| Occupation Not Reported | 0.9 | 5.8 |
| Total Employed | 100.0 | 100.0 |

**U. S. Census of Population 1960, Detailed Characteristics Massachusetts.* (Washington, 1962), pp.361-66.

The largest broad occupational group in 1960 was that of operatives but it had decreased since 1950, both in absolute numbers and in proportion to the total employed. Professional and clerical occupations increased their proportions over the decade, while management, craftsmen, operatives and laborers all decreased.

## Table 11-8

### Male/Female Breakdown by Occupation, Massachusetts, 1960.*

| | Thousands | | | | | |
|---|---|---|---|---|---|---|
| | Male | | Female | | Total | |
| | Number | Percent | Number | Percent | Number | Percent |
| Professional | 161 | 12.6 | 96 | 13.3 | 257 | 12.8 |
| Management | 141 | 11.0 | 20 | 2.8 | 161 | 8.1 |
| Clerical | 102 | 8.0 | 224 | 31.0 | 326 | 16.3 |
| Sales | 96 | 7.5 | 50 | 6.9 | 146 | 7.3 |
| Craftsmen | 269 | 21.1 | 10 | 1.4 | 279 | 14.0 |
| Operatives | 271 | 21.2 | 165 | 22.8 | 436 | 21.8 |
| Services | 94 | 7.4 | 105 | 14.5 | 199 | 10.0 |
| Laborers | 75 | 5.9 | 4 | 0.6 | 79 | 3.9 |
| Occupations not Reported | 69 | 5.4 | 48 | 6.6 | 117 | 5.8 |
| Total Employed | 1,277 | 100.0 | 723 | 100.0 | 2,000 | 100.0 |

*U. S. Census of Population: 1960, Detailed Characteristics, Massachusetts* Final Report Pc (1)-230. U. S. Bureau of the Census, (Washington, 1962), pp.361-66.

The distribution of occupations is obviously very different according to sex. Both clerical and service occupations have more females than males in absolute numbers and correspondingly a much greater percentage of females. Management, craftsmen and laborers are almost totally composed of males. This has serious implications when the trend is towards a greater concentration on service industries. Either more females must be attracted into the labor force, or males must be educated to take on the traditionally female occupations.

## Table 11-9

### Distribution of Employed Workers in Major Occupational Groups, Massachusetts, New England and United States, 1960.*

| | Thousands | | | |
|---|---|---|---|---|
| | Massachusetts | | New England | United States |
| | Number | Percent | Percent | Percent |
| Professional | 257 | 12.8 | 12.1 | 11.2 |
| Management | 162 | 8.1 | 8.7 | 12.2 |
| Clerical | 326 | 16.3 | 15.3 | 14.4 |
| Sales | 146 | 7.3 | 7.0 | 7.2 |
| Craftsmen | 279 | 14.0 | 14.6 | 13.5 |
| Operatives | 436 | 21.8 | 22.5 | 18.4 |
| Services | 199 | 10.0 | 9.7 | 11.1 |
| Laborers | 79 | 3.9 | 4.6 | 7.0 |
| Occupations not Reported | 117 | 5.8 | 5.6 | 4.9 |
| Total Employed | 2,000 | 400.0 | 100.0 | 100.0 |

*See Table 10

The distributions of occupations in Massachusetts and New England are very similar, except for a slightly greater emphasis on clerical workers and less on operatives in Massachusetts. There are greater differences when the state and the region are compared with the United States. The proportion of employment in management and laborers is considerably higher in the United States, possibly reflecting the greater importance of agriculture in the nation than in the region with its great number of small farm managers and laborers.

Professional occupations are slightly more represented in Massachusetts where there is a greater number of professional, research, and educational institutions in relation to the population. Clerical workers and operatives are also slightly more important. Probably the most surprising aspect of Table 11-9 is the similarity of distributions rather than the differences. It would, however, take a more detailed classification to reveal more fully all of the differences.

**Table 11-10**

**Change in Distribution of Occupations, Massachusetts, New England and United States, 1950-1960***

| | Massachusetts | | New England | | United States | |
|---|---|---|---|---|---|---|
| | Absolute Change | Percent Change | Absolute Change | Percent Change | Absolute Change | Percent Change |
| Professional | 70 | 37.3 | 143 | 41.6 | 2311 | 47.0 |
| Management | -14 | -8.0 | -32 | -8.4 | -1433 | -15.3 |
| Clerical | 54 | 20.0 | 124 | 25.3 | 2352 | 33.8 |
| Sales | 8 | 6.0 | 26 | 10.0 | 732 | 18.7 |
| Craftsmen | 2 | 0.8 | 38 | 6.9 | 921 | 11.8 |
| Operatives | -42 | -8.9 | -60 | -6.2 | 717 | 6.4 |
| Services | 19 | 10.6 | 56 | 16.0 | 1463 | 25.6 |
| Laborers | -23 | -22.6 | -57 | -23.3 | -1301 | -22.2 |
| Occupations not Reported | 100 | 595.0 | 186 | 485.2 | 2441 | 328.5 |
| Total Employed | 174 | 9.5 | 424 | 11.7 | 8204 | 14.5 |

*U. S. Census of Population: 1960, Detailed Characteristics, United States Summary,* Final Report Pc(1) - 10. U. S. Bureau of the Census, (Washington, 1963), pp.525-33. *Ibid. Massachusetts* Pc(1) - 230, pp.361-6. *Ibid. Connecticut* Pc(1) - 80, pp.263-8. *Ibid. Maine* Pc(1) - 210, pp.192-7. *Ibid. Rhode Island* Pc(1) - 410, pp.171-6. *Ibid. Vermont* Pc(1) - 470, pp. 151-

Professional occupations have had the greatest increase in employment between 1950 and 1960, both in absolute and relative terms, in all the areas considered. Although, or perhaps because, there is a greater proportion of professionals in Massachusetts and New England, the greatest rate of increase was in the United States as a whole.

The occupation demonstrating the next largest increase was that of clerical workers. As with the professionals, Massachusetts showed a smaller increase than New England and the United States between 1950 and 1960, yet had the greatest proportion of clerical workers. Service occupations were increasing most in the nation as a whole (over 25 per cent in the decade) but increased by only 10 per cent in Massachusetts.

The greatest decline in all areas was among laborers, perhaps again partly due to the decline in agriculture. Management was also decreasing, at a faster rate in the United States than in Massachusetts. Operatives were decreasing in Massachusetts and in New England, but not in the United States. The next table will give some indication of why these changes in occupations are occurring.

## Table 11-11

### 1960 Occupational Composition of Selected Industries in Massachusetts Industries with the Greatest Change in Absolute Employment 1950-60*

| Occupations Percent | Selected Industries—Percent | | | | | | |
|---|---|---|---|---|---|---|---|
| | Textiles | Fabricated Metals | Electrical Machinery | Transportation | Finance and Insurance | Medical Services | Education |
| Professional | 2.5 | 7.6 | 18.0 | 2.1 | 4.8 | 46.1 | 65.7 |
| Management | 3.6 | 5.2 | 3.8 | 8.5 | 15.1 | 2.1 | 2.2 |
| Clerical | 9.2 | 14.8 | 15.5 | 17.8 | 51.8 | 13.6 | 11.0 |
| Sales | 1.1 | 1.7 | 0.9 | 0.9 | 17.7 | 0.1 | 0.1 |
| Craftsmen | 13.0 | 26.1 | 15.7 | 13.1 | ,2.3 | 3.1 | 3.0 |
| Operatives | 63.4 | 38.9 | 41.3 | 44.2 | 0.5 | 2.8 | 1.1 |
| Services | 1.3 | 1.4 | 1.6 | 3.8 | 4.8 | 30.4 | 15.5 |
| Laborers | 4.3 | 2.7 | 1.2 | 8.4 | 1.5 | 0.5 | 0.6 |
| Not Reported Occupation | 1.7 | 1.6 | 2.0 | 1.2 | 1.4 | 1.2 | 0.8 |
| Change in Absolute Employment 1950-60 | -65,155 | +16,202 | +44,234 | -15,021 | +18,771 | +27,983 | +40,59 |

*U. S. Census of Population: 1960, Detailed Characteristics, Massachusetts* Final Report Pc(1) - 230, U. S. Bureau of the Census. (Washington, 1962), pp.361-6.

Professional occupations are most prevalent in education, medical services and electrical machinery. Each of these is obviously a growth industry. Education itself could have caused an increase in demand for professionals between 1950 and 1960 of over 26,000 in Massachusetts alone. Electrical machinery, which has exhibited the largest growth for a single industry, employs over 40 per cent of operatives, yet these have declined in absolute numbers. This is accounted for by the offsetting effect from the decline in the textile industry which employs over 60% of operatives.

The table shows clearly that the major reason for changes in occupational requirements is differential industrial growth. Other factors, of course, affect occupational change, such as the state of technology and the financial resources available for capital expenditure, but these are relatively minor in comparison with changes in industrial mix.

## SECTION III: PROJECTIONS OF POPULATION AND EMPLOYMENT

### (a) Population Projections

**Table 11-12**

**Population Projections of Massachusetts and New England, 1965-85***

| | Thousands | | | | | |
|---|---|---|---|---|---|---|
| | Massachusetts | | | New England | | |
| | Male | Female | Total | Male | Female | Total |
| 1965 | 2,587 | 2,777 | 5,364 | 5,419 | 5,731 | 11,150 |
| 1970 | 2,672 | 2,872 | 5,544 | 5,678 | 6,021 | 11,699 |
| 1975 | 2,822 | 3,020 | 5,842 | 6,062 | 6,409 | 12,471 |
| 1980 | 3,022 | 3,214 | 6,236 | 6,537 | 6,879 | 13,416 |
| 1985 | 3,259 | 3,442 | 6,701 | 7,068 | 7,400 | 14,469 |

*_Current Population Reports._ Series P-25, No.375 "Revised Projections of the Population of States: 1970-1985." U. S. Bureau of Census, (Washington, 1967), pp.8, 26-28, 42-44, 58-60, 75-76.

By assuming that migration rates continue within the range observed between 1955 and 1965, and that fertility rates show a moderate increase from the present level, the population is estimated to increase by 25 per cent in Massachusetts, and by 28 per cent in New England between 1965 and 1985. This compares with an increase of less than 20 per cent in Massachusetts between 1940 and 1960. The proportion of the Massachusetts population to the total New England population will continue to decrease, as the other states in the region become increasingly urbanized. The male/female breakdown, however, shows little change except for a very slight increase in the proportions of males from 48.2 per cent in 1965 to 48.6 per cent in 1985 in Massachusetts.

## Table 11-13

### Population Projections in Massachusetts and New England, 1960-80*

| | Thousands | | | |
|---|---|---|---|---|
| | Massachusetts | | New England | |
| | Total | Percent Urban | Total | Percent Urban |
| 1960 | 5,149 | 83.6 | 10,509 | 76.4 |
| 1970 | 5,812 | 85.1 | 11,840 | 78.5 |
| 1980 | 6,772 | 87.0 | 13,840 | 80.8 |

**Projective Economic Studies of New England.* U. S. Army Engineer Division, New England Corps of Engineers. (Cambridge, 1964-5).

## Table 11-14

### Population and Labor Force Projections in Massachusetts, New England and United States, 1970-80**

| | Thousands | | | | | |
|---|---|---|---|---|---|---|
| | Popu-lation (July) | | Labor Force (Annual Average) | | Labor Force Partici-pation | |
| | 1970 | 1980 | 1970 | 1980 | 1970 | 1980 |
| **Massachusetts** | | | | | | |
| Total, 14 and over | 4,150 | 4,683 | 2,434 | 2,763 | 58.6 | 59.0 |
| Males, 14 and over | 1,961 | 2,227 | 1,531 | 1,778 | 78.1 | 79.8 |
| Females, 14 and over | 2,189 | 2,456 | 903 | 985 | 41.2 | 40.1 |
| **New England** | | | | | | |
| Total, 14 and over | 8,628 | 9,828 | 5,044 | 5,767 | 58.5 | 58.7 |
| Males, 14 and over | 4,119 | 4,708 | 3,207 | 3,726 | 77.9 | 79.1 |
| Females, 14 and over | 4,509 | 5,119 | 1,838 | 2,041 | 40.8 | 39.9 |
| **United States** | | | | | | |
| Total, 14 and over | 148,944 | 173,16[illegible] | 85,257 | 100,670 | 57.2 | 58.1 |
| Males, 14 and over | 71,795 | 83,380 | 55,105 | 64,246 | 76.8 | 77.1 |
| Females, 14 and over | 77,148 | 89,781 | 30,152 | 36,424 | 39.1 | 40.6 |

**Denis F. Johnston and George R. Methee, "Labor Force Projections by State, 1970 and 1980" *Monthly Labor Review*, October 1966, pp.1149-1152.

The overall labor force participation rate is estimated to rise in Massachusetts, New England, and the United States to over 58 per cent. However, whereas the male rate is estimated to increase between 1970 and 1980 in all areas, the female rate is estimated to fall in Massachusetts and New England but to increase in the United States as a whole.

### (b) Employment Projections by Industry

**Table 11-15**

**Employment Projections, New England***

| | Thousands | | | |
|---|---|---|---|---|
| | 1960 | | 1980 | |
| | Number | Percent | Number | Percent |
| Agriculture, Forestry and Fisheries | 93 | 2.1 | 89 | 1.6 |
| Mining | 4 | .1 | 4 | .1 |
| Construction | 215 | 5.0 | 311 | 5.5 |
| Manufacturing | 1,479 | 34.1 | 1,700 | 30.3 |
| Transportation, Communication & utilities | 218 | 5.0 | 174 | 3.1 |
| Wholesale and Retail Trade | 673 | 15.5 | 902 | 16.1 |
| Finance, Insurance & Real Estate | 184 | 4.2 | 305 | 5.4 |
| Services | 680 | 15.7 | 1,220 | 21.6 |
| Government | 310 | 7.1 | 501 | 8.9 |
| Nonclassifiable | 179 | 4.1 | 180 | 3.2 |
| Unemployed | 194 | 4.5 | 233 | 4.1 |
| Total Labor Force | 4,332 | 100.0 | 5,620 | 100.0 |

**Projective Economic Studies of New England.* U. S. Army Engineer Division, New England Corps of Engineers. (Cambridge, 1964-5).

Between 1960 and 1980, total employment is estimated to increase by 30 per cent. There will be a further decrease of employment in agriculture and extractive industries and a decrease of the proportion employed in manufacturing. It is estimated that services will increase by 79 per cent between 1960 and 1980, finance and insurance by 66 per cent, and government by 62 per cent. Transportation, however, will decrease both in numbers and in proportion to the total. Finally, unemployment is expected to be further reduced.

By comparing Table 11-16 with Table 11-6, it can be seen that the only manufacturing industry which is estimated to increase its share of total employment is electrical machinery. Employment in manufacturing machinery, other than electrical, will maintain its share, but all other manufacturing industries will decrease. By 1980 the textile industry will only have 1 per cent of employment, and even the growth industry, electrical machinery, will only have 6.5 per cent. This demonstrates the increase in diversification.

Other trends should be noticed. Textiles, lumber, leather and primary metals are all estimated to decrease further in absolute numbers as well as proportionately. Paper decreases in Massachusetts but increases slightly in New England. Chemicals, rubber, fabricated metal, machinery and transportation equipment all increase in number employed, although decreasing in proportion of total employed.

## Table 11-16

### Employment Projections, Massachusetts and New England, 1980*

| | Thousands | | | |
|---|---|---|---|---|
| | Massachusetts | | New England | |
| | Number | Percent | Number | Percent |
| Agriculture, Forestry and Fisheries | 25 | 0.9 | 89 | 1.7 |
| Mining | 1 | 0 | 4 | 0.1 |
| Manufacturing | 827 | 31.1 | 1,700 | 31.6 |
| Textile Mill Products | 25 | 1.0 | 63 | 1.2 |
| Lumber and Wood Products, except furniture | 3 | 0.1 | 26 | 0.5 |
| Paper and Allied Products | 34 | 1.3 | 80 | 1.5 |
| Chemicals and Allied Products | 20 | 0.7 | 37 | 0.7 |
| Rubber and Miscellaneous Plastics Products | 41 | 1.5 | 76 | 1.4 |
| Leather and Leather Products | 45 | 1.7 | 88 | 1.6 |
| Primary Metal Industries | 18 | 0.7 | 50 | 0.9 |
| Fabricated Metal Products | 60 | 2.3 | 136 | 2.5 |
| Machinery, except electrical | 87 | 3.3 | 219 | 4.1 |
| Electrical Machinery | 174 | 6.5 | 269 | 5.0 |
| Transportation Equipment | 36 | | 126 | 2.3 |
| Other Manufacturing | 283 | 10.6 | 533 | 9.9 |
| Service Industries | 1,810 | 68.0 | 3,593 | 66.8 |
| Total Employment | 2,660 | 100.0 | 5,380 | 100.0 |

*_Projective Economic Studies of New England._ U. S. Army Engineer Division, New England Corps of Engineers. (Cambridge, 1964-5).

## SECTION IV: IMPLICATIONS FOR OCCUPATIONAL REQUIREMENTS.

It was suggested in Section II that occupational requirements were dependent upon the industrial structure. Changes in industrial mix adequately explained changes in occupational distribution between 1950 and 1960. However, it is also probable that new factors will emerge which could not be foreseen with any degree of accuracy. Those include such possibilities as an innovation caused by the upsurge of demands for services. which would allow for mechanization of service industries, or technological change in any industry. Therefore, comments on occupational requirements will be made assuming that the technology remains constant.

The projections in Section III show broadly the future picture of Massachusetts' economy. Out of a population of 6.8 million in 1980, there will be a labor force of 2.8 million, of whom approximately 36 per cent are female, as compared with 35 per cent in 1960. There will be no one manufacturing industry which dominates the economy, and there will be a much smaller proportion of manufacturing industry than in 1965. The greatest emphasis will be upon services, 23 per cent of total employment in New England, followed by wholesale and retail trade with 17 per cent.

### Table 11-17

### Projected Employment Requirements, United States, 1975*

| | Percentage Distribution |
|---|---|
| Professional | 14.5 |
| Management | 10.4 |
| Clerical | 16.5 |
| Sales | 6.5 |
| Craftsman | 12.9 |
| Operatives | 16.9 |
| Services | 14.2 |
| Laborers | 4.2 |
| Occupations not Reported | 3.9 |
| Total employed | 100.0 |

*_Tomorrow's Manpower Needs National Manpower Projections and a Guide to their Use As a Tool in Developing State and Manpower Projections,_ Draft Copy, 1967, U. S. Department of Labor, Bureau of Labor Statistics, pp.1033-1110.

The above table shows the projected distribution of occupations in 1975 in the United States. By comparing this with Table 11-9, it can be seen that professional and service workers as a proportion of the total employed have increased by over 3 per cent. Clerical workers have increased proportionately by 2 per cent and operatives by 1.5 per cent, while management has declined by almost 2 per cent. The other occupations have changed proportionately by less than 1 per cent.

In order to make "guesstimates" of occupational distribution in Massachusetts in 1980, the comparison in Section II with the United States (Table 11-9) must first be noted. Management and laborers were shown to be less important in Massachusetts, while professionals and operatives were more important. Next, the occupational composition of the major growing or declining industries (Table 11-10) must be related to the estimated industrial structure in 1980 of Massachusetts and New England (Tables 11-15 and 11-16).

Most service industries were shown to have a very high proportion of professional workers: 65.7 per cent in education, 46.1 per cent in medical services and 42.2 per cent in welfare; and most other growth industries have a considerable proportion: 18 per cent in electrical machinery, 13.6 per cent in chemicals. However, between 1950 and 1960 professional workers increased by over 69,000, so continuing increase in the demand for professional workers can be foreseen. A similar increase is likely for service workers.

The highest proportions of clerical workers were found in finance and insurance (51.8 per cent), public administration (39.8 per cent), and communications and utilities (38.5 per cent). The former in New England as a whole is estimated to increase in absolute terms by 66 per cent by 1980, a forecast which alone could account for an increase of 30,000 clerical workers in Massachusetts.

Operatives, the other category which increased proportionately in the United States by more than 1 per cent, is very important in all the manufacturing industries in Massachusetts. It decreased recently as a proportion of the total because the decline in textiles, with 63 per cent of operatives, was so drastic. It is thought that Massachusetts will have a broad base of well-diversified manufacturing industry by 1980. So the picture is likely to be similar to that of the United States as a whole.

Managers decreased by 14,000 between 1950 and 1960. They are a significant proportion of the total employed only in finance and insurance 15.1 per cent, business services 11.6 per cent, and agriculture 30.8 per cent. Because agriculture does not play so important a role in the economy of New England as in that of the United States as a whole, it is probable that the proportion employed as managers will be less in the former than in the latter, in 1980 as in 1960.

By similar processes of argument, taking account of the estimate of total

employment, the most probable occupational distribution of employment in Massachusetts in 1980 can be determined, and the increase for each occupational group can be calculated. This is shown in the following table. But it must be stressed again that this is only a very approximate picture.

**Table 11-18**

**Projections of Occupational Requirements, Massachusetts, 1980**

| | Numbers—1980 | Percentage—1980 | Absolute Change 1960-80 (000) |
|---|---|---|---|
| Professional | 412 | 15.5 | 155 |
| Management | 226 | 8.5 | 65 |
| Clerical | 466 | 17.5 | 140 |
| Sales | 173 | 6.5 | 27 |
| Craftsmen | 346 | 13.0 | 67 |
| Operatives | 452 | 17.0 | 16 |
| Services | 346 | 13.0 | 147 |
| Laborers | 106 | 4.0 | 27 |
| Occupations not reported | 133 | 5.0 | 16 |
| Total employed | 2,660 | 100.0 | 660 |

The greatest change in estimated requirements will be in three occupational groups, professionals, clerical, and services. Operatives will still be an important percentage of the total, but little increase from the 1960 position will be needed.

## CONCLUSIONS

The future of New England's economy appears to rest with the new technologically-oriented manufacturing and service industries rather than with old-line industries such as textiles, shoes and leather, and apparel. It is therefore dependent on a highly skilled labor force. Of the projected increase in employment in Massachusetts between 1960 and 1980 23 per cent is estimated to be in professional occupations, all of which require a high degree of education. This implies extra pressure upon the existing educational system, and the question is asked whether this demand for education can be met.

Although Massachusetts has, throughout its historical development, been well-endowed with excellent educational institutions, both public and private, it is vital for the strength of the region's economy that these establishments not only maintain their quality but also extend their facilities. Similarly at lower educational levels, Massachusetts needs to maintain and improve its position with regards to secondary schools and technical training.

If the expansion of the educational system, which is necessary to provide sufficient highly skilled labor, does not occur, it is likely that Massachusetts, and New England in general, will find it difficult to compete with other regions of the United States which are more richly endowed with natural resources and locational advantages.

# PART III: RECOMMENDATIONS

Curriculum

The Comprehensive High School

Organization

Institutes for Educational Development

Administration

Teacher Education

Public Support

Community Colleges

Financing

Legislation

## Chapter XII.

# *Recommendations*

The following recommendations are related to the significant issues discussed in Chapter I and are based on special studies conducted by various experts in their respective fields; papers and discussions of a special seminar held in November 1967; a survey of employers, parents, teachers, and graduates of the schools in Massachusetts; discussions with members of the Advisory Committee to the study, as well as a variety of interested organizations and individuals; research findings in the field of vocational education; and, in the final analysis, the judgment of the investigators.

The support for these recommendations, as well as discussion in depth, are to be found in the various sections preceding this part of the report. However, a statement of the framework within which these recommendations are made is desirable at this point.

*First,* it is recognized that the educational system must serve basically three groups in the secondary schools. One group includes those students who will probably enter college and enroll in an academic curriculum. Although the investigators have views on the adequacy of the existing academic curriculum, they have, in general, refrained comment because they did not consider the issue to be within the purview of the study. A second group includes those students who are highly motivated and academically qualified to enroll in a curriculum which would provide them with high level skills. This group might represent only about five to eight per cent of the student population in the secondary schools, a percentage significantly lower than the

present enrollment in vocational-technical education. A third group consists of students who, because of certain economic and social factors over which they have no control, do not find either of these curricula relevant to their aspirations, needs, and interests. This group might well represent from 40 to 60 per cent of the secondary school population.

*Second,* it is recognized that the current allocation of resources is not in alignment either with the proportions of students involved or with the needs. In fact, if we accept the broad principle that the function of the educational system is to provide equal opportunity for each youngster to realize his potential. then the third group of students should receive a greater proportion of resources relative to its share of the total student population.

*Third,* if these groupings and proportions are accepted, it follows that the curricula for the two non-academic groups must be re-examined. Although the curriculum for the vocationally oriented students (highly skilled) is fairly well determined, the curriculum for the third and largest group is yet to be developed. For purposes of this Report such a curriculum is called the Careers Development Curriculum, more fully described in the recommendations which follow.

*Fourth,* it is obvious that these changes in curriculum require a major revision in the organizational structure of the secondary schools. It is clear that the academic curriculum should remain the responsibility of the local comprehensive school system. The Careers Development Curriculum is also to be the responsibility of the local comprehensive school system with accompanying changes in resource allocation. The vocational curriculum, to be limited to the small percentage of students with strong vocational interests, is to be the responsibility of Institutes for Educational Development, the suggested name for existing and proposed regional vocational high schools. These Institutes will assume the responsibility not only for the small percentage of highly motivated vocational students but also for the increasing proportion of persons (in and out of school) who require either up-dating in their skills or complete retraining. The Institutes will become the organizations to which the members of the entire community within a radius of 30 miles can turn in an effort to obtain improved occupational adjustments so as to find a better place in the mainstream of our society. In all instances, the secondary students enrolled in these Institutes will continue to be the responsibility of the home, or sending school.

*Fifth,* these proposed changes in curriculum and responsibilities call for significant organizational and administrative changes. The Institutes referred to above would become state operated. (Currently, the existing vocational schools are under substantial state control.) At the state level, it is recommended that the Associate Commissioner for Curriculum and Instruction assume responsibility for the Careers Development Curriculum of the local comprehensive schools and that a new position (Assistant Commissioner of Education) be created to assume the responsibility for the Institutes for

Educational Development. The present Bureau of Vocational Education is to be reconstituted as a Division of Manpower, Research, and Development to be administered jointly by the State Department of Education and the State Department of Labor under the new Assistant Commissioner. This new division would, in effect, provide the bridges connecting research findings with development and curricula with the world of work.

*Sixth,* it is recognized that to accomplish this approach to occupational education it is necessary to train new teachers and administrators and retrain existing teachers and administrative personnel. The appropriate type of teacher training programs and responsibilities for various existing institutions are set forth in the following recommendations.

*Seventh,* to complement these recommendations it is necessary to change not only the public's attitudes towards occupational education but also existing legislation. Furthermore, new methods of financing must be found to provide the appropriate incentives for the development of an educational program which is relevant to students. Appropriate recommendations in these areas are set forth.

*Finally,* the recommendations include an attempt to clarify the appropriate roles to be played by the Institutes, community colleges, and technical institutes in the important area of post-secondary, non-baccalaureate programs.

## A. CURRICULUM

*Guiding Principles. 1) Vocational and technical curricula must be commensurate with the aspirations, interests, and needs of the youth and adults to be served. 2) Such curricula should go well beyond the mere teaching of manipulative skills and technical knowledge. They should be concerned with producing future citizens who will be socially and economically responsible. 3) It is recognized that no one curriculum can relate fully to the needs of all individuals.*

**Recommendations.**

**1. It is recommended that the elementary school level curriculum become concerned with the relevance of technology in our modern society (technology for children).**

This suggests that today's youngsters are exposed to a vast amount of technology but not as part of their planned schooling. Through the media of television, reading materials, toys (models), and so forth the young become inquisitive about modern technology and their environment. Thus, the elementary level teacher must be made aware of the importance of modern technology in her everyday teaching. At the present time an interesting demonstration project of this nature is being conducted under a Ford Foundation grant entitled "Technology for Children." It is anticipated that the outgrowth of this project will provide the parameters for both the training of the elementary school teacher in the content of the subject as well as the preparation of resource persons to work with her.

**2. It is recommended that industrial arts offerings be made relevant to the needs of youth through "introductions to occupations" at the junior high school level and "advanced technology" at the senior high school level.**

Although there are attempts to implement such changes in industrial arts curricula throughout the country, no concrete references can be given here. As alluded to in the section on teacher education, the philosophy of Fitchburg State College is one of science with the emphasis on major principles and basic concepts of the various divisions of technology. Seen in this light, every senior high school would continue to have one or more industrial arts laboratories. Their staffing and physical environment would, however, be quite different from the present model. It should be expected that the newly envisioned industrial arts teacher would work closely with the mathematics and science teachers in applying the construction, testing, and demonstration of the principles of modern technology. Students of such offerings (usually electives) would be the precocious and bright and probably would be destined for post-secondary education.

The "introductions to occupations" junior high school contribution of

industrial arts (not be confused with pre-vocational) suggests a re-emphasis on "exploration" in industrial arts -- an objective which has long been held but never seriously executed. Youth needs information about the working world in an activity-oriented framework. Such is not available in the presently conceived guidance program. A study of occupations, their requisites, rewards, and status is a natural focus of adolescent development and inquiry. No portion of the junior high school offering is at the present time deeply concerned with the future of the youth it serves other than those who display academic talent. It is appropriate that, at this time, options of an occupational nature be fully defined for students.

It should be remembered that industrial arts is not a curriculum but a subject, and as a subject it can make a significant contribution at both the junior and senior high school levels. It is recommended that it remain an elective in the senior high school.

**3. It is recommended that the multitude of different occupationally-oriented curricula be broken down into two broad categories: 1) Careers Development (clusters), 2) Vocational Preparation (highly skilled).**

**Careers Development (cluster).** The Careers Development Curriculum recommended is similar to attempts already being made by a few farsighted school administrators for the needs of approximately 40 to 60 per cent of the high school student population. Such a curriculum must be designed for students with special needs -- those who are held back by their socio-economic backgrounds and those who evidence little interest or talent in academic or vocational pursuits.

Such students are the potential school dropouts as well as the general curriculum "drop-in" types. Often they can be identified early in their school careers and by the ninth grade they are clearly recognizable. It is at this level (ninth grade) after they have normally experienced the elementary and junior or middle school offerings which include industrial arts and home economics, that the Career Development Curriculum should begin.

As envisioned, the Careers Development Curriculum should be non-graded, should involve an occupational cluster, and should be elected by students from the ninth grade through the twelfth grade. Hopefully, many of those vocationally talented who identify with the Curriculum desired and who receive the encouragement of the cluster teachers, vocationally talented youth, will "spin off" into the Vocational Preparatory offerings of the school district or region. The neighborhood or comprehensive high schools throughout the region become feeder schools for the Institutes for Education Development (vocational preparatory curricula) described elsewhere in this report. It should be made clear, however, that the requirements for entrance to the Institutes (usually at the 11th or 12th grades) will be maintained at a high level by the Vocational Preparatory Curriculum and only a small percentage will be admitted.

Some of the clusters of occupations that should be considered, as well as the interrelation of the academic subjects for the college preparatory curricula in every high school, should include the following:

Building Construction
Transportation and Power
Business and Office
Distributions Occupations
Health Occupations
Industrial and Fabrications
Foods and Kindred
Agricultural Occupations
Communications, Storage and Retrieval

The teaching style of the Careers Development Curriculum should be one of team teaching. Ideally the cluster teacher will serve as the catalyst through which the academic subjects (mathematics, science, language arts, social studies) will take on meaning. (see Figure 1)

Ideally the cluster content will be taught through self-contained units in order to accept students at any time throughout the entire program. The academic subject members of the team relate to the cluster units, making the academic subjects relevant to the experiences of the students. As a team, the periodic evaluation of the individual students within each cluster would be made on a week by week basis.

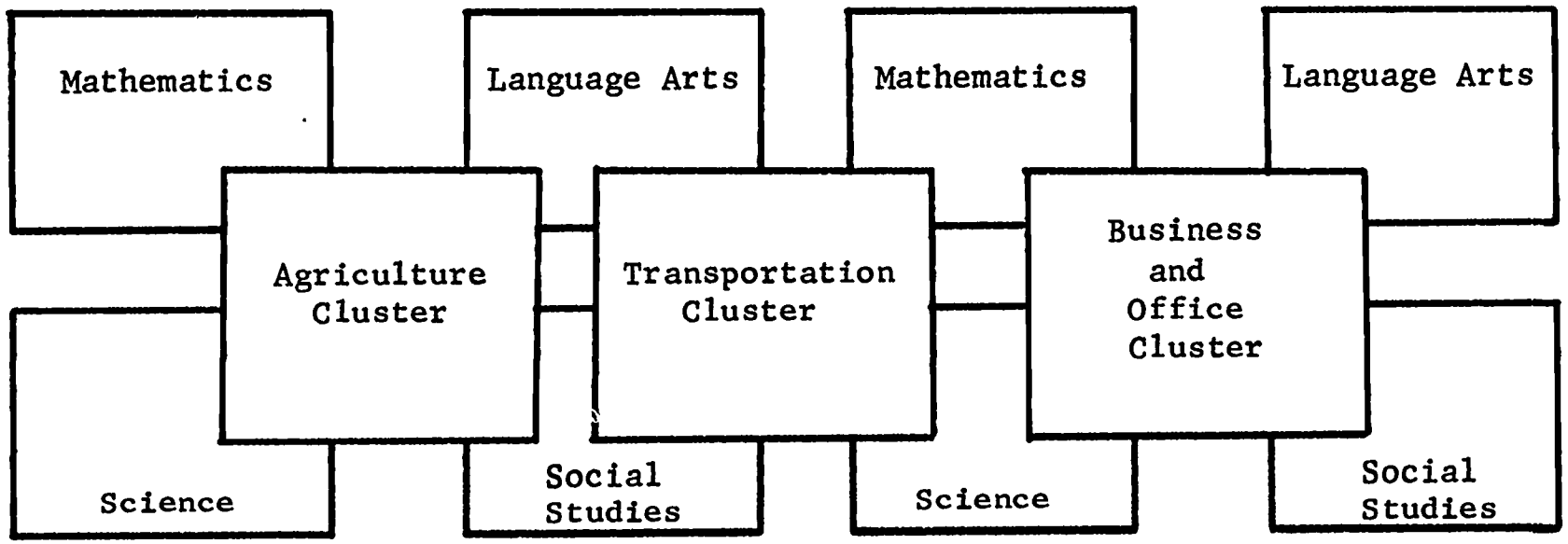
**Vocational Preparation (highly skilled).** This curriculum is directed toward the truly vocationally-talented student who, by demonstrating his ability in academic subjects (usually mathematics and science) and his manipulative dexterity, is able to identify with a particular[1] occupational skill area.

In other words, there are some students, probably fewer than are being accommodated today in the secondary school vocational programs (perhaps 5-10 per cent), who are firm enough in their choices, possess the necessary attributes of motivation and initiative, and have the prerequisites to pursue, while in high school, one of the highly skilled trade, industrial, business, and managerial areas.

Such a skills program (vocational preparation) should be limited to the upper two years of the high school offering (11th and 12th years). Such students should "spin" into them from either the college preparatory or the Careers Development offerings. In other words, the vocational preparatory curricula will be more exclusive and selective than in the past. The setting for such offerings will be the area Institutes for Educational Development, described elsewhere in this Report. The curricula will be designed and taught by technology-oriented teachers (see recommendations under Teacher Education) with the purpose of challenging the vocationally talented student to become the source of highly skilled manpower -- the future craftsman and foreman. In this respect the physical facilities, hardware, and equipment will be of necessity the industrial type. Upon graduation these students should be

[1]Sometimes the word specific is used. It is not used here because specific has the connotation of being too limited. For example, the auto mechanic trade has approximately 20 different occupational titles classified under it in the *Dictionary of Occupational Titles.*

**Figure 1 Team Teaching Cluster Concept**



recognized as the pool from which can be drawn the best advanced learners of the skilled occupations, many of whom will continue their training through various advanced programs -- both formal and informal. Indeed, the demand and competition for these graduates by industry, business, and the trades, and the advanced status they will command will be one measure of the program's success. Those who complete such a curriculum are entitled to a certificate on the basis of a comprehensive examination. Lastly, parents, school officials, and industry would recognize that this program is indeed an elite program, serving talented students and provided by master teachers with a technological background.

**4. It is recommended that the adult curricula of the Institutes for Educational Development be limited to those of less than degree (associate) nature and to those not requiring post-secondary education as a basis for their mastery.**

The full development of the community college program in Massachusetts is envisioned to answer the post-secondary educational needs of youth and adults. That is, an educational program built on a sound secondary education and conceived for a two year period culminating in an associate degree, is within the purview of the community college program. Offerings of a retraining (MDTA), upgrading (extension), apprenticeship related, short and varying term nature should constitute the adult division of the Institute for Educational Development.

Adult offerings will be appropriately given during both the day and evening sessions of the Institutes. Although it is assumed that the ancillary facilities and services of the Institutes, i.e. cafeteria, auditorium, administration, as well as guidance, health, diagnostic, and technical library, will be used by both youth and adults, it is not recommended that the classes themselves be mixed.

With respect to the Institute's adult offerings the focus should be on perpetuating an image of continuing education for all adults within the area of the Institute's influence. The Institutes should be the source to which adults can return whenever there is an educational problem involved. This is a far different role than that envisioned for the community colleges.

**5. It is recommended that all high schools offer the Careers Development Curriculum and that the Area Institutes for Educational Development provide the Vocational Preparatory Curricula as a service to the local high schools.**

In this respect the Careers Development Curriculum should be made a part of *every* high school's offering -- indeed, a significant share of the home school obligation. In an important sense it would utilize existing resources of teacher talent and physical facilities and would commit these resources to the needs of a larger percentage of high school youth.

The neighborhood or local (in some cases regional) high school assumes the responsibility for all of its students and their education -- the academically talented, those eligible for the careers development program, and those interested in the vocational preparatory program. The fact that the vocational preparatory student takes his skill subjects at the Institute for Educational Development does not relieve the local school of the responsibility for the student. He is merely out of the school building for a portion of the day.

Those students who are accepted for vocational preparation at the Institutes for Educational Development are not the responsibility of the Institute with respect to athletics, extra-curricula activities, state-required subjects for graduation, and graduation. Ideally, problems of discipline, tardiness, and absenteeism, would remain the responsibilities of the local school. It should be noted, however, that the Vocational Preparatory student may have to adjust to a longer school day due to the added transportation involved.

**6. It is recommended that post-secondary curricula of an occupational nature be offerings of the community colleges, especially those that are of a two year nature and result in the awarding of an associate degree.**

The Community College is a unique institution, and one which is already planned for by the Commonwealth. As a post-secondary, degree-granting entity, it represents a valuable contribution toward the manpower needs of the Commonwealth. Its main thrust, nevertheless, should be on a higher academic plane than the Institutes for Educational Development. To that effect community colleges need to be staffed and programmed to meet the needs of youth and adults who are seeking curricula of substantial depth and duration which relate to degree objectives. The technology offerings of engineering, i.e. mechanical, design, construction, and electrical are some examples. Other offerings related to the health, business, and managerial skills are further examples.

Obviously, there should be a close relationship between the adult offerings of the Institutes and those of the community colleges. Where it is possible to use common facilities and/or equipment this should be encouraged. Nevertheless, it is again worth noting that the academic atmosphere, administrative philosophy, and the setting itself will vary if each institution is to provide its unique contribution toward the education of adults in terms of their different needs.

## B. THE COMPREHENSIVE HIGH SCHOOL

*Guiding Principles. -- 1) Education can be carried out best in a comprehensive school setting where young people of all social and intellectual levels can mingle; 2) Most "comprehensive" high schools are not truly comprehensive in nature, and the artificiality of this terminology should be recognized. 3) A greater commitment on the part of educators must be ensured to make education itself "comprehensive" and to recognize the varied needs, interests, and aspirations of youth.*

**Recommendations.**

**7. It is recommended that every high school calling itself "comprehensive" re-examine its operation so as to allocate a greater portion of its resources to non-college bound youth.**

It has been suggested by Dale Draper in *Educating for Work,* that if 40 to 60 per cent of high school youth do not go on to college, then 40 to 60 per cent of the school budget, school faculty, and physical facilities should be directed towards the needs of these youth. [1] The test of this proposition can be found in that part of the present offerings devoted to the economic, social, and psychological needs of these youth.

The point is that to a large extent the actual choices open to secondary school youth are relatively limited both in breadth and depth. Naturally, school size relates to the problem. No high school with a small student population, especially under 1,000, can offer any great breadth of choice. Yet, at the same time, 40 to 60 per cent of the students need education more relevant to their post-high school needs.

**8. It is recommended that every comprehensive high school adopt, within the limits of their already existing resources, the cluster occupational curricula (Careers Development grades 9-12) desired in the "Curriculum" section of this report.**

Certainly, there already exists in almost every high school the nucleus for carrying out such a recommendation. What is lacking is a fuller recognition of the problem and a greater commitment to its solution. The Recommended Careers Development Curriculum utilizes, beside the internal facilities of the school, the total resources of the community to achieve the educational aim of helping young people decide their occupational careers for themselves. This is far different from "locking" them into traditional vocational offerings. Cooperative education obviously should play a role in such offerings and the whole program should be one of an elective, non-graded nature.

In order to accomplish this objective it is necessary that the present faculties be re-oriented in their mission so that responsive faculty personnel are offered the challenge to work more directly with non-college bound

[1] Dale C. Draper, *Educating for Work,* The National Association of Secondary School Principals, (Washington, 1967) p. 19.

youth, even to the extent of seeking to place students in jobs upon graduation.

9. **The Commonwealth should employ, as an incentive to encourage beyond the present endeavor of the local school (as well as the present incentives for regionalization), the awarding of a stipend to teachers engaged in the effort during their first year: more specifically, that portion of the cost related to the in-service education of the participating teachers -- a stipend of $500 per teacher.**

Essentially, this recommendation calls for a vast reorientation of a large portion of most school faculties. This effort itself will require a substantial commitment on the part of the Commonwealth and will require as well the rededication of the teachers themselves which in turn will require substantial in-service teacher education. In this respect it is recommended that a stipend be paid directly to the teacher with the intent that it be used to offset the cost of taking part in the in-service activities, most of which will be conducted as an "overload" beyond normal assignments. In reality, this would become the first order of business of the newly created Bureau of Careers Development of the State Department of Education.

At the suggested stipend rate ($500 per teacher) a budget of $100,000 per year would provide in-service training for 200 teachers per year. It would be expected that 400 teachers (cumulative) would be needed to be so prepared by 1970 and 1,400 (cumulative) by 1975, costing an aggregate of $700,000 in order to implement the program. It is assumed that after 1975 new teachers would be fully trained to enter the profession and the stipend requirement would no longer be required.

## C. ORGANIZATION

*Guiding Principles. 1) Equal opportunities for occupational education must be provided for all youths and adults 2) The local (town or city) school system must make a greater contribution to youth who are not going on to advanced education immediately upon graduation 3) The Commonwealth must concern itself with the total manpower problem and the coordination of all the resources available to solve it.*

10. **It is recommended that immediate steps be taken to re-allocate a larger percentage of local school resources to meet the occupational needs of 40 to 60 per cent of its student population.**

Obviously, the percentage of students being referred to is already enrolled in the schools. Wh t is being suggested is the re-allocation of existing resources to meet the needs of such students (see recommendations on

curriculum). If it can be agreed that any given percentage of young people (50 per cent or higher in some schools) are not going on to advanced formal education immediately upon graduation but are going to enter the world of work, then the question must be asked: "Is a comparable proportion of teacher talent, physical facilities, and other resources allocated to the needs of these students?" The answer, in the average school system, is in the negative.

No indictment is being made because in each school system there do exist teachers and administrators dedicated to making the subject matter of education relevant to needs of these students. What is requisite is a greater variety in teaching approach, a greater understanding of the needs of youth on the part of teachers, and fuller implementation of the activity-oriented educational process as presently being conducted by vocational education. The Careers Development Curriculum, described in another section of the Report, explains this view in greater detail.

It is hoped each comprehensive school interested in providing a comprehensive education will allocate a portion of its resources toward relating all of the subject matter to the needs of youth and will refrain from forcing all youth into the highly traditional patterns of the school.

Undoubtedly, substantial retraining of teachers will be necessary if this type of curriculum is to be developed. Experiences with the occupational world will be of primary importance for all subject teachers employed in the Careers Development Curriculum. It is anticipated that major teacher education institutions would take the leadership in such retraining, but this does not eliminate the responsibilities of the local school officials in conducting in-service programs along similar lines.

**11. It is recommended that major emphasis be provided by the local schools (and appropriate financial incentives be made available) for implementing a Careers Development Curriculum for a majority of students (as high as 40 to 60 per cent) at the secondary level, grades 9 to 12.**

Such organization at the local level would enroll a conservative 125,000 students by 1970 in this kind of program. It assumes, similarly, the special effort of approximately 5,000 teachers (40 per cent of all teachers grades 9-12 on a 25 to 1 student teacher ratio) and an aggregate (local - state) operating budgetary commitment of approximately $87.5 million.[2] Moreover, it will require the reorganization of present high school physical facilities. In many instances, new equipment and hardware will need to be added, shared time facilities will have to be utilized both within schools and with business and industry, cooperative education will need to be considered, and above all, teacher re-orientation will be required.

[2]Based on an average per pupil cost of $700.

Needless to say, some financial incentive to take the initial step and bring about a change of such magnitude will be necessary. The most effective way of accomplishing this change is through added State reimbursement for teacher salaries for those committed full time or part time to such an endeavor. But important as a plan of monetary incentive may be, it is even more important to assure the re-orientation of the teachers themselves toward such a program. It is suggested that workshops, institutes, and other similar activities be employed by the State leadership to assure an understanding and redirection of the effort.

The point cannot be sufficiently emphasized that this is where the major thrust for occupational education must be made. If the budget is limited (and it always is) the highest priority should be given to teacher preparation, curriculum changes, and the training of administrators and supervisors.

**12. It is recommended that approximately 30 Regional Vocational-Technical schools currently being planned become State operated Institutes for Educational Development and that greater consideration be given to allocating more of them to the large metropolitan areas.**

Although this recommendation endorses the area school concept it does call for a reappraisal of the present plan in terms of the acute need in the large metropolitan areas. For example, only one such school is planned for the Greater Boston Area[3]; this is obviously inadequate. On the other hand, a Regional Vocational School is being planned (and presently being implemented) for the Bristol County Area despite the fact that Bristol County has a substantial beginning for a comprehensive Institute for Educational Development through its $5.5 million investment in its County Agricultural School. Certainly, at a fraction of the cost of a total new complex, the Bristol plan could be combined with the agricultural school, thus making available resources for another Institute for the Boston area.

Probably the most controversial part of this recommendation is that which calls for the Institutes to be converted into State operated institutions, suggesting to some a dual educational system. Such is not the case since this Report is definitely committed to maintaining a single education system with "home rule" for all school-age students. Moreover, the Report advocates that students belong to their local schools for all other purposes, except for availing themselves of the vocational and technical offerings. Essentially, the communities served by the Institute make use of the Institute's resources but still retain the responsibility for those who attend.

The concept of Institutes operated by the Commonwealth provides several advantages: 1) the cost of the Institutes is shared equally by all taxpayers throughout the Commonwealth; 2) the opportunities for occupational education (once a network of Institutes is established) become equal

[3]Under study by the Center for Field Studies of the Harvard Graduate School of Education. (unpublished report) March, 1968.

for all; 3) the curricula offered in all of the Institutes can conform to some "State-wide" planning so that a variety of programs can be offered to meet various student interest; 4) educational leadership and teacher competency within the Institutes can be regulated through more uniform control; and 5) a substantial program of adult (non-degree) offerings can be implemented in a planned and precise manner.

What is being suggested is not unlike the 15 (with one in the planning state) Regional Vocational-Technical Schools found in the state of Connecticut, all of which have a long-standing reputation of providing quality education for both youth and adults.

13. **It is recommended that the geographic plan to provide Regional Vocational-Technical Schools be expanded and implemented within as short a time as possible. The expansion should assure such a facility (an Institute for Educational Development) within a 30 mile radius of every boy and girl throughout the Commonwealth.**

The recommendation actually extends the Regional Vocational School concept but in a somewhat different manner (see section on Institutes for Educational Development). It calls for development of the area type educational facilities in both quantity and quality to provide equal educational opportunities to all young people. It foresees a number of such Institutes in larger communities either as part of educational parks or in some other form. Moreover, in places like Boston, it eliminates separate, city-operated vocational and trade schools.

The network of area Institutes would stretch across the Commonwealth, being located where feasibility of transportation and site dictate. Each will cost approximately two and a half million dollars to construct and another one-half million dollars to equip. These must be new facilities and not inherited "dollar a year" rented real estate of an obsolete nature.

The architectural specifications of the first of these Institutes will require substantial planning and innovation. It can be expected that the Commonwealth can take advantage of this investment in planning through the standardization of most of the schools.

The financial commitment on the part of the Commonwealth will probably cost approximately 75 million dollars for physical facilities and another 15 million dollars for equipment. A cost of 90 million dollars is negligible for a bold, initial step to equalize educational opportunities for youth and to assure substantial "pay-off" for the adult population.

Yearly operating costs cannot be determined as easily, but it will approximate 13 million dollars plus an additional commitment when fully operative with approximately 500 full time students for each Institute.[4]

[4]Computed on the basis of an actual operating cost of $850 per student per year, assuming 15,500 students enrolled in 30 Institutes.

Naturally, the operation of such Institutes will vary with the service activities provided. It is anticipated that there will be a substantial variance in services from center to center, i.e. urban vs. suburban vs. rural.

## D. INSTITUTES FOR EDUCATIONAL DEVELOPMENT

*Guiding Principles. 1) Particular services and educational programs that must be made available to all school districts and their efficacy necessitates centralization. 2) One of these programs concerns the education of vocationally talented youth. 3) Another program concerns the problem of providing skilled training and/or retraining for adults required by technological change and displacement.*

**Recommendations**

**14. It is recommended that a total of 30 Institutes for Educational Development be established throughout the Commonwealth and that these Institutes be placed within reach (30 miles) of every school district and community.**

The area concept is not new to Massachusetts. At the present time six Regional Vocational-Technical High Schools are in existence and an additional 25 are in the planning stage. Few would deny, however, that their development under present procedures is slow and burdensome. The present plan of duplicating self-contained vocational high schools creates a dual educational structure at the secondary school level. It imposes self-contained curriculum offerings as the answer to the needs of all young people who seek vocational and technical education. In this respect the existing plan serves to distinguish between education in general and vocational education. Some youth belong to their local school systems while others are shunted off to other school systems. It purports to be the answer for the masses of youth who are both capable of making a strongly motivated choice to pursue a vocational goal as well as for those youth who are neither strongly motivated nor endowed to succeed in the specific offerings of the present programs. It is, therefore, submitted that neither student can be well served under the present plan.

What is being recommended is to reorganize the existing structure and to recognize the Commonwealth's responsibility for providing training of a highly skilled and more costly nature. In essence, the proposed vocational and technical program will remove many of the unqualified students it now accommodates and concentrate only on those who are assured success. This does not mean that those unqualified would not be accommodated, since they would enroll in one of "careers development" clusters in their local or neighborhood high schools. (It is anticipated that only one out of every two of the present student enrollment would be eligible to pursue vocational education under this new concept.)

**15. It is recommended that the Institutes for Educational Development be established, financed, and operated by the State Department of Education through a separate division.**

The present regional Vocational-Technical High School structure actually functions as a quasi-state establishment. The building plans are specified by the Commonwealth. The curriculum is usually specific so as to receive maximum state reimbursement, and the directors and teaching staff meet stringent certification requirements as set by the State Bureau of Vocational Education. In other words, there currently exists state control of these activities to the extent that they are substantially State operated in everything except name. What is recommended here is that they become State-operated entities in the truest sense so as to equalize the educational opportunities and services available to all boys and girls throughout the Commonwealth.

The administration of such Institutes must, therefore, be a State responsibility and one of a more far reaching nature than merely providing offerings for vocationally talented youth and skill training for adults. Although this study was not charged with the improvement of all aspects of education, it is apparent that there is a shortage of guidance counselors, reading specialists, school psychologists, special education classes, health services, curriculum specialists, and cultural experiences, in many, if not most, schools.

**16. It is recommended that in the Institutes for Educational Development the vocational and technical programs be limited to curricula of the high-skill nature in the upper two years (11th and 12th) of high school and admit only those students who possess the necessary aptitudes to achieve at such a level.**

This recommendation in effect cuts back the enrollments envisioned by vocational education in the present regional Vocational-Technical High Schools and thrusts upon them the challenge to turn out a limited but highly superior number of graduates possessing skills and knowledges higher than heretofore produced. Moreover, it imposes a concept of "quality control" at both the input and output ends of the offerings.

The curricula offered must be clearly identified as highly-skilled trades and/or occupations (usually defined as those requiring a minimum of 8,000 hours to learn) for which needs now exist. The premise that employment opportunities need to be visible in the local setting should not constitute the sole basis for the program offerings. Employment and occupational opportunities in the local areas, the Commonwealth, and the New England region should be taken into account; that is, every type of high-skilled occupational opportunity should be provided for by some curriculum in some Institute throughout the state.

Skill training for adults, both retraining and up-dating, must also be a responsibility of each Institute. At the present time, these programs are financed almost 100 per cent by federal funds. Their continuation in the Institute setting would indicate the National and State commitment to the continuing education of adults.

The notion of eliminating fixed equipment and hardware, but providing for adequate space and physical services for a variety of equipment, should be carefully considered. Under such a plan, the equipment would be rented or leased for the duration of the training program. The special adult facility would also rely on part-time instructors, frequently from employer groups, with a small nucleus of a permanent staff so as to assure maximum flexibility to change programs. It is assumed that the trainees completing these programs would receive the necessary basic and relevant general education and, upon the completion of the programs, would become immediately employed. Many such adult programs would provide compensation while in training, as well as living expenses. Therefore, the offerings would be operating almost around the clock, six days a week. Under such circumstances the need for separate, but adjacent physical facilities becomes apparent.

**17. It is recommended that high school students at the Institutes belong to their respective secondary high schools for purposes of graduation, athletics, extra-curricular activities, and state required subjects.**

This recommendation imposes upon public education in the Commonwealth an adequate network of Institutes and provides for their maximum utilization in terms of scheduling high school students. Such a network obviously will need to be established within easy transportation range (within approximately 30 miles).

The fundamental principle that students should belong to their local high schools denotes a scheduling system which will eliminate the one or two week "about" plan now frequently required by most vocational schools. There is little evidence that this plan is advantageous to either the instructional process or the student. In fact, the evidence is to the contrary, as revealed in several studies conducted by the State of Ohio. It may be argued that correlation of instruction in the mathematical, scientific, and communicative skills with the shop or laboratory instruction can only be fully achieved through an arrangement which relates all of the instruction on a daily basis.

It should be clearly understood that the students screened for the Institutes will be talented both vocationally and academically. Therefore, the classes attended back in the local high school will be of the regular type with some attempt at homogeneous grouping. The local high school classes will be generally responsible for English and history in the junior year and English in the senior year, and every effort should be made to correlate these courses.

The plan of operation of the high school classes in the Institute is devised

to accept juniors in one half-day and seniors in the other half-day if indeed any class or year classification is to be assigned them. It is entirely possible however, that a non-graded system will work best. The plan envisions the students attending the Institutes in the morning so as to reduce the transportation problem between the Institutes and the local high school.

The Institute, then, would serve as an additional resource to the local high school offering and would be one of prestige for those who are chosen to attend and who can handle the work.The instruction must turn out an end-product that assures unquestionable success based on comprehensive testing and acceptance into bona fide apprenticeships, as recognized by employers and union officials and that in every way meets the demand of employers.

**18. It is recommended that ancillary services of guidance and counseling, diagnostic testing, placement, technical libraries and follow-up should be provided for by the Institutes.**

The services of guidance and counseling, diagnostic testing, placement, and follow-up should serve the several programs housed in the Institutes. That is, both adult and in-service students who enroll in the various offerings should have access to such services. Consideration should be given to the expansion of these resources to include counseling for mentally and physically handicapped, as well as diagnostic work for all age groups.

The direct support - even to include the physical presence - of the services of the State Employment Service in these Institutes should be engaged. This agency could well perform the function of pre-employment testing, guidance, placement, and follow-up for the students enrolled.

Probably one of the most important responsibilities of the Institutes will be to recruit vocationally talented high school students to its programs. Such students must deserve the Institute's offerings to the same extent that the academically talented students deserve the best offered by the local high school. Liaison must be established and maintained with the high schools to be served and the ancillary staff of the Institute is the logical group to perform this function. The input (the students to be served) will have to be pre-identified as those possessing the motivation, initiative, and native ability to succeed in the high-skilled programs being offered. It is expected that the ability to "pre-identify" such students will be one of the critical factors in assuring the success of the Institute's programs. The Institutes are not to be considered as a panacea to the problems of all non-academically-oriented students. On the contrary, they are to be reserved for those students who have uniquely different motivations for learning skills which cannot be met by the neighborhood or comprehensive high school.

**19. It is recommended that consideration be given to other kinds of programs and services which the Institute concept can best achieve. Among these may be special classes for precocious as**

**well as classes relating to in-service teacher education, instructional materials, and cultural focus through special experiences. (Several of these could be funded under the Elementary and Secondary Education Act.)**

The proposed Institutes should be conceived of as an additional resource formerly not fully realized by the educational community. As state constructed and operated they must be justified on the basis of providing equal educational opportunities throughout the entire Commonwealth for young people and adults. This has always been the goal of public education but has never been achieved by any state as a whole. Areas of unequal educational opportunities exist even in the best financed local programs. The academically-oriented students are accommodated first and those who deviate from this orientation are frequently ignored. The human resources of society constitute all persons, and indeed our society is built on the assumption that each person has a unique contribution to make to it. To ignore, for example, the physically handicapped individual is to deprive society of an individual who can make a contribution.

The Institute concept assumes that the needs of most students will be met by the on-going educational offerings through the presently conceived pattern of high school programs which can accommodate the "usual" through staffing, enrollment, and cost patterns. Moreover, these programs must be assessed in terms of their results and must not be "watered down" to satisfy only mediocrity.

In all cases, the students served at the proposed Institute belong to the local school system to which they may return for only a single period of the day or week or perhaps more. Nevertheless, they must be the concern of their home school system.

**20. It is recommended that the present regional Vocational High School immediately take on this new role and that it gradually return the responsibility for the marginal vocationally talented student to their local schools.**

This recommendation is made with full awareness of the long and hard struggle that has gone into the establishment of each regional Vocational High School. It is assumed that financial restitution will be made to the local districts for the physical facilities and equipment that were not originally supported by Commonwealth funds. Hopefully, such restitution will enable the local school to begin to provide the "Careers Development Program" described in another section of this Report. Operating costs become another element of the process of "change-over." Serious consideration should be given to absorbing those members of the staff who have proved themselves able to work with the students enrolled in the local high school "Careers Development Program." However, caution should be exercised in terms of their "re-orientation" to this type of education. After such orientation many

of these individuals may be found to make excellent team leaders in the new cluster "Careers Development Program."

**21. It is recommended that the state determine ways in which to finance the estimated 90 million dollar complex of area Institutes as well as to assure their yearly maintenance (operating costs).**

This recommendation is discussed more fully in the recommendations on financing.

**22. It is recommended that administration of the Institutes for Educational Development be responsible to the newly established Division of Manpower, Research and Development.**

The administration of the State system of Institutes is discussed fully in another section of this Report. The Institutes are to be state operated and led by highly qualified individuals with the competence found presently in the community college system.

## E. ADMINISTRATION

*Guiding Principles. 1) The administrative function, although minor in terms of budget, is of major importance in assuring the success of the program recommended; 2) The two programs, Careers Development and Vocational-Technical, are diverse enough to warrant separate forms of administration; and 3) The administration function must be one of leadership and expedition rather than supervision and control.*

**Recommendations.**

**23. It is recommended that the occupational preparation program (Careers Development Curriculum) of the local schools be under the general supervision of the Associate Commissioner of Curriculum and Instruction and be administered by a separate Bureau of Careers Development which cuts across elementary and secondary education.**

As a separate organization the Careers Development Bureau would provide the leadership for a large percentage of students at the local school level (K-12 grades), who are oriented to the "world of work." The promotion, organization, and leadership of such offerings as Technology for Children in the elementary grades and Introductions to Occupations at the intermediate or middle level, as well as the previously described Careers Development Curriculum, would constitute the major responsibilities of the Bureau. Obviously, the Bureau's greatest challenge will be to serve as a "change agent" and to bring about the re-allocation of a major portion of the

present local resources which are now being used in a different manner either in the academic or the general curriculum.

This new Bureau must possess the necessary expertise in terms of elementary, middle, and secondary education. By working with and through teacher education programs, institutes, and workshops it is hoped that gradual but significant changes can take place at the local level. The administrative function thus becomes one of activating change and not merely legislating change. It is here that the major challenge lies and the potential for creativity exists.

**24. It is recommended that the newly created Bureau of Careers Development be headed by an educational generalist with a commitment to the occupational needs and inquisitiveness of youth (grades K to 12) at the local school level.**

As indicated, this new Bureau should be held responsible for devising and implementing broad and innovative programs of occupational exploration: i.e. introductions to technology, occupations, and clusters of careers development. As such, its mission should focus on all levels of education from K to 12 years and relate general education subjects to the needs of students. An educational generalist can best carry out the leadership role for such an endeavor.

Among the Bureau's responsibilities should be the following:

To inspire local school committees to re-allocate a substantial portion of their present budget for this endeavor

To plan and implement subject matter and curriculum.

To devise incentives and appropriate financial arrangements so as to assure the widespread acceptance of such offerings.

To assure adequate teacher preparation both in terms of quality and quantity.

**25. It is recommended that the present Bureau of Vocational Education be reconstituted to become a Division of Manpower, Research, and Development administered jointly by the State Department of Education and the State Department of Labor.**

This new Division will be placed between the State Department of Education and the Department of Labor. Unlike its present organization it would have three main bureaus: Manpower, Research, and Development.

**Manpower.** The Bureau of Manpower will have the responsibility of operating the 30 or more Institutes for Educational Development. It will develop programs for both youths and adults (see section on Curriculum). The Bureau of Manpower will be the operational unit of the Division in the sense that it is to be held responsible for the "product" of the network of area Institutes.

**Research.** The Bureau of Research will be responsible for the collection of data and the conduct of in-depth studies so as to assure accurate measures of the number and kinds of job vacancies throughout the Commonwealth. As the research arm, it must relate to other research efforts of other organizations, such as the Advisory Council on Education and the Division of Research and Development of the State Department of Education. Its separate identity, however, is clear in that it will utilize the findings of the economic and social disciplines as well as those of education. As such it will also assume responsibility for the evaluation of the instruction in terms of meeting established goals and objectives.

**Development.** The Bureau of Development will be concerned with the short-and long-range planning necessary to implement the findings of the Bureau of Research. It is anticipated that the Bureau of Development through the aid of the Bureau of Research and other agencies, will be cognizant of educational needs of youth and adults and feed these resources to the Institutes so as to assure them of the broad services needed: i.e. guidance and counseling, psychological, diagnostic, remedial education, and special classes for the handicapped. Demonstrations of all sorts will not only be carried on but also serve as the "process" by which the entire program develops and expands.

This new Division of Manpower, Research and Development would report directly to the Commissioner of Education for operational and developmental activities and to the Commissioner of Labor for research activities. As a joint Division it would assume a position squarely between the two agencies that now are concerned with the preparation of both youth and adults to fill manpower needs. At the same time, as an independent Division, it would have the freedom to act in a manner which will enable it to provide the maximum concentration of already existing resources (within both the State Department of Education and the State Department of Labor) for the purpose of developing the necessary manpower our society requires. This means that a share of the research, manpower projection, apprenticeship and other activities of the Department of Labor would become attached to the new Division. It is also suggested that the present Bureau of Vocational-Technical Education be assimilated by the new Division.

**26. It is recommended that the Division of Manpower, Research, and Development have a legally designated advisory committee, appointed by the Governor, consisting of representatives from industry, business, labor, education, economics, sociology, and psychology as well as representatives from Federal agencies dealing with manpower problems.**

Such a committee would be advisory in nature and carry out the following functions:

To recommend studies and research on manpower problems and projections.

To develop a cohesive manpower policy.

To assess the role and value of various formal and informal manpower programs.

To assure equal opportunities for acquiring occupational knowledge and skill for all groups by various means.

To project and present the budgetary estimates to the State Legislature necessary to carry out the programs.

To assume such other responsibilities as the Division of Manpower, Research, and Development deems necessary and desirable.

**27. It is recommended that the director of the Division of Manpower, Research, and Development serve on the staff of both the Commissioner of Labor and the Commissioner of Education. Moreover, his status should be in the category of an Assistant Commissioner to both Commissioners.**

Fear of being "locked in" one agency or the other can be eliminated immediately since, even at the present time, the administration of retraining and other programs calls for considerable cooperation between the two groups. Existing administrative responsibility of a dual nature without coordinated authority has created many problems. For example the selection of retrainees prior to receiving the training is the responsibility of one agency and the actual training is the responsibility of a second agency. The following suggested administrative organization provides for complete compatibility of manpower inputs and outputs. (See Figure 1).

## F. TEACHER EDUCATION

*Guiding Principles. -- 1) The teacher is central to the success of any program of education; 2) Various types of teachers are needed to carry out the programs described in this Report; 3) The Commonwealth itself should assume the responsibility for producing a sufficient number of qualified teachers to staff its programs as well as providing for their continuing education.*

**Recommendations.**

**28. It is recommended that undergraduate programs of teacher preparation be instituted to provide 1) humanistically-oriented teachers to staff the classrooms, shops, and laboratories of the Careers Development Program in the local or comprehensive high schools; and 2) technology-oriented teachers to staff the classrooms, shops and laboratories of the Institutes for Educational Development.**

This recommendation eliminates the present clock hour program of the State Department of Education and recognizes that all teachers are not suited

## DIVISION OF MANPOWER, RESEARCH AND DEVELOPMENT
### Organization Chart

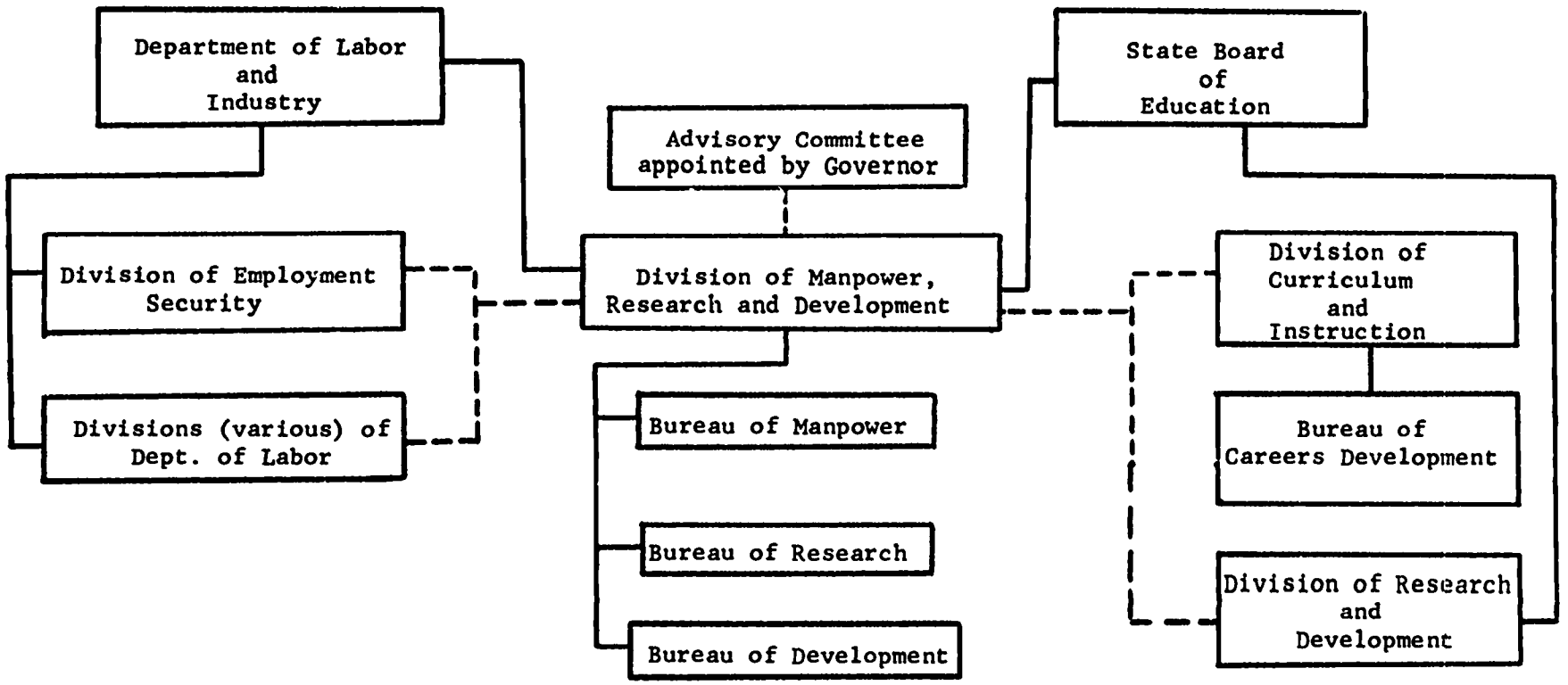



**Figure 1 Organizational Chart**

to teach all kinds of students. It further recognizes that teachers themselves are oriented toward certain student types, such as those teachers who are technically and scientifically inclined on one hand and those who are highly sensitive to the sociological and psychological problems of students with special needs on the other hand. Indeed, it is suggested that the variety of teachers needed to meet all types of youths and adults cannot be produced from the same teacher preparation mold. Far too long teacher education has been over-simplified; there clearly is no single method for the preparation of teachers. The idea of one good teacher for all students unfortunately is too often held by both teachers and parents alike. No one teacher can be all things to all children.

In recognition of the need for different types of teachers, it is suggested that consideration be given to the development of teachers by a number of separate institutions each with faculty, physical facilities, and curricula commensurate with its mission. That is to say, the faculty itself must be committed to the development of the types of teacher it is producing. This prescribes an atmosphere which is reflected in terms of the courses required, the facilities and hardware used, and the "quality control" at the completion of the program.

**Undergraduate Education — Careers Development.** – The teacher in the Careers Development Curriculum is not only career or occupationally-oriented, but also one who relates to the sociological and psychological needs of students. This kind of teacher is rarely found in modern education.

As a specialist in his own right he may be a mathematics, science, language arts, social studies major, or an occupational cluster expert. But, more than this, he must be cognizant of the special needs and interests of the youth with whom he is working. This is to say, he is mindful of the social and psychological demands of youth and is able to relate them to the subject matter he teaches.

At the present time there are few such teachers who are totally committed to the extent envisioned by this program. However, there is on every secondary school faculty a number of individuals with empathy for such students and with some special training who could be pressed into service very quickly for the Careers Development Program as described in another section of this Report. But the fact remains that not a single teacher education institution in the Commonwealth (or the Nation for that matter) is producing teachers of this specific nature, despite the fact that leading educators have supported this approach in principle.

What is needed is the acceptance of the challenge by some institutions to prepare such teachers. Particularly for the industrial fabrication and building construction careers programs, the facilities and laboratories of the industrial arts teacher preparation institution might well be used. Therefore, Fitchburg State College hopefully would display an interest in this type of teacher education. The cluster area of business and office occupations could well be the concern of Salem State College, and home economics with its cluster concept of foods, child care, and health occupations could be considered by Framingham State College. It appears at this time that the distribution and agricultural clusters, as well as some aspects of home economics related occupations, could become the concern of the University of Massachusetts.

**Undergraduate Education — Vocational Preparatory.** -- The output of such teacher preparation programs must involve a high degree of capability in science and mathematics, along with a specific technological background. Such teachers must be masters of their high skill and/or technical specialty. Their orientation and background (while pursuing a four year baccalaureate program) must assure occupational competency in the area they choose to teach. This, then, becomes their major -- their subject matter expertise.

At the present time the vast majority of these individuals, especially for trade and industrial and technical education is recruited directly from industry. This practice should be continued but, additionally, other sources of such teacher production should be implemented.

Certainly one of these new sources is the use of the "cooperative" plan found at Northeastern University. In fact, Northeastern University with its rich background in cooperative education appears to be a logical place to institutionalize such a teacher education program. Another approach that should not be overlooked is the establishment of a compact with the community colleges (and in some cases technical institutes) to feed their graduates from the two year technology offerings into baccalaureate teacher education programs. By adding some actual work experience and by testing for subject matter competency, the roles of skill and technical subjects teachers could be greatly improved. The underlying objective is to develop through all means an adequate supply of quality teachers for the specific offerings to be provided by the Institutes for Educational Development.

The staffing requirements of the Institutes will demand teachers for the specialities of agriculture (in all its aspects); business, including executive secretarial and data processing; distribution and marketing; home economics--in the more specialized sense such as dietary aide and child nursery care, as well as the additional technical and skilled trade and craft occupations. The related or general subject teachers (mathematics, science, social studies and language arts) must be provided to augment the special vocational offering.

Again the cooperative program of Northeastern University holds great potential to provide top quality teachers in all of these specialities. Thus a substantial effort could be made by Northeastern University to implement a cooperative, vocational, teacher preparation undergraduate degree and certification program, as well as a master's degree program designed to meet the needs of the recommended Institutes. Such an effort obviously should receive financial support from state and federal teacher education funds.

**29. It is recommended that a graduate program, including the offering of the Ed. D. degree, with a major in vocational-technical education, be established at one of the leading universities (University of Massachusetts, Harvard, or Boston University). Such a program should be interdisciplinary in nature, involving substantial work in sociology, psychology, economics, and other related areas. Moreover, M. Ed. offerings should be specially designed as appropriate to teacher needs at this level.**

The advanced degree should assure the development of a "new breed" of leadership for occupational education with options in administration, research and college teaching. This leader for tomorrow must use the knowledge of the various social and behavioral sciences and perform the function of translating this knowledge into operation. He needs an understanding of the disciplines of the behavioral sciences, including sociology, psychology, and economics so as to be able to integrate research from these fields for the needs of occupational education.

The program to develop such leaders must be flexible, must be based on the background of the individual, and must be able to overcome some of the barriers presently involved in unrealistic certification requirements, foreign language requirements, etc. The new vocational-technical leader, who will hold such a doctorate, should radiate many skills, broad knowledge, and a high level of leadership.

The approach to the development of the content for such a program must stem from an analysis of the role and function of the "new breed" itself. What is expected from the vocational-technical leader of the future? Will he be an administrator, a researcher, or a teacher? Will he exercise all three of these roles or will he specialize in only one of them? These questions can be answered only through an analysis of what is needed to accomplish the goals of vocational-technical education in the years ahead. If vocational educators have been isolated they need broad fertilization. How can this be achieved? Could this be accomplished through a program which encompasses seminars, internships, and readings so that the whole program becomes a laboratory as contrasted to a series of courses? What might be the role of a continuing seminar throughout the doctorate to relate knowledge gained from other disciplines to the existing problems of man, education, and work? These and other questions need to be answered.

Providing proper financial support and assistance to candidates who have been selected to pursue the advanced program is a profound concern. Talent should not be lost due to the inability to support oneself (and in many cases one's family) in a reasonable manner.

The concept of an internship in depth is suggested. The cooperative program in engineering as carried out by industry has been highly successful in producing engineering students and in relating theory to practice. Moreover, an internship, to be of value, must be highly individualized.

Teachers of both the Careers Development and Vocational Preparation Programs need advanced level work at the intermediate (M.Ed.) level. They should have the option of remaining in the classroom and becoming better teachers after completing a masters degree or embarking on a career in coordination, supervision, or administration. It is, therefore, suggested that these are unique masters' offerings and require some specialization while they are being pursued.

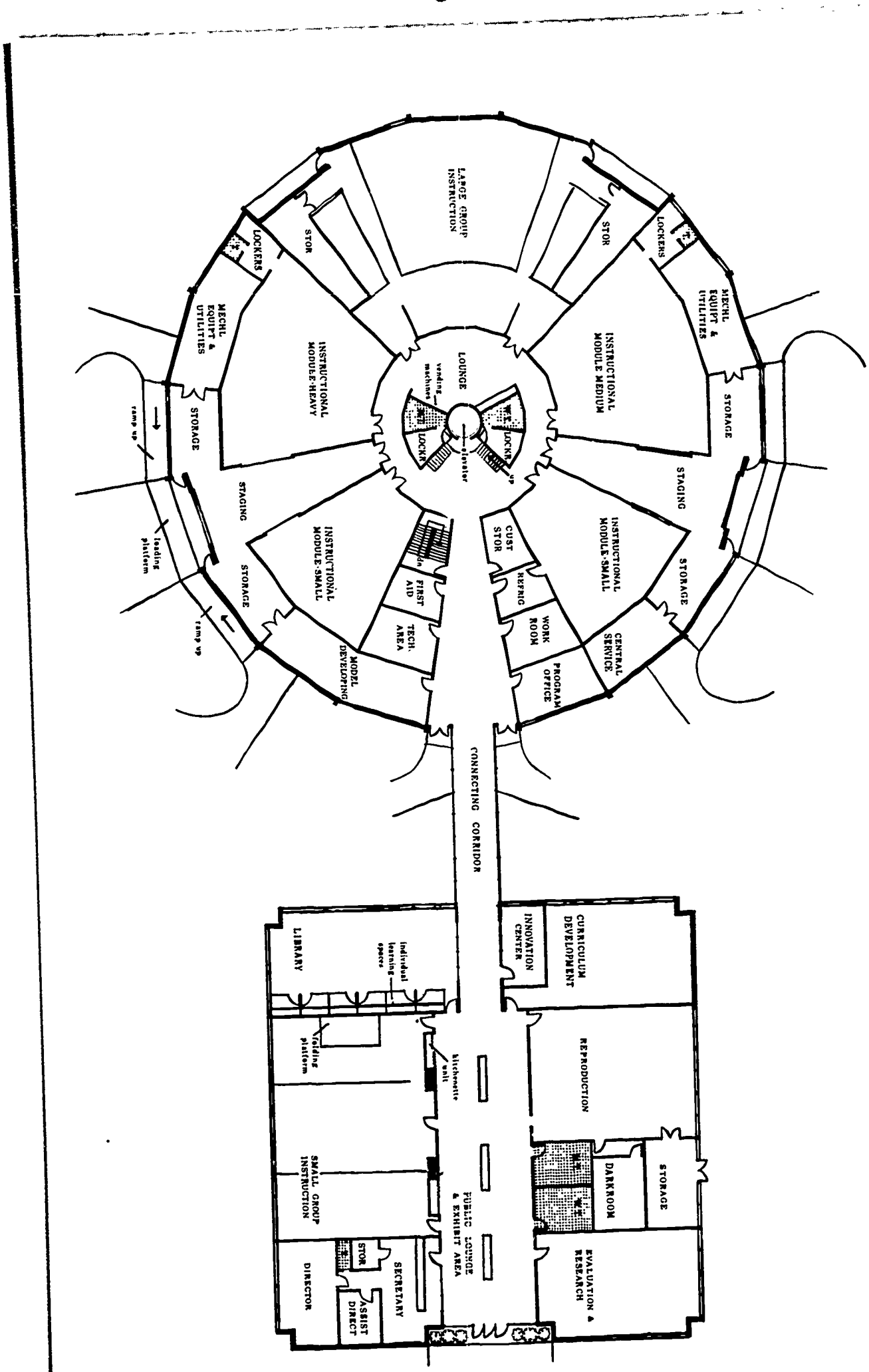
These are some of the considerations which need to be taken into account when contemplating an advanced degree program for a newly conceived vocational-technical educator.

**30. It is recommended that the continual updating of teachers in both technology and pedagogy become an integral part of the occupational teachers' progessional development and a Technology-Resources Center be established.**

Teachers of occupational education (vocational preparatory and careers development) are quickly outdated by new technological advances. The auto-mechanics teacher, for example, must keep abreast with new developments in the automotive industry. The same applies to the health occupations teacher. The continuing education of these teachers should not be left to chance but should be planned for as part of their continuing professional development.

It is clear that such facilities (especially the Institutes for Educational Development) cannot afford the luxury of standing idle for even a short time during the calendar year. The staff for such facilities (as well as for the cluster facilities) should be thought of as twelve month employees with one month vacation. They should be placed on a rotation schedule of three years with the tenth month of each year's contract devoted to professional improvement and updating. The three year rotation would include a one year return to school for formal training, a second year in industry for practical updating or in some other "externship" type of experience, and the third year at the institution of employment so as to improve their courses of study, teaching facilities, etc.

In addition, the concept of continual updating through in-service offerings, to be made available at a Technology-Resources Center, should be included in the plan. (The concept of the Technology-Resources Center is described elsewhere in this report). Such a center could be established as part of the contribution of either Northeastern University or the Lowell Technological Institute. If this is impossible, it could be made a part of the Boston Center of the University of Massachusetts (See Figure 2). Such a Center obviously should be considered the focal point for updating teachers and as such should serve the entire occupational teacher training endeavor. A capital investment in such a Center would be evidence of the will on the part of the Commonwealth to mount a program designed to meet the needs of occupationally-oriented youth.


LOCKERS
MECHL EQUIPT & UTILITIES
STORAGE
STAGING
INSTRUCTIONAL MODULE-SMALL
CENTRAL SERVICE
PROGRAM OFFICE
WORK ROOM
REPRO
CUST STOR
INSTRUCTIONAL MODULE MEDIUM
STOR
LARGE GROUP INSTRUCTION
LOUNGE
vending machines
elevator
LOCKERS
INSTRUCTIONAL MODULE-HEAVY
STOR
LOCKERS
MECHL EQUIPT & UTILITIES
STORAGE
STAGING
ramp up
loading platform
INSTRUCTIONAL MODULE-SMALL
STORAGE
ramp up
MODEL DEVELOPING
TECH. AREA
FIRST AID
CONNECTING CORRIDOR
INNOVATION CENTER
CURRICULUM DEVELOPMENT
REPRODUCTION
DARKROOM
STORAGE
EVALUATION & RESEARCH
PUBLIC LOUNGE & EXHIBIT AREA
kitchenette unit
LIBRARY
individual learning spaces
loading platform
SMALL GROUP INSTRUCTION
STOR
SECRETARY
ASSIST DIRECT
DIRECTOR

**31. It is recommended that a Center for Community College Teacher Preparation, Research, and Development be established at either Lowell Technological Institute or the University of Massachusetts.**

This recommendation grows out of the need for a central unit whose chief purpose would be to attack, creatively, selected problems of the community colleges emphasizing the concerns of the technology-oriented programs. Massachusetts does not have a vehicle through which time and resources can be devoted to the development of programs for the preparation of community college teachers (including advanced degree work) and administrators. Although this study has its primary focus on the program concerned wi[illegible]ssociate degree in technology, it should be recognized that such a [illegible]annot live in isolation. Therefore, the development of such a re[illegible]g with the increase in the number and size of Massachus[illegible]nity Colleges, points to the need for adequate preparation of [illegible]teachers and administrators.

In addition to these programs, there is a need for workshops, institutes, seminars, and in-service programs for faculty and staff members. The final aspect of the problem relates to the need for a continuing research facility that could conduct studies relating to students, curriculum, faculty, and the administration of the community colleges.

The adoption of the center philosophy, whereby a major institution commits itself fully to its development and research, would make a significant contribution toward the realization of a viable Community College network for the Commonwealth.

**32. It is recommended that in the preparation of elementary school teachers at least one course in the "technology for children" be required. Such a course would assure some understanding of technology and suggest some pedagogical means of introducing its concepts to youngsters in elementary schools.**

An understanding and interest in modern technology needs to be introduced to youth at an earlier age than it is today. The Ford Foundation project "Technology for Children," comes close to what is suggested here. Through this project, teachers are introduced to many of the concepts of modern technology and are provided the means for teaching them on a simplified scale. What is being recommended is the formalization of this project to prepare new elementary school teachers to incorporate these concepts in their teaching. A single required course during teacher preparation with an opportunity to elect an additional one might have a significant effect.

**33. It is recommended that the preparation of teachers for industrial arts be oriented towards "introduction to occupations" in the junior high school and toward the "understanding of technology" in the senior high school.**

This recommendation calls for a more realistic interpretation of the term industrial arts in its contribution toward the general education of all students. It suggests that at the junior high school level its main focus would be the exploration and introduction to occupations: their composition, their requirements for entrance and success; and some of their activities which would be experienced through the laboratory demonstration. This does not mean pre-vocational education. At the senior high school level the recommendation recognizes the need to supply youth (many of whom are going on to college) with opportunities to delve into technology by means of a laboratory experience at an advanced level.

The recommendation suggests a substantial departure from the present industrial arts teacher preparation programs. The idea of such a concept (both introduction to occupations and advanced laboratory level) is already apparent in the Fitchburg industrial arts offering, but it is definitely handicapped by inadequate physical facilities and staff to produce the number of the newly conceived industrial arts teachers required for both the junior and senior high levels. It is hoped that even at Fitchburg there will be greater emphasis and awareness of the need for producing teachers who can make their contribution in the "introduction to occupations" sense.

**34. It is recommended that a Director of Occupational Teacher Education be given a joint appointment in the Division of Higher Education, the Division of Manpower, Coordination and Development, and the Bureau of Careers Development, of the State Department of Education.**

It is essential that someone be the "overseer" of the vast teacher preparation programs being recommended. In reality, the proportions of teachers suggested for the staffing of these programs will constitute about one third of all teachers at the secondary school level and a substantial number at the elementary and junior high level. But the initial production of such a teacher supply must be considered only the beginning. Equally important is the continual updating of teachers to keep them viable.

Such an individual, of necessity, will have to function harmoniously with college presidents, school superintendents, boards of trustees, and school committees. Not only must he possess the qualities of an educational statesman, but he must be a hard nosed businessman as well. In his office will be centered the record-keeping and documentary evidence to attest to the quality output of the various teacher preparation offerings. His responsibility will include the financing and staffing of the various undergraduate and graduate programs.

**35. It is recommended that one of the first responsibilities of the Director of Occupational Teacher Education be to attend to the requirements for teacher certification in all of the various areas and that the final responsibility be placed in the Bureau of Certification.**

The present certification requirements are far too stringent. No one would disagree that some requirements are necessary and this Report has referred to the need for adequately prepared teachers holding degrees. If teacher education is implemented within institutions of higher education, the certification function should be delegated on the basis of providing program approval to the respective institutions so charged with the responsibility.

At the present time there appears to be over twenty different certificates available for vocational teacher approval: i.e. shop, related, academic, day, evening, the areas of speciality, including practical arts and handicraft, and so forth. Such specificity obviously works against rather than for teachers who possess a broad preparation and who could teach in several areas. Some condensation of both the number of areas and individual requirements is recommended.

## G. PUBLIC SUPPORT

*Guiding Principles. 1) All education is basically career-oriented. Therefore the academic, vocational, and other curricula are of equal importance. 2) Educating youth for employment immediately after high school is a worthy objective of education. 3) Class distinctions based on curriculum choice must be minimized and the quality of education provided in each curriculum should be equal.*

**Recommendations.**

**36. It is recommended that a public relations program involving business, industry, labor, and school be launched to upgrade the image of occupational education.**

The American way of life includes the recognition of the worth of the individual through his productive contribution to society as a whole and, to his fellow man. In recent years, the job which involves toil and sweat has assured a second class image. It is the white collar job for which all strive, whether skilled or not--whether the pay is substantial or not. Class distinction based on occupation permeates the educational system at all levels. Too often the student who chooses the vocational offering, because of interest and aptitude, is from that point on labeled in effect a second-class citizen.

What is needed is the rekindling, in sense and in spirit, of the worth of man regardless of occupation. Industry, business, and even organized labor have

much to gain by attempting to thwart the increasing expansion of a totally white collar society. An organized campaign is needed to show the value of the individual who contributes to our society by use of his hands as well as his head. The educational endeavor necessary to produce these people is the focus of this study. If this endeavor is successful it will not be possible to distinguish between the two groups of citizens either during or after working hours. Those who work with their hands will be recognized as persons who make a significant contribution to society.

**37. It is recommended that at least one member of the staff of each area Institutes for Educational Development, as well as a staff member within the Division of Manpower, Research, and Development and the staff of the Bureau of Careers Development, be responsible for public relations. The person holding the position should be a specialist and should be given sufficient time to perform the function properly.**

Often, if public relations are not specifically organized, they are carried on haphazardly by someone whose primary job is quite different. Or, typically, they are assumed to be an inherent part of the job of each teacher and coordinator. The usual outcome of these approaches is that public relations are neglected and the public understanding of vocational education is lacking.

Too many teachers, employers, parents, and even students themselves view vocational education as a second-class education. This impression can be counteracted partially by providing recognition for occupational success and achievement through the use of the techniques of public relations. Since these techniques require skill and experience in their application, school systems should assign this responsibility to a person who has both the ability and the time required to carry out t. , responsibility. This will result in greater business, industry, and labor participation in the programs, a condition which does not exist in many communities.

## H. COMMUNITY COLLEGES

*Guiding Principles. 1) Community colleges are designed primarily to educate "after" completion of high school. 2) As such, community college facilities, curriculum, and faculties are dedicated to provide "beyond" high school level work. 3) There are masses of adults, including recent high school graduates, who are not prepared to pursue education beyond the 12th grade because they have not yet obtained a 12th grade education.*

**Recommendations.**

**38. It is recommended that the master plan for providing community colleges throughout the Commonwealth be fully implemented within the shortest possible time.**

Massachusetts is lagging in providing public support for post-secondary education offerings. If it were not for the large number of high quality private institutions offering education, the Commonwealth would be in dire straits. Nevertheless, there are many qualified young adults who need and desire post-secondary offerings, especially those which can be identified with the community college. Evidence of this is apparent, indicated by the over-subscription at the few community colleges now in operation.

Although this study was more concerned with the occupational offerings of the community colleges, it observed the sizeable enrollment in the transfer (4 year baccalaureate) offerings of the 12 colleges now in operation. This thrust of the community college should in no way be overlooked as a promising development equally as important as the technology offering.

**39. It is recommended that greater emphasis be placed on high-level technology-oriented community college curricula.**

Probably the best example of this emphasis is the new Springfield Technical Community College. Because of its background, the College has an orientation for the type of programs being suggested. These are programs of a "post" secondary nature--truly built on sound elementary and secondary education preparation. They are of the ECPD caliber (Engineering Council on Professional Development) and the product they produce is a semi- or para-professional in the best sense. It is at this level with commensurate faculty, curricula, and physical facilities that the community college can make a significant contribution. Curricula of a para-professional nature in engineering, health, business, social welfare, teacher aides, and other such areas should make up the bulk of these offerings. Accreditation for each should be the customary practice.

**40. It is recommended that the associate degree be awarded for the satisfactory completion of post-secondary two-year community college offerings. The degree recommended for semi-professional or para-professional programs should be the Associate in Applied Science.**

Recognition is traditionally given to those who complete two year post-secondary level community college offerings. In Massachusetts, the Regional Community Colleges, with the approval of the Board of Higher Education, has the responsibility to approve programs and accredit schools to grant such degrees. As a post-secondary institution there should be no misunderstanding as to both the responsibility and the desirability of making such an award.

If this is to be the case, the responsibility for developing semi- or para-professional offerings of a high caliber becomes a clear mandate of the

Board of Regional Community Colleges. In this direction even greater effort needs to be expended, and the notion that a community college can be all things to all people should cease. This is especially true when the concept of an Institute for Educational Development is realized and the Institute takes on the role of meeting the occupational and skills requisites of youths and adults of the secondary level.

With the development of two distinctly different mission oriented institutions (Community Colleges and the Institutes for Educational Development) to provide more educational offerings for adults throughout the Commonwealth, it is hoped there will be mutual respect and cooperation. Certainly, where physical facilities exist in close proximity and are not in total use 100 per cent of the time they should be utilized by both institutions. Of particular concern to the success of both programs would be designated laboratories and shops which could be used by both. It is anticipated that if each institution becomes totally committed to its mission, there would be very few "vacant" facilities throughout the full calendar year.

## I. FINANCING

*Guiding Principles. 1) An adequate financial base for providing educational opportunities for youths and adults is the most important element in the entire educational picture, 2) Equally financed education must be made available throughout the Commonwealth, 3) The State Board of Education must take the responsibility for recommending adequate funding to assure quality occupational education second to none.*

**Recommendations.**

### Operating Costs

**41. It is recommended that the Commonwealth assume a far greater financial responsiblity in providing occupationally-oriented education than it has in the past, so as to assure equal opportunities for all youths and adults in relation to their interests and talents as well as to meet the manpower needs of the Commonwealth.**

Occupational education (namely Careers Development and Vocational Preparation) has not been available to *all* youth and adults. The additional costs necessary to develop and provide such programs will probably have to be borne, to a large extent, by the Commonwealth. Too frequently, those communities whose youth and adults seek such education cannot find it because the local tax structure or the community resources are insufficient.

The additional costs are "differential", or "incremental," costs. That is, they are the "extra" costs of providing such education since the costs of

present programs (academic or general) are already borne by the community. For example, if we assume that the average cost per pupil in a given school year was $584 for the fiscal year 1967[5] (the average pupil cost estimate) and the cost of providing approved vocational education was $850,[6] the difference between these costs ($266) can be considered to be the added cost differential of providing vocational type education.[7]

If we assume that the Careers Development Curriculum costs $700 per pupil, the added cost would be $116 per pupil. (This is an arbitrary figure and is used for illustrative purposes.)

A further example using such a computation and assuming that the state contributes 35 per cent of average local school costs follows:

| Vocational Preparation | | Careers Development | |
|---|---|---|---|
| Per student cost (est.) | $850 | Per student cost (est.) | $700 |
| Less basic education cost | 584 | Less basic education cost | 584 |
| Difference to be provided by 100 per cent state aid | $266 | Difference to be provided by 100 per cent state aid | $116 |
| Under present plan state and federal funds would reimburse 50 per cent of $850 or $425 per student | | Under present plan state ideally assumes 35 per cent of basic education cost of $584 or $204 per student | |
| Under p lan, the State would assume its 35 per cent share of basic education. $584 cost or $204 *plus* 100 per cent of $266 or a total of $470 for approximately *56* per cent of total cost. | | Under new plan, the State would assume its 35 per cent share of basic education. $584 cost or $204 *plus* 100 per cent of $116 or a total of $320 for approximately *47* per cent of the total cost. | |

Perhaps innovative methods can be found to provide occupationally-oriented education which can reduce costs further through the use of teacher aides and programmed instruction. Further consideration should be given to the maintenance of a level of enrollment which will maximize the capacity of both the teachers and the physical facilities. In this connection a student teacher ratio of 25 to 1 is suggested for the Careers Development Program, and a 20 to 1 ratio for the programs in the Institutes for Educational Development.

[5]Unpublished Paper prepared for the Massachusetts Advisory Council on Education, MACE Report 1-67, July 31, 1967.

[6]Estimated for Regional Vocational Schools for the fiscal year 1967.

[7]This assumes that these are "constant" costs. If, for example, some vocational programs are not operating at capacity the additional costs may be more

The added cost of providing *equal* opportunities for these two types of education are set forth in the following calculations. These figures are probably a maximum.

Although the estimates of "extra" costs would appear to impose additional financial burdens on the Commonwealth, it is not unreasonable to assume that the existing tax rate structure will generate increasing revenues (at both the local and state levels) as a result of the economic growth of the economy. Such increased revenues will be available, after taking account of price increases.

It should be emphasized that the increased costs are difficult to estimate because there are no data available to determine whether or not school systems are operating at capacity or even in excess of capacity. But cost considerations must be related to the benefits received from a different emphasis on education, in the form of a lower dropout rate, increased employment and earnings opportunities, reduced costs of on-the-job training, greater morale and productivity on the part of students, and improved work and citizen attitudes.

When a judgment is made about the increased social benefits in relation to the increased social costs, it is not unreasonable to conclude that the investment in occupational education is socially desirable.

**42. It is recommended that the extra cost per pupil for the Careers Development Curriculum in the local high schools be supported by 100 per cent State reimbursement.**

State reimbursement of 100 per cent of the "extra" costs is essential to provide incentives to the high schools to initiate this type of program.

*Each* school system offering the Careers Development Curriculum should have the opportunity to compute its cost differential and, as nearly as possible, this amount of reimbursement should be provided. The exact formula for determining such a differential (if it is to be less than 100 per cent) and what factors to include should be determined after the general principle is accepted. However, all costs distinctive to the Careers Development type education should be included.

**43. It is recommended that the extra per pupil cost for the Vocational programs as conducted by the Institutes for Educational Development be supported by the Commonwealth. That portion of the per pupil regular operating cost that is normally provided by the sending school be allocated to the Institute on a "charge back" basis by the local school.**

This recommendation recognizes the *added* cost of providing vocational preparation at the high school level to the five to eight per cent of the

## EXTRA COSTS OF PROVIDING PROGRAMS: FOR CAREER DEVELOPMENT AND VOCATIONAL SKILLS

**Estimated for 1970, 1975 and 1980**

A. Vocational Programs (Grades 11-12)

| | Added Cost to State |
|---|---|
| **Year 1970** | |
| 11 - 12th grade 154,053 students x 6% x $266* = (9,240 talented vocational students) | $2.5 million |
| **Year 1975** | |
| 11 - 12 grade 178,631 students x 6% x $266* = (10,716 talented vocational students) | $2.8 million |
| **Year 1980** | |
| 11 - 12 grade 203,208 students x $266* = (12,192 talented vocational students) | $3.2 million |

B. Careers Development Program (Grades 9-12)

| | |
|---|---|
| **Year 1970** | |
| 9 - 12 grades 308,107 students x 40% x 116* = (123,240 Careers Development Students) | $14.0 million |
| **Year 1975** | |
| 9 - 12 grades 357,631 students x 40% x 116* = (143,040 Careers Development Students) | $16.5 million |
| **Year 1980** | |
| 9 - 12 grades 406,417 students x 40% x 116* (162,560 Careers Development Students) | $18.7 million |

C. Estimates for Both Programs

| | |
|---|---|
| 1970 | $16.5 million |
| 1975 | $19.3 million |
| 1980 | $21.9 million |

* Cost differentials may vary considerably over the years.

students who are vocationally talented. This approach will assure the provision of this type of education through adequate Commonwealth support. It does, however, require the sending schools to pay their appropriate share of the cost while the student is attending the Institute.

For example, if the student spends the entire day at the Institute (this is not recommended and usually a half-day would be the model) the sending school would pay to the Institute its regular per pupil cost of providing full time (11th and 12th grade) education, because the student would not cost the local or sending school anything. Any portion of the regular per pupil cost for the time the student spends in the Institute program should be received by the Institute. The cost of transporting the student should also be assumed by the sending school.

**44. It is recommended that federal funds allocated to Massachusetts for providing vocational-technical education be used for construction of facilities (on a matching basis with State appropriated funds) and operating programs (youth and adult) in the Institutes for Educational Development and in the Community Colleges where applicable.**

In the fiscal year 1965, Massachusetts received about 3.5 million dollars from the federal government. This amount rose to 5.2 million in 1966 and 5.6 million in 1967. Based on the assumption that six per cent of the 11th and 12th grade high school population is vocationally talented and that $266 is the cost differential, it is clear that these funds for these same years would have been adequate to provide for the differential cost of these programs and would have been sufficient for construction of facilities and the operation of the adult phases of the program.[8] It should be pointed out that under the present federal legislation any portion of the funds can be used for construction purposes. It is essential that there be Commonwealth matching funds for any federal funds obtained for such purposes.

**45. It is recommended that there be an additional Commonwealth reimbursement in the form of a "bonus" to those schools whose performance achieves the appropriate objectives of the programs.**

Over the years inadequate attention has been paid to school performance in terms of the appropriate goals and objectives set for students by the educational administrators. It is recommended that such goals and objectives be established, that appropriate information should be obtained by the school administrators and submitted to state officials, and that "bonuses" be awarded to those school systems which meet them, taking account of the costs involved.

[8]Six per cent of enrollment for years 1965 = 7,944 @ $266 amounts to $1.7 million; 1966 = 8,061, costing $2.1 million and 1967 = 8,353 costing $2.2 million.

Education, as well as other social programs, has over the years failed in its accountability to the community and this recommendation is designed to introduce accountability into the educational system. An important by-product of this approach is that schools can be evaluated in performance, not only in terms of graduation and placement, but also in terms of student performance. Another by-product of this recommendation is that it will tend to indicate to administrators the need for new approaches if performance is unsatisfactory.

## CAPITAL COSTS

**46. The capital costs for the construction of Institutes for Educational Development should be supported 100 per cent by both State and federal funds, if available.**

The realization of the goal of 30 such Institutes entails an estimated aggregate expenditure of approximately 90 million dollars.[9] Ideally three to four Institutes would be constructed each year, requiring a total of nine to twelve million dollars per year. If such a schedule could be maintained it would take from six to eight years to create such a Statewide system (six such facilities have already been constructed: Northern Berkshire, South Shore, Greater Lawrence, Blue Hills, Blackstone Valley and Southeastern Regional).

Communities that have already constructed Institutes through local tax funds should have these funds returned to them. In addition, some thought should be given to the purchase of already existing facilities in the larger communities and to their inclusion in the statewide system of Institutes.

**47. It is recommended that the cost of providing physical facilities for the Careers Development Curriculum in the local high schools be borne by the local School Committees.**

A hard look is needed at each local school facility. Questions of full utilization, as well as achievement of educational objectives, need to be asked. The Careers Development Curriculum, suggested for the local high schools will be assuming the responsibility for 40-60 per cent of the present student population, most of whom are currently enrolled in the academic or general curriculum. Hopefully, some of the present dropouts will be retained. The question then, is whether or not 40-60 per cent of the physical facilities are being used to maximal advantage for these students.

It is assumed that certain additional space will have to be provided either by construction or by remodeling and renovation of existing facilities. Certainly the existing industrial arts, home economics, and business education portions of the physical facilities could accommodate the Careers Devel-

[9] $2.5 million each for construction, plus $.5 million for equipment. These figures do not include the increases in costs of construction and provide for minimum program facilities.

opment Curriculum. As suggested in the section of this Report in which curriculum is discussed, the cooperative education method should be employed, particularly at the upper years (11th and 12th). This would reduce the need for certain special shops and laboratories. The principle to be followed, however, should be to provide the appropriate facilities to meet the educational objectives of the programs which reflect the needs, interests, and aspirations of the students.

## J. LEGISLATION

*Guiding Principles. 1) Existing legislation, which is fragmented, should be coordinated as much as possible. 2) Legislation should reflect only the overall broad aims and objectives of the educational programs and should not be concerned with policy matters which are in the domain of the executive branch of the government.*

**48. It is recommended that Chapter 74 of the General Laws, as amended, be rewritten and reflect the need for the redirection of occupationally-oriented education, as proposed throughout this Report.**

It appears that legislation on vocational education provides a considerable work load for the State Legislature each year. (Since the organization of vocational education in 1906, a total of 221 separate pieces of legislation has been enacted through 1965.) Hopefully, the establishment of a more unified system of meeting the occupational education needs of youths and adults would eliminate the treatment of educational problems on a piece-meal basis. Although much of the present legislation would be retained, the sections affecting such items as separate vocational schools and county agricultural schools should be re-written as part of an overall program.

The new direction for occupationally-oriented education, advocated in this Report, requires the unification of effort and programs. Therefore, references to independent programs (referred to as schools in the present legislation) i.e. Agricultural Schools, Distributive Education Schools, Part-time and Evening Schools, Day Household Arts Schools, and so forth, should be eliminated from the laws. In their place there should be introduced the concepts of Institutes for Educational Development and a Careers Development Curriculum for comprehensive high schools.

**49. It is recommended that when this legislation has been re-written and approved a new bulletin be prepared to replace Bulletin 326.**

In a sense Bulletin 326 serves as a handbook for the interpretation of the "master plan" to provide occupational education (vocational) for the Commonwealth. In this respect it should be kept up-to-date on a yearly basis.

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# APPENDIX A

## Meetings, Conferences and Schools Visited

# VOCATIONAL-TECHNICAL EDUCATION STUDY

## Meetings, Conferences and Schools Visited

July — Morris Horowitz, Professor and Chairman, Dept. of Economics, Northeastern University

September — General Faculty Meeting — Northeastern University
Loring M. Thompson, Vice President and Dean of Planning, Northeastern University
Roy L. Wooldridge, Vice President and Dean of Co-operative Education, Northeastern University

October — Frank Marsh, Dean, College of Education, Northeastern University
Charles F. Seaverns, Jr., Associate Professor of Co-operative Education, Northeastern University
Frank E. Trusdale, Assistant Dean of Lincoln College, Northeastern University
Gustav S. Rook, Dean Lincoln College, Northeastern University
William C. White, Executive Vice President, Northeastern University

November — Alan B. Sostek, Associate Professor of Psychology in Education, Northeastern University
College of Education Department Head Meeting — Frank Marsh, Lawrence Durham, George B. Rochfort, Thomas Cavanagh
Manuel Zymelman, Center for Studies on Education Development, Harvard University
Manpower Training Agencies Luncheon Group of Boston, Edward T. O'Donnell, Assistant Regional Director
Advisory Committee Meeting and Luncheon — Paul Ahern, President, Vocational Councilors Assn.; Wm. G. Dwyer, President, Board of Regional Community Colleges; Lawrence E. Fox, Associate Director, Advisory Council on Education; Nathaniel Frank, Professor of Physics, MIT; William C. Gaige, Director, Advisory Council on Education; Arthur Haley, President, Mt. Wachusett Community College; James J. Hammond, President, Fitchburg State College; Frank Marsh, Dean, College of Education, Northeastern University; James McDonough, President, Vocational School Directors' Assn.; John O'Neill, Associate Commissioner of Education; Roger L. Putnam, Sr., Mass. Board of Regional Community Colleges; James Westall, President, Regional Vocational School Directors' Assn.
Symposium — A Prospectus for Change — Sheraton-Boston Hotel
James W. Altman, Director, Institute for Performance Technology, American Institutes for Research; Ivar Berg, Associate Professor, Graduate School of Business, Columbia University
Mary Jean Bowman, Professor, Comparative Education Center, University of Chicago
Richard Gibboney, Visiting Professor of Education, University of Pennsylvania

Ray Hummel, Professor of Education, University of Pittsburgh
Vincent Lannie, Associate Professor, Education History, New York University
Thomas M. Benton, Assistant Professor of Education, Central Michigan University
Benjamin Shimberg, Director, The Educational Testing Service
Marvin B. Sussman, Professor and Chairman, Dept. of Sociology, Case-Western Reserve University
Rhoda W. Baruch, Assistant Professor, School of Education, Harvard University
Morris A. Horowitz, Professor and Chairman, Dept. of Economics, Northeastern University
Michael J. Piore, Assistant Professor of Economics, MIT
John E. Deady, Superintendent of Schools, Springfield
William Kvaraceus, Professor of Education and Director of Youth Services, Tufts University
Theodore Brameld, Professor of Education, Boston University
James J. Hammond, President, Fitchburg State College
Nathaniel H. Frank, Professor of Physics, MIT
Neal Gross, Professor of Education and Sociology, Harvard University
Robert Flanagan, General Dynamics Corporation, Quincy Division
Walter Markham, Director, Bureau of Vocational Education
Mrs. Robert P. Pickney, Member of the State Education Committee, League of Women Voters
Mrs. G. B. Kistiakowski, Chairman, Education Committee, League of Women Voters
Anita L. Martin, Consultant in Human Relations
Paul Ahern, President, Vocational Counselors Assn.
Wm. G. Dwyer, President, Board of Community Colleges
James Westall, President, Regional Vocational Schools
E.B. VanDusen, Director, Division of Evening Studies, Lowell Tech. Inst.
Robert E. Pruitt, Superintendent of Schools, Quincy Public Schools
Roger Putnam, Mass. Board of Regional Community Colleges
John O'Neill, Associate Commissioner of Education
James McDonough, President, Vocational School Directors' Assn.
Frank Marsh, Dean of the College of Education, Northeastern University
Arthur Haley, President, Mt. Wachusett Community College
Edmond P. Garvey, President, Springfield Technical Community College
Urwin Rowntree, Director, Adult, Vocational & Library Programs, U. S. Regional Office of Education
Paul Marsh, Educational Consultant, Arthur D. Little Company
Morgan Lewis, Institute for Research on Human Resources, The Pennsylvania State University
Mrs. Nancy Atwood, Research Analyst, Administration and Finance, The Commonwealth of Massachusetts
MacDonald Barr, Joint Center for Urban Studies, MIT and Harvard University
Michael Alleyne

| | |
|---|---|
| December | E. Lawrence Durham, Professor and Chairman, Foundations of Education, Northeastern University |
| | Bert Waters, Educational Reporter, Boston Globe |
| | Arthur E. Greenberg, Chairman, Upper Cape Cod Regional Vocational-Technical School Committee |
| January | David R. Cook, Professor and Chairman, Guidance and Counselor Education, Northeastern University |
| | Boston Trade High School for Girls, James B. McDonough, Headmaster |
| | Miss Pearlman, representative of Congressman Pucinski |
| | Thomas J. Cavanagh, Assistant Dean, College of Education, Northeastern University |
| | Newton Technical High School, Orrin M. Brawn, Director |
| | Daniel Malia, Coordinator of Industrial Arts Programs, Newton Public Schools |
| | Rindge Technical High School for Boys, Robert R. Sweeney, Headmaster |
| | Quincy Public Schools, Robert E. Pruitt, Superintendent |
| | McCann Vocational High School, James R. Westall, Superintendent-Director |
| | University of Massachusetts — Philip Edgecomb, Asst. Prof. School of Ed.; Ray Budde, Co-director, Distributive Teacher Education Project; W. C. Wolfe, Co-director, Distributive Teacher Education Project; Helen Vazanian, School of Home Economics; Philip Haight, Supv. of Agricultural Schools and Depts., Bureau of Vocational Education |
| | Fitchburg State College, James J. Hammond, President |
| February | Vocational Administrators' Conference — Westfield State College |
| | Community Colleges — Lewis O. Turner, President, Greenfield Community College; John F. McKenzie, President, Massachusetts Bay Community College; John W. Musselman, President, Massoit Community College; Harold E. Shively, President, North Shore Community College; William G. Dwyer, President Board of Regional Community Colleges; Ken A. Brunner, Professor and Chairman, Dept. of Higher Education, Southern Illinois University |
| | George B. Rochfort, Jr., Associate Professor and Acting Chairman, Dept. of Instruction, Northeastern University |
| | Leslie J. Nutting, Director, Greenfield Area Vocational Study Organization |
| | Framingham Vocational High School, Joseph Keefe, Principal |
| | Boston Trade High School for Boys, Arthur J. Driscoll, Acting Director |
| | Reuben Margolin, Project Director, Rehabilitation Institute, Northeastern University |
| | Metropolitan Area Planning Council Symposium, Stanley Russell, Director |
| | Charles Haley, Associate Director, Graduate School of Education, Northeastern University |
| | Urban League — James W. Conway, President, Federation of Charlestown Organization; Wm. Gaines, Co-Chariman, Jamaica Plain APAC; Mrs. Doris Graham, Head of Dorcester APAC; Barbara Seidenberg, ABCD, Vocational-Technical Education; Joseph Duggan, Chairman, Manpower, ABCD |

Bristol County Agricultural School, John Farrar, Director

Blue Hills Regional Vocational-Technical High School, Wm. A. Dwyer, Director

Richard Howes, Assistant Director, Vocational Education, State Department of Education, Connecticut

Herb Righthand, Director, Bureau of Vocational Services, Connecticut

Brockton High School, Joseph Prioli, Guidance Counselor

Whitman-Hanson Regional High School, Harry E. Boothby, Principal

Gloucester High School, Robert Natti, Principal

March

Ashland High School, Roy Hayward, Principal

Natick High School, Howard V. Hennigar, Principal

Luncheon Discussion — Employers — Frank M. Ryan, Chairman, Board of Trustees, Worcester Vocational School Dept.; Matthew Stepanski, Executive Vice President, Central Massachusetts Employers Assn.; Herbert Johnson, Riley Stoker Corporation; Lawrence Blair, Industrial Relations Manager, Sprague Electric Company; Richard Fontaine, Chief Engineer, Morgan Construction Company; Richard Hildreth, Employment Manager, Wyman Gordon Company; Arthur Pingalore, Director of Trainees, Heald Machine Co.; James Wrightson, Chief Draftsman, Morgan Construction Company; Bert Gilson, Operations Assistant, I.B.M.; James Lawson, Supt. of Machine Tool Division, Norton Company; Blanche M. Penn, Director, David Hale Fanning Trade High School; Oscar Maynard, Co-ordinator, Worcester Industrial Technical Institute; Edward J. Purcell, Director, Worcester Boys Trade High School; Vincent Catacchio, Dean of Admissions, Worcester Industrial Technical Inst.; Robert K. Butler, Administrator, Worcester Vocational School Department

New Salem Vocational High School, William Conroy, Jr., Principal

Memorial High School, Lawrence R. McGowan, Principal

Somerville High School, Albert H. Giroux, Principal

Louis Vrettos, Dean of Instruction and Director of Suburban Campus, Northeastern University

Waltham Vocational High School, Ernest V. Viscarello, Director

Lexington High School, Charles Johnson, Guidance Counselor

Labor Union Representatives — Walter J. Ryan, International Union of Operating Engineers; Adam J. Owens, Richard C. O'Brien, Meat Cutters Union; James McCordy, Radio and Television Engineers; Lawrence Sullivan, Greater Boston Labor Council; Valentine Murphy, Greater Boston Labor Council President

State Department Staff — Bureau of Vocational Education — John W. Fitzgerald, Senior Supv. of Education; Paul F. Brown, Supv. of Education; Anthony V. Cipriano, Senior Supv. of Education; John Connolly, Senior Supv. of Education; Jean Marks, Supv. of Home Economics; James A. Pelley, Supv. of Trade and Industrial Schools for Boys and Men; Alfred F. Hoyle, Supv. of Trade and Industrial Schools for Boys and Men; James L. Burke, Senior Supv. of Trade and Industrial Schools; Grace L. Nagle, Senior Supv., Health Occupations; Raphaela A. Picucci, Supv., Health Occupations; Philip A. Haight, Supv., Agricultural Schools and Departments; G. Joseph Gribouski, Supv., Agricultural Schools and Depts.; W. J. McConnell, Senior Supv., Industrial Schools for Boys and Men; John P. Manning, Supv., Adult Distributive Education; John P. Morine, Senior Supv., Guidance; Sophie

Hollander, Supv. in Education; Mary I. McKay, Supv., Distributive Education; Agnes M. O'Neill, Supv., Home Economics; T. A. Januck, Supv., Administration; A. F. Clarke, Supv., Administration; F. J. Lombard, Supv., Administration

Teacher Educators — Bureau of Vocational Education — Theodore M. Gilmore, Newton Technical High School; Edward T. Hannon, Quincy Vocational-Technical High School; Harold E. Clarke, Weymouth Vocational-Technical High School; Wm. A. Dwyer, Blue Hills Regional Technical High School; G. Joseph Gribouski, Supv., Agricultural Schools and Depts.

Kevin B. Harrington, State Senator — Essex County; Wm. Saltonstall, State Senator — Essex County, Joseph DiCarrlo, State Representative — Suffolk County; Robert Belmonte, State Representative — Middlesex County; George Rogers, State Representative — Bristol County

Seminar — Discussions of Vocational Education — An Economist Looks at Education -- Jacob J. Kaufman, Northeastern University

Greater Boston Personnel and Guidance Association — David Cook, Chariman, Dept. of Counselor Education, Northeastern University; Edward F. Saunders, Guidance Director, Xaverian High School; John F. McGrath, Director of Guidance, Melrose High School; Mrs. Angie Ingraham, President, Greater Boston Personnel and Guidance Assn.; Alan B. Sostek, Trustee, Greater Boston Personnel and Guidance Assn.; Robert C. Dumont, Asst. Director of Personnel, New England Mutual Life Insurance Co.

Equal Opportunities Task Force — James C. Elms, Director, NASSA Electronics Research Center; Charles E. Jones, Special Assistant to the Director; Gene G. Mannella, Assistant Director for Instrumentation and Data Processing Research

Somerville Trade High School, Walter E. Struble, Director

Advisory Committee Meeting and Luncheon

Theodore Sizer, Dean, College of Education, Harvard University

Nathaniel Frank, Professor of Physics, Massachusetts Institute of Technology

Robert Watson, Director, Bureau of Curriculum Innovations, Dept. of Education

Stanley Russell, Director, Metropolitan Area Planning Council

Daniel Malia, Coordinator, Industrial Arts Programs, Newton Public Schools

Stanley Ziemba, Principal, Chicopee Comprehensive High School

Robert Milky, Asst. to Superintendent of Chicopee School District

Alfred R. Rios, Director Chicopee Boys' Day Industrial High School

Seminar — Discussions of Vocational Education — The Picture of Occupational Education in Massachusetts -- Now and in the Future -- Carl J. Schaefer, Northeastern University

Employment Security, Isaac Fine, Assistant Director and William Connor

H. Russell Beatty, President, Wentworth Institute

Seminar — Discussions of Vocational Education — Requisites of a Viable Occupational Education Program in Massachusetts with Emphasis on Teacher Education, Carl J. Schaefer, Northeastern University

| | |
|---|---|
| | Paul LeMaitre, Assistant to Evening School Registrar, Northeastern University |
| May | U. S. Regional Office of Education, Urwin Rowntree, Director, Adult, Vocational and Library Programs; Dona R. Sheldon, Program Officer; Matthew E. Cardoza, Program Officer; James C. Cronin, Program Officer; Nicholas J. Hondrogan, Program Officer; Arlene Hope, Program Officer, Library Services; Jesse A. Taft, Program Officer |
| | Lowell Technical Institute, E. B. VanDusen, Director of Evening Division; John L. Steele, Provost |
| | Massachusetts Teachers Association, Girard D. Hottleman, Coordinator of Instructional Services |
| June | Advisory Committee Meeting and Luncheon |
| | Senator Kevin B. Harrington, Senate Majority Leader, Commonwealth of Massachusetts |

## APPENDIX B

### Tables and Supporting Data

## Table I

### Student Enrollments and Projections Public Schools K-12 1955-1980[a]

| Year | k-6 | 7-8 | 9-12 | Totals |
|---|---|---|---|---|
| 1955 | 444,803 | 107,059 | 153,869 | 705,731 |
| 1960 | 502,391 | 140,653 | 201,643 | 844,687 |
| 1965 | 575,672 | 150,472 | 264,853 | 990,997 |
| 1970 | 650,120 | 173,925 | 308,107 | 1,083,950[b] |
| 1975 | 721,895 | 196,185 | 357,262 | 1,203,580[b] |
| 1980 | 793,670 | 218,445 | 406,417 | 1,323,210[b] |

a Annual Reports, 1955-1965, Massachusetts Department of Education, Division of Research & Development. Estimates for 1970-1980 were computed for this study and determined by projecting a weighted least-squares line approximation.

b The projected total figures were determined independently due to year to year variation in the number of students in the three-grade groupings, the more stable increase in total number of students gives a more accurate figure for the total than would the sum of the three-grade groupings.

## Table II

### Approved Vocational Teachers Projections 1955-1980[a]

| Program | 1955 | 1960 | 1966 | 1967 | 1970 | 1975 | 1980 |
|---|---|---|---|---|---|---|---|
| Agriculture | 94 | 111 | 108 | 108 | 132 | 144 | 156 |
| Distribution | 38 | 68 | 57 | 53 | 75 | 104 | 133 |
| Health (post-sec)[b] | - | - | 74 | 78 | 119 | 181 | 243 |
| Business and Office | - | - | 658 | 1,536 | 4,166 | 8,551 | 12.936 |
| Home Economics[c] | 195 | 190 | 140 | 136 | 123 (150) | 95 (175) | 67 (200) |
| Technical (sec & post-sec) | - | - | 298 | 300 | 509 | 825 | 1,142 |
| Trades & Industry | 882 | 1,110 | 1,184 | 1,232 | 1,323 | 1,534 | 1,746 |
| Totals | 1,209 | 1,479 | 2,519 | 3,443 | 6,447 | 11,434 | 16,423 (16,556) |

a Massachusetts Department of Education, Office of Vocational Education, Annual Reports, 1955-1967. Estimates for 1970-1980 were computed for this study and determined by projecting a weighted least-squares line approximation.

b Federally reimbursement for health programs did not begin until 1963. The projected figures, therefore, reflect the slight increase over the years 1963-1967. The manpower needs in the health occupations are increasing at a high rate and the teacher needs of 1970-75-80 will most likely be much greater than what is represented here.

c The date for home economics teachers for the years 1954-1967 show a progressive decline. This is because the figures obtained do not include supplementary teachers, eg. evening practical arts. This downward trend is expected to be reversed and increases will be shown early in the 1970's. Estimated increases are shown in parentheses.

## Table III

### Total Expenditures for Vocational Education by Source of Funds, Massachusetts, 1964-67

| Year | Federal | State | Local | Totals |
|---|---|---|---|---|
| 1964[a] | 988,348 | 5,277,045 | 5,410,831 | 11,676,224 |
| 1965[a] | 2,577,858 | 11,258,415[b] | -- | 13,836,273 |
| 1966c | 5,138,397 | 7,835,149 | 13,463,289 | 26,436,835 |
| 1967c | 5,570,531 | 10.337,125 | 16,309,791 | 32,271,447 |

a *Vocational and Technical Education, A Review of Federally Aided Programs,* Government Printing Office, 1964 and 1965.

b State and Local funds combined.

c Annual Reports, 1966 and 1967. Bureau of Vocational Education.

## Table IV

### Expenditures for Vocational-Technical Education in Massachusetts, by Functions, 1964-1967

| Year | Administration | Supervision | Teacher Ed. | Source |
|---|---|---|---|---|
| 1964[a] | 858,866 | 38,248 | b | State & Local |
| | 16,140 | 58,318 | b | Federal |
| Totals | 868,006 | 96,566 | 159,666 | |
| 1965[a] | 933,407 | 32,531 | 33,422 | State & Local |
| | 60,318 | 91,542 | 67,871 | Federal |
| Totals | 933,725 | 124,073 | 101,293 | |
| 1966[c] | 888,364 | 32,314 | 30,127 | State & Local |
| | 92,429 | 146,103 | 73,433 | Federal |
| Totals | 980,793 | 178,417 | 103,560 | |
| 1967[c] | 986,115 | 26,480 | 19,896 | State & Local |
| | 214,650 | 114,403 | 81,942 | Federal |
| Totals | 1,200,765 | 140,883 | 101,838 | |

a *Vocational and Technical Education, A Review of Federally Aided Programs,* Government Printing Office, 1964 and 1965.

b Breakdown not available.

c Annual Reports, 1966 & 1967, Bureau of Vocational Education.

## Table V

### Preparatory Occupational Education Programs in Massachusetts, Enrollment by Grades, 1962-63 and 1966-67[a]

| Program Type | 1966-67 Enrollment-Grades[b] | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | 13 | 14 | 1962-1963 | 1966-1967 |
| Boys' Day Industrial | 3035 | 4058 | 2941 | 2337 | 189 | 69 | 11,231 | 12,629 |
| Girls' Day Industrial | 142 | 272 | 300 | 211 | 175 | - | 962 | 1,100 |
| Industrial Departments | - | 574 | 254 | 80 | - | - | 992 | 908 |
| Boys' Trade Prep (Type C) | c | c | c | c | c | c | 402 | 752 |
| Girls' Trade Prep (Type C) | c | c | c | c | c | c | 88 | 131 |
| Day area Vocational (Technical) | 26 | 156 | 196 | 192 | 540 | 315 | 634 | 1,425 |
| Day Practical Nursing | - | - | - | - | 821 | - | 752 | 821 |
| Day Agricultural Schools | 313 | 198 | 187 | 194 | 53 | 100 | 740 | 1,045 |
| Day Agricultural Departments | 113 | 119 | 82 | 85 | 3 | - | 417 | 402 |
| Day Household Arts Schools | 317 | 212 | 154 | 108 | 1 | - | 740 | 792 |
| Day Household Arts Departments | 438 | 549 | 321 | 205 | - | - | 1,279 | 1,423 |
| Part-time Cooperative Trade | 12 | 10 | 249 | 834 | 279 | 8 | 801 | 1,392 |
| Cooperative Distributive | - | - | 45 | 637 | 57 | 16 | 402 | 755 |
| Totals | 4,396 | 6,148 | 4,639 | 4,883 | 2,118 | 508 | 19,420 | 23,575 |

a Massachusetts Department of Education, Bureau of Vocational Education.

b Enrollment by Grades is not given for 1962-63.

c Not reported by grade.

## Table VI

### Boys' Day Industrial Education Programs in Massachusetts, Enrollment by Type of School and by Curriculum, 1962-63 and 1966-67[a]

| Curriculum | Boys' Day Industrial | | Industrial Dept's in Boston H. S. | | Co-op H. S. Programs | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | 1962-63 | 1966-67 | 1962-63 | 1966-67 | 1962-63 | 1966-67 | 1963 | 1967 |
| Airplane service | 50 | - | - | - | - | - | 50 | - |
| Autobody repair | 245 | 384 | 20 | 25 | 21 | 36 | 286 | 445 |
| Auto repair | 2028 | 2069 | 271 | 259 | 129 | 255 | 2,428 | 2,573 |
| Baking | 75 | 50 | - | - | - | - | 75 | 50 |
| Beauty Culture | 19 | 20 | - | - | - | - | 19 | 20 |
| Boat Building | 14 | 27 | - | - | - | 5 | 14 | 27 |
| Building construction and repair | 19 | 14 | - | - | - | - | 19 | 14 |
| Cabinetmaking | 657 | 613 | 118 | 106 | 73 | 123 | 848 | 842 |
| Carpentry | 1066 | 1287 | - | - | 15 | 37 | 1,081 | 1,324 |
| Commercial design | 18 | 55 | - | - | - | - | 18 | 55 |
| Diesel | 32 | 35 | - | - | 3 | 11 | 35 | 46 |
| Drafting (machine) | 359 | 518 | - | - | 13 | 32 | 372 | 550 |
| Electrical | 1286 | 1289 | 249 | 210 | 88 | 156 | 1,623 | 1,655 |
| Electronics | 548 | 655 | - | - | 10 | 51 | 558 | 706 |
| Fishing and vessel management | 13 | 8 | - | - | - | - | 13 | 8 |
| Food service | 19 | 93 | - | - | - | 1 | 19 | 94 |
| Industrial design | 23 | 19 | - | - | - | - | 23 | 19 |
| Machine shop | 2208 | 2184 | 172 | 140 | 232 | 327 | 2,612 | 2,651 |
| Painting | 299 | 256 | - | - | 3 | 8 | 302 | 264 |
| Patternmaking | 77 | 79 | - | - | 3 | 11 | 80 | 90 |
| Plant maintenance | 16 | 72 | - | - | - | 8 | 16 | 80 |
| Plumbing | 180 | 199 | - | - | 5 | 11 | 185 | 210 |
| Power Stitching | 21 | 10 | - | - | - | - | 21 | 10 |
| Printing | 739 | 752 | 87 | 10 | 134 | 168 | 960 | 930 |
| Sheet metal | 652 | 756 | 43 | 39 | 55 | 104 | 750 | 899 |
| Shoemaking and repair | 148 | 584 | - | - | - | - | 148 | 584 |
| Steam engineering | 39 | 45 | - | - | - | - | 39 | 45 |
| Upholstery | 69 | 52 | 32 | 28 | 12 | 20 | 113 | 100 |
| Welding | 312 | 268 | - | - | 5 | 16 | 317 | 284 |
| General Vocational | - | 584 | - | - | - | - | -- | 584 |
| Oil Burner and air conditioning | - | 41 | - | - | - | 6 | | |
| Outboard Motor repair and small engine | - | 21 | - | - | - | 2 | -- | 23 |
| TOTALS | 11,231 | 13,029 | 992 | 817 | 801 | 1388 | 13,024 | 15,234 (589) |

1963 (29 Curricula) 1967 (32 Curricula)

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

## Table VII

### Girls' Day Industrial Schools in Massachusetts, Enrollment by Curricula and by Grades, 1962-63 and 1966-67[a]

| School | Enrollment 1962-1963 | 1966-1967 |
|---|---|---|
| Boston | 267 | 470 |
| Essex County | 40 | 40 |
| Fall River | 70 | 41 |
| Norwood-Peabody | 110 | 88 |
| Springfield | 218 | 238 |
| Worcester | 257 | 223 |
| Totals | 962 | 1100 |

| | 1962-63 | 1966-67 |
|---|---|---|
| Largest School Enrollment | 267 | 470 |
| Smallest School Enrollment | 40 | 40 |
| Mean School Enrollment | 160 | 183 |

| Curriculum | Number of Schools 1963 | 1967 | Enrollment-Grades[b] 9 | 10 | 11 | 12 | 13 | Total 1963 | 1967 |
|---|---|---|---|---|---|---|---|---|---|
| Needle Trades | 5 | 5 | 96 | 157 | 111 | 49 | 25 | 364 | 438 |
| Beauty Culture | 6 | 5 | - | - | 107 | 98 | 131 | 303 | 336 |
| Foods Trades | 5 | 5 | 46 | 115 | 82 | 64 | 19 | 262 | 326 |
| Printing | 1 | - | - | - | - | - | - | 23 | - |
| Totals | 6 | 6 | 142 | 272 | 300 | 211 | 175 | 962 | 1100 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

b Enrollment by grades is not given for 1962-63.

## Table VIII

### Agricultural Schools and Departments in Massachusetts, Enrollment by Schools and Grades, 1962-63 and 1966-67[a]

| Day Agricultural Departments | Enrollment—Grades[b] | | | | Total | |
|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | 1962-1963 | 1966-1967 |
| Boston | 28 | 1 | 3 | - | 104 | 32 |
| Narragansett Regional | 10 | 15 | 6 | 17 | 44 | 48 |
| Worcester | 10 | 13 | 17 | 13 | 42 | 53 |
| Silver Lake Regional | 12 | 6 | 7 | 2 | 31 | 27 |
| Wachusetts Regional | 8 | 6 | 12 | 3 | 30 | 29 |
| Hadley | - | - | - | - | 27 | - |
| Pioneer Valley Regional | 5 | 8 | 5 | 7 | 22 | 25 |
| Barnstable | 6 | 1 | 3 | 0 | 20 | 10 |
| North Brookfield | 18 | 27 | 2 | 9 | 19 | 56 |
| Shelburne | - | - | 2 | 2 | 18 | 4 |
| Westport | 7 | 4 | 3 | 3 | 17 | 17 |
| Frontier Regional | - | - | - | - | 15 | - |
| Stockbridge | 6 | 6 | 4 | 6 | 15 | 22 |
| Charlton | 3 | 4 | 1 | 4 | 13 | 12 |
| Sub-Totals | 113 | 91 | 65 | 66 | 417 | 335 |
| Totals for 5 Schools and 14 Departments | 426 | 289 | 305 | 360 | 1,137 | 1,380 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

b Enrollment by grades is not given for 1962-63.

## Table IX

### Business and Office Occupations in Massachusetts, Enrollment by year, 1966-68[a]

| Year | Number of Schools | Enrollment | Per School |
|---|---|---|---|
| 1966 | 208 | 66,945 | 322 |
| 1967 | 227 | 54,023[b] | 237 |
| 1968[c] | 205 | 61,326 | 299 |

a Massachusetts Department of Education, Office of Elementary and Secondary Education, 1968.

b Enrollment for grades 10-11-12 only.

c Estimated projection figures, source: Senior Supervisor of Elementary and Secondary Education.

## Table X

### Part Time Cooperative Distributive Education Programs in Massachusetts, 1962-63 and 1966-67[a]

In 1962-63 Retail Selling was taught in 19 schools, 4 of them in Boston.
In 1966-67 Retail Selling was taught in 31 schools, 5 of them in Boston.

In 1962-63 Total Enrollment was 402; -- 90 in Boston.
In 1966-67 Total Enrollment was 755; -- 101 in Boston.

Grade Distribution of Enrollments:

| | 1962-63 | 1966-67 |
|---|---|---|
| 11th Grade | 17 | 45 |
| 12th Grade | 370 | 637 |
| 13th Grade | 15 | 57 |
| 14th Grade | - | 16 |
| Total | 402 | 755 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

## Table XI

### Vocational Home Economics Schools and Departments in Massachusetts, Enrollment by Grades, 1962-63 and 1966-67[a]

| Schools | Enrollment–Grades[b] 9 | 10 | 11 | 12 | Totals 1962-1963 | 1966-1967 |
|---|---|---|---|---|---|---|
| Cambridge | 43 | - | - | - | 47 | 43 |
| Everett | 8 | 3 | 1 | - | 13 | 12 |
| Fall River | 35 | - | - | - | 26 | 35 |
| Lowell | 55 | 54 | 27 | 16 | 153 | 152 |
| New Bedford | 74 | 72 | 76 | 55 | 275 | 277 |
| New Salem | 14 | 7 | 7 | 4 | 21 | 32 |
| Northampton | 22 | 20 | 12 | 13 | 40 | 67 |
| Springfield | 39 | 25 | - | - | 76 | 64 |
| Worcester | 27 | 31 | 32 | 20 | 89 | 110 |
| Sub-total for 9 H. E. Schools | 317 | 212 | 155 | 108 | 740 | 792 |
| H. E. Departments 35 Schools (38 for 1963) | 438 | 549 | 231 | 205 | 1,279 | 1,423 |
| Total for 44 (47 in 1963) Schools and Departments | 755 | 761 | 386 | 313 | 2,019 | 2,215 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

b Enrollment by grades is not given for 1962-63.

## Table XII

### Part Time Cooperative Skilled Crafts Programs in Massachusetts, 1962-63 and 1966-67[a]

| Skilled Craft | Number of Schools 1963 | Number of Schools 1967 | Enrollment–Grades[b] 9 | 10 | 11 | 12 | 13 | 14 | Totals 1962-1963 | Totals 1966-1967 |
|---|---|---|---|---|---|---|---|---|---|---|
| Auto Body Repair | 3 | 5 | - | - | 13 | 17 | 6 | - | 21 | 36 |
| Auto Repair | 7 | 13 | 12 | 10 | 43 | 135 | 54 | 1 | 129 | 255 |
| Boatbuilding | - | 1 | - | - | 2 | 3 | - | - | - | 5 |
| Carpentry | 5 | 6 | - | - | 2 | 35 | - | - | 15 | 37 |
| Cabinetmaking | 4 | 5 | - | - | 22 | 65 | 36 | - | 73 | 123 |
| Diesel Repair | 1 | 1 | - | - | 3 | 8 | - | - | 3 | 11 |
| Drafting (machine) | 4 | 6 | - | - | 9 | 20 | - | 3 | 13 | 32 |
| Electrical | 7 | 13 | - | - | 4 | 151 | 1 | - | 88 | 156 |
| Electronics | 3 | 3 | - | - | 14 | 32 | 5 | - | 9 | 51 |
| Food Trades | - | 1 | - | - | 1 | - | - | - | - | 1 |
| Machine Shop | 10 | 15 | - | - | 83 | 158 | 82 | 4 | 232 | 327 |
| Machine and Tool design | - | 1 | - | - | - | 1 | 3 | - | - | 4 |
| Oil heat and Air Conditioning | - | 1 | - | - | - | 6 | - | - | - | 6 |
| Painting | 2 | 3 | - | - | 1 | 7 | - | - | 3 | 8 |
| Patternmaking | 1 | 1 | - | - | 1 | 10 | - | - | 3 | 11 |
| Plumbing | 1 | 2 | - | - | 2 | 9 | - | - | 5 | 11 |
| Printing | 6 | 6 | - | - | 29 | 98 | 41 | - | 134 | 168 |
| Plant Maintenance | - | 1 | - | - | - | 8 | - | - | - | 8 |
| Sheet Metal Work | 6 | 7 | - | - | 19 | 51 | 34 | - | 55 | 104 |
| Small Engine Repair | - | 1 | - | - | - | 2 | - | - | - | 2 |
| Upholstery | 2 | 2 | - | - | 4 | 10 | 6 | - | 12 | 20 |
| Welding | 2 | 3 | - | - | 2 | 14 | - | - | 5 | 16 |
| Totals | 18 | 24 | 12 | 10 | 254 | 840 | 268 | 8 | 801 | 1392 |

Notes:

1. In 1962-63: of the 18 schools, 7 were in Boston, enrolling 468 students.
   In 1966-67: of the 24 schools, 7 were in Boston, enrolling 655 students.

2.

| | 1962-63 | 1966-67 |
|---|---|---|
| Largest School enrollment | 82 | 136 |
| Smallest School enrollment | 2 | 8 |
| Mean School enrollment | 44 | 58 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

b Enrollment not given by grades for 1962-63.

## Table XIII

### Technical Programs in Massachusetts, Enrollment by Curriculum and Grades, 1962-63 and 1966-67[a]

| Curriculum | Number of Schools 1963 | Number of Schools 1967 | Enrollment—Grades[b] 9 | 10 | 11 | 12 | 13 | 14 | Total 1962-1963 | Total 1966-1967 |
|---|---|---|---|---|---|---|---|---|---|---|
| Advanced design drafting | 1 | - | - | - | - | - | - | - | 34 | - |
| Commercial art and Industrial design | - | 1 | - | - | - | - | 15 | - | - | 15 |
| Communication electronics | 1 | - | - | - | - | - | - | - | 34 | - |
| Data Processing | 1 | 1 | - | - | - | - | 159 | 81 | 15 | 240 |
| Dental Assistants | 2 | 5 | - | - | - | - | 130 | - | 35 | 130 |
| Drafting | 4 | 8 | 5 | 26 | 22 | 33 | 57 | 41 | 54 | 184 |
| Electronics | 10 | 16 | 21 | 61 | 110 | 111 | 108 | 59 | 208 | 470 |
| Electrical power technology | - | 2 | - | - | - | - | 31 | 14 | - | 45 |
| Industrial design | - | 1 | - | - | - | - | - | 1 | - | 1 |
| Industrial Technician | 1 | - | - | - | - | - | - | - | 133 | - |
| Machine and tool design technology | 1 | 2 | - | - | - | - | 39 | 21 | 63 | 60 |
| Medical assistant | 2 | 2 | - | - | - | - | 36 | - | 54 | 36 |
| Mechanical Technology | 2 | 3 | - | - | - | - | 58 | 48 | 57 | 106 |
| Metals Technology | 1 | 1 | - | - | - | - | 4 | 6 | 9 | 10 |
| Oil, heat and power technology | 1 | 1 | - | - | - | - | 22 | 15 | 27 | 37 |
| Optics | - | 1 | - | - | - | - | 18 | 12 | - | 30 |
| Practical Nursing | 12 | 13 | - | - | - | - | 821 | - | 611 | 821 |
| Technical | - | 1 | - | 69 | 64 | 48 | - | - | - | 181 |
| Surgical Technician | 2 | 3 | - | - | - | - | 51 | - | 52 | 51 |
| Structural Design | - | 3 | - | - | - | - | 15 | 6 | - | 21 |
| Totals | 14 | | 26 | 156 | 196 | 192 | 1564 | 304 | 1,386 | 2,438 |

a Massachusetts Department of Education, Bureau of Vocational Education, 1968.

b Enrollment not given by grades for 1963.

## Table XIV

### Evening Occupational Education Programs in Massachusetts, 1962-63-1965-66. Summary of Programs under Division of Vocational Education.[a]

| Program Type | Enrollments 1962-1963 | 1965-1966 |
|---|---|---|
| Evening Industrial | 7,262 | 6,420 |
| Evening Trade Extension (Women) | 27 | 293 |
| Evening Apprenticeship Schools | 2,694 | 3,091 |
| Evening Practical Art | 39,641 | 41,723 |
| Evening Agriculture | 294 | 88 |
| Evening Distributive Occupations | 1,518 | 1,970 |
| Evening Practical Nursing | 224 | 126 |
| Evening Area Vocational (Technical) | 932 | 634 |
| Totals | 52,592 | 54,345 |

a Massachusetts Department of Education, Bureau of Vocational Education 1968.