

A COMPARISON OF THE CAREER SUCCESS OF THE  
GRADUATE AND THE NON-GRADUATE OF  
AUTOMOTIVE TECHNOLOGY AT  
MISSOURI SOUTHERN  
STATE COLLEGE

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## CHAPTER I

### INTRODUCTION

#### The Problem

Every educational program should be evaluated periodically to see if it is meeting the needs of the students and the community. In technical education, one method of evaluation used is a "follow-up" study of students who have graduated from the program. Information gained from such a study can be used to evaluate the course offerings of the institution. Moreover, the starting and present salaries and the types of positions that graduates hold show the success and value of the program.

In addition, some colleges have had 50 percent or more of the students "drop out" after they have completed the technical training course, but before they have completed the requirements for an Associate Degree. These students may become employed in the field for which they have received training. Normally, researchers have not included these students in the "follow-up" studies. Therefore, a study gathering and analyzing occupational information from this large group of students would provide a better understanding of the needs and successes of technical programs. It might also prove interesting to compare the college entrance test scores of this group of students to the scores of those students completing the Associate Degree to determine if this examination



could be used to identify students most likely to "drop out" prior to completion of a degree.

In 1966, Missouri Southern State College at Joplin, Missouri, began a program of training in Automotive Technology. The yearly enrollment in this program varied from 18 to 25 students. Therefore, between 30 and 40 persons were involved in technical training each year. Each semester there were approximately 15 second-year students, but no more than six usually graduated. The remainder of the second-year students either quit school and went to work in a job related to their college training or opted for another career area. This group, which each year does not complete the Associate Degree, is of interest to the Automotive Technology faculty. The major concern of the faculty was the career success of those students who "dropped out" before completing the Associate Degree.

Every other year, since 1970, the Dean of Semi-Professional and Technical Education at Missouri Southern State College has conducted a "follow-up" study of the students who had completed the Associate Degree in the past two-year period in Automotive Technology and the other 12 technical programs offered by the institution. While these surveys have proven useful, they did not include those students who took technical courses and did not graduate. College officials assumed that this group left the institution to find employment in the field for which they were trained or in a related one. This group has been large. Useful data can be gleaned from surveying the careers of these students. These data then can be compared to data gathered from the students who graduate from the program. This information can be used to help design program changes beneficial both to students and the college.

### The Purpose

The purpose of this research is to compare the careers of the graduates and the non-graduates of the Automotive Technology program at Missouri Southern State College by studying beginning and present salaries and the individual's level of employment.

### The Research Hypotheses

The major hypothesis of this study is that the student who earns the Associate Degree in Automotive Technology in a technical program at Missouri Southern State College will be more successful in his career than the non-graduate. More specifically, this research will prove or disprove the following null hypotheses:

1. There will be no significant difference in the beginning and current salaries of the graduate and the "drop-out."
2. There will be no significant difference in the number of graduates in management positions when compared to the non-graduate.
3. There is no significant difference in the college entrance test scores of the graduate and the non-graduate.

### Assumptions

For the purpose of this study, the investigator has made the following assumptions:

1. The former students used in this study are representative of future enrollees.
2. The information provided by the former students is accurate in terms of position and beginning and present salary.

3. The evaluation of the Automotive Technology curriculum by former students is not biased.

4. The students' college entrance test scores are actual representations of their ability to succeed in college.

#### Scope and Limitations

This study will include all students who completed the Associate Degree between June, 1968, and June, 1977. In addition, those students who completed 48 hours of automotive technical classes, but "dropped out" before completing the Associate Degree requirements, will be included to provide the sample for the "drop outs."

There are several limitations inherent with the use of a questionnaire to gather data from former students. One major limitation is that the investigator can seldom locate 100 percent of the former students. Many of these former students and their families have moved from the area and left no forwarding addresses. Second, there is usually less than 100 percent response from the students who do receive the questionnaire.

A third limitation of the study is that the determination of the status or the occupational position of the former student's job will be made by the investigator. Because of differences in the names of the positions, the investigator may place the former student in the incorrect "management" or "labor" group. This could affect the results of that portion of the study which compares the graduates and "drop outs" in relation to their advancement to management positions.

Another limitation of this study is the former students' ability to place a value on each course taken in the Automotive Technology and

General Education curriculums. Some of the students may enter a course with previous knowledge and skills, and may be unable to determine that portion of skills and knowledge gained during the class. Many students may not be in a position at this time where the skills and knowledge acquired during a course would be applied in his occupation. Therefore, the student's perceived value of a course may not be a true indication of the contribution of that course to his career success.

Finally, the college entrance test scores, provided by the Guidance and Counseling Service at Missouri Southern, may not be complete. If the student was unable to take the test during a regular testing session, he was required to complete only the mathematics and verbal sections. These students would not have a complete score to be used in the comparison of the graduate and the "drop out." Therefore, this student's score would have to be discarded and would not be included in the study.

#### Definition of Terms

1. Missouri Southern State College: In 1966, the Missouri State Legislature authorized the formation of a unique institution of higher education at Joplin, Missouri. This legislation provided for dual financing of a four-year college in Joplin. Thus, Missouri Southern State Senior College, supported by state funds, and Missouri Southern State Junior College, supported by local tax funds, were established. (The Junior College existed as a county-supported unit prior to this change.) In June, 1977, the State of Missouri assumed total responsibility for the funding of this institution. In this study, the Missouri Southern State College will refer to the total institution.

2. "Drop out": A "drop out" is a student who had completed the required 48 hours of technical training in Automotive Technology, but left the institution before completing the requirements for the Associate Degree.

3. Management position: Management position refers to the supervisory positions which former students held. These positions require that an employee direct the activities of others. The person employed in this capacity would use technical knowledge in the performance of his job and would not normally perform manipulative tasks.

4. Labor position: Labor position refers to those positions of less than supervisory level. Persons employed at this level would apply technical knowledge and manipulative skills in the performance of their tasks.

5. American College Testing Program (ACT): This test battery is part of the entrance requirements for Missouri Southern State College. The composite, math, and verbal scores were gathered from data obtained from the Guidance and Counseling Office of the Student Personnel Services at the college.

6. Missouri College Testing Program (MCTP): This test battery was part of the entrance requirement for this college until 1974. It consisted of a verbal and a mathematics test. The scores were reported in terms of Verbal Skills, Mathematics Skills, and a Composite Score. These scores were gathered from data obtained from the Guidance and Counseling Office of the Student Personnel Services at the college.

7. School and College Ability Test (SCAT): This was the test battery part of the entrance requirements from 1974 until the ACT became the required test at Missouri Southern. The mathematics, verbal, and

composite scores for students during the period when this test was required were supplied by the Guidance and Counseling Office at Missouri Southern State College.

8. "T scores": "T scores" are a statistical process used to convert scores on several test instruments to "standard" or equivalent scores. This process was used to convert the students' scores on the MCPT, SCAT, and ACT scores to common scores. "T scores" have a mean of 50 and a standard deviation of 10. It should be noted that these "T scores" are based on the national norms for the college bound high school graduate. These norms are within one point of being correct for the student population at Missouri Southern State College, according to Dr. Gene Mouser, Director of the Office of Guidance and Counseling.

## CHAPTER II

### REVIEW OF LITERATURE

#### Introduction

When conducting a dissertation research project involving a survey, it is always useful to review similar studies which scholars have reported in professional journals and monographs. Accordingly, the relevant literature for this study includes information about the scope of technical education, a comparison of curriculum for Automotive Technology, and a review of similar studies conducted by other institutions and State Departments of Education.

#### Scope of Technical Education

When one searches the reference materials on technical education, he will quickly learn that several differences of opinion exist on the definition of a technician and the educational requirements of technical training. This section of the review of literature will include several definitions of technicians and will contain information about some of the different levels at which technicians operate and the educational levels required to perform these tasks.

#### What is a Technician

The Dictionary of Occupational Titles (33) defines a technician as one who works in direct support of engineers and scientists. A

technician also uses theoretical knowledge of sciences, mathematics, and engineering to design, solve problems, test and modify machines (33). Another encyclopedia defines a technician as one who is able to follow technical procedures and operate and repair complex machines (41). Yet another reference source defines a technician as one who spends 50 percent or more of his time in the use of technical skills, rather than manual skills.

There is no question that a technician is a person who has been trained to use mathematical and scientific knowledge and manipulative skills to solve problems, including diagnosis and repair of machinery. He also assists the professional in the discharge of his duties.

#### Technical Education

Defining technical education would not be practical because of the variety of occupational clusters and levels at which technicians are employed. All technical training is offered at the post-high school level. Technical training requires an understanding of mathematics and sciences and their application to the problems of the particular field of study. Beyond this point, each of the fields of study varies.

One method of defining technical education would be to give some information on the level at which the technician operates. The oldest recognized group of technicians is that of the engineering technicians. This is an occupational group which is based on the understanding and use of scientific and engineering principles and mathematics to solve problems; also, design or modify machines or processes. These persons assist the engineers and work at a level below them, but are on a level above the skilled craftsman. Technical education required for this type of



task is similar to that of the engineer, but with more emphasis on manipulative skills. In many other areas, there are technicians operating at different levels. These persons might assist the professional or provide necessary services which require considerably more skills in the manipulative area, but more technical knowledge than needed by the skilled craftsman. A technician might be required to diagnose and analyze problems, understand processes and procedures, or use applied graphic skills.

A technician of this type operates in a variety of fields. Such technicians are found in manufacturing, agriculture, health-related occupations, maintenance and service, sales engineering, and data processing. Each of these occupations would require the person to have some technical expertise, and the technical or scientific knowledge to operate at this level.

### Conclusion

When one defines the duties of a technician, he quickly learns that this is an extremely difficult task because of the variety of occupations concerned. It is difficult to define the amount and type of technical education needed for each program. Several things apparently are common to all technical education fields and training. Such technical preparation occurs beyond the high school level and normally requires some background in science and mathematics. It also usually demands some of the manual abilities of the skilled craftsman.

### Comparison of Curriculum

The primary purpose of this section of the review of literature is to determine if the Automotive Technology programs leading to the

Associate of Science Degree meets the standards for technician training mentioned in TECED 5223, Curriculum Development in Technical Education at Oklahoma State University. Moreover, a secondary purpose of this paper is to determine the total number of hours required for the Associate Degree and to ascertain which classes are required in the mathematics and science component of the training used by other institutions offering this degree. It is possible that this information could be used to reduce the number of required hours in the curriculum in such programs as that of Missouri Southern State College.

The authors of technical education programs reviewed tend to agree concerning basic course guidelines and on the areas of concentration for technical programs. These individuals also believe that the student should take approximately 62 hours in his Associate Degree program. To complete the degree program in two years, a student has to take a class load of about 15 hours per semester. This 15-hour class load causes the student to be in class about 25 hours per week. Four or five separate classes are taken in any one semester. There are some exceptions to this practice, however, for some programs in the health related areas require 80 hours before a degree is awarded (29).

Four general course categories are technical speciality, related technical, mathematics and science, and general education. The percentage of the curriculum devoted to each of the areas varies from program to program. The technical courses would be the courses in the student's major area of concentration which teach the skills, knowledge techniques, procedures, and operations required for employment in the field. Normally, the technical programs are so designed as to place the student in technical courses 35 to 49 percent of the time. The related technical

classes provide additional background which is helpful in the technical field, but not always essential for employment. These classes and additional training could affect advancement in the future. In these standard programs, 7 to 10 percent of the time is devoted to related technical materials. As the technician must deal with mathematics and scientific principles, part of the program is normally spent developing skills in these areas. Mathematics courses through calculus are recommended in most technical programs. Therefore, the student will spend 9 to 13 percent of his time studying mathematics. Also, as a firm understanding of the scientific principles in the areas of physics, chemistry, mathematics, and thermodynamics is always helpful, the student might spend from 9 to 31 percent of his program studying these subjects. The remaining 11 to 15 percent of his courses would be in the area of general education. These are a series of courses designed to help the student to develop skills in communications, economics, and citizenship. Moreover, these courses should give the student an appreciation of his cultural background (29).

#### The Automotive Program at Missouri

##### Southern State College

A program leading to the Associate of Science degree in Automotive Technology was established in 1966 at Missouri Southern State College. The major purpose of the program was to train "service technicians" for the local automotive service industry. Some authors refer to such a trained person as a skilled craftsman, but for the purpose of this paper a craftsman who can use diagnostic equipment to make decisions and solve problems and then make the necessary repairs and adjustments is operating

TABLE I  
 AUTOMOTIVE TECHNOLOGY CURRICULUM AT MISSOURI SOUTHERN  
 STATE COLLEGE

	Credit	Lecture	Lab
<u>First Semester:</u>			
Automotive Engines	7	3	12
Intermediate Algebra	3	3	
English Composition	3	3	
Fundamentals of Physical Science	5	3	2
Freshman Orientation	<u>1</u>	<u>1</u>	
TOTALS	19	13	14
<u>Second Semester:</u>			
Automotive Electrical and Emission Control	7	3	12
Technical Mathematics	3	3	
Introductory Drafting	3	1	4
General Psychology	3	3	
Speech Techniques	<u>3</u>	<u>3</u>	
TOTALS	19	13	16
<u>Third Semester:</u>			
Automotive Chassis, Brakes, and Transmission	7	3	12
Automotive Air Conditioning and Power Accessories	4	3	3
Technical Science	4	3	3
Automotive Business Management	3	3	
Personal Health	<u>2</u>	<u>2</u>	
TOTALS	20	14	18
<u>Fourth Semester:</u>			
Automotive Body and Paint (First Nine Weeks)	7	5	20
Automotive Service Management (Second Nine Weeks)	7	5	20
United States History	3	3	
Fine Arts Elective	<u>3</u>	<u>3</u>	
TOTALS	20	11	20

Source: Missouri Southern State College Catalog 1977-1978 (21).

as a technician. It was the feeling of the advisory committee, which is comprised of area employers and persons employed in the trade area, that a considerable period of time should be devoted to the development of skills in the laboratory or shop facility. Therefore, the classes in the major field require the student to spend a large amount of time in the development of the required proficiency in the trade area.

During the first semester, the student should complete 19 semester hours. This would require the student to spend 27 hours on the campus each week. The Automotive Engines course is the first class in the technical speciality. It consists of the theoretical knowledge of all prime movers and the practical repair and service techniques required by industry. The student will be given seven hours credit for this class and will spend three hours in lecture and 12 hours in the laboratory per week. In the area of mathematics and science, he will take Physical Science and a beginning Algebra class. The Physical Science course includes basic chemistry and physics principles as they affect the operation of the mechanisms and machines. In the general education area, the student will take English Composition and a campus orientation course which explains all the services and facilities available to the student.

In the second semester, the student will spend 29 hours in class each week to complete 19 semester hours. The technical speciality course is Automotive Electrical and Emission Control. This course contains information on the electrical components, fuel system, lubrication needs, and emission control systems found on later model motor vehicles. This class has three one-hour lecture periods which are used to cover the theoretical operation of these units and 12 hours of laboratory devoted to the diagnosis and repair of these units. Technical Mathematics is a related

mathematics course which develops the use of mathematics to solve problems related to machinery and the motor vehicle. In this course, the student studies math up to and including trigonometry. A related drafting class is recommended at this time to help the student to understand shop drawings, diagrams, and cut-away pictures of the components. In addition, the student should take the speech techniques or public speaking class to increase his ability in oral communications, and a psychology class so that he can understand his reactions, and increase his abilities to work with others.

During the student's third semester, more than half the classes taken are in his technical speciality. The Air Conditioning and Power Accessories class covers the operation and service of these components in three one-hour lectures and three hours of laboratory. Automotive Chassis, Brakes and Transmission is another of the seven-credit-hour blocks in the student's technical speciality. A related technical science class also is taken at this time. This course relates the physical and chemical principles learned in Physical Science to the motor vehicle. The laboratory period, two hours per week, is devoted to proving the principles on the actual components. Automotive Business Management is a basic class in bookkeeping as required for operating a small business. This class includes inventory control and supervision based on the need of the automotive service industry. The personal health or physical activity is taken at this time as part of the general education requirements. During this semester, the course load is 20 semester hours or 32 contact hours.

During the student's final semester, he will take two seven-hour classes in the technical speciality area. Each of these classes will

meet for one hour of lecture daily and 20 hours of laboratory per week. These classes will last eight weeks. The first eight weeks will be spent in Auto Body and Painting developing a knowledge of repair processes and refinishing so that the student will be able to judge the quality of a repair, if and when he is in a management position. The Automotive Servicing course will meet the second eight weeks and the lectures will cover management, shop layout and design, and industrial safety. The laboratory period will be used by the student to develop his skills in the shop in a "real-life" situation. A history and fine arts class will be taken to complete the student's general education requirements. The student earned 20 credit hours during the semester and spent 31 hours in class each week.

As compared to the model curriculum discussed at the beginning of this section, the program at Missouri Southern State College was similar to the guidelines in most sections of the curriculum, except in terms of credit and contact hours required each semester. The program consists of 78 semester hours. Six hours (7.6 percent) are devoted to related technical classes. The technical speciality is 39 semester hours. This constitutes 50 percent of the student's program. The general education requirement consists of 26 percent (18 credit hours) of the program requirements. The Mathematic-Science Component of the curriculum is 15 semester hours (19.4 percent). The science component is nine hours (11.5 percent) and the mathematics component is six hours (8.0 percent).

#### Study of Other Curriculums

In the study of curriculum, the author examined the offerings in Automotive Technology at 16 colleges. Five of the institutions were

in Missouri, four were located in Kansas, and two were in Oklahoma. The five remaining schools were scattered around the nation; but as their curriculums were similar to those examined in the adjacent states, they will only be mentioned in the text and not shown in Tables II and III. The curriculum will be examined in terms of the four course areas of related technical, technical speciality, general education, and mathematics and science.

The first area to be examined is the Technical Speciality. These are the classes in the automotive speciality. The normal percentage of the total classes devoted to the repair, diagnosis, and service of the automobile was between 35 and 45 percent. Only in two cases were 30 percent or less of the courses in this area of technical speciality. These programs were offered by the Central Missouri State University and Kansas State University of Pittsburg. Forest Park, in St. Louis, and Missouri Western State College devoted 50 to 60 percent of their curriculum to automotive courses. One of the unusual features of some of the programs examined was the amount of time that was devoted to the laboratory for the development of skills. Allegany Community College of Cumberland, Maryland, had course descriptions stating that the student would have no laboratories, but instead would have three hours of demonstrations per week (1). Many schools broke the classes into three or four credit hour blocks, with the lecture on a one-to-one credit hour basis, while the laboratory required two hours of time for each hour of credit. Northeastern Oklahoma A & M College does not require its automotive students in the degree program to take a class covering major engine overhaul or service to the block and components (25). Central Missouri State University offers 18 hours in the automotive area, and



TABLE II  
THE NUMBER OF CREDIT HOURS DEVOTED TO EACH CURRICULUM AREA\*

	Technical Speciality	Related Technical	Mathematics Science	General Education	Total
Barton County Community College	28	6	3	27	64
Butler County Community College	15	6	11	31	63
Central Missouri State University	18	20	6	18	62
Crowder College	38	6	3	18	65
Northeastern Oklahoma A&M College	24	16	10	17	67
Forest Park Community College	39	3	7	17	66
Jefferson College	32	0	6	25	63
Kansas City, Kansas Community College	28	6	8	18	60
Kansas State Uni- versity of Pittsburg	19	12	8	24	63
Missouri Southern State College	39	6	15	18	78
Missouri Western State College	31	12	3	14	60

\*Compiled from the catalogs of the listed institutions (2) (4) (5) (7) (12) (17) (19) (20) (21) (22) (25).

TABLE III  
THE PERCENTAGE OF THE CURRICULUM DEVOTED TO EACH AREA\*

	Technical Speciality	Related Technical	Mathematics Science	General Education
Barton County Community College	44	9	5	23
Butler County Community College	24	9	18	49
Central Missouri State University	30	33	7	30
Crowder College	58	9	5	28
Northeastern Oklahoma A&M College	36	24	15	25
Forest Park Community College	59	5	10	26
Jefferson College	51	0	9	40
Kansas City, Kansas Community College	47	10	13	30
Kansas State Uni- versity of Pittsburg	30	19	13	30
Missouri Southern State College	50	7.6	19.4	23
Missouri Western State College	52	20	5	23

\*Compiled from the catalogs of the listed institutions (2) (4) (5) (7) (12) (17) (19) (20) (21) (22) (25).

three of these hours are in small engine repair (single cylinder engines similar to those found on lawn mowers). Also, this institution requires a related class in Jet Aircraft Engines (5). Kansas City Community College, in Kansas City, Missouri, uses the Area Vocational-Technical School for its training facility. The classes in the automotive area are offered during the first year and summer. This leaves only the general education requirements to be taken during the second year (19). Butler County Community College, in El Dorado, Kansas, has classes in theory in the technical speciality. These classes are listed as lecture only. During the second and fourth semesters, the student takes a five-hour laboratory to gain the skills required of the technician (4). Barton County Community College, at Great Bend, Kansas, has no laboratory for the Engines or the Automotive Fundamentals classes taken during the first semester (2).

The related technical classes are designed to be supportive of the technical area being studied by the student. The hours in this area ranged from 20 hours or 33 percent at Central Missouri State University to zero at Jefferson Community College at Hillsboro, Missouri. The norm seemed to be between 15 and 20 percent. The normal areas covered were graphics communications or drafting, welding, machine shop, and applied electronics. The most unusual related technical course in curricula examined was offered at Central Missouri State University in Furniture Refinishing and Upholstery (5). Forest Park offered only a three-hour related course in the form of a class in manufacturing processes (12). It appeared that most of the institutions required the student to enroll in related technical courses which would help him to succeed in the chosen occupational field.

The mathematics-science component in the different programs motivated this author to examine this aspect of the various programs. The normal offering in the science area was a beginning physics for science majors or the general education physics course. Crowder College at Neosho, Missouri, Barton County Community College at Great Bend, Kansas, and Missouri Western State College of St. Joseph, Missouri, had no science courses required of their students. The normal mathematics requirement was algebra, but Crowder College uses a business mathematics class that the business department teaches (7). Jefferson Community College and Northeastern Oklahoma A & M College have technical oriented mathematics classes offered to the students.

In general education requirements, several items of interest were noted. The normal amount of hours required was 14 to 18 or about 25 percent in this area of curriculum. However, some differed greatly for Butler County Community College's program was 50 percent general education classes. Kansas State University of Pittsburg and Jefferson Community College required that 40 percent of the student's classes be in this curriculum area.

### Conclusions

The primary purpose of this portion of the review of literature was to determine if the automotive technology programs which lead to the Associate Degree met the standards of technical education as outlined in TECED 5223, Curriculum Development in Technical Education, at Oklahoma State University. All of the programs, except that of Missouri Southern State College, required 62 to 66 hours. In the area of technical speciality, eight of the schools in Kansas, Missouri, and Oklahoma

required enough hours (35 to 49 percent of the curriculum) in the field. After closely examining many programs, most courses required the student to spend four to six hours per week in the laboratory; while in the existing program at Missouri Southern State College, the student spends 12 hours or more per week in the laboratory developing skills in the technical speciality. The related technical courses, in most schools, were relevant for the student and his area of specialization. Several schools, including Central Missouri State University and Northeastern Oklahoma A & M College, have concentrated much of their curriculum on related technical courses. The mathematics and science component was less than suggested in the model in all the schools except Missouri Southern State College. In most schools, the science requirement was the general education physical science class. The mathematics required was normally the beginning algebra course. The general education curriculum was varied in terms of the number of hours required. This was due largely to institution and state policy. The general education requirement ranged from 31 hours at Butler County Community College in Kansas (4), to as few as 17 hours at Forest Park in St. Louis (12).

Most of the colleges examined required some sort of mathematics and science courses. Only Crowder, Missouri Western, and Forest Park required a single mathematics class. Missouri Southern State College was the only institution requiring a second related mathematics course. The science requirement, in most schools, was the beginning physical science class. Again, this course was a general education course and was not related to the automobile. Missouri Southern State College requires an additional science class, Technical Science, which concentrates on the practical application of scientific principles to the motor vehicle.

Generally, most of the institutions required fewer hours of mathematics and science when compared to the guidelines given in TECED 5223, Curriculum Development in Technical Education.

#### Review of Related Research Studies

A review of similar research studies indicated that two studies existed which provided "follow-up" information on those students who "dropped out" prior to the completion of their technical training." In a study conducted by Somers, Sharp, and Wyint (30), called "The Effectiveness of Vocational and Technical Programs, a National Follow-Up Survey--Final Report," those students who "dropped out" were surveyed to determine the effect their action had on their career success. The authors concluded that there was no difference in the wages received by the non-graduate and the graduate in their first position but, as time went by, the graduate tended to receive larger salary increases than the non-graduate. One other interesting fact revealed was that students in distributive, trade and industrial, and agriculture programs tended to rate the required academic classes much lower when compared to students in other occupational training programs (30). The Minnesota State Department of Education has conducted an extensive data collection program on all students who are enrolled in the area vocational-technical schools. This data was used to predict trends in the enrollments in the AVTS. The student completed a biographical data form as he began a program. When the student terminated training, for any reason, he had to fill out a termination report. One year after graduation, a "follow-up" questionnaire was sent to the former students. This form contained a section which was filled out by his employer and returned. The data in

this report covered the period from 1970 to 1974. The reasons listed for termination of a program were graduation (61 to 73 percent), withdrawal (15 to 30 percent), or receiving a training certificate (5 to 8 percent). The reasons given by those students who withdrew prior to the completion of training were that they transferred to another educational institution (4.5 to 6.5 percent), economic reasons (19.9 to 25.3 percent), personal reasons (17.7 to 23.7 percent), and failure in the courses (34.4 to 37.4 percent). Both of these studies indicated that those students who "dropped out" prior to the completion of their training programs tended to seek employment in the area for which they received training. And, in some cases, the "drop outs" completed their training after being employed in the occupation for which they were trained.

These two studies and the other related studies which were examined by this researcher used the questionnaire method to gather data from the former students. In each of the efforts, the researcher mailed a cover letter, a copy of the questionnaire, and a stamped, self-addressed envelope to the persons in the sample. Two weeks later, the researcher mailed a post card reminder to the non-respondents. About four weeks after the original mailing, a second cover letter and a second copy of the questionnaire and a stamped, self-addressed envelope were sent to persons who had not responded. All of the studies, except two, were concerned with those students who had completed their training. According to the studies examined, the majority of the students accepted employment in the occupation for which they were trained. Those students who were unable to find employment in the field for which they were trained, or in a related area for their first employment, seemed to move to that area when seeking later employment. The health occupations and

trade and industrial education areas demonstrated the highest percentages of first position placement in the area of training, while agriculture programs had the lowest percentage of students placed in the field for which training was received. These students reported that they felt that they were able to obtain their first position due to the training received. The majority of the students (70 to 90 percent) were satisfied with the training that they received and would be willing to repeat their training if they had it to do again. In those surveys where the employers of former students were asked about the skills the student had brought to the job, it was learned that these students had been well-trained and most of the responding employers were willing to hire future graduates of the training programs.

After reviewing the literature available, one might conclude that it is necessary to survey those students who have completed the Associate Degree and those students who "dropped out" prior to graduation. Such a study might help to identify the problems which may exist in the training program. This information might help to prevent future students from dropping out prior to the completion of their training program. Useful information might also be gathered which would help determine if the technology graduates had greater career success than those students who terminated their training prior to the completion of the degree.



## CHAPTER III

### METHODOLOGY AND ANALYSIS OF DATA

#### Introduction

Many methods exist for obtaining information about former students of an educational program. The two most commonly employed methods are the personal interview and the questionnaire. The latter is mailed to each of the former students.

The personal interview is the most valid method, as the interviewer is present to clarify each question. But, this method requires considerable time and travel for the interviewer. Questionnaires seldom elicit 100 percent response. Poor response to questionnaires can be overcome by sending out a greater number of questionnaires. The advantage of using this method of survey is that a large number of former students can be reached. Significantly, this method can indicate accurately the career success of the graduates and the "drop-outs" of the Automotive Technology program at Missouri Southern State College.

The data accumulated in this study will be used to help improve the Automotive Technology Program at the college. Changes in the curriculum have to be made after careful consideration of the effectiveness of the program. Faculty involved in program development must analyze the data carefully and evaluate the success of the program. The purpose of this study has been to provide sufficient information to the

staff of the Automotive Technology Program at Missouri Southern so they can make whatever program changes appear necessary.

### Construction and Validation of the Survey

#### Instrument

The questionnaire used in this study was designed to gather the following information about the former students:

1. The employment status of the former students.
2. The name and address of their employer.
3. The former student's job title.
4. The former student's beginning and present salary.
5. The former student's evaluation of his education in his present occupation.
6. The job satisfaction of the former student in relation to his degree.
7. Advanced education obtained by the student.
8. The former student's evaluation of the Automotive Technology program in terms of:
  - a. The material included in the automotive courses.
  - b. The amount of laboratory time spent in each class.
9. The students' comments about possible changes in the Automotive Technology program at Missouri Southern State College.

James K. Maupin, Dean of Technology, Dr. Jerry P. Coburn, Instructor of Drafting and Design, James Gray, Director of the Computer Center, and Arnal Morris, Instructor of Automotive Technology, all of Missouri Southern State College, served as a review panel on the questionnaire. The revised form was tested with a limited group of present students and a

few available graduates of the Automotive Technology program. This process identified potentially poorly phrased questions. These were then corrected.

#### Data Collection Process

The mailing list was developed from the Automotive Technology student folders and a list of declared majors in Automotive Technology on file in the Automotive Technology faculty offices. Finally, the questionnaire was sent to all students who completed the Associate Degree between 1968 and 1977, and those students who completed all the Automotive Technology courses but "dropped-out" prior to the completion of the requirements of the Associate Degree. This group consisted of 66 graduates and 45 "drop-outs."

The first mailing was made on June 1, 1978. The mailing consisted of the following items:

1. A letter of introduction and explanation (Appendix A).
2. One copy of the questionnaire (Appendix B).
3. A self-addressed, stamped envelope.

Approximately 45 days after the first mailing, July 14, 1978, a second mailing was sent to those persons who had not responded. This mailing consisted of the following items:

1. A letter requesting the assistance of the former students (Appendix C).
2. A second copy of the questionnaire.
3. A second self-addressed, stamped envelope.

A third mailing was made to the non-respondents on September 1, 1978. This mailing consisted of the following items:

1. A follow-up letter which explained the purpose of this study (Appendix D).

2. A third copy of the questionnaire.

3. A third self-addressed, stamped envelope.

In addition, college entrance test scores of the graduates and the "drop-outs" were collected from the records available in the Office of Student Personnel Services at Missouri Southern State College. This data were used in an attempt to predict graduation or "drop outs" from the Automotive Technology program.

#### Analyzing the Data

The data gathered from the questionnaire was analyzed in the following manner. A list of the employers of the former students, graduates, and "drop-outs" was compiled from the questionnaire which former students returned. The students' positions were classified in terms of "management" or "labor" by the student's description of his duties. In addition, former students were classified as a "graduate" or "drop-out." The student's description of his position would be used to determine if he was employed in a field for which he was trained or a non-related field. This data was analyzed by the use of a 2 x 2 chi square table to determine whether the degree helped students attain management positions and whether their positions related to the training they received. The level of significance was set at the .05 level (42).

The student's present and beginning salaries were recorded in \$1,000 increments. These data were analyzed by the use of chi square to determine if the salaries, beginning and present, were higher for those

students who earned the Associate Degree as compared to those who "dropped out." The level of significance was set at the .05 level (42).

Other data that the questionnaire provided were reported and analyzed by using tables to determine if former students were satisfied with their present positions and the training received in the Automotive Technology program at Missouri Southern State College. In addition, the information gathered concerning the value of the Automotive Technology courses was examined to determine if any changes in the present curriculum should be considered.

The college entrance test scores were obtained from the Guidance and Counseling Office of Student Services. Due to the time span, the scores were either MCTP, SCAT, or ACT Test Batteries. In order to make a comparison, it was necessary to convert these scores to "T scores." This transformation was done so that the scores would have a common mean and standard deviation. Dr. Gene Mouser, Director of Guidance and Counseling, performed this task for the investigator. The "T scores" were analyzed by the use of a "t test" to determine if there was any significant difference in the college entrance test scores for the graduate and the "drop-out." If there was, the college entrance test score could be assumed to be an indicator of the potential "drop-out." The level of significance was set at the .05 level (42).

#### Questionnaire Returns

A total of 111 persons were identified as graduates and "drop-outs" and all were mailed questionnaires. Eleven of the questionnaires were returned as undeliverable. Of the remaining 100 questionnaires, 70 were returned completed. Forty-seven (67.14 percent) were graduates and 23

(32.86 percent) were "drop-outs." It should be noted that three of the "drop-outs" returning the questionnaire had completed the Associate Degree and that this information was unknown to this investigator at the time of classification.

#### Present Employment Status

Forty-three graduates and 21 "drop-outs" (91.43 percent of the total return) reported full-time employment. One of the graduates reported that he was unemployed. Two of the "drop-outs" were in the military service. Three of the respondents stated that they were full-time students. These persons were graduates of the Associate Degree program. One of these former students was using his automotive training to finance his way through medical school.

#### Type of Position Held

Information was supplied by the former students about their present positions. This was used to determine if the student was employed in a management or labor position as described in the "Definition of Terms" on pages five and six. Forty-nine percent (23) of the graduates indicated they held management positions, while 38 percent (eight) of the "drop-outs" reported that they occupied similar positions (Table IV). Fifteen of the "drop-outs" (62 percent) and 24 (51 percent) of the graduates held positions below the managerial level.

One of the hypotheses of this research paper is that the graduate of the program is no more likely to hold management positions than the "drop-out." When examining the data by the use of chi square, the  $X^2$  is 1.25. The hypothesis must have a  $X^2$  of 3.8 or more with one degree

of freedom at the .05 level to be significant. Since the computed chi square was less, the null hypothesis must be accepted. Therefore, the graduate is no more likely to hold a management position than the "drop-out."

TABLE IV  
JOB DESCRIPTION

	Management	Labor
Graduate	23	24
Non-Graduate	9	15

$X^2 = 1.25$ , not significant.

#### Relation of Employment to Training Received

It was deemed important by the investigator to determine if the former students were employed in a position which was related to the training which they had received. Thirty-seven (52.87 percent) of the graduates and 17 (24.28 percent) of the non-graduates were employed in the field for which they were trained or a related area (Table V). Therefore, 77 percent of the respondents were employed in the field for which they were trained or a related one. Sixteen of the respondents, 10 graduates (14.28 percent) and six "drop-outs" (8.57 percent), were

employed in fields that were not related to the training received at Missouri Southern State College.

TABLE V  
RELATION OF EMPLOYMENT TO TRAINING RECEIVED

	Related	Non-Related
Graduate	37	10
Non-Graduate	17	6

$X^2 = 0.20$ , not significant.

A second hypothesis of this study was that the graduate of the program was no more likely to hold employment in the field for which he was trained or a related one than the "drop-out." When the researcher examined the data by use of chi square, the  $X^2$  was 0.20. The hypothesis had to have a computed  $X^2$  of 3.8 or larger with one degree of freedom to be significant at the .05 level. Since the computed chi square was less, the null hypothesis must be accepted. Therefore, the data revealed that the graduate was no more likely to be employed in the field in which he received training or a related one than the "drop-out."

#### Salaries: Current and Beginning

Another hypothesis of this study was that the graduate would not receive a higher beginning salary and would not earn a higher current



salary than the "drop-out." The persons who received the questionnaire were asked to report their beginning and current yearly salary in \$1,000 increments. (See Appendix E for all raw salary data.)

The researcher learned, upon examining the returns, that 13 graduates and nine non-graduates (38.6 percent) received beginning salaries of \$8,000 and below (Table VI). Slightly less than half of the respondents, 18 graduates and nine "drop-outs," received \$8,000 to \$12,000 for their compensation during the first year. Three "drop-outs" and one graduate earned salaries of \$12,001 to \$15,000 upon leaving the campus. The beginning salary of one graduate was between \$16,001 and \$20,000, while three graduates earned \$20,001 to \$24,000 during their first year. Thirteen of the returns were left blank or improperly answered and, therefore, were not included in this data.

TABLE VI

## SALARIES

	Current*		Beginning**	
	Graduate	Non-Graduate	Graduate	Non-Graduate
Below \$8,000	4	3	13	9
\$8,001-\$12,000	12	7	18	9
\$12,001-\$16,000	9	10	1	3
\$16,001-\$20,000	4	1	1	0
\$20,001-\$24,000	4	0	3	0
\$24,001 and Over	3	0	0	0

\* $\chi^2 = 6.7353$ , not significant.

\*\* $\chi^2 = 5.0633$ , not significant.

The graduates reported several higher current salaries when compared to the non-graduates. Three of the graduates were earning salaries of \$24,001 and higher, while four were receiving salaries of \$20,001 to \$24,000. The highest paid "drop-out" and four graduates indicated yearly compensation for the current year in the \$16,001 to \$20,000 bracket. The salary bracket of \$12,001 to \$16,000 was reported by nine graduates and 10 non-graduates. A group of 12 graduates and seven non-graduates earned salaries of \$8,001 to \$12,000 during 1978. Those persons indicating salaries in the range of \$8,000 and below for the current year consisted of four graduates and three "drop-outs."

The statistical method which was used to examine the salary data was chi square. The level of significance had been set at the .05 level. The graduate and the "drop-out" were compared in terms of beginning and current salaries. To have usable data, the investigator grouped the data into six categories. The computed  $X^2$  on the comparison of the current salaries was 6.7353, while the computed  $X^2$  on the beginning salary was 5.0633. At the .05 level, the value of the chi square with five degrees of freedom must be 11.1 or greater to be significant. Therefore, again the researcher had to accept the null hypothesis. Thus, there is no significant difference in the beginning and current salaries of the graduate and the "drop-out."

#### Utilization of College Education

##### in Current Position

Fifteen (21.5 percent) of those persons returning the questionnaire indicated that their education provided knowledge which was used very much in their current position. Thirty-four (48.5 percent) reported that

they used their education only partly in their current employment. Ten of the respondents (14.28 percent) used their education very little. Eight (11.13 percent) reported that in their current position they did not use their college training. Three failed to answer this item.

#### Was the Degree a Major Factor in Being Hired

The tabulation of the returns indicated that 23 (32.86 percent) believed that having a degree was a major factor in being hired for their present position. Slightly more than 60 percent (43) of the respondents felt that their degree was not a factor in their being hired. Thus, generally the training in Automotive Technology had been sufficient to get the students hired. Completion of all facets of a degree were unimportant in finding a job. Four of the returned questionnaires were left blank on this item.

#### How Well has Your Background Prepared You for the Position that You are Currently Holding

This question was asked to determine the value of the preparation that the graduates and the "drop-outs" had received from the Automotive Technology program at Missouri Southern State College. Twelve (17.14 percent) felt that the program prepared them very well for their present position. Fifty-seven percent (40) indicated that their education had prepared them adequately for their work. Fourteen (20 percent) of the former students felt that they were poorly or not at all prepared for the position they held. Four failed to answer this question.

### Satisfaction with Current Position

This portion of the questionnaire asked the former students to express their feelings of satisfaction with current positions in terms of salary, working conditions, and type of work. Each of these areas will be discussed.

Only three of the graduates and "drop-outs" were very satisfied with their salaries. Approximately one-half (34) of the respondents were satisfied with their compensation for working. Twenty (28.5 percent) indicated that they were dissatisfied with their salaries. Nine (12.85 percent) of the questionnaires were marked "Very Dissatisfied" in the area of salary and four of the instruments were returned blank.

Approximately 20 percent (13) were very satisfied with their working conditions. Thirty-five (50.0 percent) marked the blank which indicated they were satisfied with their working conditions. Fourteen (20.0 percent) persons reported dissatisfaction with their working conditions by checking the "Dissatisfied" (13 times) and "Very Dissatisfied" (one time) blanks. Eight failed to answer this question.

The final question in this area sampled the former students' satisfaction with the type of work which they were performing. None of the respondents indicated that they were "Very Dissatisfied." Only nine (12.85 percent) reported that they were "Dissatisfied." One-third (23) reported that they were "Very Satisfied" with the type of work which they were doing. The remainder (38), except for five which were left blank, were satisfied with the work that they were performing (Table VII).

TABLE VII  
SATISFACTION WITH CURRENT POSITION

	Very Satisfied	Satisfied	Dis- satisfied	Very Dis- satisfied	No Answer
Salary	3	34	20	9	4
Working Conditions	13	35	13	1	8
Type of Work	23	33	9	0	5

#### Degree Completion

This item on the questionnaire dealt with the completion of the Associate Degree and advanced degrees. Thirty percent (21) indicated that they completed their degree, but it took more than two years for them to do so. Twenty-nine (41.43 percent) of the respondents indicated that they had completed degree requirements. This question was unanswered by 20 (28.57 percent) of the former students of the program.

The second part of this item dealt with the completion of advanced degrees since graduation at Missouri Southern State College. Sixteen (22.85 percent) indicated that they had completed Bachelor degrees. Seventy-five percent (12) of these degrees were awarded by Missouri Southern State College. Eight (50 percent) of these advanced degrees were in Management-Technology. One degree was presented in each of the following areas: Business Administration, Accounting, Marketing and Management, and Industrial Arts. Three former students had completed

Bachelor of Science degrees in Automotive Technology at Pittsburg State University, and another former student completed a degree in Business Administration at the Joplin campus of Columbia College.

#### Part-Time and Full-Time College Attendance

Ten of the graduates and non-graduates reported that they were attending college full-time. Missouri Southern State College had retained eight of these. Five were studying Management Technology, and one in each of the following areas: Machine Technology, Industrial Arts, and Criminal Justice. One graduate was studying to become a Doctor of Chiropractic Medicine in Kansas City. Another was completing a Masters degree in Business Administration at Pittsburg State University.

Four indicated part-time college attendance. Two of these students were completing degrees at Pittsburg State University in the areas of a Bachelors degree in Vocational-Technical Education and a Masters in Business Administration. Another graduate was completing a Masters in Business Education at the University of Kansas. At Missouri Southern State College, one graduate was working toward the completion of the requirements for the Bachelors degree in General Studies.

#### The Single Class of Least and Most Value in the Major and Outside the Major

One item on the questionnaire requested the respondents to list the class in their major which was of the most and least value. Automotive Engines was reported to be of the "Most Value" by 20 and of the "Least Value" by one person (Table VIII). Automotive Electrical and Emission Control was the most valuable class according to nine of the respondents.

TABLE VIII  
CLASS OF MOST AND LEAST VALUE

	Most	Least
<u>Automotive Major:</u>		
5306-100 Automotive Engines	20	1
5306-110 Technical Mathematics	1	10
5306-120 Automotive Electrical and Emission Control	9	0
5306-130 Automotive Business Management	7	11
5306-190 Technical Science	2	12
200 Automotive Chassis and Brakes	2	0
220 Automotive Air Conditioning	3	0
250 Automotive Body and Painting	6	7
260 Automotive Service Management	1	1
<u>Outside of Major:</u>		
Immediate Algebra	11	1
Composition	2	8
Physical Science	7	2
Freshman Orientation	0	1
Introduction to Drafting	3	3
General Psychology	6	4
Speech Techniques	2	3
Personal Health	1	1
U.S. History	1	10
Fine Arts	1	11
Economics	1	0
Business Communications	3	0

Ten of the former students felt that Technical Education was one of the least valuable, while one felt that this class was the most valuable course in the curriculum. Automotive Chassis, Brakes, and Transmission was the most important class for two students. Three indicated that Automotive Air Conditioning was their choice as the course of most value in their major. Technical Science was reported as the course of least value by 12, while only two felt it was of the most value in their major area. Seven persons indicated they believed that the Automotive Business Management course was of most value, and 12 reported that this course was of least value. It should be noted that six of the seven students had continued in the Management-Technology program. Automotive Body and Painting was reported to be the most valuable by six respondents; however, in seven cases, this course was the least valuable in the major area. Automotive Service Management was reported to be of the least and most value once.

In addition, the student was asked to evaluate those courses outside of his major in terms of the most and least value. It was surprising that 11 felt that Algebra was the most important course outside the major and only one respondent rated it as the least important. Eight rated English Composition as the least important. Two felt English Composition was the most valuable course outside of the major field of study. The science requirement was noted nine times, seven as the most valuable course and twice as the least valuable. One former student reported that Freshman Orientation was the course of least value outside of the major. Introduction to Drafting was rated three times in the least and most value column. Six respondents believed Psychology was the most valuable course outside of their major, while four disagreed.



Speech Techniques was the most valuable class for two and the least valuable for two. One questionnaire was marked to indicate Personal Health was the most valuable, and only one reply indicated that this course was the least valuable. United States History, the Fine Arts elective, and Economics were each mentioned once as the most valuable class. Ten former students felt History was the least valuable and 11 indicated the Fine Arts elective was the least valuable course outside of the major. Three of the Management Technology graduates believed that Business Communications was the most valuable course outside the major.

Students' Opinions of Courses to be  
Added or Deleted

One item on the questionnaire was the respondents' opinions on the classes which should be added or deleted from the curriculum to meet the needs of the student more appropriately. The various answers were tabulated and, if possible, were grouped to reduce the possibilities.

In the area of courses to be added or areas to be examined for future possible adoption, the two most recommended courses (or areas) were diesel mechanics and management skills. Each of these areas was mentioned seven times. It should be noted that those students who continued into Management-Technology, an upper level two-year Bachelor of Science program at Missouri Southern State College, were the ones who recommended increased management skills. Five felt the need for more emphasis on electricity and electronics as newer vehicles have increased use of electronic control devices. A need was indicated on four questionnaires for a more thorough transmission rebuilding course.

Welding courses would be helpful, according to three former students. Two students recommended increased laboratory periods and two others recommended that a Bachelors degree in Automotive Technology be inaugurated. The following areas were mentioned only once as areas of concern of the former students: automotive parts sales and management, more air conditioning, machine shop courses, courses in self-motivation, increased psychology, more body work and repainting, and more mathematics (Table IX).

Some respondents recommended the deletion of courses in which they either did not feel they learned anything or were disinterested. Fourteen recommended that Technical Mathematics be deleted. Twelve former students indicated that the Technical Science course should be eliminated. Six believed that Automotive Business Management should be eliminated from the curriculum. Two could not find a reason to retain General Psychology as part of the Automotive Technology degree requirements. The following areas or courses were each recommended for deletion or change once: Physical Education and the reduction of the management hours required for the Management Technology degree.

#### Student Assessment of Course Value

The graduate and the "drop-out" were asked to evaluate each of the classes in the Automotive Technology curriculum. The courses were to be rated in terms of their value to the student on the job. The courses were rated from "No Real Value," "Some Value," "Considerable Value," "Major Value," and "Critical Value." (See Appendix F for data.)

Ten percent (seven) of the respondents failed to rate the Automotive Engines course. The largest group, 31 (44.24 percent), indicated that

TABLE IX  
STUDENT OPINION OF COURSES TO BE ADDED  
OR DELETED

Courses to be Added	N	Courses to be Deleted	N
Diesel Mechanics	7	Technical Mathematics	14
Management Skills	7	Technical Science	12
Electricity	5	Auto Business Management	6
Public Relations	4	Psychology	2
Transmission Courses	4	Less "Management" in Management-Technology	1
Welding	3	Physical Education	1
Increased Lab Time	2		
Bachelors Degree in Auto	2		
Parts Store Management	1		
More Air Conditioning	1		
Machine Shop	1		
Self-Motivation	1		
Psychology	1		
Body Work (Increased)	1		
Mathematics	1		

this class was of "Critical Value." Twenty-seven percent (19) reported this course was of "Major Value." Ten former students felt this course was of "Considerable Value." Only three believed that this class was of "Some" or "No Real Value."

Technical Mathematics was felt to be of "No Real Value" or only "Some Value" by more than 50 percent (36) of the respondents. Twelve rated this class of "Considerable Value" and "Major Value," respectively. Slightly more than 10 percent (eight) felt this class was of "Critical Value." Two failed to indicate a value for Technical Mathematics.

Of the respondents, 68.5 percent felt that Automotive Electrical and Emission Control was valuable preparation for employment. Twenty-two rated this course as of "Critical Value," while 26 rated the class of "Major Value." Ten former students rated this class of "Considerable Value" or "Some Value," respectively. Two chose not to place value on this class while no one felt that this course possessed "No Real Value."

Automotive Business Management was felt to have "No Real Value" by 12 respondents (17.1 percent). Four failed to answer this item. Thirteen respondents (18.6 percent) indicated that the former students believed this class was of "Considerable Value" and "Critical Value," respectively. Nine (12.85 percent) felt that this course was of "Major Value." Twenty-seven percent (19) rated this course as having "Some Value."

Approximately 20 percent (13) rated Technical Science as of "Major Value" or "Critical Value." Six felt the course was of "Critical Value" while seven rated it as of "Major Value." Twelve respondents (17.14

percent) considered this course to be of "Considerable Value." Thirty percent (21) of the questionnaires were marked "Some Value." Twenty-two (31.43 percent) marked their questionnaires in the "No Real Value" column. Only two questionnaires were left blank.

Fifty-four respondents (77 percent) reported that Automotive Chassis, Brakes, and Transmission was of "Major Value" or "Critical Value" in their preparation for work. Twenty-six (37.17 percent) felt this course was of "Critical Value." "Major Value" was the rating of 40 percent (28). Only 10 percent (seven) reported this class was of "Considerable Value." Six questionnaires were marked "Some Value." Ratings of "No Real Value" appeared on two questionnaires. One failed to answer this item.

Automotive Air Conditioning and Accessories was felt to be of "Critical Value" by 30 percent (21) of the respondents. Twenty-two marked this course as of "Major Value" in their job performance. Fifteen (21.42 percent) felt that this class was of "Considerable Value." Fewer than five percent believed that this course was of "No Real Value." This question was left blank by three former students.

Slightly less than 30 percent (20) of the former students felt that Automotive Body and Painting was of "Critical Value." Three stated that this course was of "No Real Value." Nine returns indicated that the respondents felt that this course was of "Some Value." Seventeen (24.29 percent) and 18 (25.7 percent) of the questionnaires were marked "Considerable Value" and "Major Value," respectively. Three of the questionnaires were left blank.

Automotive Service Management, the final class in the automotive curriculum, was felt to be of "Critical Value" by more than 30 percent (33) of the respondents. Eighteen (23.7 percent) of the questionnaires were marked to indicate that this course was of "Considerable Value." Slightly less than 20 percent (13) of the respondents indicated that this course had "Some Value." Only three former students believed that this course was of "No Real Value." This item was not marked on five of the questionnaires.

#### Student Evaluation of the Amount of Time

##### Spent in the Laboratory

Automotive Engines is the first class in the normal sequence of the classes. It requires 12 hours of laboratory per week. Approximately 46 percent (32) felt the laboratory experience was adequate. Twenty-seven (38.5 percent) of the respondents reported the laboratory experience was too short. Two former students indicated that too much time was spent in the laboratory. Nine (12.85 percent) of the questionnaires were not answered. (See Appendix F for data.)

Approximately 60 percent (41) of the former students felt that the 12 hours of laboratory for Automotive Electrical and Emission Control was adequate. Three stated that the laboratory experience was too long. Twenty-four (34.28 percent) reported the need for a longer laboratory period. This item was not answered on two questionnaires.

The laboratory period for Technical Science was felt to be too long by 25 percent (17) of the former students. Thirty-nine (55.7 percent) believed that the two-hour laboratory period was adequate for

the material covered. Nine indicated that the laboratory experience was too short. No opinion was expressed by five of the former students.

Slightly less than 43 percent (30) reported that the laboratory experience for Chassis, Brakes, and Transmission was too short. Thirty-six former students (51.4 percent) indicated that the laboratory experience was adequate in terms of time. Two believed that the 12 hours of laboratory time was too long. This item was not answered by two respondents.

Thirty-four (48.5 percent) of those persons who returned the questionnaire indicated that the laboratory time for Automotive Air Conditioning and Accessories was too short. Approximately 43 percent (30) felt that the four-hour laboratory was adequate. Too much laboratory experience was reported by three of the former students. Three of the questionnaires were not answered on this item.

Automotive Body and Painting was reported to have too much laboratory time by eight former students. Twenty-six (37.0 percent) believed that the laboratory experience was too short. Forty-six percent (32) felt that the laboratory time was adequate. This item was left blank by four former students.

Automotive Service Management was reported by 31 (44.28 percent) to have adequate laboratory time at 12 hours per week. Nineteen (27.14 percent) stated that the laboratory time was too short. Twenty-one percent (15) indicated that the laboratory experience was too long. Seven percent (five) failed to answer this question.

College Entrance Test Score Comparison of the  
Graduate and the Non-Graduate

One of the hypotheses was: There would be no significant difference in the Verbal Skills, Mathematics Skills, and Composite test scores of the graduate and the "drop-out." The data for analysis was provided by the Office of the Guidance and Counseling that is part of Student Services of the college (Appendix G). During the period of this study, 1968 to 1977, three types entrance test batteries were used. The Missouri College Placement Test (MCPT) was employed until 1974. Since 1974, the School and College Aptitude Test (SCAT) and the American College Test (ACT) have been used. Dr. Gene Mouser, Director of Guidance and Counseling, converted the various test data to "T scores." The "T scores" have a mean of 50 and a standard deviation of 10. ("T scores" on verbal, mathematics, and composite test scores can be found in Appendix G.)

The verbal section of these test batteries measured the student's ability to understand written information. The graduates' mean or average score was 47.32. The "drop-out" mean was 43.89. The mode or most frequent score was 42 for the graduate and 39 for the non-graduate. The median or mid-score was 46 for the "drop-out" and 47 for the graduate. When the scores were analyzed by use of the "t test," the computed value of "t" was 1.50. To be significant at the .05 level, with 42 graduates and 28 "drop-outs" or 78 degrees of freedom, the computed "t" had to be 2.0 or larger. Therefore, there was no significant difference in the verbal scores of the graduate and the non-graduate.

The mathematics area of the test data indicated that there was less difference in the two groups' aptitude as compared to the verbal scores.



The median of both groups was 47. The mode for the graduates was 46. The non-graduates had a bi-modal distribution of scores. The two modes for this group were 40 and 47. The means for both sets of data varied only slightly more than one. The graduates' mean was 47.78 and the non-graduates' mean was 46.66. With 78 scores, the degrees of freedom were 76. The computed "t score" was 0.47. To be significant at the .05 level with 76 degrees of freedom, the "t" must be 2.0 or larger. Thus, there was no significant difference in the mathematics test battery scores of the graduate and the "drop-out."

The final statistical comparison of the graduate and the "drop-out" was the composite scores on the college entrance test battery. This is the combined score of the mathematical and verbal sections. The non-graduates' mode was higher at 46 when compared to the bi-modal distribution of the graduates. The graduates had modes of 39 and 40. The median was 46 for both groups. The mean for the graduates was 47.38. The mean score for the "drop-outs" was 45. The computed "t score" was 0.96. This score was less than the required "t" value of 2.0. Accordingly, there was no significant difference in the composite scores of the graduate and the non-graduate.

Alas, when this investigator compared the verbal, mathematical, and composite scores of the graduate and non-graduate, no significant difference was found between the two groups on these three measures. Therefore, the students' test scores cannot be considered an accurate indicator of the student's potential to graduate or "drop-out" of the Automotive Technology program at Missouri Southern State College.

## CHAPTER IV

### SUMMARY AND RECOMMENDATIONS

#### The Purpose

The purpose of this research was to compare the careers of the graduates and the "drop-outs" of the Automotive Technology Program at Missouri Southern State College. The two groups were compared on the basis of beginning and current salaries, type of position held, and the relation of their occupation to the training received at the college. The college entrance test scores were compared for the graduates and the "drop-outs." The purpose of this analysis was to determine if these scores could be used to predict students who were potential "drop-outs." In addition, information gathered by the questionnaire should provide data that could be used to modify the courses in Automotive Technology so that they may become more beneficial to the student. Information was gathered on course value, satisfaction with their training and working conditions, and suggestions for areas of future consideration and change.

#### Limitations

There were several limitations placed on this study due to the method of data collection. Seldom can an investigator locate 100 percent of the former students of an educational program. In addition, not all persons receiving the questionnaire will respond. The researcher can

introduce error into the study with his interpretation of job titles and the relationship of the training received to the respondents' occupations. Some of the students did not have entrance test scores on file; therefore, could not be used in that portion of the study.

#### Data Collection

The method of data collection used in this study was a questionnaire. The three-page questionnaire was mailed to 111 former Automotive Technology students. This group consisted of 66 graduates and 45 "drop-outs." The "drop-out" was a person who had completed 48 hours of training in Automotive Technology, but failed to complete the requirements for the Associate of Science Degree. Eleven of the instruments were returned as undeliverable. Seventy percent of the remaining 100 questionnaires were returned and were used in this study.

In addition, college entrance test scores were obtained from the Office of Guidance and Counseling. Due to the time span, three different entrance tests were used. Therefore, these test scores had to be converted to "T scores" before the scores could be compared in an attempt to find an indicator of the potential "drop-out."

#### Summary

The data reported in this study were used to determine a comparison of career success of the graduate and "drop-out" of the Automotive Technology Program at Missouri Southern State College. The data indicated that there was no significant difference in the two groups when compared in terms of position held, management or labor. In addition,

the type of position held in relation to the training received was not significantly different for either group. The graduate and the non-graduate were compared in terms of salaries, current and beginning, and no significant difference was found. And last, the graduate and "drop-out" were compared in terms of college entrance test scores, verbal, mathematics and composite, in order to determine if these scores could be used to identify the potential "drop-out." But, alas, there was no significant difference in the two groups' test scores. Due to the data gathered in the statistical portion of this study, there appears to be no difference in the career success of the graduate when compared to the non-graduate.

Additional data were gathered from the former students about the Automotive Technology program at the college. Forty-nine former students felt that their positions partly utilized their college education. Sixty-five percent believed that a degree was not a major factor in being hired. Fifty-two respondents believed that their educational background prepared them adequately for their present position. The former students were almost split when questioned on their satisfaction with their salaries. Forty-eight reported they were satisfied with their working condition. And 85 percent (56) were satisfied with the type of work they were performing. Ten of the former students were attending college full-time and four reported part-time attendance.

The former students believed that Automotive Engines was the most valuable course in their major area and Algebra was the most valuable course outside of their major. Three automotive classes were indicated as the least valuable courses in the major area. These classes were: Technical Mathematics, Automotive Business Management, and Technical

Science. United States History and the fine arts elective were the two most mentioned classes of least value outside of the major. The respondents were asked to indicate those areas that should be added to the curriculum. Diesel Mechanics and Management Skills were the two most frequently mentioned areas. The areas to be deleted or modified, in the opinion of the former students, were Technical Mathematics and Technical Science.

Approximately 60 percent of the former students believed the following courses were of "Critical" or "Major Value" in their preparation for work: Automotive Engines; Automotive Electrical and Emission Control; Chassis, Brakes, and Transmissions; Air Conditioning and Power Accessories; Auto Body and Painting; and Automotive Service Management. There were three classes which over 50 percent of the respondents felt were of "No Real Value" or "Some Value." These classes were Technical Science, Automotive Business Management, and Technical Mathematics. The laboratory periods were evaluated in terms of length. Approximately 50 percent felt they were adequate, but approximately the same number felt that the laboratories were too short. Never more than three reported that the laboratories were too long, except in Technical Science, Automotive Body and Painting, and Automotive Service Management.

### Conclusions

1. As a result of the survey of the curriculum of the various Automotive Technology programs, this researcher found that the credit hours required for the Associate Degree of Science in Automotive Technology were considerably higher than required for most other similar programs reviewed.

2. The major courses in the Automotive Technology curriculum, the seven credit hour courses, require the student to spend 12 hours per week in a laboratory perfecting skills and applying the knowledge gained during the lecture period. The student at Missouri Southern State College spends considerably more time in the laboratory than do students in the other programs examined in the review of similar curriculums.

3. There were no significant differences in the current and beginning salaries of the graduate and the "drop-out" when compared by chi square.

4. The graduate was no more likely to be in a management position than the "drop-out." This hypothesis was tested by the use of chi square.

5. The graduate is no more likely to be employed in the area for which he was trained than the non-graduate when compared statistically by chi square.

6. The college entrance test was not a reliable indicator of the potential "drop-out."

7. There were no significant differences in the career success of the graduate and the "drop-out" when compared in terms of salary (beginning and current), relationship of the position to the training received at the college, and type of position held (management or labor).

8. The respondents felt that their education was utilized partly in their current position.

9. Over 50 percent of the respondents were satisfied with their salaries.

10. Slightly fewer than 70 percent of the former students were satisfied with their working conditions.
11. Fifty-six of the respondents reported that they were satisfied with the type of work they were performing.
12. The areas of courses to be considered for future possible adoption were Diesel Mechanics and Management Skills.
13. The areas which the former students most often felt should be deleted from the curriculum were Technical Mathematics and Technical Science.
14. Evaluation of the automotive courses by the respondents indicated that the automotive courses were extremely valuable, except for Technical Science, Technical Mathematics, and Automotive Business Management.
15. Fifty percent of the former students reported that the laboratories were felt to be of adequate length. The remaining group felt that the laboratories were too short.

#### Implications

1. It was the opinion of the investigator that the number of hours required to complete the Associate Degree in Automotive Technology is excessive. The 78-hour requirement could have a detrimental effect on the growth of this program.
2. Technical Mathematics was one of the courses which 14 recommended to delete from the current curriculum. Yet, 11 respondents believed that algebra was the most important course outside their major field. This response may be due to the practice of teaching the related mathematics which pertains to the technical material as needed in each

course and covering the same material again in Technical Mathematics. Therefore, the students may feel that this duplication of material was unnecessary.

3. Technical Science suffered from a similar fate. Eleven indicated that this course should be deleted from the major, while seven believed that Technical Science was the most valuable course outside their major. But, again, the related science principles are covered as they pertain to each class and the students may believe that Technical Science was a duplication of effort.

4. Some changes must be made in Automotive Business Management. It is a basic accounting class which is modified to relate to the automotive repair industry. Many students have stated that they would hire someone to do their accounting. Eleven former students believed this class should be deleted from the curriculum. But, when asked about areas which needed to be added to the curriculum, seven responded with a need for more management skills. It may be necessary to incorporate the needed management skills and the ability to understand accounting statements into the other classes and delete the present Automotive Business Management course.

5. Most of the schools examined had four- to six-hour laboratory periods for each class. But, this investigator and the Automotive Technology faculty at Missouri Southern State College would not propose to change their program to this type of plan. The faculty believe it is the only time that students have for skill development in the technical area. In the existing program, with 12 hours of laboratory each week, it is the faculty's opinion that scarcely enough time is available



for the student to gain the needed skill in the operation of equipment and service techniques.

#### Recommendations

1. This researcher feels that it is important that the Advisory Committee and the faculty of Missouri Southern State College examine the credit hours required to complete the Associate of Science Degree in Automotive Technology and, if possible, bring the number of credit hours into line with the other programs examined in the review of literature.

2. Diesel Mechanics and Management Skills should be examined as areas of future exploration and possible course adoption.

3. The Advisory Committee and the Automotive faculty of the college should examine Technical Mathematics, Technical Science, and Automotive Business Management to determine if these courses could be modified to become more beneficial to the student or if they should be eliminated from the curriculum.

4. The Automotive Technology faculty should examine those activities that occur during the laboratory period to determine if the time could be structured to become more beneficial to the student.

5. The college should continue, with their Advisory Committee, to determine the needs of industry for trained technical personnel. The college should attempt to train personnel to meet the needs of industry.

6. A follow-up of this same group of students should be conducted in the future to determine if, at that time, there is a difference in the career success of the graduate and the "drop-out."

7. In a future follow-up of the same students, it might prove

informative to survey the employers of these former students to determine if the skills which the student brings to the job are adequate.

In closing, this investigator believes that the examination of various institutions' curriculums in Automotive Technology should be continued and the ideas gathered from this study should be integrated into the program at Missouri Southern State College in an effort to improve the program. The faculty at Missouri Southern State College must implement changes continually to insure that the program remains current and is beneficial to the student. The institution must encourage the continued follow-up of the former students: the graduate and the "drop-out." These follow-up studies could provide valuable information which could be used to modify existing programs so that they may become more useful to the student.

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**APPENDIXES**

**APPENDIX A**

**LETTER #1**



MISSOURI *Southern State* COLLEGE,  
NEWMAN & DUQUESNE ROADS JOPLIN, MISSOURI 64801  
PHONE 417-624-8100

Office of the Dean  
of Technology

June 1, 1978

As part of our continuing effort to improve the Automotive Technology program at Missouri Southern State College, we are conducting a survey of the graduates of this program as well as those persons who completed the Automotive Technology courses, but failed to complete the general education requirements for graduation. The purpose of this survey is to obtain information about the former students' employment and the value of the training that was received at MSSC.

Will you please assist us by completing the enclosed questionnaire and returning it in the enclosed, stamped envelope as soon as possible. In addition, we hope that you will be willing to provide us with any information or suggestions which we can use to improve the quality of the Automotive Technology program at Missouri Southern. All information that is collected will be considered confidential and no individual will be mentioned by name in any publication.

We appreciate your assistance and cooperation.

Sincerely,

*James K. Maupin*  
James K. Maupin  
Dean of Technology

*Roger E. Adams*  
Roger E. Adams, Assistant Professor  
Automotive Technology Department

P

Enclosures: 2

**APPENDIX B**

**QUESTIONNAIRE**

## STUDENT FOLLOW-UP DATA FORM

Date \_\_\_\_\_

1.

Please review the above information for accuracy, correct any errors, and answer the following questions.

Phone \_\_\_\_\_

2. Present address of parent, guardian, or nearest relative:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code \_\_\_\_\_

3. At present time I am:

- (a) Working full time \_\_\_\_\_ (d) In Military Service \_\_\_\_\_  
 (b) Working part time \_\_\_\_\_ (e) A full time student \_\_\_\_\_  
 (c) Unemployed \_\_\_\_\_

4. If you are employed on a full-time basis, complete this section. If not proceed to Section 5.

(a) Employer \_\_\_\_\_

(b) Employer's address: \_\_\_\_\_

(c) City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code \_\_\_\_\_

(d) Your title: \_\_\_\_\_

(e) Briefly describe your job: \_\_\_\_\_

(f) Date of initial employment in current position: Month \_\_\_\_\_ Year \_\_\_\_\_

(g) Indicate starting yearly salary range with a "1", current salary with a "2"

Below \$5,000 \_\_\_(a) 10,001-11,000 \_\_\_(g) 16,001-17,000 \_\_\_(m) 22,001-23,000 \_\_\_(s)

\$5,000-6,000 \_\_\_(b) 11,001-12,000 \_\_\_(h) 17,001-18,000 \_\_\_(n) 23,001-24,000 \_\_\_(t)

6,001-7,000 \_\_\_(c) 12,001-13,000 \_\_\_(i) 18,001-19,000 \_\_\_(o) 24,001-25,000 \_\_\_(u)

7,001-8,000 \_\_\_(d) 13,001-14,000 \_\_\_(j) 19,001-20,000 \_\_\_(p) Over \$25,000 \_\_\_(v)

8,001-9,000 \_\_\_(e) 14,001-15,000 \_\_\_(k) 20,001-21,000 \_\_\_(q)

9,001-10,000 \_\_\_(f) 15,001-16,000 \_\_\_(l) 21,001-22,000 \_\_\_(r)

(h) Does your current position utilize your College education?

Very Much \_\_\_(1) Partly \_\_\_(2) Very Little \_\_\_(3) None \_\_\_

(i) Do you believe that your degree was a major factor in your being hired for this job?

Yes \_\_\_(1) No \_\_\_(2)

(j) How well has your educational background, from this college, prepared you for the position you are currently holding?

Very well \_\_\_(1) Adequately \_\_\_(2) Poorly \_\_\_(3) Not at all \_\_\_(4)

(k) Indicate your degree of satisfaction with your current position in terms of salary:

Very satisfied \_\_\_(1) Satisfied \_\_\_(2) Dissatisfied \_\_\_(3) Very Dissatisfied \_\_\_(4)

Working conditions: Very satisfied \_\_\_(1) Satisfied \_\_\_(2) Dissatisfied \_\_\_(3)

Very Dissatisfied \_\_\_(4)

Type of Work: Very satisfied \_\_\_(1) Satisfied \_\_\_(2) Dissatisfied \_\_\_(3)

Very Dissatisfied \_\_\_(4)

5. (a) If you did not graduate within two years of beginning the automotive Technology, have you completed the degree requirements?

Yes \_\_\_(1) No \_\_\_(2) Date \_\_\_\_\_

(b) Have you received an advanced degree since graduation with Associate Degree from this college?

Yes \_\_\_(1) NO \_\_\_(2) Date \_\_\_\_\_

If your answer to 5(b) was yes, answer the question below for the last degree received.

(c) When? Month \_\_\_\_\_ Year \_\_\_\_\_ Where \_\_\_\_\_

Degree: \_\_\_\_\_ Major \_\_\_\_\_

6. (a) Are you attending college on a full-time basis?

Yes \_\_\_(1) NO \_\_\_(2)

If your answer to 6(a) was yes, answer the questions below.

(b) Where? \_\_\_\_\_ (c) Degree sought \_\_\_\_\_

(d) Major: \_\_\_\_\_

7. (a) Are you attending college on a part-time basis?

Yes \_\_\_(1) No \_\_\_(2)

(b) Where? \_\_\_\_\_ (c) Degree sought \_\_\_\_\_

(d) Major: \_\_\_\_\_

8. What course of courses that you took in your program here, have you found of least value?

(a) Major area \_\_\_\_\_

(b) Outside of Major \_\_\_\_\_

Most value?

(c) Major area \_\_\_\_\_

(d) Outside of Major \_\_\_\_\_

9. In your opinion, to improve your academic preparation, what subject matter should be:

(a) added: \_\_\_\_\_ (b) deleted: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

10. Indicate the value of the courses listed below by placing a checkmark in the appropriate box.

	NO REAL VALUE	SOME VALUE	CONSIDERABLE VALUE	MAJOR VALUE	CRITICAL VALUE
<b>AUTO ENGINES</b> -Auto 100 deals with the theoretical and practical application of the internal combustion engine and diagnosis and service of this unit.					
<b>TECHNICAL MATHEMATICS</b> -Auto 110 Use of mathematical principles to solve problems in applied field.					
<b>AUTOMOTIVE ELECTRICAL AND EMISSION CONTROL</b> -Auto 120 Study of Electricity, the ignition system, electrical systems and fuel system and service of these units.					
<b>AUTOMOTIVE BUSINESS MANAGEMENT</b> -Auto 130 A basic study of accounting and management principles as related to the automotive service industry.					
<b>TECHNICAL SCIENCE</b> -Auto 190 The study of physics and chemistry as applied to the automobile.					
<b>AUTOMOTIVE CHASSIS, BRAKES, AND TRANSMISSION</b> -Auto 200 The study of design, operating principles and service procedures of the chassis, suspension system, brakes and driveline of the modern vehicle.					
<b>AUTOMOTIVE AIR CONDITIONING AND ACCESSORIES</b> -Auto 220 A course designed to familiarize the student with air conditioning and power accessories. Emphasis is placed on diagnosis and service.					
<b>AUTOMOTIVE BODY AND PAINT</b> -Auto 250 Study of Body construction, repair and refinishing procedures.					
<b>AUTOMOTIVE SERVICE MANAGEMENT</b> -Auto 260 The principles of shop organization and management are discussed during the lecture period. The laboratory period was designed to allow student to specialize in an area of interest.					

11. Indicate your opinion on the amount of time spent in shop or Laboratory in appropriate box.

	TOO SHORT	ADEQUATE	TOO LONG
<b>AUTO ENGINES</b> -12 hrs.			
<b>AUTOMOTIVE ELECTRICAL AND EMISSION CONTROL</b> -12hrs			
<b>TECHNICAL SCIENCE</b> -2hrs			
<b>AUTOMOTIVE CHASSIS, BRAKES, AND TRANSMISSION</b> -12 hrs			
<b>AUTOMOTIVE AIR CONDITIONING AND ACCESSORIES</b> -4 hrs.			
<b>AUTOMOTIVE BODY AND PAINT</b> -12 hrs.			
<b>AUTOMOTIVE SERVICE MANAGEMENT</b> -12hrs.			

12. Additional Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**APPENDIX C**

**LETTER #2**

MISSOURI  
NEWMAN & DUQUESNE ROADS  
PHONE 417-624-8100

*Southern State*

COLLEGE

JOPLIN, MISSOURI 64801



July 14, 1978

Several weeks ago, we mailed you a questionnaire surveying the former students and graduates of the Automotive Technology program at Missouri Southern State College.

As of yet, we have not received your reply. Therefore, in anticipation that the original questionnaire may have been misplaced, we are enclosing another copy. It is extremely important that we receive this information relating to your career success and education since leaving MSSC. This information will be used to improve the Automotive Technology program at MSSC.

Will you please assist us by completing the enclosed questionnaire and returning it in the enclosed, stamped envelope as soon as possible. We hope that you will be willing to provide us with any information or suggestions which you feel will be helpful. All information collected will be considered confidential and no individual will be mentioned by name.

We sincerely appreciate your cooperation.

Sincerely,

*James K. Maupin*  
James K. Maupin  
Dean of Technology

*Roger E. Adams*  
Roger E. Adams  
Assistant Professor, Automotive Technology

P

Enclosures: 2

APPENDIX D

LETTER #3



MISSOURI *Southern State* COLLEGE  
NEWMAN & DUGUESNE ROADS JOPLIN, MISSOURI 64801  
PHONE 417-624-6100

September 1, 1978

During the past several months, we have mailed out questionnaires surveying the career success of the former students and graduates of the Automotive Technology program at Missouri Southern State College.

As of yet, we have not received your reply. It is extremely important that we receive this information relating to your career success and education since leaving MSSC. This information will be used to improve the Automotive Technology program at MSSC.

Will you please assist us by completing the enclosed questionnaire and returning it in the enclosed, stamped envelope as soon as possible. We hope that you will be willing to provide us with any information or suggestions which you feel will be helpful. All information collected will be considered confidential, and no individual will be mentioned by name.

We sincerely appreciate your cooperation.

Sincerely,

*James K. Maupin*  
James K. Maupin  
Dean of Technology

*Roger E. Adams*  
Roger E. Adams  
Assistant Professor  
Automotive Technology

JKM, REA:mm

Encl. - 2

**APPENDIX E**

**SALARY TABLE**

TABLE X  
COMPARISON OF GRADUATES' AND NON-GRADUATES' SALARIES

Pay Scale	Current Pay		Beginning Pay	
	Graduates	Non-Graduates	Graduates	Non-Graduates
Below \$5,000	1	0	4	0
\$5,001-\$6,000	1	0	3	3
\$6,001-\$7,000	1	0	2	3
\$7,001-\$8,000	1	3	4	3
\$8,001-\$9,000	1	0	7	1
\$9,001-\$10,000	5	2	8	6
\$10,001-\$11,000	3	1	2	0
\$11,001-\$12,000	3	4	1	2
\$12,001-\$13,000	3	1	1	2
\$13,001-\$14,000	2	3	0	0
\$14,001-\$15,000	1	0	0	1
\$15,001-\$16,000	3	6	0	0
\$16,001-\$17,000	1	1	0	0
\$17,001-\$18,000	1	0	1	0
\$18,001-\$19,000	1	0	0	0
\$19,001-\$20,000	1	0	0	0
\$20,001-\$21,000	1	0	0	0
\$21,001-\$22,000	1	0	0	0
\$22,001-\$23,000	0	0	1	0
\$23,001-\$24,000	1	0	1	0
\$24,001-\$25,000	1	0	0	0
Over \$25,000	2	0	0	0

**APPENDIX F**

**TOTAL DATA**

## STUDENT FOLLOW-UP DATA FORM

Date \_\_\_\_\_

1.

Please review the above information for accuracy, correct any errors, and answer the following questions.

Phone \_\_\_\_\_

2. Present address of parent, guardian, or nearest relative:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

3. At present time I am:

(a) Working full time \_\_\_\_\_ (d) In Military Service \_\_\_\_\_

(b) Working part time \_\_\_\_\_ (e) A full-time student \_\_\_\_\_

(c) Unemployed \_\_\_\_\_

4. If you are employed on a full-time basis, complete this section. If not, proceed to Section 5.

(a) Employer \_\_\_\_\_

(b) Employer's Address \_\_\_\_\_

(c) City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

(d) Your title: \_\_\_\_\_

(e) Briefly describe your job: \_\_\_\_\_

(f) Date of initial employment in current position: Month \_\_\_\_\_ Year \_\_\_\_\_

(g) Indicate starting yearly salary range with a "1," current salary with a "2."

Below \$ 5,000 \_\_ (a) 10,001-11,000 \_\_ (g) 16,001-17,000 \_\_ (m) 22,001-23,000 \_\_ (s)

\$5,000- 6,000 \_\_ (b) 11,001-12,000 \_\_ (h) 17,001-18,000 \_\_ (n) 23,001-24,000 \_\_ (t)

6,000- 7,000 \_\_ (c) 12,001-13,000 \_\_ (i) 18,001-19,000 \_\_ (o) 24,001-25,000 \_\_ (u)

7,001- 8,000 \_\_ (d) 13,001-14,000 \_\_ (j) 19,001-20,000 \_\_ (p) Over \$25,000 \_\_ (v)

8,001- 9,000 \_\_ (e) 14,001-15,000 \_\_ (k) 20,001-21,000 \_\_ (q)

9,001-10,000 \_\_ (f) 15,001-16,000 \_\_ (l) 21,001-22,000 \_\_ (r)

(h) Does your current position utilize your college education?

Very Much 15 (1) Partly 34 (2) Very Little 10 (3) None 8 (4) NA 3 (5)

(i) Do you believe that your degree was a major factor in your being hired for this job?

Yes 23 (1) No 43 (2) NA 4 (3)

(j) How well has your educational background, from this college, prepared you for the position you are currently holding?

Very well 12 (1) Adequately 40 (2) Poorly 7 (3) Not at All 7 (4) NA 4 (5)

(k) Indicate your degree of satisfaction with your current position in terms of salary:

Very satisfied 3 (1) Dissatisfied 20 (3) No answer 4 (5)  
Satisfied 34 (2) Very Dissatisfied 9 (4)

Working Conditions:

Very satisfied 13 (1) Dissatisfied 13 (3) No answer 8 (5)  
Satisfied 35 (2) Very Dissatisfied 1 (4)

Type of work:

Very satisfied 23 (1) Dissatisfied 9 (3) No Answer 5 (5)  
Satisfied 33 (1) Very Dissatisfied 0 (4)

5. If you did not graduate within two years of beginning the Automotive Technology:

(a) Have you completed the degree requirements?

Yes 21 (1) No 29 (2) No Answer 20 (3) Date \_\_\_\_\_

(b) Have you received an advanced degree since graduation with Associate Degree from this college?

Yes 17 (1) No 52 (2) No Answer 1 (3) Date \_\_\_\_\_

(c) If your answer to 5(b) was yes, answer the question below for the last degree received.

When: Month \_\_\_\_\_ Year \_\_\_\_\_ Where \_\_\_\_\_  
Degree \_\_\_\_\_ Major \_\_\_\_\_

6. (a) Are you attending college on a full-time basis?

Yes 10 (1) No 60 (2)

(b) If your answer to 6(a) was yes, answer the questions below.

Where? \_\_\_\_\_ Degree sought \_\_\_\_\_  
Major \_\_\_\_\_

7. (a) Are you attending college on a part-time basis?

Yes 4 (1) No 66 (2)

(b) Where \_\_\_\_\_ Degree sought \_\_\_\_\_  
Major \_\_\_\_\_

8. What course of courses you took in your program here, have you found of least value?

(a) Major area \_\_\_\_\_

(b) Outside of Major \_\_\_\_\_

Most Value?

(c) Major area \_\_\_\_\_

(d) Outside of Major \_\_\_\_\_

9. In your opinion, to improve your academic preparation, what subject matter should be:

(a) Added:

(b) deleted:

\_\_\_\_\_

10. Indicate the value of the courses listed below by placing a checkmark in the appropriate box.

	CRITICAL VALUE	MAJOR VALUE	CONSIDERABLE VALUE	SOME VALUE	NO REAL VALUE	NO RESPONSE
AUTO ENGINES - Auto 100 deals with the theoretical and practical applicatoin of the internal compustion engine and diagnosis and service of this unit.	31	19	10	2	1	7
TECHNICAL MATHEMATICS - Auto 110 Use of mathematical principles to solve problems in applied field	8	12	12	26	10	2
AUTOMOTIVE ELECTRICAL AND EMISSION CONTROL - Auto 120 Study of Electricity, the ignition system, electrical systems and fuel system and service of these units.	22	26	10	10		2
AUTOMOTIVE BUSINESS MANAGEMENT - Auto 130 A basic study of accounting and management principles as related to the automotive service industry.	13	9	13	19	12	4
TECHNICAL SCIENCE - Auto 190 The study of physics and chemistry as applied to the automobile.	13	9	13	19	12	4
AUTOMOTIVE CHASSIS, BRAKES, AND TRANSMISSION - Auto 200 The study of design, operating principles and service procedures of the chassis, suspension system, brakes and driveline of the modern vehicle.	6	7	12	21	22	2
AUTOMOTIVE AIR CONDITIONING AND ACCESSORIES - 220 A course designed to familiarize the student with air conditioning and power accessories. Emphasis is placed on diagnosis and service.	26	28	7	6	2	1
AUTOMOTIVE BODY AND PAINT - Auto 250 Study of body construction, repair and refinishing procedures.	21	22	15	8	3	1
AUTOMOTIVE SERVICE MANAGEMENT - Auto 260 The principles of shop organization and management are discussed during the lecture period. The laboratory period was designed to allow students to specialize in an area of interest.	20	18	17	9	3	3

11. Indicate your opinion on the amount of time spent in shop or Laboratory in the appropriate box.

	ADEQUATE	TOO LONG	TOO SHORT	NO ANSWER
AUTO ENGINES - 12 hrs.	32	2	27	9
AUTOMOTIVE ELECTRICAL AND EMISSION CONTROL - 12 hrs.	41	3	24	2
TECHNICAL SCIENCE - 2 hrs.	39	17	9	5
AUTOMOTIVE CHASSIS, BRAKES, AND TRANSMISSION - 12 hrs.	36	2	30	2
AUTOMOTIVE AIR CONDITIONING AND ACCESSORIES - 4 hrs.	30	3	34	3
AUTOMOTIVE BODY AND PAINT - 12 hrs.	32	8	26	4
AUTOMOTIVE SERVICE MANAGEMENT - 12 hrs.	31	15	19	5

APPENDIX G

ENTRANCE TEST SCORES



TABLE XI  
COLLEGE ENTRANCE TEST SCORES

	Verbal		Math		Composite	
	Grads	Drop-Out	Grads	Drop-Out	Grads	Drop-Out
24		1	2		3	
25						
26						
27						1
28						
29	2	1	1			
30		2		1		
31	1			2		1
32					1	
33	1	1	1	1		
34			2		1	1
35		1				
36	2		1		2	
37	2	1	2			1
38	1		2		1	1
39	4	4			4	
40	1		2	3	4	2
41	1	1	1		1	1
42	6	1	2	1	1	1
43						
44	1			1	2	
45	2		2		2	3
46	1	2	6	2	3	4

TABLE XI (Continued)

	Verbal		Math		Composite	
	Grads	Drop-Out	Grads	Drop-Out	Grads	Drop-Out
47	2	1	4	3		1
48	2	1	1	2	1	2
49	3			1		1
50	3	3		1	1	
51	3		1	2		
52		1		1		
53		1	2	2	2	1
54		3	3	1	3	3
55	2	2	1			
56			2		3	
57	1			1	3	
58	3	1	5		1	
59	1	3				
60	1					
61	2				1	
62			3	1		2
63			1		1	
64			1		2	
65	1				1	
66	2				1	
67	1					
68				1		
69						
70	52	28	51	27	47	27

**APPENDIX H**

**ADDITIONAL COMMENTS FROM RESPONDENTS**

There is never enough time to adequately teach tech subjects.

The only way to learn Auto Technology is by practical experience in a new car dealership. The new car service schools teach new changes every year and the independent shop won't get these new equipment changes for a couple of years. The school teaches some real good things.

Theory is essential to the learning process. Shop time, however, is the only true test of one's theory. Real problems with complex interwoven roots to them are the source that imbeds learned knowledge in the mind.

For somebody training to be a mechanic, I think more time should be spent in the shop for more training. I also think that a four-year degree should be added.

It is extremely difficult to learn all that is needed in such a short time we have to do it.

Emission Controls more critical. Service Management--need more exposure to customer handling and pacifying.

Auto Service Management sounds like the type of program that a student could get a jump ahead of most people that apply for jobs.

With the coming years looking toward diesel, I feel that this is something coming to the automobile industry. It is already the major thing in trucking and there are getting to be more and more trucks.

As a manager, in looking for employees, I want people who can communicate, can think positive, follow directions, and have a goal in life. No matter what position, this a must.

In my opinion, Auto Engine, Chassis, Brakes and Transmissions, and Body and Paint are the major subjects and should have as much time in the shop as possible.

I think instructor Roger Adams is one of the best, except for his lack of knowledge of the procedure a mechanic must use in working in an actual garage or shop.

I feel a course in education covering just the very basic steps in organization, curriculum development, and objectives would be beneficial in helping the student better understand how the educational system works. Thus, helping the student gain more from the programs.

My present occupation does not deal directly with this field, but I use the knowledge on a weekly basis in servicing my own auto and others.

Automotive Chassis, Brakes and Transmissions should be split into two classes, with transmissions not mandatory. The Auto Tech is out of proportion with other two-year degrees which stops people from completing it. It took me two and one-half years to complete, meaning four and one-half for a B.S.

Automotive Engines and Electrical Emission are the most critical and deserve an ample amount of time in order to become competent in auto servicing and maintenance.

In lab work, an instructor's helper would be a helpful addition.

I appreciated greatly the classes I had at M.S.S.C. I enjoy working on cars and will continue to in my spare time. To help students in preparation for work. I think a customer relations class would be very helpful. I worked at a new car dealership for two and one-half years and the new car owner needs understanding and patience shown to them.

Tech Science is a duplication of a required general education course as is Tech Math.

The only reason I went to college and paid my way all the way through working 40 hours a week was because my father couldn't answer my questions. Personally, Mr. Adams, you taught me how to paint.

In order to train a student for auto service work, I definitely feel more emphasis should be placed on shop work and practical experience with less emphasis on theory.

Before working for the railroad industry, I spent five years as an automobile mechanic in a Chevrolet garage. I found the areas which are most profitable in dollars vs. time spent to be automatic transmissions and air conditioning work. Also, I cannot stress enough importance on a student learning the theory and scientific reasoning behind each area of study. Obviously there is not enough time in the college situation for a student to become experienced in any area of automotive repair, let alone all areas. But if a student is given some exposure to all facets of the repair business and understands the theory and principles of operation behind each area of study, then with practical experience he will easily learn the proper repair because he will understand the why and how everything works.

The automotive courses gave me basic knowledge to get me started in this field and I am very satisfied with the program as a whole.

The automotive classes were very good, but some of the classes that were required need to be changed.

Diesel powered vehicles are more in demand and use than ever before. I believe a course specializing in this area would benefit both the community and M.S.S.C.

If I were rating as an auto mechanic, I would upgrade. My opinions considerably, but most areas just apply to the diesel field.

Tech Math and Tech Science--to be efficient should be combined with engines lecture. A lot of the same material is covered.

Service Management needs to explore the working relations between mechanic, manager, and customer and the attitudes of politeness and respect between at least co-workers and management.

They don't emphasis enough time on management which would allow for greater opportunity for advancement.

Students planning on working in a new car dealership should have the pay system of flat rate manual stressed during the courses. For example, most dealerships pay only .9 of an hour for a tune-up now and if it takes the mechanic 1.9 hours to do the job, he is working on his own time. Speed is more important than accuracy in this type of situation as viewed by this person in several local dealerships (i.e., mechanics not checking spark plug gap before installing and if points or timing are even close to specs it is left alone). I spent three years working and going to school because I thought an automotive degree and being a good mechanic would help me in my chosen career field, but as it turns out the highest paid mechanics are fresh out of high school and I personally would not even let them touch a vehicle of mine. Doing a good job at anything sometimes takes a little extra effort and time. In a car dealership there is no time allowed for a good job to be performed and that is why it should be made a point of by the instructor to learn to be fast first because that is how a mechanic is paid. As far as the service management part is concerned, everywhere I worked the service managers knew less about the automotive business than the mechanics. The service manager in one auto center in town could not even pass the state auto inspector's test but on the same hand when I asked for and felt my qualifications warranted being promoted from general serviceman to auto specialist they felt I wasn't a good enough mechanic. I did not fill out the original form I was sent because I am very bitter about the time I wasted going to school just to end up sweeping floors to support my family. I didn't finish my courses for a degree for money reasons and sure do not interest the school; but if I had, it still would have been worthless in my opinion.

The available job market for a person with an A. T. degree includes many jobs in the manufacturing industry. Therefore, I might suggest more study in the area of manufacturing processes and materials as used in the automotive industry (i.e., metallurgy, plastics, fiberglass). Other areas might include failure analysis and trouble-shooting.

As a truck owner, it is a necessity to be able to maintain my own truck. Also, I service all of the company-owned trucks and some of the other owner-operator's trucks. Without this course and Mr. Adams and Mr. Mason, I would not be where I am today. My training earns me extra money and allows me to save a considerable amount of the upkeep of my truck.

M.S.S.C. and your staff have a great program. So keep it that way if possible.

Math, Science, and Management should be delegated to respective departments.

My time spent at M.S.S.C. has allowed me to work in the automobile field here and overseas with confidence. This attitude was the result of patience and understanding given me by the excellent instruction via Roger Adams and direction from James Maupin.

After receiving my A.S. degree, I worked for two years in three different shops and finally gave up auto mechanics as a vocation because I just could not make enough money to support my family. I would highly recommend Mr. Maupin to consider Construction Tech as a program to offer.

I have checked "too short" for many of the items above--I think that maybe the lecture time should be shortened some and increase the shop time. You might find that the student will do better and might enjoy the program more.

I believe the staff at the auto department is excellent and with a more complete description of some of the classes the student may benefit more. In the lecture area, I think that the instructor should dismantle each part of the auto assembly and explain what the part's function is.

This is the finest program of its type I have ever seen. It is nice to feel prepared for the job you are hired for. Thanks.

More instructors, as well as shop space, should be added to this program.

Need more instructor-to-student contact. Most classes seem to need an extra instructor.

Overall the course was good--more time devoted to shop time should be added. Experience is what most businesses look for and courses in business are an added investment.

More shop time and training in proper use of tools and a little less theory would greatly benefit and prepare the student for the job market. Its only a two-year course and two years is so little time to teach a person the knowledge he needs to get started in this field.

VITA<sup>2</sup>

Roger Earl Adams

Candidate for the Degree of

Doctor of Education

**Thesis:** A COMPARISON OF THE CAREER SUCCESS OF THE GRADUATE AND THE NON-GRADUATE OF AUTOMOTIVE TECHNOLOGY AT MISSOURI SOUTHERN STATE COLLEGE

**Major Field:** Occupational and Adult Education

**Biographical:**

**Personal Data:** Born in Pittsburg, Kansas, March 10, 1944, the son of Mr. and Mrs. Earl L. Adams.

**Education:** Graduated from College High School, Pittsburg, Kansas, in 1962; received Bachelor of Science in Industrial Technology degree from Pittsburg State University in 1966; received Master of Science degree from Pittsburg State University in 1968; received Specialist in Education degree from Pittsburg State University in 1973; completed requirements for the Doctor of Education degree at Oklahoma State University in May, 1981.

**Professional Experience:** Mechanic/Bodyman, Hix Automotive, 1962-64; Counterman/Machinist, Pittsburg Automotive, 1964-66; Instructor, Central Oregon College, 1966-67; Assistant Professor/Instructor, Missouri Southern State College, 1967 to present; Adjustor, General Adjustment Bureau, summer, 1972; co-owner, Joplin Van World, 1978 to present.

**Professional Organizations:** National Education Association, American Vocational Association, Missouri Vocational Association, Technical Education Association.