FACTORS AFFECTING INTERSTATE MOBILITY OF TECHNICIANS GRADUATING FROM OKLAHOMA SCHOOLS

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PREFACE

In the analysis of the industrial future of a state the economic development of its people must be considered. Only if its people are technologically prepared can they aid in this industrial growth and development. Valid research investigating the manpower needs of the state of Oklahoma has been important in identifying the potential growth of industry in light of the educational needs for the required manpower. If the newly developed manpower leaves the state for employment at just that time when they are ready to enter the labor market Oklahoma may find it no longer has the technologically oriented manpower needed for its industrial growth and development.

This study is an attempt to identify which of the technicians graduating from the post-high school physical science and engineering related technology programs are leaving the state for employment, and to compare several personal characteristics and abilities that may tend to affect interstate geographic mobility.

I wish to express my appreciation for the encouragement and assistance given me by my thesis advisors, Drs. M. W. Roney and P. V. Braden, and to the many friends and associates whose help was most valuable in completing this study.

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CHAPTER I

INTRODUCTION

The people of this country have reacted readily during most of their history to a call for a better opportunity by "pulling up stakes" in order to seek a more fulfilling life, whether measured in a personal hope or economic gain. Industry, in turn, has responded to new opportunities with equal vigor in a quest for new resources or new outlets for capital investment. With new developments have come industrial techniques that have raised the levels of skill and increased the amount of knowledge required to successfully perform industrial occupational duties. Manpower and industrial conditions in one part of the country are of prime concern to the economic development and growth in other parts of the country. The worker with above average education, saleable skill, and higher abilities can easily move to where pay and working conditions are improved.

The educational facilities of Oklahoma that are designed to prepare persons for industrial occupations range from short intensive courses of a highly specialized nature to graduate curricula of the universities. These programs are organized to meet the needs of persons being

trained in the state for the industrial manpower needs of Oklahoma. The economic growth and future development of the state's industries depend upon a well-educated and highly-skilled labor force. Recent studies (1, 2) indicate a large proportion of this segment of the labor force is leaving the state for their first employment and many of those who take employment, in Oklahoma, leave in the next two or three years. It is of major concern to educators, government, and industrial leaders of Oklahoma if the state continues to lose these highly trained technicians just when they are ready to take a place in the industrial scene. The question arises, of technicians who leave the state because of employment, are they of the higher ability and socioeconomic level and thus of greater potential to the state?

The Purpose

The overall problem with which this study was concerned was to investigate the possible continued loss of Oklahoma's trained technicians, and to identify the characteristics of these technician graduates considered necessary for desirable citizens and to their future potential to the state.

The specific purposes of this study were: (1) to identify the demonstrated academic ability and socioeconomic status of technician program graduates, particularly those who graduated during the years 1964 through 1968,

from eleven post-high-school institutions of Oklahoma that offered programs of the physical science and engineering related technologies; (2) to investigate the relationship of the technician's demonstrated academic ability and personal and socioeconomic status to interstate geographic mobility; (3) to identify which selected job factors were most involved in the technician's decision to take their present employment either in-state or out-of-state; (4) to determine if distinguishing mobility patterns exist for technician program graduates from urban to rural and rural to urban areas; (5) to provide information for a data bank of Oklahoma's technician program graduates for those who may be concerned with the utilization of technical manpower; and (6) to provide format data for future follow-up studies.

Need for the Study

If a state is to have economic growth it must have among other things, an increase in the numbers of its various industries, jobs, raw materials, and facilities. A major goal of Oklahoma is to increase its economic growth.

John J. Klein (3, p. 2, 3), in a recent study suggested that Oklahoma's lag in economic attainment, when compared to many other parts of the nation, can be attributed to its very recent agricultural origins. Since 1939 Oklahoma's economy has been showing signs that are more closely related to the rest of the nation as evidenced by

increased industrialization, a rising urban population, decline in the rural economy, growth of the service industries, and a more efficient utilization of natural resources. As a result Oklahoma per capita income as a percentage of the nation as a whole, has increased from 62.1 percent in 1939 to 81.1 percent in 1960. (3, p. 2)

The problem the state's leaders now face is to develop an overall plan which will effectively accomplish this goal. A frequently mentioned policy is to attract new industry and business to the state, but to get industry to move into Oklahoma requires the consideration of many factors. Some of these factors include access to materials, markets, utilities, transportation, the effective use of the state's educational system, and the availability of trained manpower.

The state's highways, railways, and waterways are improving. With the completion of the new turnpikes, interstate highways, and the soon to be completed Arkansas River Waterway, adequate transportation to materials and markets is assured. Oklahoma's natural resources such as coal, gas, oil, and water can provide needed power, labor costs are within reason, and the educational facilities of Oklahoma that are designed to prepare individuals for labor's needs are being trained in the state for the industrial manpower needs of the state both now and in the future. Effort must now be made for Oklahoma to retain its trained manpower.

The National Manpower Council (4, pp. 15, 17, 19) reports that the development and effective utilization of the nation's human resources cannot be left to chance. It is suggested that there is a direct relationship between our economic progress and the quantity and quality of our available skilled manpower, and that the nation's future progress and strength depends upon a conscious and deliberate concern with these manpower sources.

Oklahoma's industrial and business development during the next few years will be strongly related to the available supply of trained manpower, amongst which there is now an acute need for technicians. This need was expressed in the Oklahoma Employment Security Commission's 1964 survey (5, p. 26) of employment in technical occupations. Amongst the categories studied, the technician occupations as a group were the smallest, but it was predicted that this group would increase at a rate exceeding other categories by 1966, and by 1975 should increase to six times its expected size of 1966.

Lloyd D. Briggs in A STUDY OF THE PLACEMENT OF GRADUATES FROM OKLAHOMA'S POST HIGH SCHOOL PROGRAMS OF ELECTRONIC TECHNOLOGY found for the years 1959 through 1964 49% of the technician graduates of the junior colleges and technical institute graduates moved away from Oklahoma sometime after their initial employment upon graduation from the technical program. (6, p. 22)

The Oklahoma State University Placement Service's

Sixth Annual Report, (1, p. 9) illustrates the interstate mobility pattern for technician graduates of the technical institutes for the years 1962 through 1966. In their findings 58% of the technician graduates accepted their initial employment out-of-state during that period.

Jack Ladinsky (7, p. 473) in his study referred to the mobility of labor as a "way of life" for a substantial portion of American families. In the earlier part of the century the emphasis on internal migration was on workers from rural areas moving to industrial centers, but some major economic and organizational changes in both the private and public sectors of our society has changed this. Thus, the "brain drain" of the "elite" of Oklahoma's young workers has progressively become an important concern of the leaders of the state.

Research of the literature for a study of the quality of technician program graduates failed to divulge any which pertained to out-of-state migration of technician program graduates of the physical science and engineering related fields from Oklahoma's junior colleges and technical institutes per se. As to mobility, Jack Ladinsky (7) and Wilfred Bates (2) appear to be the only researchers who have considered the technician at all. Ladinsky wrote only slightly of technician's geographic mobility, and although Bates studied technician mobility, he directed his study to employment patterns, attitudes about Oklahoma, job satisfaction, and employer practices as related to inter-

state geographic mobility. Much more study needs to be done as to the "why" of labor mobility.

A recent follow-up study by the Oklahoma State Department of Vocational and Technical Education (5) pointed out that the state was continuing to lose its technicians, and that many of those who take initial employment in Oklahoma tend to leave in the next two to three years. It would appear that a study concerned with which technicians are leaving, their ability, and socio-economic level, could make a significant contribution to the evaluation of the future economic growth of the state. If Oklahoma is to be successful in its current effort to attract new industry to the state, and to support the expansion and growth of its existing industry, it will need to know the possible potential of its trained labor force, among which are the technicians. If the best of these are being lost to other states, this too, should be shown.

Research Questions

The purpose of this study was to determine which of selected variables tended to affect interstate geographic mobility among technician program graduates of the physical sciences and engineering related fields during the five year period of 1964 through 1968 from eight junior colleges, two technical institutes and one vocational technical school in Oklahoma. From this population emerged two sub-populations: (1) those technician graduates who accepted

employment in Oklahoma, and (2) those technician graduates who accepted employment out of the State.

Based upon a comparison of the members of the two sub-populations the investigator formulated the following research questions:

Question 1: How many of Oklahoma's recent technician graduates have taken employment out of the state, and of these, how many have since returned?

Question 2: Is there a difference in the technician graduates personal and socio-economic background when associated with interstate geographic mobility?

Question 3: Is there a difference in the technician graduates demonstrated academic ability when associated with interstate geographic mobility?

Question 4: Is there a relationship between interstate geographic mobility pattern of technician graduates and field of technology studied?

Question 5: Is there a difference in the interstate geographic mobility pattern of the technician graduates when related to selected job factors reflecting employment satisfactions?

Assumptions Basic to the Study

Six basic assumptions were incorporated in the study: It is assumed (1) that the extent of out-of-state migration of Oklahoma's technician program graduates of the last five years is undesirable in light of the state's expected economic growth, (2) that the technician program graduates socioeconomic background will vary significantly for comparison, (3) that recent technician program graduates academic grade averages will vary significantly for comparison, (4) that the junior colleges and technical institutes of Oklahoma who have had graduates from 1964 through 1968 will provide the needed information for the study, (5) that a questionnaire completed by technician graduates will provide the needed information for the study, and (6) that a questionnaire completed by technician program graduates will provide an effective method of obtaining valid and useful data for the study.

Scope and Limitations of the Study

The following are limitations of the study: (1) all data were collected and limited to the technician program graduates of the physical science and engineering related fields; (2) the study further limited its scope to those technicians program graduates who secured full-time employment within the continental United States; and (3) the investigator collected data from eight selected junior colleges, two technical institutes, and one vocational

technical school in Oklahoma graduating technicians with the associate degree or equivalent education during the five years, 1964 through 1968.

Definition of Terms

In this technology dominated world, a common understanding of technical terms and phrases are important in order to convey ideas, recommendations and in the framework in which new proposals are described. The definition of terms, then, is a necessary starting point in any effort to communicate in any discussion. English is a living language, and the meanings of its words necessitate continual attention if it is to serve as a factor in the effectiveness of our thinking. For clarity the following terms are identified.

Active Manpower Policy. The process embracing those principles and programs which aim to assist the individual to become fully employed in productive work to his choosing consonant with his aptitudes, talents, and interest under fair standards; to help sustain and rehabilitate the individual experiencing economic or personal hardships; and to help maintain the individual in an adaptable, flexible, and responsible a stance as possible to the changing requirements of the world of work. (8, p. 121)

Community. Structural relationship through which a localized population provides its daily requirements, i.e., a village, a city, a state.

Community College. A junior college operated by the board of education of a local basic administrative unit (including the independent local board for one or more community colleges). Instruction is adapted in content, level, and schedule to the needs of the local community. (9, p. 5)

Community of Orientation. The type of community in which a person lives most of his or her life, i. e., rural or urban.

Employed. Those persons working at an occupation at least thirty-six hours per week who receive a wage, salary, or fee.

Gainful Employment. Employment in a recognized occupation for which persons normally receive a wage, salary, fee or profit. (10, p. 672)

Geographic Mobility. A movement from place to place (11, p. 86)

Interstate Geographic Mobility. A movement from state to state.

Junior College. An institution of higher education which offers the first two years of college instruction, frequently grants an associate degree, and does not grant a bachelor's degree. Offerings include transfer and/or terminal programs (with an immediate employment objective) at the post-secondary instructional level and also may include adult education programs. It is an independently organized institution (public or non public), or an

institution which is a part of the public school system, or an independently organized system of junior colleges. The term does not refer to the lower division of a four-year institution, even if this lower division is located on a campus entirely different from the campus of the parent institution.

Labor Mobility. The willingness or propensity to move (12, p. 240)

Manpower Policy. See Active Manpower Policy.

Migration. The voluntary movement of individuals beyond and outside their interaction systems in the community of residence. (13, p. 75)

Mobility. A quality of flexibility, adjustability, and freedom of movement among labor markets. (11, p. 82)

Out-Migration. The voluntary movement of individuals beyond and outside their community or residence.

Post-High School Level. See Post-Secondary Instructional Level.

Post-Secondary Instructional Level. The general level of instruction provided for pupils in college programs, usually beginning with grade 13, and any instruction of a comparable nature and degree of difficulty provided adults and out-of-school youths. (10, p. 679).

Rural Community. A community not classified as urban (less than 2,500 inhabitants). (14, p. XV)

Technical Education. Education to earn a living in an occupation in which success is largely dependent upon

technical information and understanding of the laws of science and principles of technology as applied to modern design, production, distribution, and service. (9, p. 20).

Technical Institute. A school at the post-high school level which offers technical education in one or more fields to prepare people for employment in positions which lie between the skilled workers and professional scientists or engineers. (9, p. 20)

Technology. The application of scientific principles in research, design, development, production, distribution, or service. It is often used to denote a segment of the applied sciences, i. e., electronic technology. (9, p. 20)

Unavailable. Those persons in the military service and full time students. (15, p. 6)

Unemployed. Those persons not classified as gainfully employed or unavailable.

Urban Community. A community of 2,500 or more inhabitants. (4, p. 15)

Vocational Technical School. A school at both the high school and post-high school level which offers technical education and vocational trade education in one or more fields to prepare people for employment, courses offered are not given college credit.

CHAPTER II

REVIEW OF LITERATURE

This review of literature revealed two recent studies which investigated out-of-state migration of technician program graduates of Oklahoma. One dealt with a segment of the population utilized in this study and the other study investigated most of the educational institutions from which this study's population was obtained. Neither study was concerned with the comparison of instate vs. out-of-state migration as related to demonstrated academic ability, the socioeconomic status, and other personal characteristics of the graduates. Actually, no studies were found relating specifically to the economic and educational background of individuals as factors affecting geographical mobility of technicians and the eventual effect of mobility to the economy of Oklahoma. Studies were found that dealt with the economic and educational background of individuals as related to future aspirations and decisions of vocational choice. The studies were of value in revealing similarities and differences in problems, purposes, techniques and procedures, and in identifying results that, to some degree, might serve as a basis for comparison later in this study.

The review of literature for the background of this study is divided into broad categories to deal generally with: (1) the technician and technical education; (2) the general characteristics of geographic mobility, and (3) the sociological and economic effect of migration of labor.

The Technician

To the uninitiated, a technician and his place on the industrial scene may be an enigma when surveying the literature and in observing the several functions in which the technician is found in the various industires. Herbert S. Wood (16) observed that there was little consistency of definition when referring to the technician's responsibilities and duties, and measures do not exist for assessing the amount of knowledge and skill he is required to possess. The technician is probably best defined in broad, general terms by dealing with his job title, the amount of training he will have had, and the knowledge areas he will have in common with others of like ability. When limiting the area of concern of technician duties related to those of just the engineering and physical science fields it is still a formidable task of defining but in general, the descriptions of the technicians' jobs and responsibilities fall into a wide band between the skilled craftsman and those of the professional engineer or scientist. Of the many job titles by which the technician is known, two general titles are found to be in most common use -- the engineering technician

and the industrial technician. (17, 18)

The engineering technician (19, 20) works with engineers and physical scientists in virtually every area of their endeavor, requiring for some technicians a high level of mathematics, science, and applied technical ability. Many are involved in supervised research, at a highly sophisticated level. The responsibilities include the construction of complicated scientific apparatus, the fabrication and assembly of experimental equipment, drafting and some advance design work.

The industrial technician on the other hand, operates within a more narrow range of activities. (21) His work is usually more "job oriented", centering on specific jobs. For this reason, his educational preparation need not be as extensive as that of the engineering technician. Here, the education will give greater emphasis to the manipulative skills than to mathematics and sciences, although the latter is pertinent to the basic educational experiences. The industrial technician is commonly found involved with jobs dealing with production, supervision, and inspection, device testing for quality control of production, or 'trouble shooting' equipment and systems already installed. Technicians often supervise work and perform in job activities which have in the past been the province of the engineer.

A publication prepared by Dr. Maurice W. Roney for the U. S. Office of Education (22, p. 6-8) provided twelve

criterion for identifying the general responsibilities of technical occupations. However it was suggested that equal weight should probably not be given to each criteria, and that no single occupation would require all of them. They are listed as follows:

1. Applies knowledge of science and mathematics extensively in rendering direct technical assistance to scientists or engineers engaged in scientific research and experimentation.

2. Designs, develops, or plans modifications of new products and processes under the supervision of engineering personnel in applied engineering research, design and development.

3. Plans and inspects the installation of complex equipment and control systems.

4. Advises regarding the maintenance and repair of complex equipment with extensive control systems.

5. Plans production as a member of the management unit responsible for efficient use of manpower, materials, and machines in mass production.

6. Advises, plans, and estimates costs as a field representative, or a manufacturer, or distributor of technical equipment and/or products.

7. Is responsible for performance of environmental tests of mechanical, hydraulic, pneumatic, electrical, or electronic components or systems and the preparation of appropriate technical reports covering the tests.

8. Prepares or interprets engineering drawings and sketches.

9. Selects, compiles, and uses technical information from references such as engineering standards, handbooks, and technical digests of research findings.

10. Analyses and interprets information obtained from prevision measuring and recording instruments and make evaluations upon which technical decisions are based.

11. Analyses and diagnoses technical problems that involve independent decisions.

12. Deals with a variety of technical problems involving many factors and variables which require an understanding of several technical fields.

Technical Education

As early as 1931, the Society for the Promotion of Engineering Education (23) published a summary report that recognized the rising level of knowledge required of staff experts and technical supervisors. Because industry is unable to supply its own needs in filling the technical, and supervisory positions, they have had to look more and more to the technical school for their supply.

A post-secondary type of educational institution was needed to give the more intensive and practical applied training not being provided by the engineering colleges, and it became apparent that these schools must principally direct their education to the supervisory and technical personnel needed by particular industries (24). The name 'technical institute' was proposed as the most suitable and all inclusive name for these schools.

Studies of the technical institute have since been undertaken. Wickenden and Spahr (23) were the first to conduct investigations, followed by many others amongst which are Smith and Lipsett, (25) Henninger, (26) and Graney (27).

Most technical institutes follow the pattern provided by Wickenden and Spahr (23) and characterized as being a

post-secondary school catering to those individuals with previous industrial experience and desiring intensive preparation in a specific field of interest. The educational experience would prepare the students for entry occupations that would fall primarily between the skilled and the professional level, but with enough ability to enable them to advance in time to a professional status. The courses would be intensive, shorter, and essentially terminal rather than preparatory, in comparison to those of the professional school. Though concerned with both technical and supervisory pursuits, the latter is more often emphasized relating to actual industrial usage. The teachers, while adequately prepared in a scholarly sense, are primarily chosen because of their practical experiences, and for their ability to teach the directly practical, emphasizing the "doing" as distinct from study or book theory.

Dr. M. Roney (22, p. 9) identified the development of five general abilities in the educational content of the technical institute. The abilities are:

1. Facility with mathematics, ability to use algebra and trigonometry as tools in the development of ideas that make use of scientific and engineering principles; an understanding of, though not necessarily facility with, higher mathematics through analytical geometry, calculus, and differential equation, according to the requirements of the technology.
2. Proficiency in the application of physical science principles including the basic concepts and laws of physics and chemistry that are pertinent to the individual's field of technology.
3. An understanding of the materials and processes commonly used in the technology.

4. An extensive knowledge of a field of specialization with an understanding of the engineering and scientific activities that distinguish the technology of the field. The degree of competency and depth of understanding should be sufficient to enable the individual to do such work as detail design using established design procedures.

5. Communication skills that include the ability to interpret, analyze, and transmit facts and ideas graphically, orally, and in writing.

In studies made by Hammond (28), Roney and Braden (29), the U. S. Department of Labor (30), and Engineering Manpower Commission (32), the technician's education was defined as "being a planned sequence of school experiences designed to prepare persons for a cluster of jobs in specialized fields of technology at the post-secondary level." The program should be at least two (2) years, but not more than four (4) years in length, leading to the associate degree or similar designations. The technician's education should also include emphasis in mathematics and sciences as well as depth in a particular specialized field of technology. The curriculum in the individual technologies should meet particular objectives enabling the graduate to enter a job area after graduation with little or no further on-the-job training, that he be able to advance in his job in harmony with the new developments in his technology, and that he have a substantial foundation in his technology to continue his education if he so desires.

Geographic Mobility Defined

In the review of literature of labor mobility, several

significant points were observed: (1) the terms migration and mobility were used interchangeably (as well as geographical and residential mobility) when relating to the movement of labor; (2) for the most part, studies of mobility have been the sole province of the sociologist and the economist; (3) studies of all kinds of labor mobility are among those of different educational levels, occupations, and age groups; (4) information on the mobility of workers has been distinctly limited. Studies were small in scope with little uniformity in the type of workers dealt with, the time periods covered, and/or methods utilized in measuring mobility; and (5) no studies dealt specifically with the socioeconomic background of the individual, or the individual's ability related to the motivation for his mobility.

Basically, mobility is a subjective concept concerning a person's willingness or unwillingness to make a change (12), (32), (11). Geographical mobility is the movement of residence, and more directly to the subject of this thesis, a movement into or out of a labor market (13). "The willingness or propensity to move" as stated by Reynolds (12, p. 240) is embraced by a variety of motives and activities. Job movements are of varying types. Types of mobility suggested by Kerr (33) and Parnes (34) are summarized here as movement from one employer or organization to another (Occupational mobility); movement from one industry to another (Industrial mobility); movement from one area to

another (Geographical mobility); and between employment and unemployment, or into and out of the labor market.

Not only is mobility termed industrial, occupational, and geographical, but in addition it is divided as horizontal and vertical as well. Nelson (35) indicated geographical movement to be horizontal mobility, and vertical mobility to be the movement of persons or groups from one class or status to another. Vertical movement could be either upward or downward.

Herbert Parnes (34) differentiated propensity as being of three types; (1) propensity to move to a new job that is more appealing by having a known permanence, (2) to leave one job which has proven satisfactory without having a new job in sight, and (3) of an unemployed worker to change residence, industry or occupation in order to secure employment.

Charles Meyers (36) expressed the measuring of applied manpower mobility as resulting from his willingness to move, in addition to his having the opportunity to change employment either from one occupation, industry, or geographical area to another. Meyers implied that the amount of movement reflected the interaction of supply to the demand for labor.

Demography of Mobility

As stated above, the studies of geographic mobility have been mainly the province of the sociologist and the

economist. Among both groups the center of attention has been in the industrial sectors on movement among blue collar workers, non-whites, and the unemployed. The researcher found little data on mobility of white collar workers, and close to no work at all being carried out on the mobility of professional and technical workers. Yet Ladinsky (7), Malm (37), and several Labor Department studies (30, 39, 40) concur that geographical mobility of the professional, technical, and kindred workers are the most mobile segment of the labor force, and that geographic mobility drops off rapidly with decreasing education. Therefore, the concern with the manpower problems investigated in the study are essentially of two kinds: (1) those problems dealing with the availability of manpower in terms of numbers, costs to geographical location and mobility, and (2) those problems concerned with the effective utilization of manpower in the job being done.

Willard Wirtz (40, p. 143) in a manpower report to the President said that "one of the chief goals of an active manpower policy is matching workers and jobs. The progress we make toward this objective depends, in part, on achievements in two other major areas of manpower policy -- the creation of jobs and the development of workers abilities."

Sommers (41) declared that policy makers must know the costs and gains of personnel, and the social investments in manpower relocation. The investment in mobility is critically influenced by the investment of training and education

if economic benefits are to be derived from mobility.

Webbink (42) suggests that the economists as responsible citizens must consider facts when discussing the costs and benefits of labor mobility. An essential foundation to the development of our economic, political, and social institutions is a free movement of labor. Some degree of flexibility in the movement of labor has always been essential in maintaining both stability and effective economic operations. The growth and development of the social facilities essential in maintaining both stability and effective economic operations provide for the growth and development of the social facilities essential to our present way of living. But more and more, in recent years, the question arises that if we are to gain maximum utilization of labor resources, can our method of free movement of labor, based on employer and worker choices directed toward individual advantages, be retained as a basic procedure for manpower allocation? Webbink then cautioned that in the interest of both long-range and immediate economic and social growth we must not "organize our human resources by persuasion or compulsion just to strengthen the economy without destroying the chief distinctive contribution that can be made in developing an industrial society." (42, p. 7)

Yoder (11) and Palmer (43) suggested that mobility in the labor force provided the necessary flexibility, adjustability and freedom that is required in the process of equalizing the demands of the supplier of manpower among

different geographical areas and labor markets. "Too little mobility can retard or present the effective allocation or distribution of manpower resources and thus occasion its under-utilization or waste. Too much mobility can have exactly the same detrimental influence on the application of manpower resources." (11, p. 80) We, as a nation of people, value human resources above all others, therefore, human mobility is a primary concern to all modern society.

It is the Census Bureau's practice to measure geographical mobility of a population by comparing an individual's residence at two points in time. The population is divided into two groups which are classified as non-movers (those residing in the same house both years) and movers (those residing in a different house at the later time). The movers are then classified as local movers (different house, same country) and migrants (different country residence). Migrants are, in turn, classified as being those coming from noncontiguous states.(44)

The U. S. Department of Labor have been responsible for the most extensive studies relating to geographic mobility of the United States populace. The Manpower Report to the President, (30) and (44), Manpower Research and Training, (45), and Manpower Research: Mobility and Worker Adaptation to Economic Changes in the United States, (46) are some of the most recent studies made identifying and depicting the geographic mobility patterns of the nation's workers. Information gleaned from these reports

suggests that the migration of persons in this country is constant, and that the overall mobility rates remain relatively stable and close to 20 percent (ranging from 18.6 to 21 percent) in all successive census surveys conducted since 1948). (46)

Personal Factors Causing Mobility

Of the personal factors which contribute most to geographical mobility, age, as related to the family cycle, reflects the typical pattern. When young people leave home to find jobs, marry, and set up their own households mobility rates are highest. Of the married men 18 to 24 years old living with their wives, the mobility rate was 63.3 percent compared to 19.6 percent for single men. (46) Mobility rates for men and women average the same over a lifetime, but the patterns differ appreciably at certain ages. Women between the ages 18 to 21 are distinctly more mobile than men; 35 percent of the women aged 18 to 19 move, as compared with 20 percent of the men. This trend continues until the ages of 22 and 24 when the rates are about the same for both sexes, and from the ages of 25 to 30 years the mobility rates of men begins to be greater than that of women. (41, p. 22) Considering other personal factors affecting mobility, Yoder (47) found renters move more often than homeowners, heads of families were less likely to move than other family members in the labor force, and mobility declined in direct proportion to increased age.

When relating social factors as affecting geographic mobility it was found that education and the level obtained, has a direct effect on labor mobility. Most studies addressing themselves to this factor suggested that the better educated were more mobile than all other groups, and that geographic mobility drops off sharply with decreasing education. (6, 11, 30, and 46)

Technician Mobility

Current surveys of population mobility generally show migration as highest at the top and bottom of the occupational ladder; professional and technical occupations are at the top, and farm and unskilled labor are at the bottom. Ladinsky (7) reports that 10 percent of all male professional workers were migrants as compared to about six percent of all others excluding the lowest group.

Higher income or improved employment status are reflected in levels of education when related to geographic mobility. Ladinsky (7) found professional, technical, and kindred workers the most mobile when they associated mobility to income levels. "The practice of the American worker to change this residence apparently is strongly influenced and limited by the character of his income and employment status." (7, p. 21) Livernash (48), Malm (37), Myers (49), U. S. Department of Labor (50) found that the move to better economic areas where job opportunities are expanding has always been basic to man's search for a

better life.

Lansing (51) and Tarvers (52) reported that professional and technical workers had the highest lifetime mobility and recent mobility rates of all occupational strata. Seventy-four percent had moved from place of birth, as compared to an average of 64 percent for all other workers; and 33 percent had moved within the past five years, as compared to 16 percent for all others. Thus, it would seem that professional and technical workers are the most mobile segment of the labor force especially when compared to all other labor groups. Five year rates of mobility are even more sensitive to permanent, one-way mobility than are one-year rates, and it is this kind of mobility that characterizes technical labor. (43)

The high ratio of migration among professional and technical worker can be attributed to many complex factors. A look at the 1960 Census of one-in-a-thousand sample of 16 independent variables can be analyzed to determine their strength and relative importance in explaining variations in geographic mobility. (41) In summary, the findings show that with increased age and family size, geographical mobility is lessened, but higher geographical mobility is stimulated by educational levels. Young married professionals move most and farthest; males move somewhat more than females. (53)

CHAPTER III

DESIGN AND METHODOLOGY

The purpose of this chapter is to describe the method of design utilized for determining the population and controlling variables, and the method by which the data was collected and analyzed. Certain problems require precise experimental control and manipulation; others may be more satisfactorily attacked by way of naturalistic observations or nonexperimental assessment. The over-all technique is chosen to best fit the problem under investigation, and the choice of technique affects the detail of design and the operations for measuring or manipulating the variables. The lack of uniform standards and measurement methodology of previous studies dealing with the mobility of labor populations, the population's status when contacted for information as related to education is, ex-post-facto and precludes the use of certain investigative techniques. Although there are other effective techniques utilized in this type of study, a mailed questionnaire was developed and used because it was the only practical technique available consistent with the size of the population being studied.

The ex-post-facto type of research is characterized

as research in which the independent variable or variables have already occurred. The researcher starts with observations of the dependent variables in retrospect for their possible relations to, and effect on, the independent variables. The limitations and weaknesses of the ex-post-facto type of research as described by Kerlinger (54) are "(1) the inability to manipulate independent variables, (2) the lack of power to randomize, and (3) the risk of improper interpretation . . . Despite its weakness, much ex-post-facto research must be done . . . simply because many research problems . . . do not lend themselves to experimental inquiry."

"Follow-up" procedures (15) are used in ex-post-facto research which involve research designs that require a contact with individuals who have shared experiences, and which the investigator wishes to study. The two main classifications of follow-up studies are the explanatory and the descriptive studies, or a combination of the two techniques.

Explanatory studies attempt to explain a situation, test a theory, or draw inferences to the relation between the cause and its effect. Explanatory is further divided into diagnostic and experimental methods. The diagnostic study searches for possible causes in evaluating a situation. The experimental type of study tries to create new situations by manipulating the environment and introducing experimental factors to gain an understanding of the actual

operation of a system. The design of the research of this study will follow the structure herein described as being ex-post-facto using explanatory follow-up procedures from the diagnostic standpoint.

Selection of Population

All subjects for the study were technician program graduates receiving the Associate Degree or its equivalent from eleven selected junior college, technical institutes, and technical vocational schools of Oklahoma. Okmulgee Tech does not grant a formal degree for its two year technical program. The institutions included: (1) Altus Junior College, (2) Cameron State College, (3) Connors State College, (4) Eastern Oklahoma A&M College, (5) Murray State College, (6) Northeastern Oklahoma A&M College, (7) Northern Oklahoma College, (8) Oklahoma State Tech, Okmulgee, (9) Oklahoma State University Technical Institute, Oklahoma City, (10) Oklahoma State University Technical Institute, Stillwater, and (11) Sayre Junior College.

The departments involved were contacted through the president's office to ascertain their willingness to participate in the study. Information in the form of a letter was directed to each participating school requesting information regarding the names and addresses of the graduates by major area of study for each of the five year periods, 1964 through 1968. A copy of the letter is included in

Appendix B.

The cross-sectional population for this study included all those students who met the following criteria: (1) had graduated from one of the physical science or engineering related technologies of one of the twelve institutions selected. (2) had graduated between 1964 through 1968; (3) were presently employed full-time; (4) were presently not in the armed forces; (5) had completed a valid questionnaire.

Instrument

Research of the ex-post-facto type usually utilizes collection of data either from existing records or a self-administered questionnaire. The method of gathering data for this study utilized the self-administered questionnaire. The design and development was based on suggestions by Good (55) and Oppanheim (56). An attempt was made to restrict the length to three pages, and to write the majority of the questions in such a manner as to permit answering with either a check mark, one word, or short answer. The questionnaire form was kept short and simple, so that more of the graduates would be inclinded to participate in the study. The developed questionnaire was pre-tested with the cooperation of technician graduate candidates of Oklahoma State University Technical Institute, Stillwater. Needed changes were made and a revised questionnaire was developed. A copy of the questionnaire is included in Appendix B.

Description of Institutions

Three different types of institutions were included in the eleven institutions whose graduates were studied.

Junior Colleges

The eight junior colleges selected have fully accredited programs of study. Accreditation has been awarded by the state accrediting agencies and by the North Central Association of Colleges and Secondary Schools. The associate of arts degree is offered in both transfer and terminal curricula.

To be eligible for admission a student must have graduated from an accredited high school. Exception to this requirement is made for students over 21 years of age who may be admitted on a probationary basis. Upon completion of two semesters of satisfactory work, the probationary student may be admitted on a regular basis.

Within the division of industrial education the eight junior colleges offered a total of 12 transfer and terminal curricula. Students enrolled in technical education programs in the division of industrial education were selected as subjects in this study.

The number of curricula of technology offered by any one of eight junior colleges varies from one to as many as seven in each school. These programs are: Electronic data processing technology, design drafting technology (both architecture and industrial), electronic technology,

mechanical technology, civil technology, civil and highway technology, chemical technology, climate control technology, and instrumentation and process control technology.

Vocational Technical School

The vocational technical school selected for this study is the largest school of its kind in the state. Graduation requirements are the successful completion of all course requirements, and recommendations of the department head. Upon graduation the Certificate of Accomplishment is awarded. Student studying at this institution are not awarded college credit.

To be eligible for admission at this institution a student must have completed high school or have attained seventeen and one half years of age.

Operating on a trimester calendar the school offers 43 trade and technical programs. Graduates of five of the forty-three programs are: electronic data processing, engineering aids, drafting and design, industrial electronics and refrigeration and heating.

Technical Institutes

Technical institute students included in this study were selected from two technical institutes operated by the Oklahoma State University. These institutions, operated as divisions of the University's College of Engineering, offer two-year, college level, specialized programs leading

to an associate degree in technology.

Operating on a semester calendar the institutions offer thirteen different technologies. The programs offered at the on-campus institute in Stillwater are: aeronautics, construction, drafting and design, electronic, fire protection, mechanical, metals, petroleum, and radiation and nuclear technologies. The programs offered by the metropolitan technical institute are: architectural and structural drafting and design, civil, computer programming, industrial drafting, electronics, instrumentation and process control, and environmental control technologies

Demonstrated Academic Ability

As a criterion to determine the general ability of an individual, his performance in school in the form of a grade point average has been used extensively in numerous studies.

Funches (57) in a study at Jackson State College on the correlation between ACT scores and grade point average (GPA) found a positive degree of correlation between ACT scores and grade point averages from college grades. Ellis (58) in a similar study stated that ". . . records of prior academic attainment often have a direct bearing on their (the student) future attainments in life." Ellis in comparing the grades of one institution to any other suggested that there may be some variation among schools and their grading procedures. The need for having records that can

be transferred to, and used at other campuses, however causes a high degree of standardization both in the keeping of academic records and method of grading. More over, administrative necessity serves to keep recording errors at a minimum.

> "one of the most striking developments on the contemporary college scene is the decline of the tradition that students should confine their attendance to one undergraduate institution. For a variety of reasons, college students today are apt to switch schools one or more times in their undergraduate careers." (58, p. 260).

Moberely (59) and Sleeper (60) found that the coefficients of predictive validity between Graduate Record Examination and Grade Point Average were statistically significant at the .30 level. About which Alexakos (61) commented.

> In general, the results of the present study are compariable to results obtained by other investigators who have reported validity coefficients in the neighborhood of .30 for the GRE Aptitude Test.

Hillway (62) qualifies the level of results by stating:

> A positive correlation of a .30 or higher ordinarily may be considered sufficient evidence of a positive degree of relationship.

Dickinson and Newbegin (63) found that employers in both industry and government seem to be using academic grades as a principle yardstick in hiring and in deciding individual salaries.

In a study of NON-TEACHING GRADUATES OF THE FOUR-YEAR STATE COLLEGES, Robinson (64) found:

> The graduate's grade point average in general courses were positive correlated with employer rating of the graduates, and that the importance of student's doing well in their courses should not be minimized in terms of their success in future employment. (64, p. 143)

Academic achievement was defined as a student's grade point average (GPA) in his over-all grades from the institution from which he graduated. The GPA was obtained in part from the response to item Number 5 on the general questionnaire, and in part from student records (when made available to the investigator) of the institution from which he had graduated.

Socioeconomic Scale

In this study the socioeconomic scale developed by Duncan (65) was used to determine socioeconomic background of the respondent. This scale evolved over a period of years from a study by North and Hatt in 1945, which led to the development of the National Opinion Research Center (NORC) study conducted in 1947.

The Occupational Prestige Scale developed by NORC was limited because scores are not available for occupations employing more than half of the labor force. The subsequent development of a scale for all occupations was carried out with the aid of a research grant to the University of Chicago from the United States Public Health Service. The major purpose for the development of the scale was not to predict unknowns, but to construct from census information a graduated rating scale which could be used in

research requiring a system of stratification. The scale is given in three forms, any one of which can be used in statistical analysis.

Students of social stratification are in general agreement that the occupation of the husband is more likely than that of the wife, to reflect the socioeconomic status of the family. Assessment of social economic status for this study was made on the basis of the respondents report of the specific occupational title of his father (or whoever supports your family). A numerical value was assigned from the socioeconomic scale for all occupations to that of the father's occupation. This data was obtained from the respondent's questionnaire item number 3 and 4.

Data Collection

Data from as many of the graduates as possible was secured and in attempting to do so, a list was compiled of all graduates and available mailing addresses for the years 1964 through 1968. The list of names and addresses was prepared from information obtained from each shool participating in the study. The total number of graduates for the years included in the study was 1653.

Questionnaires to be completed under supervision were sent to technician graduate candidates of each of the eleven selected institutions during the month of May, 1968. Each department head was personally contacted and briefed by the investigator before the questionnaire was completed

by the graduate candidate. The technician graduates who did not complete questionnaires at that time were sent follow-up letters and questionnaires. A questionnaire was sent to each graduate of the years 1964 through 1967 with a cover letter explaining the purpose of the study and soliciting his cooperation. A copy of the letter is in Appendix B.

There were 351 graduate candidates in the May, 1968, classes of the selected schools, who filled out questionnaires. (Oklahoma State Tech's 1968 graduates were contacted by letter). A list of all graduates, the year of graduation, and the technology studied from each institution participating in the study was obtained and verified for completeness: Fifty-four of the graduates were established as foreign students who had or were returning to their country for employment; these were eliminated from the study. Questionnaires with a cover letter, a stamped and addressed envelope, were sent to each of the remaining 1248 technician graduates of the previous years. One hundred and forty three forms were returned due to inadequate address or address unknown. Of the remaining 1105 to be contacted, 315 responded by returning useable questionnaires.

Normal statistical techniques for sampling the population were not attempted in order that the largest sample possible could be obtained from the population. It was the hope of the investigator that more meaningful information

could be gained utilizing this method than might be expected from a smaller sample. To check the assumption of normality of the sample of respondents, a Chi Square, goodness of fit test was made to determine if the sample departed significantly from the shape of the normal distribution of the total population of technicians graduating from the eleven selected institutions during the years studied.

The data in Table I lists the schools included in the study, the total number of graduates from each, and the number of respondents to the questionnaire from each. A percent value for each school of the total of 1653 was computed as the expected frequencies, and a percent value for the respondents from each school of the total of 666 was computed as the observed frequencies. The Chi Square of 0.2804 at 10 degrees of freedom was less than the appropriate value in the Chi Square table at the .05 level of confidence, thereby suggesting no statistically significant difference among the technician graduates responding to the survey, and the number of graduates from eleven schools during the years studied. The test indicates that the sample very closely represents the total population in subsequent analysis.

Data Analysis

The facilities of the Oklahoma State University Computer Center were used, in part, to make the analysis of the data. Since the population of the sample indicated

no statistically significant difference from the parent population, the methods of analysis of frequency, percentage, and simple listings were used for clarity. To determine associations were percentages may not be the best method other appropriate statistical techniques were used.

TABLE I

FREQUENCY AND PERCENTAGE OF TECHNICIAN GRADUATES RESPONDENTS BY INSTITUTION

Institutions	Number of Graduates N = 1653	Number of Respondents N = 666	Total
Junior Colleges			
Altus Junior College	20*	20	
Cameron State College	48	25	
Connors State College	9*	4	
Eastern Oklahoma State College	110	47	
Murray State College	10*	7	
Northeastern Oklahoma A&M College	210	106	
Northern Oklahoma College	32	18	
Sayre Junior College	19	10	
Technical Institutes			
OSU Technical Institute (Oklahoma City)	215	99	
OSU Technical Institute (Stillwater)	436	222	
Vocational Technical Schools			
Oklahoma State Tech (Okmulgee)	544	108	
TOTAL	1653	666	

df = 10 sign. .05 = 18.31 X^2 = 0.2804

*School had fewer than five years of graduates

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

The analysis of data presented in this chapter is in three sections. First, an analysis of the employment pattern of the technician graduates initially included in the study is described. Second, the interstate geographic mobility pattern of the technician graduates who accepted employment is described. Presented in the third section is the data analysis relating to the research questions generated by the design of the study.

Description of Employment Pattern

The purpose of this study was to identify which selected variables are associated with interstate geographic mobility among employed technician program graduates of Oklahoma. The technicians chosen for the study graduated from technology programs of the physical science and engineering related fields during the five year period 1964 through 1968. The eleven educational institutions from which they graduated consisted of eight (8) junior colleges, two (2) technical institutes, and one (1) vocational technical school. The location of the eleven schools is shown in Figure 1. The junior colleges reported 458 graduates,

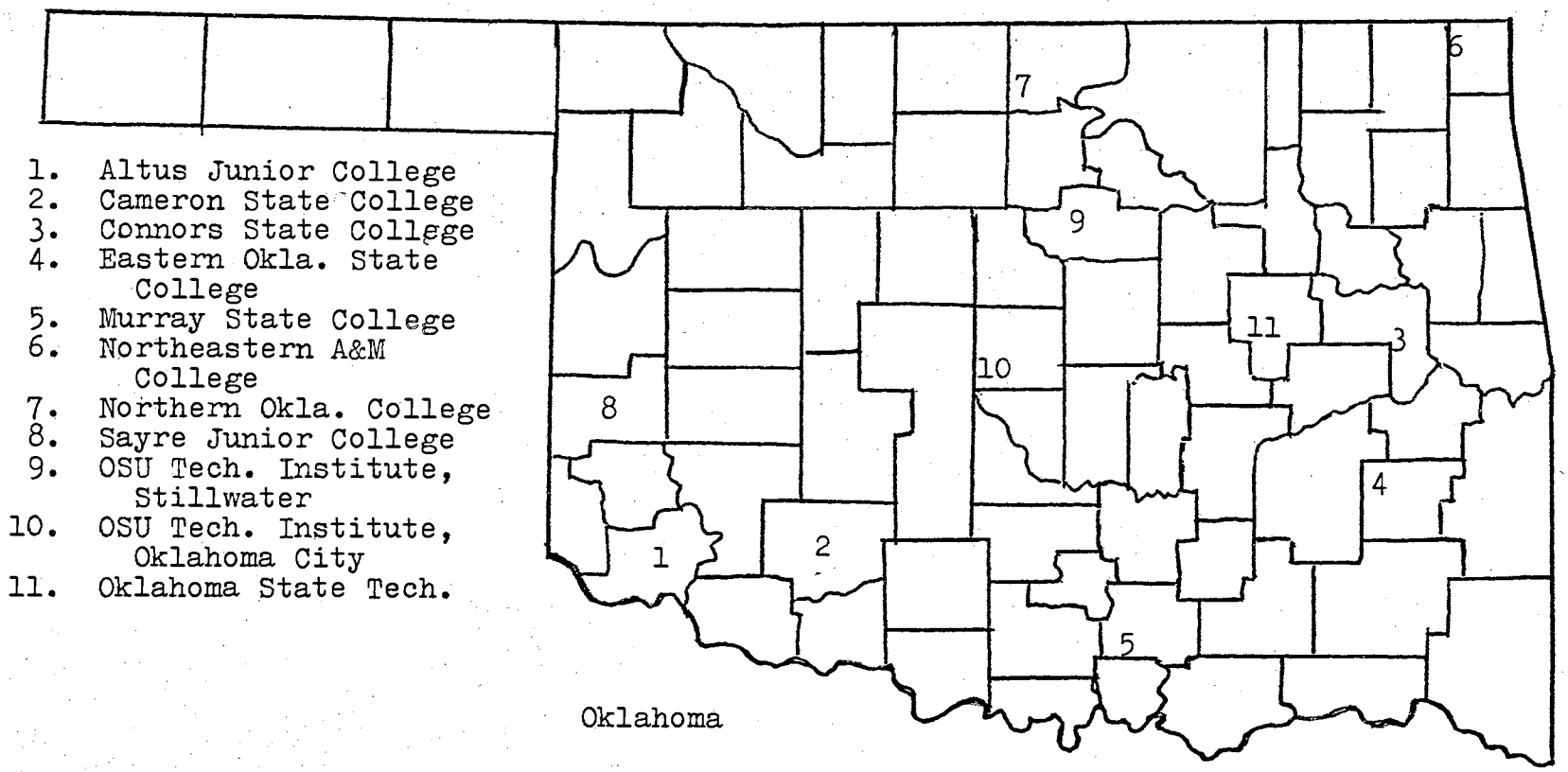

Figure 1. Location of Eleven Schools Included in the Study and their distribution in Oklahoma

the technical institutes reported 651 graduates, and the vocational technical school reported 544 graduates. A listing of the individual schools, the number of full time employed graduates from each school, and the number of respondents to the survey for the study is given in Table II. The number of technicians reported as graduates from any one school varied from nine to five hundred and forty-four. Table III provides a frequency analysis of the sixteen technical programs and graduates responding to the survey of the eleven schools participating in the study. Each respondent completed a questionnaire from which data concerning the employment pattern was obtained. In a number of cases when individual items were examined, the total number of responses was less than 666. Primarily, this was a result of the respondents either omitting some item or marking more choices than were required.

Forty percent of those reported as graduates of technical programs in Oklahoma, during the years studied, responded to the questionnaire. An analysis of the employment pattern of these graduates is in Table IV. Those graduates reported as either continuing their education, presently unemployed, disabled, or presently in the military service accounted for 48.1 percent of the respondents. These graduates were considered unavailable to the study.

The data given in Table V gives an analysis of the employment pattern of graduates as to type of institution attended for technical education. The percentage of

TABLE II

POPULATION OF THE STUDY

Institutions	Number of Respondents	Number of Full-time Employed
Junior Colleges	(237)	(55)
Altus Junior College	20	3
Cameron State College	25	8
Connors State College	4	1
Eastern Oklahoma State College	47	5
Murray State College	7	2
Northeastern Oklahoma A&M College	106	21
Northern Oklahoma College	18	11
Sayre Junior College	10	1
Technical Institutes	(321)	(193)
OSU Technical Institute (Oklahoma City)	99	59
OSU Technical Institute (Stillwater)	222	134
Vocational Technical Schools	(108)	(79)
Oklahoma State Tech. (Okmulgee)	108	79
TOTAL	666	327

TABLE III

FREQUENCY OF RESPONDENTS AND DISTRIBUTION OF TECHNOLOGIES STUDIED BY INSTITUTION

Technology Studied	Altus Junior College	Cameron State College	Connors State College	Eastern Okla. State Col.	Murray State College	Northeastern A&M College	Northern Okla. College	Sayre Junior College	OSU Tech. Inst. OC	OSU Tech. Inst. Still.	Oklahoma State Tech.	Total
Refrigeration and Heating						*			9		29	38
Radiation										17		17
Petroleum										2		2
Metals										6		6
Mechanical						9				26		35
Instrumentation									4			4
Fire Protection										31		31
Electronic		10		13		27	7	10	46	51	27	191
Drafting		6	4	12	7	33	3		20	34	41	167
Data Processing	20	9		15		29	8		18		4	103
Construction										21		21
Civil & Highway				3								3
Civil									2			2
Chemical				4		8						12
Aeronautical											31	31
Engineering Aide											3	3
TOTAL	20	25	4	47	7	106	18	10	99	222	108	666

*There were no respondents in this technology from this school.

TABLE IV

FREQUENCY AND PERCENTAGE ANALYSIS OF THE EMPLOYMENT PATTERN OF RESPONDENTS TO SURVEY

Employment Status	Number	Percent
Employed	327	51.9
Unemployed	16	2.0
Continuing Education	252	35.5
Military Service	71	10.4
TOTAL	666	99.8*

*Discrepancy due to rounding off to nearest tenth percent

TABLE V

PERCENTAGE ANALYSIS OF RELATIONSHIP OF EMPLOYMENT PATTERN TO TYPE OF INSTITUTION ATTENDED

	Type of Institution		
Employment Status	Junior College N = 215	Technical Institute N = 323	Vocational Technical School N = 108
Employed	22.1	59.8	75.9
Unemployed	4.1	1.5	1.9
Continuing Education	67.1	27.9	3.7
Military Service	6.7	10.8	18.5
TOTAl	100.0	100.0	100.0

graduates responding to the questionnaire by type of institution were: junior colleges, 235 or 35.3 percent; technical institutes, 323 or 48.4 percent; and the vocational technical school, 108 or 16.3 percent. Of those graduates reported as employed full time, 63.3 percent had attended technical institutes. The highest percentage of technical program graduates continuing their education were from the junior colleges, 62.7 percent. One junior college had 72.4 percent of its graduated technicians of a terminal technician program continuing their education. Two percent of the vocational technical school graduates indicated they were continuing their education. The vocational technical school does not offer transferable college credit which may account for the difference in percentage of those continuing their education from other types of institutions.

Technology graduates were asked on item 14 of the questionnaire "Which most nearly represents your present work as related to your technology training?" The data given in Table VI presents an analysis of the relationship of the technology studied, to on-the-job duties. Sixty-nine and four-tenths percent reported present occupation as being directly related to technology studied; twenty-five and one-tenth percent reported present occupation as only partly related to technology studied; and five and five-tenths percent reported present occupation as not related to technology studied. Of the three types of

schools surveyed, 60.8 percent of the graduates of technical institutes found jobs that directly related to their technology speciality when compared to the two other types of institutions.

TABLE VI

FREQUENCY AND PERCENTAGE ANALYSIS OF THE RELATIONSHIP OF TECHNOLOGY STUDIED TO ON-THE-JOB DUTIES

Relation of Job Duties	Type of Institution					
	Junior College N = 52		Technical Institute N = 193		Vocational Tech. School N = 82	
	No.	%	No.	%	No.	%
Directly Related (227)	21	40.14	138	71.5	68	83.6
Partly Related (82)	21	40.14	49	25.4	12	14.6
Not Related (18)	10	19.12	6	3.1	2	2.4

Description of the Interstate Geographic Mobility Pattern

The interstate geographic mobility pattern for the 327 technician program graduates responding to the survey as being full-time employees is given in Table VII.

TABLE VII

FREQUENCY AND PERCENTAGE ANALYSIS OF THE INTERSTATE GEOGRAPHIC MOBILITY PATTERN OF THE EMPLOYED TECHNICIAN GRADUATES

Interstate Mobility	Number	Percent
Employed in Oklahoma	171	52.2
Employed out of State	156	47.7
TOTAL	327	99.9*

*Discrepancy due to rounding off to nearest tenth percent.

Testing the Questions Generated by the Study

Question 1: How many of Oklahoma's recent technician graduates have taken employment out of the state, and of these, how many have since returned?

Data indicating the interstate geographic mobility pattern for the 327 technician graduates who responded to the questionnaire is given in Table VIII. (See Appendix D for distribution by State.) These data indicate that 49.2 percent had taken employment and remained in Oklahoma since completing technician training. Of those who are reported as having been employed out of the state, 3.1 percent had since returned. Of the technician graduates responding to the survey, 52.2 percent are presently employed in Oklahoma. A Chi Square test was used to treat the raw scores of Table

VIII to determine if a statistically significant difference existed in the relationship of interstate mobility to type of institution. The Chi Square of 19.48 was in excess of the .05 level. A statistically significant difference did exist between technician graduates interstate geographic mobility and type of institution from which they graduated.

TABLE VIII

FREQUENCY AND PERCENTAGE ANALYSIS OF THE INTERSTATE GEOGRAPHIC MOBILITY PATTERN OF THE EMPLOYED TECHNICIAN GRADUATES BY TYPE OF SCHOOL

Interstate Mobility	Junior College N = 52		Technical Institute N = 193		Vocational Tech. School N = 82	
	No.	%	No.	%	No.	%
Remained in Oklahoma	40	76.9	78	40.4	43	52.4
Migrated Out of State	11	21.1	108	54.5	37	45.1
Returned to Oklahoma	1	2.0	7	5.1	2	2.4
TOTAL	52	100.0	193	100.0	82	99.9*

*Discrepancy due to rounding off to nearest tenth percent.

In an analysis of the technician graduate's on-the-job duties when related to technology studied, it was found that 62.7 percent of the non-migrants to 72.4 percent of

the migrant's employment related directly to technology studied. Analysis of this data is given in Table IX.

TABLE IX

FREQUENCY AND PERCENTAGE ANALYSIS OF THE RELATIONSHIP OF INTERSTATE GEOGRAPHIC MOBILITY PATTERN TO ON-THE-JOB DUTIES

Interstate Mobility	On-The-Job Duties					
	Directly Related		Partly Related		Not Related	
	No.	%	No.	%	No.	%
Oklahoma Employment (171)	114	50.2	47	57.2	10	55.5
Out of State Employment (156)	113	49.8	35	42.8	8	44.4
TOTAL	227	100.0	82	100.0	18	100.0

Question 2:

Is there a difference in the technician graduates personal and socioeconomic background when associated with interstate geographic mobility?

Data indicating the relationship of age of technician graduates to interstate mobility are given in Table X. The data is presented in four age ranges of approximately three years each. There is little difference at any age range

when comparing migrant graduates to non-migrants. A Chi Square analysis of the relationship of age of technicians to interstate mobility indicated a Chi Square of 5.839 with 3 degrees of freedom was found to be not statistically significant. Age was not considered a significant variable to interstate migration.

TABLE X

CHI SQUARE ANALYSIS OF THE TECHNICIANS AGE TO INTERSTATE MOBILITY

Age Range	in-state	out-of-state	total
20-22	41	25	66
23-25	59	62	121
26-29	37	35	72
30-over	29	39	68
TOTAL	166	161	327

df = 3 sign .05 = 7.82 X^2 = 5.839 not significant

When comparing technician graduates age and type of institutions to interstate geographic mobility it was found that seventy percent of the graduates from technical institutes 25 years of age and under were employed outside of Oklahoma. Table XI presents data indicating the

relationship of age to interstate geographic mobility by type of institution.

TABLE XI

FREQUENCY ANALYSIS OF THE RELATIONSHIP OF AGE TO INTERSTATE GEOGRAPHIC MOBILITY BY TYPE OF INSTITUTION

Age Range	Institution					
	Junior College		Technical Institutes		Vocational Technical School	
	in	out	in	out	in	out
20-22	19	3	18	18	5	4
23-25	14	2	33	43	13	17
26-29	3	3	22	23	13	5
30 over	6	2	10	27	14	10
TOTAL	42	10	83	111	45	36

The analysis of marital status of graduates as related to interstate geographic mobility is given in Table XII. A Chi Square test was run on the data giving a Chi Square value of 2.52 with one degree of freedom. Using the Yates Adjustment, at the .05 level of confidence -- the Chi Square value was not in excess of the .05 level of confidence. It is therefore concluded marital status of technician

graduates has no statistically significant affect when compared to interstate geographic mobility. An analysis of technician's marital status by type of institution indicates that the larger percentages of married graduates employed out of Oklahoma had graduated from technical institutes.

TABLE XII

A CHI SQUARE ANALYSIS OF THE MARITAL STATUS OF TECHNICIAN AS RELATED TO INTERSTATE GEOGRAPHIC MOBILITY*

Marital Status	In-State	Out-of-State	Total
Single	35	24	59
Married	99	109	208
TOTAL	134	133	267*
df = 1 sign. .05 = 3.84		x^2= 2.52	not significant

*not all respondents indicated marital status.

The investigator had planned to use the sex of the graduates as one of the variables to compare with interstate geographic mobility. However, there were only 10 female technician graduates who responded to the questionnaire, and such a comparison was considered of little value.

Technology graduates were asked in item 5 of the questionnaire "Which represents where you have lived most of your life before entering the technology programs?" This question was intended to determine what proportion of the technician graduates are being developed for labor markets of other states, and to give some indication of the rural to urban migration pattern whether in Oklahoma or in some other state.

TABLE XIII

RELATIONSHIP OF MARITAL STATUS OF TECHNICIAN GRADUATES TO INTERSTATE MOBILITY BY TYPE OF INSTITUTION

Marital Status	Junior College		Technical Institute		Voc Tech School	
	in state	out of state	in state	out of state	in state	out of state
single	11	1	16	18	8	5
married	19	8	53	69	27	32

In the analysis of the rural to urban migration of technician graduates a Chi Square test was used and there was found to be a significant difference which indicated a mobility shift of technician graduates from rural communities to urban communities. Data indicating this

relationship is given in Table XIV. The place of residence was designated as rural if the respondent indicated his community of origin as farm ranch, open country, village or small town of less than 10,000 population. The place of residence was classified urban if the respondent indicated his community of origin as a city of 10,000 and over up to including metropolis.

TABLE XIV

A CHI SQUARE ANALYSIS OF THE RELATIONSHIP OF COMMUNITY OF ORIGIN TO COMMUNITY OF OCCUPATION

Residence Classification		Community of origin	Community of occupation	Total
Rural		179	56	235
Urban		148	271	419
	TOTAL	327	327	654
df = 1	sign.	.05 - 3.87	x^2 = 100.5	significant

Data taken from Table XV indicates mobility shift of technicians studied. Fifty four and seven-tenths percent of the graduates indicated their community of origin from population areas of less than 10,000. Respondents to the survey indicated that only 14 percent return to this same

size community. Forty-five percent classified their community of origin as urban, 82.9 percent of the respondents indicated the community of occupation as urban. The data also indicates that of those who left Oklahoma for employment settled in larger communities.

TABLE XV

AN ANALYSIS OF MOBILITY SHIFT OF OKLAHOMA TECHNICAL PROGRAM GRADUATES FROM 1964 THROUGH 1968

Residence Classification	Community of origin	Community of Occupation in state	Community of Occupation out of state
Farm or Ranch	69	5	0
Open Country	25	6	1
Village (under 2500)	39	11	3
Town (2500-9,999)	46	22	8
Small City (10,000-49,999)	79	56	46
Large City (50,000 99,999)	11	7	22
Metropolis (100,000 over	58	62	78
TOTAL	327	169	158

In the analysis of the relationship of the type of institution attended to interstate geographic mobility given in Table XVI indicates a statistically significant difference in relation to out-state migration when compared to type of school attended. A Chi Square analysis indicated $X^2 = 9.33$ with 2 degrees of freedom which is above the .05 level of confidence. It is therefore concluded the variables interstate mobility and type of school attended are independent.

TABLE XVI

FREQUENCY AND PERCENTAGE ANALYSIS OF THE RELATIONSHIP OF TYPE OF INSTITUTION ATTENDED TO INTERSTATE GEOGRAPHIC MOBILITY

Institution	in state		out-of-state	
	number	percent	number	percent
Junior Colleges	44	25.1	12	7.9
Technical Institute	84	48.0	106	69.7
Vocational Technical School	47	26.8	34	22.4
TOTAL	175	99.9*	152	100.0

*discrepancy due to rounding off to nearest tenth percent.

TABLE XVI A

FREQUENCY ANALYSIS OF THE RELATIONSHIP OF TYPE OF INSTITUTION ATTENDED TO INTERSTATE GEOGRAPHIC MOBILITY AND SIZE OF COMMUNITY OF OCCUPATION

Institution	in-state							out-of-state						
	Farm or Ranch	Open Country	Village (under 2,500)	Town (2,500 to 9,999)	Small City (10,000-49,999)	Large City (50,000-99,999)	Metropolis (100,000)	Farm or Ranch	Open Country	Village (under 2,500)	Town (2,500 to 9,999)	Small City (10,000-49,999)	Large City (50,000-99,999)	Metropolis (100,000)
Junior College	2	3	1	3	21	3	5	0	0	1	2	2	1	6
Technical Institute	0	0	4	12	20	4	44	0	1	2	6	29	11	57
Vocational Technical School	3	3	6	7	15	0	13	0	0	1	0	13	8	13

The socioeconomic background of the technician graduates' parents was a variable examined in relation to interstate geographic mobility. Item 3 of the questionnaire asked "Father's or guardian's occupation (be specific)". The technician's parent's socioeconomic status was based upon Duncan's (65 p. 263-275) Socioeconomic Index for Occupations. This index was constructed from the 1950 census

information of which the results is a graduated rating scale that can be used in research requiring a system of stratification.

For purposes of data analysis each occupation was given a socioeconomic index value and an interval scale was developed using the mean and standard deviation of the frequency and range of the occupation index values. Of the 327 respondents, data in Table XVII indicate 50.5 percent of the technician graduate's parents who were in the High groups of 1 and 2 were employed in Oklahoma. The largest group to leave Oklahoma for employment of the high group was 35.7 percent of group 2.

The data given in Table XVIII is a Chi Square analysis of technician graduates parent's socioeconomic status when compared to interstate geographic mobility. A Chi Square of 0.171 was less than the .05 level of confidence indicating no significant difference between the technician graduates parent's socioeconomic background when compared to interstate geographic mobility.

Question 3: Is there a difference in the technician graduates demonstrated academic ability when associated with interstate geographic mobility?

Some institutions did not make available individual grade point average of the technician program graduates to the investigator requiring Items 17 of the questionnaire to be included to obtain this data. Wherever possible, grade point averages were collected and compared

TABLE XVII

FREQUENCY AND PERCENTAGE ANALYSIS OF THE RELATIONSHIP OF SOCIOECONOMIC STATUS OF PARENTS OF TECH GRADUATES TO INTERSTATE GEOGRAPHIC MOBILITY

Parents Socio-economic Status		in-state number	in-state percent	out-of-state number	out-of-state percent
High					
	I	34	20.1	23	14.6
	II	51	30.2	60	38.0
Low					
	III	44	26.0	47	29.7
	IV	40	23.7	28	17.7
	TOTAL	169	100.0	158	100.0

TABLE XVIII

CHI SQUARE ANALYSIS OF THE RELATIONSHIP OF SOCIOECONOMIC STATUS OF PARENTS OF TECHNICIAN GRADUATES TO INTERSTATE GEOGRAPHIC MOBILITY

Socioeconomic Status	in-state	out-of-state	total
High	85	83	168
Low	84	75	159
TOTAL	169	158	327

df 1 sign. .08 = 3.84 X^2 = .171 not significant

with the reported grade point average of the respondent. In every case there was no discrepency between reported and real grade point average. The data given in Table XIX gives an analysis of the relationship of technician graduates grade point average to interstate geographic mobility.

TABLE XIX

FREQUENCY AND PERCENTAGE OF THE RELATIONSHIP OF TECHNICIAN GRADUATES GRADE POINT AVERAGE TO INTERSTATE GEOGRAPHIC MOBILITY

GPA	in-state number	in-state percent	out-of-state number	out-of-state percent
4.0-3.6	16	10.3	17	11.1
3.5-3.1	38	24.5	48	31.4
3.0-2.6	55	35.5	52	34.0
2.5-2.1	37	23.9	30	19.6
2.0-1.5	9	5.8	6	3.9
TOTALS	155	100.0	153	100.0

The data indicates little or no difference between grade point averages of technician program graduates in any particular GPA interval of those who were employed out of Oklahoma, and those who were employed in Oklahoma. The

data in Table XX indicates 57.8 percent of the graduates from the technical institutes left Oklahoma for employment, compared to 25.0 percent of the graduates from the junior colleges and 43.2 percent of the graduates of the vocational technical school.

Question 4: Is there a relationship between the interstate geographic mobility pattern of technician graduates when compared to the field of technology studied?

The Chi Square analysis showing the relationship of interstate geographic mobility is presented in Table XXI. The Chi Square test with 2 degrees of freedom was 12.55 which was larger than the .05 level of confidence. The data indicates a statistically significant difference in the relationship of the field of technology studied to interstate mobility, when compared to type of institution attended by the technician graduates.

In an analysis of Table XXII showing the number of respondents to the study by field of technology studied, the data indicates the technologies that the greater number going out-of-state for employment were: radiation technology, 93 percent; aeronautical technology, 83 percent; fire protection technology, 83 percent; and electronic technology 51.5 percent. Of the technologies included in the study fire, protection technology had the largest groups reporting their community of origin as being from out-of-state. The data found in Table XXIII gives the interstate geographic mobility pattern of technician

TABLE XX

DISTRIBUTION OF TECHNICAL GRADUATES GRADE POINT AVERAGE AND INTERSTATE MOBILITY BY TYPE OF SCHOOL

GPA	Junior College		Tech. Inst.		Voc. Tech.	
	in state	out state	in state	out state	in state	out state
4.0-3.6	1 (3.3)	1 (10.0)	3 (3.8)	9 (8.3)	12 (26.1	7 (20.1)
3.5-3.1	7 (23.3)	4 (40.0)	17 (21.5)	29 (26.9)	14 (30.4)	15 (42.9)
3.0-2.6	8 (26.7)	4 (40.0)	31 (39.2)	38 (35.2)	16 (34.8)	10 (28.6)
2.5-2.1	10 (33.3)	1 (10.0)	25 (31.6)	27 (25.0)	2 (4.3)	2 (5.7)
2.0-1.5	4 (13.3)	0 (0.0)	3 (3.8)	5 (4.6)	2 (4.3)	1 (2.9)
TOTALS	30	10	79	108	46	35

graduates by field of technology, and by type of institution attended. The data indicates that the reason for leaving Oklahoma for employment is more related to the technology studied than to any other single variable.

TABLE XXI

CHI SQUARE ANALYSIS OF THE RELATIONSHIP OF TECHNOLOGY STUDIED TO INTERSTATE GEOGRAPHIC MOBILITY BY TYPE OF SCHOOL ATTENDED

Interstate Mobility	Junior College	Technical Institute	Vocational Technical School	Total
in-state	37	85	47	169
out-of-state	15	107	36	158
TOTAL	52	192	83	327

df = 2 sign. .05 level $x^2 = 12.55$ significant

Question 5: Is there a difference in the interstate geographic mobility pattern of the technician graduates when associated with selected job factors reflecting employment satisfaction?

The respondents to the questionnaire were asked to choose from 26 commonly given reasons for job satisfaction. The technician was to indicate the most important reason

TABLE XXII

FREQUENCY AND PERCENTAGE ANALYSIS OF THE RELATIONSHIP OF TECHNOLOGY STUDIED TO INTERSTATE MOBILITY

Technology	in-state number	in-state percent	out-of-state number	out-of-state percent
Refrigeration and Heating	20	11.8	10	6.3
Radiation	1	00.6	14	8.8
Petroleum	1	00.6	0	0.0
Metals	11	00.6	2	1.2
Mechanical	12	7.1	8	5.0
Instrumentation	1	0.6	0	0.0
Fire Protection	4	2.4	19	12.0
Electronic	48	28.4	51	32.3
Drafting	45	26.6	34	21.5
Data Processing	23	13.6	5	3.1
Construction	5	2.9	3	1.9
Civil and Highway	0	0.0	1	0.6
Civil	0	0.0	1	0.6
Chemical	4	2.4	0	0.0
Aeronautical	2	1.2	10	6.3
Engineering Aide	2	1.2	0	0.0
TOTAL	169	100.0	158	99.6*

*discrepancy due to rounding off to nearest tenth percent

TABLE XXIII

FREQUENCY AND DISTRIBUTION OF INTERSTATE GEOGRAPHIC MOBILITY BY FIELD OF TECHNOLOGY STUDIED BY TYPE OF INSTITUTION ATTENDED

Technology	Junior College N = in	out	Technical Institute N = in	out	Vocational Technical School N = in	out
Refrigeration & Heating	0	0	5	2	15	8
Radiation	0	0	1	14	0	0
Petroleum	0	0	1	0	0	0
Metals	0	0	1	2	0	0
Mechanical	2	1	10	7	0	0
Instrumentation	0	0	1	0	0	0
Fire Protection	0	0	4	19	0	0
Electronic	8	7	30	32	10	12
Drafting	9	2	18	16	18	16
Data Processing	14	4	7	1	2	0
Construction	0	0	5	3	0	0
Civil & Highway	0	1	0	0	0	0
Civil	0	0	0	1	0	0
Chemical	4	0	0	0	0	0
Aeronautical	0	0	2	10	0	0
Engineering Aide	0	0	0	0	2	0
TOTAL	37	15	85	107	47	36

with one (1); the second most important reason with a two (2); and the third most important reason with a three (3). These choices were tallied as to, in-state, out-of-state, employment pattern. Each choice was weighted; a 3 was given for the indicated first choice; a 2 for the second choice; and a one for the third choice. The number of responses were multiplied by their weighted values and a sum obtained for each choice. These sums were ranked and a Mann Whitney U score was computed from these ranks for employed out-of-state respondents and in-state respondent. A value for a z score was then computed and a z score of .504 was obtained. For a two tailed test at the probability level of .05 the value of .58 was larger than the computed z score of .504. It was concluded that there was no significant difference between those who took employment out-of-the-state to those who took employment in-the-state when comparing reasons of employment satisfaction. Table XXIV presents the data and the selected job factors of technician graduate's employment choices. The number listed in the in-state and out-of-state columns are weighted score sums for each factor. Those respondents who took employment in Oklahoma indicated their highest score as "enable me to look forward to a stable and secure future." Those respondents who took employment out-of-state indicated their highest score as "Provides an opportunity to use my special abilities and aptitudes." Each reason was rated as one of the first three choices by each group.

TABLE XXIV

THE RELATION OF SELECTED JOB FACTORS WITH CONCENSUS NUMBERS TO INTERSTATE MOBILITY OF TECHNICIAN GRADUATES

Job Satisfaction	in-state number	in-state concensus	out-of-state number	out-of-state concensus
a. Permit me to be creative and original.	39	6	60	6
b. Enable me to look forward to a stable and secure future.	137	1	113	3
c. Provide an opportunity to use my special abilities and aptitudes.	76	2	144	1
d. Provide a high starting salary.	71	5	118	2
e. Give me a chance to work with little or no supervision.			42	7
f. Enable me to gain a respected position in the community.			6	22.5
g. Give me an opportunity to work with friendly people.			11	14.5
h. Provide an opportunity to continue my education.			61	4.5
i. Provide fringe benefits: paid vacations, insurance, retirement, etc.			61	4.5
j. Provide an opportunity for rapid promotions	21	12	24	9
k. Provide excellent physical working conditions.	31	8	11	14.5
l. Provide for good employer-employee relations.	11	17.5	16	11

TABLE XXIV (continued)

Job Satisfaction		in-state number	in-state concensus	out-of-state number	out-of-state concensus
m.	Provide for rapid salary increases.	8	21	13	12
n.	Be with a company which is better known.	18	13	39	8
o.	Give me an opportunity to be helpful to others.	11	17.5	10	16
p.	Be within short commuting distance.	13	15.5	7	20
q.	Parents live near to where job is located	28	9	7	20
r.	Have friends and relatives near.	26	10	9	17
s.	Spouse wanted to live there.	3	22	6	22.5
t.	Better chance to find some one to marry.	1	24	0	25.5
u.	Like the climate.	9	20	18	10
v.	Like size of community.	14	14	12	13
w.	Greater freedom of behavior	0	25.5	7	20
x.	Can better yourself socially and culturally.	2	23	1	24
y.	Like the general cost of living in the community.	10	19	8	18
z.	Prefer the morality of the community.	0	25.5	0	25.5

The factor ranked third by graduates who were employed in Oklahoma was "provide an opportunity to continue my education". It ranked third by graduates employed in Oklahoma and fourth by the out-of-state group. Neither group rated being close to family and friends as being important, but those going out-of-state rated, "Be with a company which is better known" as seventh in 26 choices.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The problem with which this study was concerned was to determine if Oklahoma during the five year period (1964-1968) continued to lose its trained technical manpower at a significant level among the graduates of the two year post-high school engineering and physical science related technologies. The study was also concerned with identifying the possible effects of selected personal and socio-economic characteristics of these graduates that may tend to cause interstate geographic mobility.

Summary

There has been much speculation and study in recent decades about scientific and technological development of this nation. The impact on the occupational and educational structure of scientific and technical development is constantly evidenced by the business and industrial technique and educational curriculum intended to meet the growing needs and demands of society. The complexity of industrial technique has been responsible for all levels of occupations to be elevated, and in turn has resulted in a shortage of professional and semi-professional manpower.

Many of the educational institutions of Oklahoma are continuing to develop program and curricula intended to produce the needed manpower, and yet the demand is greater than the educational out-put (29). Of the technicians who complete their education in Oklahoma many, because of interstate geographic mobility, are not available to the state's industry upon completion of their program.

An attempt was made in this study to investigate the possible employment pattern of the technician program graduates of eleven Oklahoma schools with implications for the reduction of out-of-state migration of these technicians.

The basic design of the study was ex-post-facto in nature, by which the respondents who secured employment within the state of Oklahoma, and the respondents who secured employment out-of-the-state were compared, utilizing their responses to questions related to selected variables asked in a questionnaire designed for that specific purpose. The number and kinds of educational institutions from which the population of the study was drawn were: Eight junior colleges, two technical institutes, and one vocational technical school. All educational institutions included in the study were in Oklahoma, and have graduated technicians of the physical science and engineering related technologies in the years included in the study. The respondents to the questionnaire included in the survey were 666 technician graduates from a total of 1653 reported

graduates during the years 1964 through 1968. Frequency and percentage analysis, the Chi Square, and other statistical techniques, simple listings and pertinent remarks were used throughout the study.

Limitations

Certain limitations should be kept in mind while interpreting the results of this study. Since this study is based upon an ex-post-facto design, the investigator was unable to control or manipulate the independent variables, nor was he able to randomize the population. Thus, improper interpretation is a major risk undertaken when conducting research of this type.

Due to the lack of control pointed out in the preceding paragraph, a second limitation is the risk of generalizing the findings. Though the study involved a specific type of population -- 1964 through 1968 technician graduates of the associate degree (or its equivalent) programs in Oklahoma's junior colleges, technical institutes, and vocational technical schools who secured full time employment within the United States -- no statistical evidence is available to indicate that this population is typical of any other group of technicians at this time or in the future.

A third limitation has to do with the questionnaire method of collecting data. Regardless of the care in designing and administering a questionnaire, no guarantee

can be given that the respondent's interpretation of the questions asked will be the same as intended by the designer of the questionnaire. There is no absolute assurance that survey respondents will give valid responses. Thus, for an ex-post-facto design to be valid to the reader, he must accept the assumption that the investigator did not select subjects or make use of data that would intentionally bias the results.

Conclusions

Answers to five research questions were sought in this study. In an attempt to provide at least a partial answer to the five questions, data were collected and analyzed from 666 technician program graduates of eleven post-high-school institutions of Oklahoma. This section states each research question and the conclusions based upon the findings.

First Research Question: How many of Oklahoma's recent technician graduates have taken employment out of the state, and of these, how many have since returned?

Summary and Conclusion: The data indicating the interstate mobility pattern of technician graduates tends to support the thesis that Oklahoma is losing some of its technician program graduates from its labor market. Of the technician graduates responding from five years of graduates of eleven educational institutions from almost every part of the state, 49.2 percent did not indicate they

had ever left the state for employment. Of those who had left the state for employment, 3.1 percent have since returned to Oklahoma for employment. Many who had taken employment out-of-state indicated a desire to return if the opportunity existed. (see comments of graduates Appendix D).

Sixty-two and seven tenths percent of those who went out of Oklahoma for employment reported on-the-job duties directly related to technology studied.

The conclusions of the investigator is that Oklahoma is losing about half of the technician program graduates of the physical science and engineering related technologies to other states' labor markets, and that few return for lack of knowledge of employment opportunities available. Of those who take full time employment, more of those who leave the state will work at jobs that directly relate to the technology studied.

Second Research Question: Is there a difference in the technician graduate's personal and socioeconomic background when associated with interstate geographic mobility?

Summary and Conclusion: In the analysis of data relating to age of technician graduate and mobility, little difference was found at any age of those who went out of state for employment and those who stayed in Oklahoma for employment. When comparing type of institution attended to age and interstate mobility, of those who went out of Oklahoma for employment, 70.7 percent were graduates of

technical institutes.

The findings indicate that marital status does not affect interstate geographic mobility of technician graduates at a statistically significant level. Fifty-two percent of married graduates were employed out of state, but when comparing type of school attended, 63 percent of married graduates who were employed out of state were graduates of technical institutes. Ninety-eight and five-tenths percent of the respondents were males, and no comparison for sex and interstate mobility was made.

When comparing community of origin to community of occupation a statistically significant difference did occur. A majority (54.7 percent) of the graduates indicated community of origin as rural, and only 14 percent returned to a similar size community for employment. Of those who went out of Oklahoma for employment the trend was to larger communities. The type of institution from which the technician graduated, had a significant effect on size of community of occupation. Of those going out-of-state for employment in urban places, 69 percent were from technical institutions. The socioeconomic status of the technician graduates' parents does not appear to have any particular influence upon the migration pattern of the technician. There was some indication that original state residence may have had an effect on interstate geographic mobility, but the number of technicians who were from out-of-state was too small to make such a conclusion. About half (50.6

percent) of the technician graduates that were from the higher socioeconomic background stayed in Oklahoma for employment.

Thus, the investigator concludes that the variables age, marital status, and socioeconomic background do not have a statistically significant affect on interstate geographic mobility of technician graduates. However, the community of origin (rural-urban), community of occupation, and type of institution attended did tend to affect interstate geographic mobility among technician graduates.

Third Research Question: Is there a difference in the technician graduate's demonstrated academic ability when associated with interstate geographic mobility?

Summary and Conclusions: The data indicates that little difference exists in the demonstrated academic ability, determined by grade point average, of technician graduates who went out of Okla. for employment. However, when analyzing intervals of grade point average and interstate mobility, the technician who went out of Oklahoma for employment were of the 2.1 to 3.5 GPA and from the technical institutes.

The conclusion of the investigator is that the grade point average variable had no unusual affect upon interstate geographic mobility of technician graduates.

Fourth Research Question: Is there a relationship in the interstate geographic mobility pattern of technical graduates when compared to the field of technology studied?

Summary and Conclusions: The data indicates that

there was a significant difference between the two sub-populations when compared to field of technology studied. A further analysis of individual technologies indicates that four particular technologies had the greatest out-of-state migration. These were: radiation technology with 93 percent of graduates migrating out-of-the-state; aeronautical technology and fire protection technology with 83 percent each of their graduates migrating out-of-the state; and electronics technology with 51.5 percent. The number of electronic technology graduates leaving Oklahoma is so close to the number who stayed, it may be unrealistic to make a valid assumption from this statistic. In the case of the other three technologies there seems to be no labor market for these technologies in Oklahoma.

The investigators concludes that more of the technology graduates identified by technology studied, stay in Oklahoma for employment except in those technologies of radiation, fire protection and aeronautical.

Fifth Research Question: Is there a difference in the interstate geographic mobility pattern of the technician graduates when associated with selected job factors reflecting employment satisfaction?

Summary and Conclusion: To the 26 commonly given reasons for job satisfaction, the respondents indicated no significant difference in their reasons for taking employment out-of-the-state to the group who remained in Oklahoma for employment. Both sub-populations rated a

secure and stable future, and being able to work at the technology studied as one of their first three choices. Both sub-populations rated high the chance to continue their education. Those who took employment out-of-state considered the fame of the company fairly important, and those who stayed in Oklahoma indicated being close to family and friend as being fairly important.

The investigator concludes that the factors which tend to affect job satisfaction didn't necessarily affect interstate geographic mobility.

Recommendations

There have been several variables investigated in this study which have been suggested as affecting interstate geographic mobility of technicians graduating from the various technologies in Oklahoma. Of these variables few tend to have an effect on the mobility of the technicians when analyzed as affecting mobility over a number of years.

Several questions do arise as to the effectiveness of some of the terminal technology programs offered by the several schools in Oklahoma. The attitude of the individual graduate seems to be not necessarily against any state or locality but for job security, and being able to work at his chosen area of interest. The significant mobility shifts in the employed tend to be only in the technologies that do not seem to have adequate employment opportunities in Oklahoma. In the responses received there was not a

feeling of animosity detected toward Oklahoma per se, but a feeling of disappointment when employment opportunities were minimum in their particular area of study.

The major interstate mobility shifts were most noticeable from the technical institutes where graduates were given a better opportunity to select employment from a number of major companies from a variety of states.

It is therefore, recommended that:

1. Institutions providing technical education of the terminal program type should provide more adequate resources for the technician graduates' placement.
2. Employers of technician graduates in Oklahoma should re-evaluate their employment practices to include this level of semi-professional employee into their manpower market, which would include among other practices a closer contact between school and industry.
3. Administrators of educational institutions should encourage their technology staff, through finances and available time, to visit with the several industries of Oklahoma in order that they become better aware of the employment opportunities of Oklahoma, and that Oklahoma industry become better aware of potential labor sources available to them.
4. There should be developed a central system of collecting and disseminating placement and employ-

ment information to be sent to schools, employers and other interested agencies of Oklahoma, to better facilitate the employment needs of both industry and the student.

5. Some form of continuous communication should be developed pertaining to the problems associated with the education and employment needs of Oklahoma industries operating in Oklahoma.
6. There should be further research on "why" technician graduates of Oklahoma's junior colleges tend to continue their education either in another field or other institutions after completing their technical education.

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APPENDICES

APPENDIX A

TYPES OF INSTITUTIONS FROM WHICH STUDY WAS TAKEN

Type	Institutions and location
Junior Colleges	Altus Junior College Altus, Oklahoma Cameron State College Lawton, Oklahoma Connors State College Worner, Oklahoma Eastern Oklahoma State College Willberton, Oklahoma Murray State College Tishimingo, Oklahoma Northeastern Okla. A&M College Miami, Oklahoma Northern Oklahoma College Tonkawa, Oklahoma Sayre Junior College Sayre, Oklahoma
Technical Institutes	Oklahoma State University Technical Institute Oklahoma City, Oklahoma Oklahoma State University Technical Institute Stillwater, Oklahoma
Vocational Technical Schools	Oklahoma State Tech. Okmulgee, Oklahoma

APPENDIX B

The questionnaire was designed to collect data, from the technician program graduates, relative to the personal socioeconomic status, grade point average, and selected job satisfaction data examined in this study. The design of the instrument was based on questionnaire from other studies and included some suggestions from members of my advisory committee.

OKLAHOMA STATE UNIVERSITY • STILLWATER

School of Occupational and Adult Education 74074
Classroom Building 406
372-6211, Ext. 6287

January 6, 1969

Dear Graduate:

Oklahoma is in a period of transition. New industry wishes to come to the state, and the state is interested that this happen. With this impending economic growth, the state's future development will depend on a highly-skilled and well-educated labor force.

To encourage industry to develop in Oklahoma, it is necessary to evaluate the state's labor potential. Many studies are being conducted by the state government, federal government, and the universities of Oklahoma to determine the available labor market. Especially significant will be data relating to post high school technicians of the science and engineering fields of which you are a part.

I am presently conducting a follow-up study of technician program graduates that will provide information for the data bank project being directed by the School of Occupational and Adult Education at the Oklahoma State University. To complete the study we will need information from you that is included in the accompanying questionnaire. Responses to the questionnaire will not be identified with any individual or organization in any published material or report.

Your cooperation will be appreciated and will be mutually helpful in our efforts to assist in the state's industrial development program.

Sincerely,

Eugene G. Sherrell
Graduate Assistant

EGS/jbb

OKLAHOMA STATE UNIVERSITY · STILLWATER

School of Occupational and Adult Education 74074
Industrial Building 104
372-6211, Ext. 7261

The following information is needed to assist in a state-wide study of two year post-high school technician program graduates of the physical science and engineering related fields from Oklahoma.

Please complete only those items that relate to you.
Responses to this questionnaire will not be identified with any individual or organization in any published material or report.

1. Name: _____
Last First Middle Initial
Address: _____
Street or Box Number
_____
City and State Telephone

2. Name and address of a person who will always know where to get in touch with you:

Name: _____
Last First Middle Initial
Address: _____
Street or Box Number
_____
City and State Telephone

3. Father or guardian's occupation (be specific): _____
(If retired or deceased, indicate his life's occupation)

4. If father or guardian's occupation is farming, please check one of the following which best describes his work.

_____ (a) Farm owner and operator
_____ (b) Tenant farmer--owns stock and equipment, not land
_____ (c) Tenant farmer--does not own land, stock or equipment
_____ (d) Farm hand

5. Which represents where you lived most of your life before entering the technical program? (check one)

_____ (a) On a farm or ranch
_____ (b) In open country (small acerage)
_____ (c) Town under 2,500 population
_____ (d) Town, 2,500-9,999
_____ (e) City, 10,000-49,999
_____ (f) City, 50,000-99,999
_____ (g) City, 100,000 & over

Please give city and state _____

6. If answer to question 5 is (a) or (b), please indicate approximate number of miles from nearest postal city or town. _____

7. Which represents where you lived just before entering technician program? (if different from above)

_____ (a) On a farm or ranch
_____ (b) In open country (small acreage)
_____ (c) Town under 2,500 population
_____ (d) Town, 2,500-9,999
_____ (e) City, 10,000-49,999
_____ (f) City, 50,000-99,999
_____ (g) City, 100,000 & over

Please give city and state _____

8. If answer to question 7 is (a) or (b) please indicate approximate number of miles from nearest postal city or town. _____

9. Which represents where you now live? (if different from above)

_____ (a) On a farm or ranch
_____ (b) In open country (small acreage)
_____ (c) Town under 2,500 population
_____ (d) Town, 2,500-9,999
_____ (e) City, 10,000-49,999
_____ (f) City, 50,000-99,999
_____ (g) City, 100,000 & over

Please give city and state _____

10. If answer to question 9 is (a) or (b), please indicate approximate number of miles from nearest postal city or town. _____

11. Date of Birth __/__/__, Date of Marriage 19___, No. of Children _____

12. Education and Work Experience (What you did - major part of year)

Year	School and Organization	City	State
1963			
1964			
1965			
1966			
1967			
1968			

(use back of page if needed)

13. Field of technology in which you prepared: _____

14. Which most nearly represents your present work as related to your technology training. (please check one)

(a) _____closely related, (b) _____partly related, (c) _____not related

15. If answer is (c) please identify present occupational duties.

_____

(use back of page if needed)

16. What will be/was your actual monthly starting salary immediately after graduation? _____

17. Which represents your overall college grade point average. (check one)

    4.0 to 3.6 _____, 3.5 to 3.1 _____, 3.0 to 2.6 _____,

    2.5 to 2.1 _____, 2.0 to 1.5 _____.

18. List pay increase (s) you received each year since completing technician training. _____

    _____

19. Below are listed from (a) to (z) some of the most common reasons given by employees for taking a job. Please place (1) by the one item that best describes the reason which most influenced you in taking your first employment just after completing technician program, (2) by the one item of second in importance and (3) by the one item of third importance. List other reasons if these do not apply.

    a. Permit me to be creative and original.
    b. Enable me to look forward to a stable and secure future.
    c. Provide an opportunity to use my special abilities and aptitudes.
    d. Provide a high starting salary.
    e. Give me a chance to work with little or no supervision.

    f. Enable me to gain a respected position in the community.
    g. Give me an opportunity to work with friendly people.
    h. Provide an opportunity to continue my education.
    i. Provide fringe benefits: paid vacations, insurance, retirement, etc.
    j. Provide an opportunity for rapid promotions.

    k. Provide excellent physical working conditions.
    l. Provide for good employer-employee relations.
    m. Provide for rapid salary increases.
    n. Be with a company which is better known.
    o. Give me an opportunity to be helpful to others.

    p. Be within short commuting distance.
    q. Parents live near to where job is located.
    r. Have friends and relatives near.
    s. Spouse wanted to live there.
    t. Better chance to find some one to marry.

    u. Like the climate.
    v. Like size of community.
    w. Greater freedom of behavior.
    x. Can better yourself socially and culturally.
    y. Like the general cost of living in the community.
    z. Prefer the morality of the community.

    1. _____
    2. _____
    3. _____

APPENDIX C

DISTRIBUTION OF TECHNICIAN GRADUATES BY STATE

TABLE XXV

FREQUENCY AND PERCENTAGE ANALYSIS OF DISTRIBUTION OF TECHNICIAN GRADUATES WHO SECURED FULL TIME EMPLOYMENT BY STATE

State	Number	Percent
Alaska	1	0.003
Arizona	2	0.006
Arkansas	2	0.006
California	13	0.040
Connecticut	2	0.006
Georgia	1	0.003
Hawaii	1	0.003
Idaho	2	0.006
Illinois	5	0.015
Iowa	6	0.018
Kansas	15	0.046
Louisiana	4	0.012
Maryland	1	0.003
Massachusetts	1	0.003
Michigan	1	0.003
Missouri	13	0.040
Nevada	3	0.009
New Jersey	1	0.003
New Mexico	9	0.028
New York	1	0.003
North Carolina	1	0.003
Ohio	2	0.006
Oklahoma	169	0.523
Oregon	2	0.006
Pennsylvania	3	0.009
South Carolina	2	0.006
Tennessee	1	0.003
Texas	48	0.147
Virginia	5	0.015
Washington	3	0.019
Wisconsin	5	0.015
	327	0.998*

*Discrepencies due to rounding off to the nearest tenth percent.

APPENDIX D

STATEMENTS FROM RESPONDENTS

TABLE XXVI

IDENTIFICATION OF SELECTED ATTITUDE STATEMENTS RELATED TO OKLAHOMA IN GENERAL BY LETTER

Item	Selected Attitude Statements
1	Unable to find a job, even in Tulsa. I have looked eighty different places.
2	I have found that a person is more valuable in his field if he has mechanical training.
3	Oklahoma's industry - or lack of it - is forcing qualified people to leave the State.
4	If Oklahoma could match the conditions found elsewhere I would return.
5	I would like to teach, but the money, fringe benefits and retirement do not compare to industry.
6	My feelings are different now than two years ago. I would move back to Oklahoma if jobs were available.
7	The Technical Institute would be a much better program if the University would advertise it. Many companies had never heard of the Technical Institute at Stillwater. The courses are good and graduate technicians could get much better-paying jobs if more large companies knew about the Technical School.
8	Oklahoma should recognize the need for keeping technical people who are state educated. My son was not offered a position in Oklahoma that even closely equalled the opportunities offered by out-of-state industry.

TABLE XXVI (continued)

Item	Selected Attitude Statements
9	Fire departments in general have not adapted themselves to the acceptance of college graduates.
10	Published information indicates that the technician will fill the gap between the skilled tradesman and the engineer. There is not a gap between these two professions. There is a chasm which can neither be filled nor escaped.
11	There is a need for the technician, but there is no room for advancement out of technician ranks into the more highly skilled technical areas or the lower-skilled areas of engineering. Technical education is only valuable to one who is not concerned about the future and complacent in his work.

VITA

Eugene G. Sherrell

Candidate for the Degree of

Doctor of Education

Thesis: FACTORS AFFECTING INTERSTATE MOBILITY OF TECHNICIANS GRADUATING FROM OKLAHOMA SCHOOLS

Major Field: Higher Education

Biographical:

Personal Data: Born in Barnsdall, Oklahoma, November 18, 1924, the son of Mr. and Mrs. James A. Sherrell.

Education: Graduated from Senior High School, Springfield, Missouri, in May 1943; received Bachelor of Science degree from the University of Missouri in 1953, with a Major in Industrial Education, received the Master of Education degree from the University of Missouri in 1961, with a major in Industrial Education; completed requirements for the Doctor of Education degree at Oklahoma State University in August, 1969.

Professional Experience: High School Industrial Arts teacher, Rolla, Missouri, 1953-1955; instructor, Department of Industrial Education, Southwest Missouri State College, Springfield, Missouri, 1965-1967; Graduate Teaching Assistant, Department of Adult and Occupational Education, 1967-68; Assistant Professor Southwest Missouri State College, 1969.