

Author: Kolasa, Christopher J.

Title: *Factors Influencing Enrollments of High School Students in the Nicolet College Automotive Technology Program – What Encourages Enrollment and what Discourages Enrollment*

The accompanying research report is submitted to the **University of Wisconsin-Stout, Graduate School** in partial completion of the requirements for the

Graduate Degree/ Major: MS Career and Technical Education

Research Advisor: Dr. Kenneth Welty

Submission Term/Year: Spring 2018

Number of Pages: 75

Style Manual Used: American Psychological Association, 6th edition

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STUDENT:

NAME: Christopher J. Kolasa **DATE:** 5/11/2018

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME: Dr. Kenneth Welty **DATE:** 5/11/2018

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Committee members (other than your advisor who is listed in the section above)

1. CMTE MEMBER'S NAME: **DATE:**
2. CMTE MEMBER'S NAME: **DATE:**
3. CMTE MEMBER'S NAME: **DATE:**

This section to be completed by the Graduate School

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Kolasa, Christopher J. *Factors Influencing Enrollments of High School Students in the Nicolet College Automotive Technology Program – What Encourages Enrollment and what Discourages Enrollment*

Abstract

The purpose of this study was to identify factors that encourage or discourage the enrollment of high school student graduates in Nicolet College's Automotive Technology program.

The results of the study found that students with higher levels of automotive knowledge and those that had access to professional mentors were more likely to consider further automotive education. Students with accurate conceptions of the work performed by automotive technicians were less likely to consider further automotive education. Automotive repair skill was not a significant factor in determining whether they pursue further automotive education. Lastly, a significant number of high school students are interested in automotive technology under the auspice of a hobby in contrast to a career.

Given these findings, the automotive technology program should provide professional development that leads to Automotive Service Excellence (ASE) certification for area high school automotive instructors so they can become more effective mentors. It should also support high school students' avocational interests in automotive technology by holding workshops, sponsoring events, and connecting students with accomplished members of the car hobby as an indirect approach to the recruitment of high school students to Nicolet College's Automotive Technology program.

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Chapter I: Introduction

Automotive repair shops in Northern Wisconsin are experiencing growth, but are having difficulties hiring skilled automotive technicians. There is a shortage of automotive technicians across the nation as well as in Northern Wisconsin. Demand has increased within Nicolet College's service region because new dealerships have been built in the Rhinelander area while the established dealerships and independent shops are expanding or addressing employee turnover. While the automotive repair industry has been experiencing growth, the numbers of high school graduates pursuing post-secondary training in automotive technology has decreased across Nicolet College's service region and the nation.

Enrollments in high school Career and Technical Education (CTE) classes have been trending downward. According to the National Center for Education Statistics (2009), the percentage of high school graduates earning credits in transportation and automotive repair has decreased 2.1% between 1990 through 2009. During that same time period, the average number of credits earned by high school graduates in CTE classes went from an average of 4.2 credits down to 3.5 credits.

Wisconsin Technical College enrollments have also been trending downward since the economic downturn of 2008. All but one technical college in Wisconsin indicated that enrollments were down in 2013 (Mills, 2014). This trend has also been verified at Nicolet College as the Automotive Technology program has experienced lower than normal enrollments for the past two school years. Figure 1 lists the enrollment trends for the automotive program from 1969 to 2015. Of particular concern was the enrollment decline of 34 automotive students in 2014 down to 17 in 2015. The Full Time Equivalency count (FTE) for the automotive technology associates degree went from 10.09 FTEs to 3.0 FTEs during that time frame – a 70.2

% reduction (Nicolet College, 2017a). It is not known what caused the abrupt drop in enrollment, and a sudden drop of this magnitude has not been experienced before throughout the program's history.

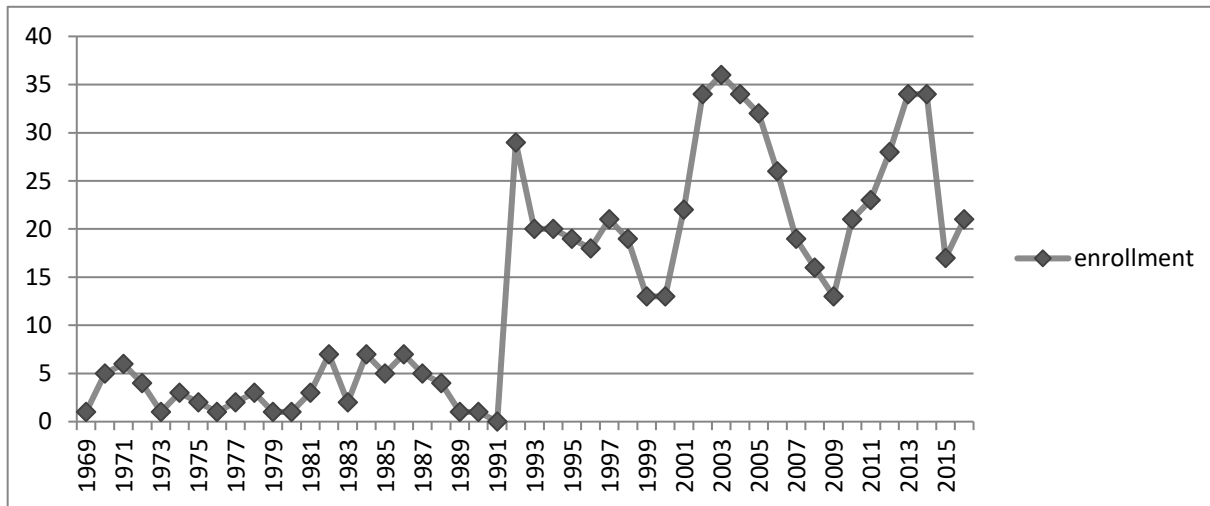


Figure 1. Nicolet College automotive program enrollment from 1969 to 2016.

Another issue directly related to Northern Wisconsin is the dwindling number of high school and college aged people living in the district. From 2010 to 2015, Oneida County, the county where Nicolet College is located, experienced a population drop of 431 people, going from 35,998 people to 35,567 (United States Census Bureau, 2017). Fewer people are making this area their permanent home, which is affecting program enrollments.

There is a high demand for automotive technicians in Nicolet College's district, and throughout Wisconsin. According to the Wisconsin TechConnect (2017) website, which has job listings posted for automotive technicians, there were 142 job openings in the state of Wisconsin with five openings specific to the Rhinelander area during the period of time between September and October of 2017. Feedback from car dealership and independent repair facility personnel indicated a frustration with advertising job openings in TechConnect due to lack of responses from students. These repair facilities would rather visit Nicolet in an attempt to hire students. A

local GM dealership indicated a need to hire upwards of seven students between 2017 and 2018. A local independent transmission rebuilding shop indicated a need for three automotive technicians. Two other independent repair shops indicated a need for an automotive technician each. These job openings added to the positions available on TechConnect suggests there were at least 17 job openings in Rhineland and the surrounding area in October 2017.

Car dealerships and independent shops in the Nicolet College district depend on Nicolet College's Automotive Technology program for trained entry-level technicians to fill positions. The automotive technology program graduated two students in the spring of 2017. With a potential of 17 job openings available in the Rhineland area, there were not enough graduates to fill vacant positions identified by employers. Continued low enrollments could cause the program to be suspended for a period of time, or completely eliminated altogether, forcing car dealerships and independent repair shops to look elsewhere for technicians.

Statement of the Problem

Automotive enrollments have decreased at Nicolet College and throughout the state of Wisconsin. Total enrollment at Nicolet for the 2016-17 school year was below 50% of capacity, with only 10 automotive technology students currently enrolled, two of which were second year students on track to graduate (Nicolet College, 2017). Low enrollments led to low graduation numbers at Nicolet College, causing car dealerships and independent repair shops to struggle to fill entry level automotive technician positions within their companies. Therefore, this study aspired to identify what factors encourage or discourage enrollment of high school students into the Nicolet College Automotive Technology program.

Purpose of the Study

The purpose of this study was to identify factors that encourage or discourage high school student graduates to enroll into the Nicolet College Automotive Technology program. More specifically, this line of inquiry tried to determine if knowledge of automotive service, experience servicing automobiles, conceptions of the automotive service industry, and mentoring and encouragement from others align with plans to enroll in Nicolet College's Automotive Technology program. Therefore, this study addressed the following research questions:

1. Does the amount of automotive repair knowledge that students have make them more or less likely to enroll in the Nicolet College Automotive Technology program?
2. Are high school students with skills to perform common vehicle repairs more or less likely to enroll in the Nicolet College Automotive Technology program?
3. Do high school students have accurate or inaccurate conceptions of servicing automobiles and does that make them more or less likely to enroll in the Nicolet College Automotive Technology program?
4. Do mentors make high school students more or less likely to enroll in the Nicolet College Automotive Technology program?

Assumptions of the Study

The following assumptions underpin this line of inquiry:

1. Practice test items addressing basic automobile maintenance that were published by the National Institute for Automotive Service Excellence (ASE), and endorsed by high school automotive teachers, are valid and appropriate measures of automotive knowledge for high school students completing introductory courses in automotive technology.

2. High school students enrolled in introductory automotive classes at the secondary level have studied basic automotive maintenance concepts and procedures.

Importance of the Study

Automotive training programs are expensive to operate and have lower class sizes compared to general education classes. High school enrollments have decreased because “shop classes” are no longer a required component for graduation in some states (Brown, 2012). Many CTE programs have been eliminated because of their cost relative to the numbers of students being served in times of higher academic accountability and ever-tightening budgets. Students are not getting exposed to the skilled trades such as automotive servicing and do not realize that this is a high-wage, high-demand occupation that will provide a decent earning potential and job security.

With lower interest and enrollments in automotive programs at the secondary level, post-secondary programs are also experiencing lower enrollments and, in turn, are graduating fewer skilled automotive technicians into the workforce. There are currently not enough skilled automotive graduates to fill the job openings in the Nicolet College District.

The following line of inquiry was in alignment with The National Career and Technical Education Research Agenda because it aligns with the research problem areas of program relevance and effectiveness. It addressed the impact of CTE in community development, high-skill, high-wage, or high-demand occupations, and return on investment by state for CTE (Lambeth, Joerger, & Elliot, 2009).

Definition of Terms

The following operational definitions were adopted for the purpose of this study.

Automotive repair skill. Self-reported experiences and confidence levels with routine maintenance tasks on different makes and models of automobiles.

Automotive Service Excellence certification. Successful completion of exams that cover eight areas of an automobile that measure automotive knowledge.

Basics. Automotive servicing topics that are associated with recommended maintenance for most vehicles such as oil changes, tire pressure checks, air filter replacement, fluid level checks, and brake pad inspections.

Conceptions of automotive repair. Levels of agreement with statements derived from the Bureau of Labor Statistics that describe the job duties, working conditions, education requirements, and tools associated with being an automotive technician.

Knowledge of automotive repair. Correct answers to items that address basic automotive maintenance selected from practice tests for the Automotive Service Excellence certification exams.

Mentors. People reported to provide support and encouragement relative to pursuing an interest in automotive technology (e.g., parents, peers, professionals, councilors).

Limitations of the Study

The limitations of the study were as follows:

1. This study was limited to high school students enrolled in automotive technology courses at Tomahawk, Rhinelander, Northland Pines, and Crandon high schools.
2. The results cannot be generalizable to other regions of Wisconsin.

3. Only 62 students participated in the survey and, therefore, the data analysis was limited to comparisons based on frequencies, percentages, and the results of Fisher Exact tests.

Chapter II: Literature Review

The purpose of this study was to identify factors that encourage or discourage enrollment of high school student graduates into the Nicolet College Automotive Technology program. More specifically, it will examine perceptions of automotive repair and how experience and knowledge of servicing vehicles influences students' future career decisions, whether student conceptions of being an automotive technician are accurate or inaccurate, and if mentors influenced students to pursue a career in automotive repair. The review of literature included background information about the nature of being an automotive technician, social cognitive career theory, basic automotive knowledge, automotive experience, common conceptions about being an automotive technician, and influences such as mentors for recruitment of automotive students into post-secondary training programs.

Background Information

Working as an automotive technician is a demanding job that requires a vast amount of qualities that are deemed important for becoming successful. According to the United States Department of Labor, Bureau of Labor Statistics (2015a), automotive technicians must possess physical strength, dexterity, mechanical skills, troubleshooting skills, and customer service skills. Working on vehicles is also a relatively dangerous occupation as cuts, scrapes, bruises, and minor burns are common. Physical demands also require automotive technicians to stand for long periods of time, lift heavy objects, and work in awkward positions.

Furthermore, the automobile has become a technologically sophisticated piece of machinery. Vehicles now contain many computer modules that communicate with each other via extremely fast data networks. The technology has advanced to the point where the self-driving car has become an emerging technology. According to the Ford Motor Company (2016), the

company is developing a fully autonomous taxi to be operational and available for commercial use in the year 2021. The physical demands of automotive repair along with the rapid advancement in technology has increased the need for skilled automotive technicians who are capable of servicing the mechanical and electronic systems in these vehicles. According to the Manpower Group (2016) Annual Talent Shortage Survey, skilled labor, which includes automotive technicians, is the labor segment that is in highest demand in the United States. American businesses are reporting difficulty filling job positions in this strata of the labor market. The State of Wisconsin is predicting a 2.11 % increase in automotive technicians between 2014 and 2024 which will result in an average of 384 new job openings each year through 2024 (Wisconsin's WORKnet, 2016).

According to the United States Department of Labor, Bureau of Labor Statistics (2015e), the mean annual income for an automotive technician is \$38,470 with the possibility of making over \$100,000 a year as a master technician (Technician Pay Appeals to Teens, 2002). An automotive technician is considered to be a high-skill, high-pay occupation that also is in high-demand. Automotive repair is an important contributor to the national economy. In 2016, automotive repair contributed over 126 billion dollars to the nation's gross domestic product (Statista, 2017).

According to Canning (2015), the automotive repair industry is losing many experienced skilled automotive technicians to retirement, advancement, and attrition. A growing economy is also creating a demand for more automotive technicians. This demand is concerning because the number of young people, referred to as Generation Y, who are aspiring to become automotive technicians is not enough to meet current or future demands.

Social Cognitive Career Theory

According to Savickas (2005), if a person develops a certain knowledge or expertise in a particular trade or occupation, it then reinforces their self-efficacy, or belief that they can have continued success in the future. If they perceive many barriers to their success, then the likelihood of entering into the occupation is low. Enough experience can be gained in adolescence to start making reasonable choices for possible career outcomes such as automotive repair by the end of high school. Students that believe they can repair vehicles for a living after taking high school automotive classes would obviously be more inclined to attend post-secondary automotive training programs than those who don't. Bandura (1977), argues that the four most influential sources for developing self-efficacy are accomplishments based on previous success or failures, watching others and being mentored, verbal encouragement or discouragement, and psychological and emotional factors. Self-efficacy can then drive student motivation to pursue a particular career or occupation. It is common for automotive students to report having had influential individuals in their lives who steered them into the automotive trade, such as a parent, uncle, or friend that has experienced success in automotive repair.

Social cognitive career theory is centered on self-efficacy, but also relies on a person's outcome expectations and personal goals (Lent, Brown, & Hackett, 2002). Outcome expectations include projection about how satisfied one would be with the occupation, and personal goals include how motivated one is to reach a particular outcome. Automotive repair is highly technical and challenging work that has been portrayed as a dirty and low-paying occupation. Lower enrollment numbers in automotive repair programs locally and nationally could be linked to perceived dissatisfaction with the occupation. This theory will be used to inform this study if student self-efficacy in automotive repair can be achieved by taking high school automotive

courses or learning more about automotive repair and ultimately lead to enrollment at the automotive program at Nicolet College.

Automotive Repair Knowledge

Having or gaining knowledge of automotive repair is one of the factors that can make an individual believe that they can be successful servicing automobiles as a career. A high school student can develop basic knowledge of automotive repair during high school automotive courses and then continue to build more advanced knowledge by enrolling in post-secondary automotive training at a technical college. Upon graduation it is not unusual for a technician to undergo more specific factory training.

The National Institute for Automotive Service Excellence exams (2018a) speak to the industry standards for measuring a person's automotive repair knowledge. ASE has developed eight standardized tests for automotive technicians which are (A1) Engine Repair, (A2) Automatic Transmission/Transaxle, (A3) Manual Drivetrain and Axles, (A4) Suspension and Steering, (A5) Brakes, (A6) Electrical/Electronic Systems, (A7) Heating and Air Conditioning, and (A8) Engine Performance. These tests are designed to measure a person's automotive knowledge. A review board consisting of automotive technicians, shop owners, and automotive instructors periodically review, design, and update test questions for each area as new technologies are introduced and older technologies become obsolete.

The National Institute for Automotive Service Excellence (2014) says it requires two years of verifiable work experience for automotive technicians to become eligible to take the tests. However, students that have enrolled and graduated from a post-secondary automotive training program are granted one year of experience and only need a year of experience to be eligible to take the ASE certification exams.

ASE testing is now administered electronically and can be taken at almost any time. Certification candidates simply identify a test center offering the exams, make an appointment, and a certified proctor administers the test. Once completed, the test-taker gets instant feedback whether he or she passed or failed the exam in question. The feedback is broken down further into sub-sections so he or she can see his or her strengths and weaknesses in certain areas. An automotive technician can become certified in any or all of the eight areas. Once all eight tests have been passed, they will have earned the status of ASE Master Technician, proving their automotive repair knowledge.

Obtaining ASE Master Technician status indicates substantial knowledge in the eight specialty areas previously mentioned. ASE testing is important because certification is often required by shop owners and dealerships when looking for automotive technicians. Furthermore, ASE certified technicians can command higher salaries because of their proven knowledge of automotive repair and due to marketability of facilities that employ ASE certified automotive technicians.

Individuals that have passed one or more ASE exams are certified for five years. Upon the fifth year, recertification tests need to be taken to extend the certification another five years. The recertification tests usually have fewer questions than the initial exams.

The National Institute for Automotive Service Excellence (2017) speaks to a series of tests developed specifically for students exiting an automotive training program. Although not as rigorous as the regular ASE exams, students who pass these tests get a certification that lasts two years. Student certification exams are used by technical colleges to assess student knowledge at the end of the training program. The results of these exams are often used to measure learning outcomes and to satisfy state mandated accountability requirements.

Automotive Repair Experience

According to the United States Department of Labor, Bureau of Labor Statistics (2015b), automotive service technicians and mechanics inspect, maintain, and repair passenger cars and light duty trucks. The automotive repair industry commonly interprets experience as the number of years a person has been doing certain repairs. The National Institute for Automotive Service Excellence (2014), requires two years' work experience before an automotive technician can attempt to become ASE certified. As automotive technicians gain more experience, they progress into servicing the more complicated vehicle systems and components.

To uncover the skills and abilities that an automotive technician must possess in the Midwestern United States, CarMD (2017) said they analyzed the most common check engine light repairs indicated to customers in the calendar year 2016. They utilized a large network of ASE certified automotive technicians and shop owners to obtain the data from 955,233 recommended repairs. The vehicle model years were between 1996 and 2016. According to this study, the following were the top 10 most common check engine light repairs recommended in the Midwest:

1. Replace oxygen sensor(s)
2. Replace catalytic converter(s)
3. Replace ignition coil(s) and spark plug(s)
4. Inspect for loose fuel cap
5. Replace spark plug wire(s) and spark plug(s)
6. Replace mass air flow sensor
7. Replace evaporative emissions purge control valve
8. Replace thermostat

9. Replace ignition coil(s)
10. Replace evaporative emissions control valve

Automotive technicians also need to possess the knowledge and skills to perform normal maintenance tasks. According to the United States Department of Labor, Bureau of Labor Statistics (2015c), automotive technicians perform basic care and maintenance, oil changes, fluid checks, tire rotations, and brake repairs. The National Automotive Technicians Education Foundation (2013) lists these maintenance tasks as mandatory competencies that must be taught in an accredited automotive training program:

1. Changing engine oil and filter
2. Changing automatic transmission fluid and filter
3. Changing fuel filters
4. Flushing cooling systems
5. Balancing, rotating, or replacing tires
6. Inspecting or replacing air filters and pollen filters
7. Replacing brake pads and rotors
8. Changing timing belts and accessory belts
9. Testing batteries

The repairs and maintenance tasks listed previously are likely frequently addressed by automotive technicians in the Nicolet College district of Northern Wisconsin. Therefore, aspiring automotive technicians need to develop the knowledge and skills needed to diagnose and address these common maintenance and repair issues across a variety of automobile makes and models.

Conceptions of Automotive Repair

One of the factors that influence enrollment in the Nicolet College Automotive Technology program is accurate and inaccurate conceptions of the automotive repair industry. According to the United States Department of Labor, Bureau of Labor Statistics (2015c), the main job duties of an automotive technician are to inspect, maintain, and repair cars and light duty trucks. More specifically, these duties include the following:

1. Identify problems with computer diagnostic equipment
2. Plan work procedures using charts, manuals, and experience
3. Test parts and systems for proper operation
4. Follow checklists
5. Perform basic care and maintenance
6. Repair or replace worn parts
7. Perform repairs to manufacturer and customer specifications

Although the environmental conditions of repair shops can vary, the United States Department of Labor, Bureau of Labor Statistics (2015d) describes the work environment that an automotive technician will be subjected to include the following:

1. Standing for most of the day
2. Working in well ventilated and well lighted shops
3. Fixing problems with computers
4. Working with greasy parts and tools
5. Working in uncomfortable positions
6. Working evenings, weekends, and overtime
7. Working in an occupation with one of the highest injury and illness rates

8. Requiring post-secondary education to be hired
9. Requiring to become or maintain ASE certification
10. Purchasing their own tools

Many believe that being an automotive technician is a menial, low-paying dirty job. In a study by Harris (2003), it is stated that only 21% of students surveyed thought that automotive technicians are well paid and are not “grease monkeys”. According to the United States Department of Labor, Bureau of Labor Statistics (2015e), the median pay for automotive technicians for the year 2016 is \$38,470 per year or \$18.50 per hour. In contrast, the United States Department of Labor, Bureau of Labor Statistics (2015f) indicated that the median wage for a diesel service technician to be \$45,170 per year. Automotive students working part-time while going to college have indicated wages between \$9.00 and \$11.00 dollars per hour within the Nicolet College service region. Local starting wages for entry level automotive technicians that have graduated from the Nicolet College Automotive Technology Program reported incomes between \$21,000 and \$25,000 per year (Nicolet College, 2017b).

Mentoring High School Students to Become Automotive Technicians

According to the Merriam-Webster dictionary (2017), a mentor is a person acting as a counselor or guide. Mentors for high school students considering a career as an automotive technician could be professional automotive technicians, shop owners, friends, neighbors, or family members that work on vehicles. Informal mentoring relationships and formal mentoring programs can be great opportunities for students to gain automotive skills and knowledge. Conventional wisdom suggests students who discover they are good at repairing vehicles under the guidance and encouragement of a mentor are more likely to pursue further education and training.

An informal mentor can help high school students develop an interest in automotive repair. According to Inzer and Crawford (2005), informal mentoring takes place in a relationship between two people where one gains knowledge and wisdom from the other. This relationship is considered voluntary through mutual friendship. An informal mentor could be a neighbor that works on vehicles where the young person is allowed to help with repairs. Another example could be a father-son vehicle restoration project where the young person works and learns as he or she works on a vehicle together.

Formal mentoring tends to be a work-place driven initiative (Inzer & Crawford, 2005). This type of mentoring may include a new employee pairing up with a veteran employee with the goal of developing the new employee to his or her potential. Repair shops commonly hire high school aged apprentice technicians to work with a master technician while they go to school. Automotive Youth Educational Systems (2014) describes an example of a formal mentorship within a dealership while the student goes to high school for part of the day and then works in a shop with a mentor for another period of time. Formal mentoring programs give employers an opportunity to identify, nurture, and groom young people to fill positions within their automotive repair businesses. More specifically, a mentor could impress upon the student how to care for customer vehicles, how to use and care for tools, how to repair vehicles, and how to maintain work stations.

Chapter III: Methodology

The purpose of this study was to identify factors that encourage or discourage the enrollment of high school student graduates into the Nicolet College Automotive Technology program. More specifically, it examined perceptions about automotive repair and how increased experience and knowledge of servicing vehicles influences students' future career decisions, whether student conceptions of being an automotive technician are accurate or inaccurate, and if mentors influenced students to pursue a career in automotive repair. The following narrative outlines the methods and procedures used in this study, including the research design, sample selection, instrumentation, implementation procedures, and data analysis.

Research Design

The research design for this study was descriptive, and a survey methodology was used to gather the data needed to address the research questions. The independent variables in this study were automotive knowledge, automotive experience, conceptions of automotive repair, and mentoring of automotive students. The dependent variables in this study were students' enrollment at Nicolet College, students' career choice, and the career opportunities of an automotive technician.

Subjects

The subjects who participated in this study were 62 high school automotive technology students from Crandon, Northland Pines, Rhinelander, and Tomahawk High Schools.

The total number of students from Crandon High School was 14, of which 12 were male and two were female. Their grade levels included four freshman, three sophomores, three juniors, and four seniors. In terms of previous automotive related coursework, five students

indicated taking a small engines course, seven students indicated taking an introductory automotive course, and one student indicated taking an advanced automotive course.

According to the Wisconsin Information System for Education Data Dashboard (2017a), 44.4% of students enrolled at Crandon High School qualified for a free or reduced lunch for the 2016-17 school year.

The total number of students from Northland Pines High School was 12, of which 11 were male and one was female. Their grade levels included two sophomores, nine juniors, and one senior. In terms of previous automotive related coursework, ten students reported taking a small engines course, four students indicated taking an introductory automotive course, and one student indicated taking an advanced automotive course.

According to the Wisconsin Information System for Education Data Dashboard (2017b), 36% of students enrolled at Northland Pines High School qualified for a free or reduced lunch for the 2016-17 school year.

The total number of students from Rhinelander High School was 22, of which 21 were male and one was female. Their grade levels included eight freshman, five sophomores, four juniors, and five seniors. In terms of previous automotive related coursework, 22 students indicated taking a small engines course, six indicated taking an introductory automotive course, and one indicated taking an advanced automotive course.

According to the Wisconsin Information System for Education Data Dashboard (2017c), 34.1% of students enrolled at Rhinelander High School qualified for a free or reduced lunch for the 2016-17 school year.

The total number of students from Tomahawk High School was 14, of which 13 were male and one was female. Their grade levels included one junior and 13 seniors. In terms of

previous automotive related coursework, 12 students reported taking a small engines course, eight students reported taking an introductory automotive course, and ten students reported taking an advanced automotive course.

According to the Wisconsin Information System for Education Data Dashboard (2017d), 33% of students enrolled at Tomahawk High School qualified for a free or reduced lunch for the 2015-16 school year.

Instrumentation

The instrumentation used for this research was a paper and pencil questionnaire. The tool was divided into four discrete sections that measured automotive repair knowledge, automotive repair skill, conceptions of automotive repair, and mentoring students in automotive repair. The first section featured a pool of items that were adopted from ASE practice exams. They were selected based on their alignment with common maintenance and inspection charts based on the assumption they represent basic automotive repair knowledge for an entry level position in the automotive servicing industry. The scale used for the automotive repair knowledge section includes multiple choice answers primarily utilizing ASE style “Technician A”, “Technician B”, “Both” or “Neither” for possible answers. Student responses were compared to the answers associated with the ASE practice exam questions to determine number of items answered correctly.

The second pool of items measured automotive repair skill in the context of common automotive maintenance procedures that were adopted from CarMD and aligned with those outlined by the United States Bureau of Labor Statistics for entry level employment. The scale used for the automotive repair skill section included identifying the confidence level that the student has towards certain vehicle repairs. The scale ranges from “very confident”, “confident”,

“somewhat confident”, to “not confident”. Frequency of repair is also measured. The scale ranges from “zero repairs performed”, “one repair performed”, “two to three repairs performed”, and “four or more repairs performed”. Finally, students were asked how many different makes and models of vehicles that they have serviced. The scale ranges from “zero make/model”, “one make/model”, “two to three makes/models”, and “four or more makes/models”.

The third pool of items were also based on the United States Bureau of Labor Statistic’s description of the work performed by automotive service technicians. They were used to measure students’ conceptions of the working conditions associated with automotive repair. The items and scale used to measure conceptions of automotive repair included statements that described basic job duties and working conditions of automotive technicians. Students were asked if they strongly agreed, agreed, disagreed, or strongly disagreed with each statement.

The fourth section featured items that addressed mentoring high school students. They were based on a review of literature regarding the nature of mentoring, especially in the context of supporting an interest in working on automobiles and possibly pursuing further education and a career in automotive servicing. The items scale used to measure students’ experiences with mentoring features statements that asked students to strongly agree, agree, disagree, or strongly disagree. A student could also select not-applicable if they had not had an opportunity to work with a mentor.

Procedures Followed

Prior to implementing the survey, the researcher provided a copy of the instrument to the high school automotive instructors participating in this study. They were asked to look over and determine if the questionnaire was developed at an appropriate level for high school aged students. All four automotive instructors from Rhinelander, Tomahawk, Crandon, and Northland

Pines high schools indicated the items were appropriate based on the scope and sequence of their curriculum and instruction. The questionnaire was administered at each high school in a classroom near the automotive lab. Students were given as much time as they needed to complete the survey within the time period allocated for their automotive technology class. Students were informed that their participation in the survey was voluntary, their identity would remain anonymous, and their results would be kept confidential. They were given brief instructions on how to complete the questionnaire and where to put their completed questionnaire when finished. The researcher reviewed an example question for each section so students could ask questions if anything was not clear. All the students that participated were able to complete the questionnaire within their assigned class period. The total number of students enrolled in the automotive courses at all the four high schools was 68. Sixty-two students were in attendance and completed the questionnaire. Copies of the tests and answer sheets were given to each high school instructor for instructional use within their classrooms.

Method of Data Analysis

Responses to the items that measured automotive knowledge were compared to an answer key of correct answers to indicate total number of correct responses. Correct and incorrect responses were reported in the form of frequencies and percentages. Responses from the section that measured experiences with automotive repairs were reported in the form of frequencies and percentages. Responses to the sections addressing conceptions and mentoring were reported as frequencies and percentages. A Fisher Exact test was used to compare the students' plans for further education related to automotive servicing and their automotive knowledge, automotive repair skill, conceptions of automotive technicians, and experiences with mentors.

Chapter IV: Results

The purpose of this study was to identify factors that encourage or discourage the enrollment of high school student graduates into the Nicolet College Automotive Technology program. More specifically, it examined students' perceptions about automotive repair and how increased experience and knowledge of servicing vehicles influences students' future career decisions, whether student conceptions of being an automotive technician are accurate or inaccurate, and if mentors influenced students to pursue a career in automotive repair. The research study was descriptive in design utilizing a survey methodology to gather data needed to address the research questions.

Subjects

The subjects utilized for this study included students from Rhinelander, Tomahawk, Northland Pines, and Crandon high schools. The total number of students surveyed included 57 males and five females. All students were enrolled in or had previously taken small engines, introductory automotive, or advanced automotive classes. See Tables 1 - 8.

Table 1

Sample Demographics - Rhinelander

| Grade Level | Males | Females |
|-------------|-------|---------|
| Freshman | 8 | 0 |
| Sophomore | 5 | 0 |
| Junior | 3 | 1 |
| Senior | 5 | 0 |

Table 2

Sample Demographics - Tomahawk

| Grade Level | Males | Females |
|-------------|-------|---------|
| Freshman | 0 | 0 |
| Sophomore | 0 | 0 |
| Junior | 1 | 0 |
| Senior | 12 | 1 |

Table 3

Sample Demographics – Northland Pines

| Grade Level | Males | Females |
|-------------|-------|---------|
| Freshman | 0 | 0 |
| Sophomore | 2 | 0 |
| Junior | 8 | 1 |
| Senior | 1 | 0 |

Table 4

Sample Demographics - Crandon

| Grade Level | Males | Females |
|-------------|-------|---------|
| Freshman | 4 | 0 |
| Sophomore | 3 | 0 |
| Junior | 2 | 1 |
| Senior | 3 | 1 |

Table 5

Previous Automotive Coursework - Rhineland

| Class | Males | Females |
|-------------------------|-------|---------|
| Small Engines | 21 | 1 |
| Introductory Automotive | 6 | 0 |
| Advanced Automotive | 1 | 0 |

Table 6

Previous Automotive Coursework - Tomahawk

| Class | Males | Females |
|-------------------------|-------|---------|
| Small Engines | 11 | 1 |
| Introductory Automotive | 8 | 0 |
| Advanced Automotive | 10 | 0 |

Table 7

Previous Automotive Coursework – Northland Pines

| Class | Males | Females |
|-------------------------|-------|---------|
| Small Engines | 9 | 1 |
| Introductory Automotive | 3 | 1 |
| Advanced Automotive | 1 | 0 |

Table 8

Previous Automotive Coursework - Crandon

| Class | Males | Females |
|-------------------------|-------|---------|
| Small Engines | 5 | 0 |
| Introductory Automotive | 6 | 1 |
| Advanced Automotive | 1 | 0 |

The study revealed a predominately male population of automotive students with a good sample of students from freshman age through senior. All high schools offered a small engines class, an introductory automotive maintenance class, and an advanced automotive repair class. The small engines class is the entry level class that freshman take before being able to take automotive classes. All of the respondents were currently enrolled in an advanced automotive class, except one class section of students from Rhinelander who were enrolled in a small engines class. Some of the respondents checked more than one response. Twenty-one percent of the respondents indicated that they had no interest in pursuing a career in automotive repair. Nineteen percent of respondents indicated they would only pursue automotive repair as a hobby with no further education, while 21% indicated they would pursue automotive repair as a hobby and consider further education in automotive repair. Eight percent of the respondents indicated that if they were to pursue a career in automotive repair, they believed they could just enter the workforce. Eleven percent of the respondents indicated that they would entertain the possibility of enrolling in the Nicolet Automotive Technology program, while 3% of the respondents indicated the possibility of enrolling in a different automotive repair program or enrolling at a later date. See Table 9.

Table 9

Plans for the Future

| Plan | Number | Percentage |
|---|--------|------------|
| Not interested in a career in automotive repair. | 17 | 21% |
| Interested as a hobby only with no further education. | 12 | 19% |
| Interested as a hobby only, would consider further education. | 12 | 21% |
| Interested as a career, would consider further education. | 7 | 14% |
| Interested as a career, would just enter the workforce. | 5 | 8% |
| Would consider applying to Nicolet College Automotive Technology program. | 9 | 11% |
| Would consider applying to automotive repair program elsewhere. | 2 | 3% |
| May apply to an automotive repair program at a later date. | 2 | 3% |

Automotive Repair Knowledge

The first research question sought to determine if high school students with high or low levels of automotive knowledge were more or less likely to enroll in the Nicolet College Automotive Technology program. The average score on the automotive knowledge exam for all four high schools was 58% (see Table 10). Respondents displayed knowledge in basic maintenance items such as motor oil, transmission fluid, antifreeze, air filters, fuel filters, tires, and compression testing. To a lesser degree, the respondents displayed some knowledge in areas such as battery testing, brake fluid/bleeding, and brake pad wear.

Table 10

Average Automotive Knowledge Score for Each School

| School | Average Score |
|--------------------------------|---------------|
| Rhinelanders Class 1 | 62% |
| Rhinelanders Class 2 | 53% |
| Tomahawk | 65% |
| Crandon | 48% |
| Northland Pines | 64% |
| Average (Mean) for all Schools | 58% |

To determine if automotive knowledge is a factor in making a student more or less likely to enroll in the Nicolet Automotive Technology program, automotive knowledge scores were compared to the future plans that were indicated by each respondent. Respondents that indicated that they are not pursuing a career in automotive repair had an average score of 53%, with a high score of 100% and a low score of 17%. A total of 17 respondents selected no interest in a career in automotive repair. See Figure 2.

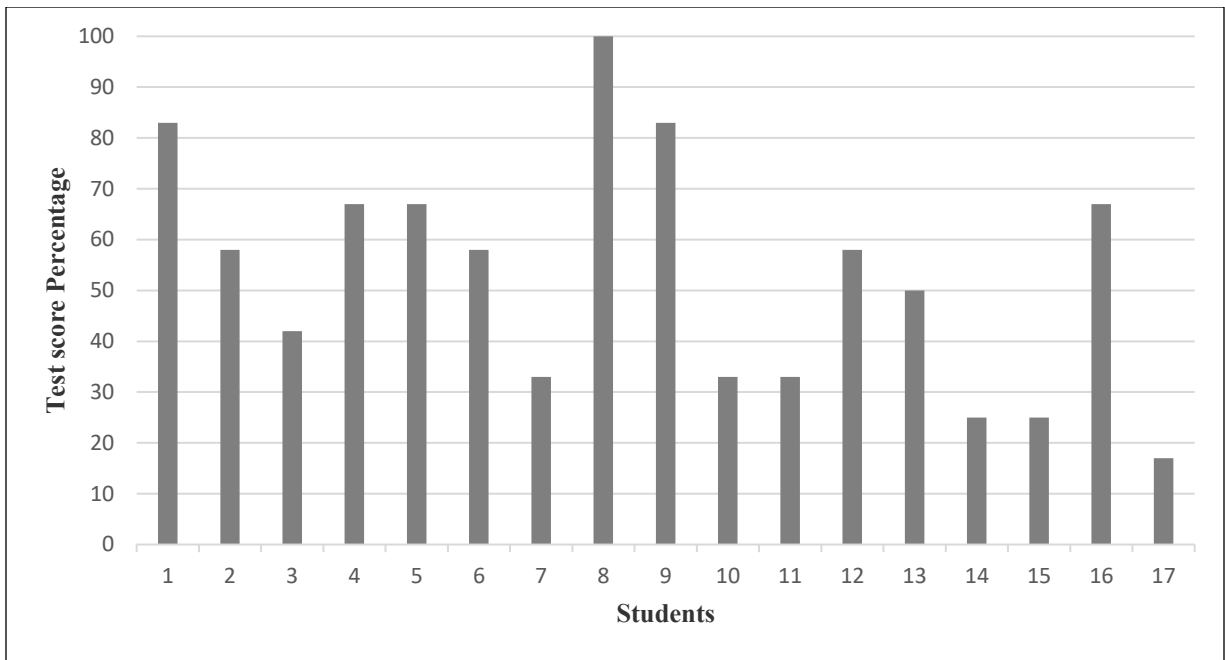


Figure 2. Test scores of respondents who answered “I am not interested in a career in automotive repair.”

Respondents who indicated that they are interested in automotive repair only as a hobby and not looking to further their education beyond high school in the automotive field had an average score of 54%, with a high score of 83% and a low score of 25%. A total of 12 respondents selected an interest in automotive repair as a hobby only with no further education. See Figure 3.

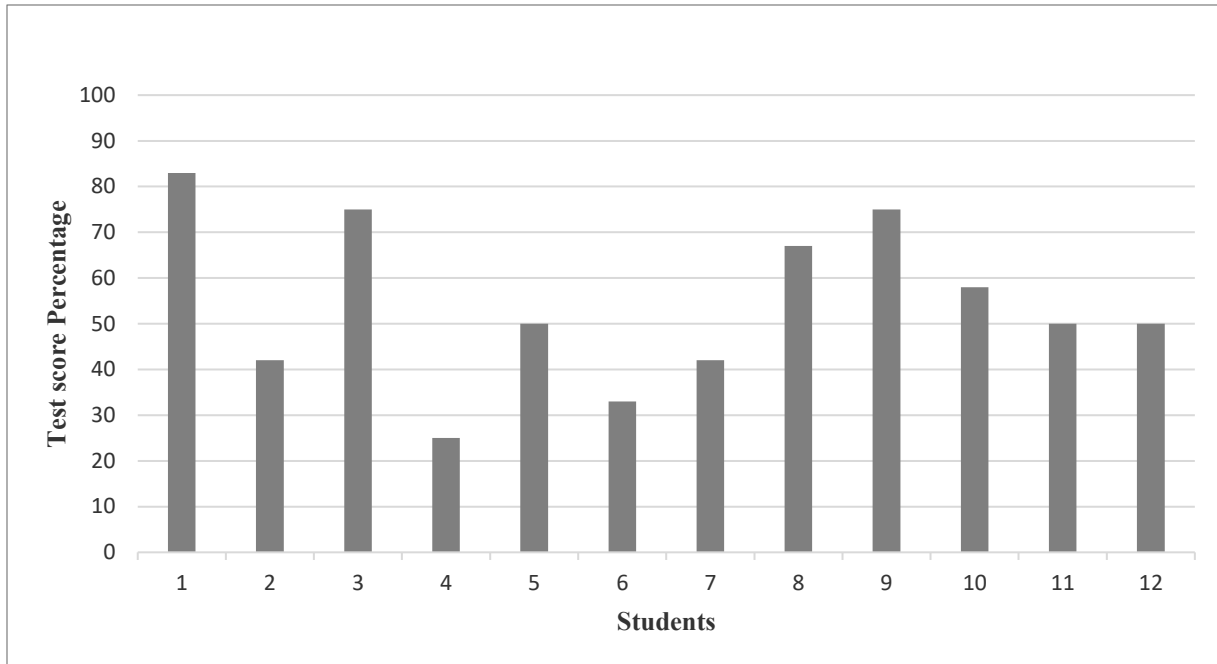


Figure 3. Test scores of respondents who answered “I am interested in automotive repair only as a hobby and am not looking to further my education beyond high school in the automotive field.”

Respondents who indicated that they are interested in automotive repair only as a hobby and would consider further education beyond high school in the automotive field had an average score of 69%, with a high score of 92% and a low score of 42%. A total of 12 respondents selected an interest in automotive repair as a hobby only and would consider education beyond high school in the automotive field. See Figure 4.

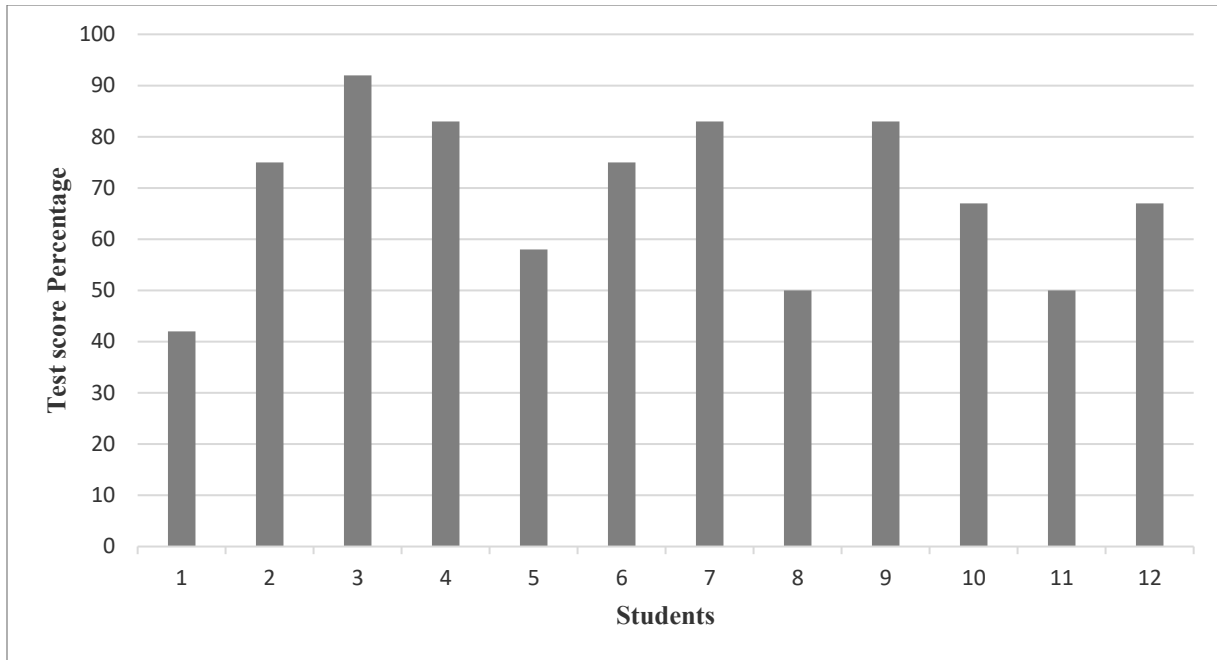


Figure 4. Test scores of respondents who answered “I am interested in automotive repair only as a hobby and would consider education beyond high school in the automotive field.”

Respondents who indicated that they are interested in automotive repair only as career and would consider further education beyond high school in the automotive field had an average score of 59%, with a high score of 83% and a low score of 33%. A total of seven respondents selected an interest in automotive repair as a career who would consider education beyond high school in the automotive field. See Figure 5.

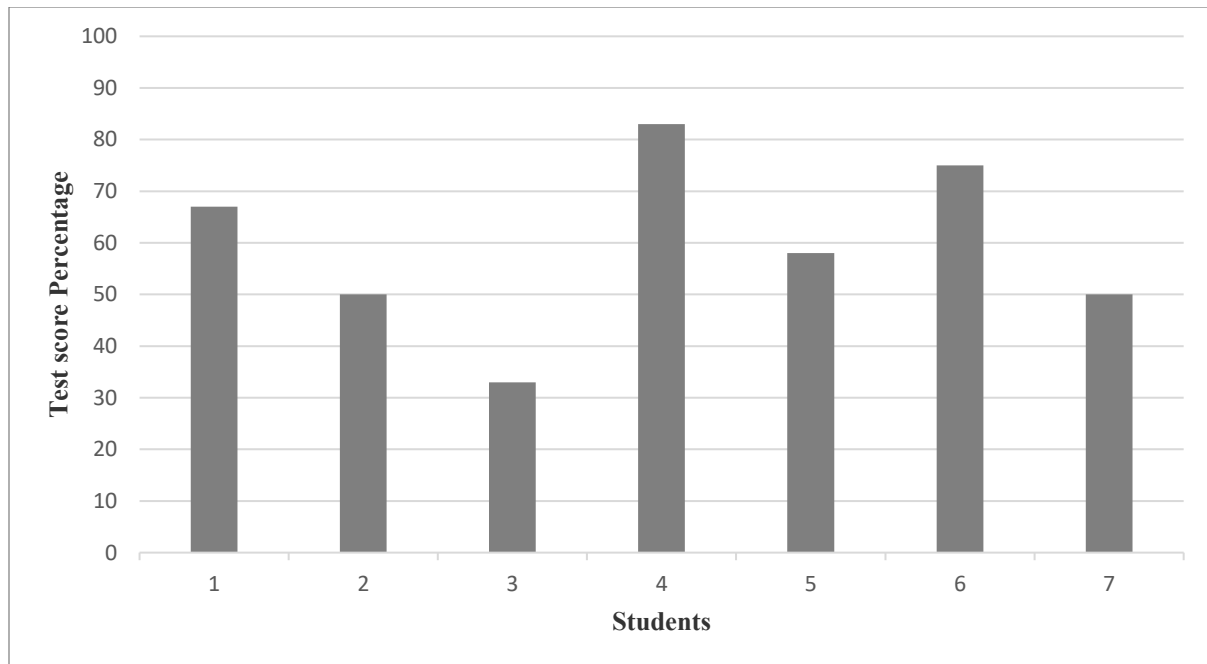


Figure 5. Test scores of respondents who answered “I am interested in automotive repair as a career and would consider education beyond high school in the automotive field.”

Respondents who indicated that they are interested in automotive repair as a career and feel they could just enter the workforce had an average score of 53%, with a high score of 75% and a low score of 33%. A total of five respondents selected an interest in automotive repair as a career who would just enter the workforce. See Figure 6.

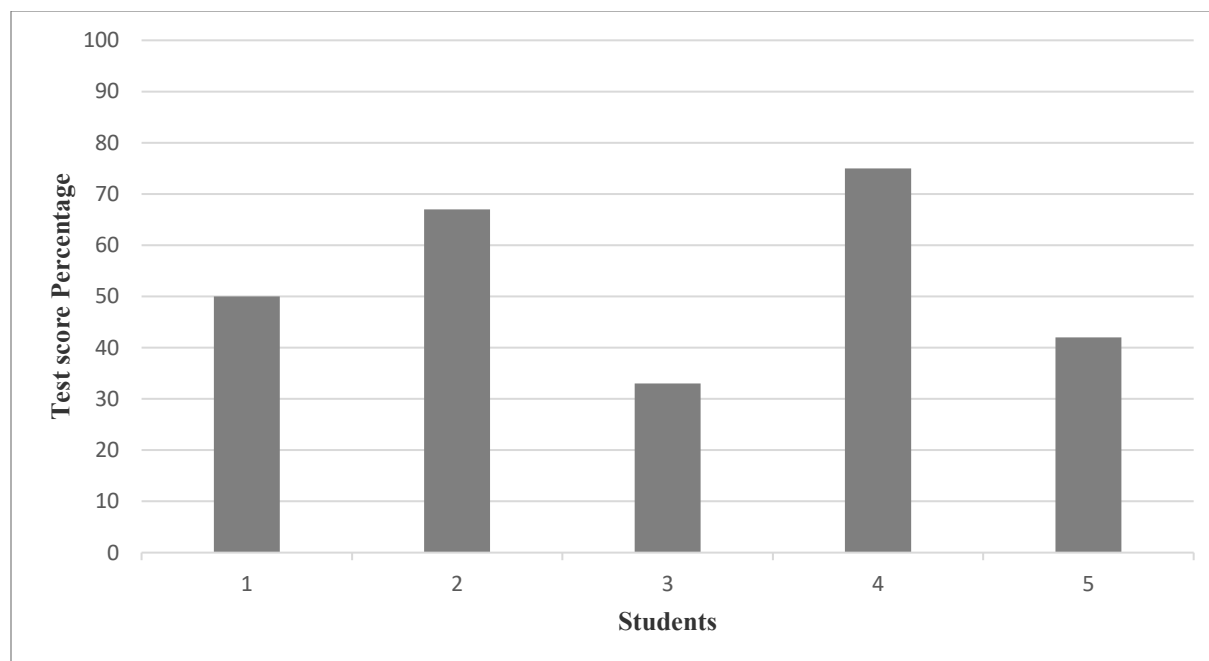


Figure 6. Test scores of respondents who answered “I am interested in automotive repair as a career and feel I could just enter the workforce.”

Respondents who indicated that they are considering applying to the Nicolet College Automotive Technology program had an average score of 61%, with a high score of 83% and a low score of 50%. A total of nine respondents selected that they are considering applying to the Nicolet College Automotive Technology program. See Figure 7.

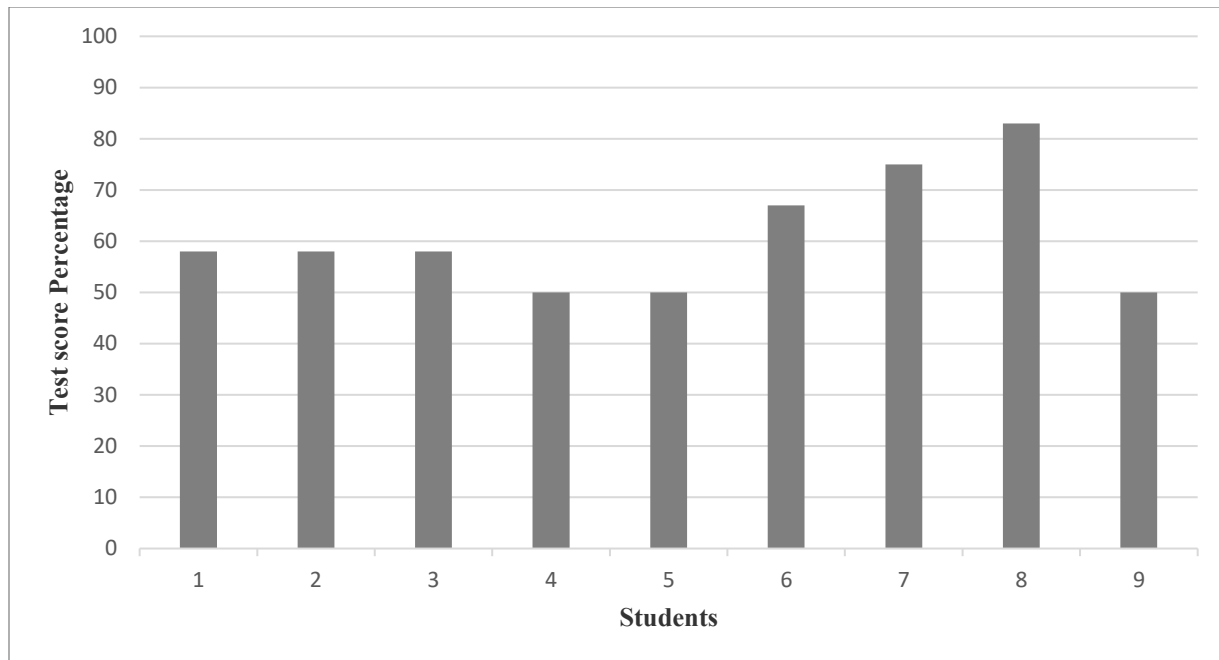


Figure 7. Test scores of respondents who answered “I am considering applying to the Nicolet College Automotive Technology program.”

Respondents who indicated that they are considering applying to an automotive repair program elsewhere had an average score of 67%, with a high score of 75% and a low score of 58%. A total of two respondents selected that they are considering applying to an automotive repair program elsewhere. See Figure 8.

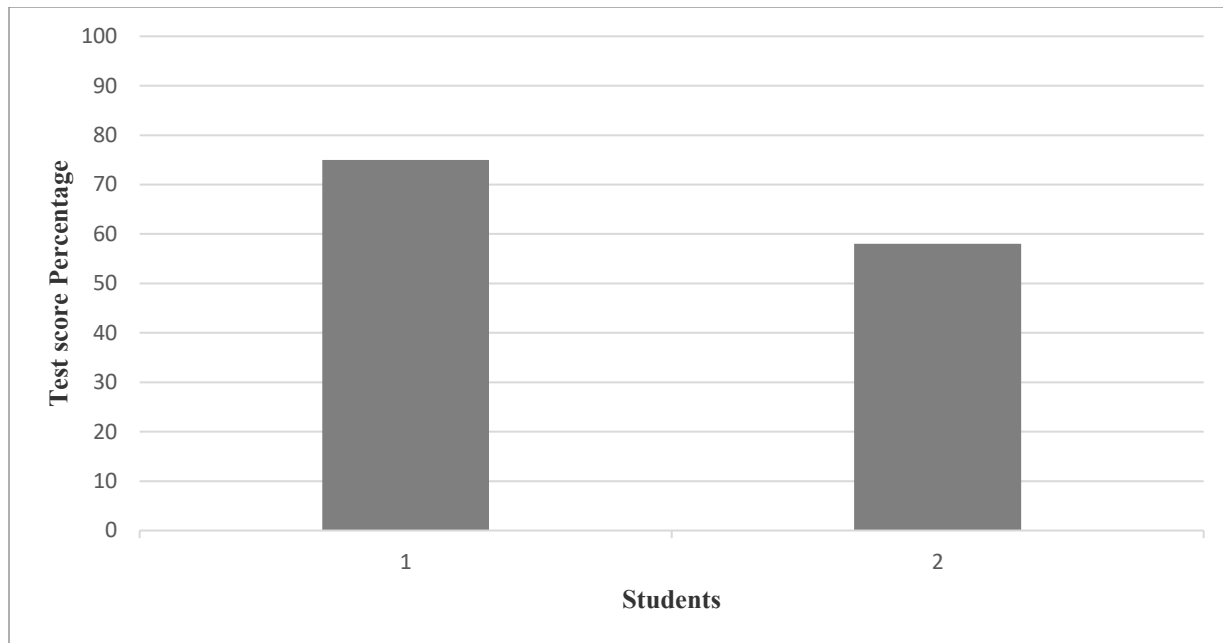


Figure 8. Test scores of respondents who answered “I am considering applying to an automotive repair program elsewhere.”

Respondents who indicated that they may apply to an automotive repair program at a later date had an average score of 30%, with a high score of 42% and a low score of 17%. A total of two respondents selected they may apply to an automotive repair program at a later date. See Figure 9.

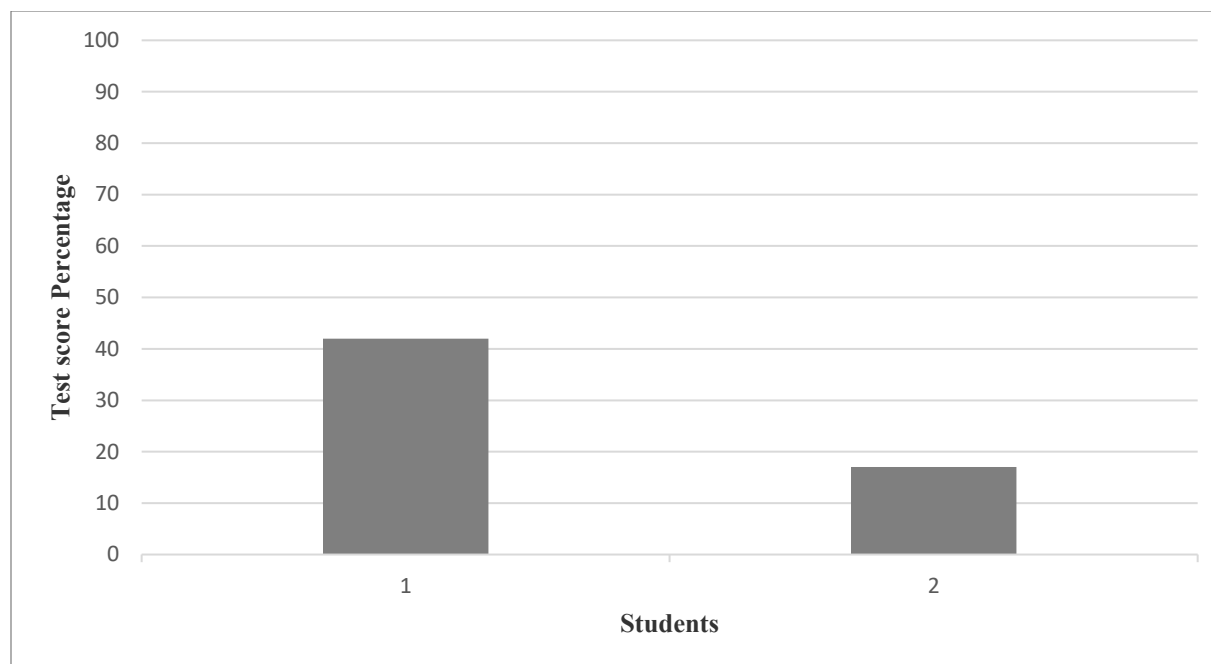


Figure 9. Test scores of respondents who answered “I may apply to an automotive repair program at a later date.”

Students that scored at/or above the mean on the knowledge test and are not considering further automotive education slightly outnumbered students that are considering further automotive education. The majority of students that scored below the mean on the knowledge test are not considering further automotive education ($p < 0.3014$). The results of the study were found to be not statistically significant. Students with automotive repair knowledge at/or above the mean were almost equally split between considering and not considering further automotive education. The majority of students with automotive repair knowledge below the mean are not considering further automotive education. Students with automotive repair knowledge at/or above the mean are more likely to consider further automotive education at Nicolet College than students with automotive repair knowledge below the mean. See Table 11.

Table 11

Automotive Repair Knowledge Compared with Further Education Plans

| Amount of Automotive Repair Knowledge | Considering Further Education | Not Considering Further Education |
|---------------------------------------|-------------------------------|-----------------------------------|
| Knowledge at/or Above the Mean | 17 | 18 |
| Knowledge Below the Mean | 9 | 18 |

Automotive Repair Skill

The second question sought if high school students with high or low levels of self-assessed automotive repair skill were more or less likely to enroll in the Nicolet College Automotive Technology program. Roughly half of the respondents indicated they were confident or very confident with their skill and the other half indicated they were somewhat confident or not confident with their repair skill. Respondent confidence level was highest for basic maintenance procedures such as changing oil and filter, inspecting tires/adjusting tire pressure, and inspecting brake pads for wear. A few of the respondents reported never changing oil on a vehicle, inspecting tires/adjusting tire pressure, and inspecting brake pads for wear. Level of confidence closely mirrored the number of repairs and number of makes/models of vehicles that the respondents indicated working on. Thus, increases in confidence for the majority of respondents was proportional to a greater number of repairs on different makes/models of vehicles. See Tables 12, 13, and 14.

Table 12

Average Repair Skill Confidence Level

| Confidence Level | Percentage |
|--------------------|------------|
| Very Confident | 31% |
| Confident | 19.8% |
| Somewhat Confident | 23% |
| Not Confident | 26.2% |

Table 13

Average Number of Repairs

| Number of Repairs | Percentage |
|-------------------|------------|
| 0 | 28.3% |
| 1 | 19.5% |
| 2 - 3 | 26.4% |
| 4 or More | 26.9% |

Table 14

Average Number of Vehicle Makes/Models

| Number of Makes/Models | Percentage |
|------------------------|------------|
| 0 | 28.3% |
| 1 | 26.5% |
| 2 - 3 | 26.9% |
| 4 or More | 18.6% |

The majority of the respondents were confident in their skills to change oil and filter and not confident in their skills to flush a cooling system. Confidence level for changing oil and filter

was compared to considering further education or not. The results were found to be not statistically significant ($p < .0522$). Confidence level for flushing a cooling system was compared to considering further education or not. The results were found to be not statistically significant ($p < .1567$). The results of the study indicated that automotive repair skill is not a major factor in making a student more likely to enroll at Nicolet College. Many students with automotive repair skill have no interest in a career in automotive repair. A large majority of the students do indicate some confidence in changing oil and less confidence in flushing a cooling system. In both samples, the majority of students are not considering further automotive education. See Table 15.

Table 15

Repair Confidence Compared to Further Education

| Confidence Level | Considering Further Education | Not Considering Further Education |
|---|-------------------------------|-----------------------------------|
| Confident Changing Oil | 25 | 25 |
| Not Confident Changing Oil | 2 | 10 |
| Confident Flushing a Cooling System | 10 | 8 |
| Not Confident Flushing a Cooling System | 15 | 29 |

Conceptions of Servicing Automobiles

The third research question sought to identify if students who have accurate or inaccurate conceptions of servicing automobiles were more or less likely to enroll in the Nicolet College Automotive Technology program. Students were given an accurate list of what automotive technicians should expect and experience daily working as an automotive technician and asked to what extent they agreed with the conceptions. A few of the respondents disagreed and/or

strongly disagreed with some of the conceptions. The majority of the conceptions were answered either as strongly agree or agree. See Table 16.

Table 16

Average Percentage of Automotive Repair Conceptions

| Agreement | Percentage |
|-------------------|------------|
| Strongly Agree | 21.5% |
| Agree | 55.3% |
| Disagree | 20.7% |
| Strongly Disagree | 2.5% |

About a quarter of the respondents disagreed that automotive technicians must purchase and maintain their own tools, the majority disagreed that automotive technicians have the highest rate of injury and illness of all occupations, and about a quarter disagreed that automotive technicians stand for most of the day and work overtime and weekends. The results indicate that the majority of respondents who agreed that automotive technicians have one of the highest injury and illness rates of all occupations are not considering further automotive education. The majority of students who disagreed that automotive technicians have one of the highest injury and illness rates of all occupations would consider further education ($p < 0.0061$). See Table 17.

Table 17

Conceptions of Injury and Illness Rates Compared to Further Education

| Agreement | Considering Further Education | Not Considering Further Education |
|--|-------------------------------|-----------------------------------|
| Agree automotive technicians have one of the highest injury and illness rates | 3 | 16 |
| Disagree automotive technicians have one of the highest injury and illness rates | 23 | 20 |

Mentoring High School Automotive Students

The fourth research question sought to determine if students have had a mentor to work with while servicing automobiles and if mentors made them more or less likely to enroll in the Nicolet College Automotive Technology program. Mentors were broken down into professional automotive technician/shop owner and no mentor/non-professional mentor. The results of the study indicate that the majority of the respondents have been introduced to automotive repair by a mentor. The majority of the respondents also indicated that working with a mentor increased their knowledge and skills in automotive repair, made them feel like they could repair vehicles for a career, and gave them an accurate conception of automotive repair. Approximately half of the respondents indicated no desire to have a career in automotive repair and the other half indicated a possible interest in a career in automotive repair/possible further education. The results do indicate that the majority of students that had professional mentors would consider further automotive education, while the majority of students that had non-professional mentors would not consider further automotive education ($p < 0.0008$). See Table 18.

Table 18

Student Career Considerations per Type of Mentor

| Mentor Type | Considering Further Education | Not Considering Further Education |
|---------------------------------------|-------------------------------|-----------------------------------|
| Professional Technician/Shop Owner | 21 | 10 |
| No Mentor/Non-Professional Technician | 7 | 24 |

Chapter V: Discussion, Conclusion and Recommendation

The purpose of this study was to identify factors that encourage or discourage the enrollment of high school student graduates in Nicolet College's Automotive Technology program. More specifically, it examined high school students' perceptions about automotive repair and how experience and knowledge of servicing vehicles influences students' future career decisions, whether student conceptions of being an automotive technician are accurate or inaccurate, and if mentors influenced students to pursue a career in automotive repair. More specifically, the study sought to address the following research questions:

1. Does the amount of automotive repair knowledge that students have make them more or less likely to enroll in the Nicolet College Automotive Technology program?
2. Are high school students with skills to perform common vehicle repairs more or less likely to enroll in the Nicolet College Automotive Technology program?
3. Do high school students have accurate or inaccurate conceptions of servicing automobiles and does that make them more or less likely to enroll in the Nicolet College Automotive Technology program?
4. Do mentors make high school students more or less likely to enroll in the Nicolet College Automotive Technology program?

The research design for this study was descriptive and a survey methodology was used to gather the data needed to address the research questions. The independent variables were automotive knowledge, automotive experience, conceptions of automotive repair, and mentoring. The dependent variables in this study were students' enrollment at Nicolet College, students' career choice, and the career opportunities of an automotive technician.

The subjects in this study were 62 high school students enrolled in automotive technology courses at Rhinelander, Tomahawk, Northland Pines, and Crandon high schools during the fall semester of 2017. Students were given a questionnaire that was divided into six sections. They addressed knowledge of basic automotive servicing, experience performing basic automotive servicing, experience with mentors in the context of automotive servicing, conceptions of automotive servicing working conditions, future plans relative to further education and employment in automotive servicing, and basic demographics and prior coursework. The instrument was reviewed by the secondary automotive teachers participating in the study and all the items were judged to be appropriate for high school students in terms of content and readability. The data collected was analyzed using descriptive statistics, and, when appropriate, a Fisher Exact test was used to determine relationships between variables.

Discussion

The automotive programs offered at Nicolet College are guided by an advisory board that consists of area automotive business leaders and automotive technicians from the region being served. The advisory board has consistently reported a need for well-rounded graduates who have the technical skills needed to service modern automobiles along with the soft skills needed to interact with coworkers and customers. Therefore, the curriculum has been configured to prepare automotive technicians with both skill sets.

The National Institute for Automotive Service Excellence (2018b) states that its mission is to improve the quality of automotive service by testing and certifying automotive technicians, shop owners, and automotive instructors. When automotive professionals pass the required tests, it is assumed that the person does possess expertise and knowledge in automotive repair. The test questions are written very carefully to evaluate the knowledge of a professional automotive

technician. The sample test questions used in this study were selected to evaluate the level of knowledge that high school automotive students should possess relative to basic automobile maintenance. The knowledge test had a mean score of 58%. Many students scored well, while others scored very poorly. The results of the study suggest most of the students that scored low on the knowledge test are not considering further education or a career in automotive servicing. These students may be taking automotive classes to obtain credits for graduation and may not even have an interest in repairing vehicles. A few students that demonstrated minimal automotive repair knowledge are considering further education. These students may have a passion for automobiles, but have limited access to the vehicles, tools, and mentoring needed to develop their knowledge. Students that scored at/or above the mean were equally split relative to pursuing further education. More specifically, approximately half the students with knowledge at/or above the mean were considering further education in automotive repair but not ready to commit to a career in automotive repair. Students with higher levels of automotive knowledge were more likely to consider further automotive education than students with lower levels of automotive knowledge.

A list of common repairs that are performed on a daily basis by automotive technicians were presented to the students enrolled in high school automotive courses. The tasks in question were general maintenance items that are considered lower level skills that automotive students need to master before moving on to more complicated repairs. The students reported the highest levels of confidence in the areas of changing oil and filter, inspecting/adjusting tire pressure, and inspecting brake pads. They reported lower levels of confidence for many of the remaining repair tasks (e.g., changing/checking automatic transmission fluid, flushing cooling systems, changing fuel filters). Most of the students reporting skills also indicated that they performed the task more

than once and on multiple vehicles. This aligns with Savickas (2005), who says that developing knowledge and expertise reinforces self-efficacy, which makes them believe they can have future success. Success could be viewed by students pursuing automotive repair as a hobby as being able to perform the basic maintenance procedures on their own vehicles. The study did not render any evidence that students with repair skills were more inclined to pursue further automotive education than those without repair skills. The amount of automotive repair skill that high school students possessed was not a significant factor in determining whether they pursue further automotive education or not.

Working as an automotive technician can be a difficult and demanding occupation. The United States Department of Labor, Bureau of Labor Statistics (2015d) clearly outlines the working conditions associated with being an automotive technician. They included earning a modest average yearly income, working in uncomfortable positions, working with greasy parts and tools, standing for most of the day, purchasing your own tools, and dealing with high rates of injury or illness. All of these could be viewed negatively by a student. The majority of students demonstrated accurate conceptions of the working conditions of most automotive technicians. However, 63% did not recognize that automotive technicians have one of the highest injury and illness rates of all occupations. The results of this study suggested the students that did not know automotive technicians have high injury and illness rates were more likely to consider further automotive education and pursue a career in automotive repair than those that were aware of this statistic. Overall, the data suggests students with accurate conceptions of the work performed by automotive technicians were less likely to consider further automotive education and less likely to enroll in the Nicolet College Automotive Technology program.

Many repair shops have experienced technicians that are assigned to work with and mentor students who are working in entry level positions. Because of the difficulty finding skilled automotive technicians, repair shops are investing time and resources in training young people to be productive employees who recognize the long-term benefits of working for their company as aspiring automotive technicians. This investment in human capital can include tuition reimbursement and tools for those going to school. This aligns with a study by Manchester (2010), that found tuition reimbursement and financial help reduce employee turnover and help businesses retain long-term employees. The findings of this study suggest professional mentors such as shop owners or seasoned automotive technicians have greater influence on students relative to considering a career in automotive repair than non-professional mentors such as friends and family. A vast majority of respondents indicated that a mentor professionally engaged in the profession introduced them to automotive repair, increased their skills and knowledge, made them feel like they could service automobiles as a career, and helped them develop accurate conceptions of the occupation. Furthermore, students reported their professional mentors recommended further automotive education. The results of the study indicated students with professional mentors who influence them to consider further automotive training were more likely to report an inclination to enroll in the Nicolet College Automotive Technology program.

The findings of this study suggest a significant number of high school students are interested in automotive technology under the auspice of a hobby in contrast to a career. Furthermore, they are inclined to pursue further education in automotive technology from an avocational perspective in contrast to career preparation. Consequently, those students have more of an informal-versus-formal orientation towards the study of automotive technology. Thus,

efforts to recruit high school students to make a commitment to a two-year degree program that leads to industry recognized credentials as certified automotive technicians might be premature given their status in the career development process. More specifically, their participation in automotive courses at the secondary level is more exploratory and avocational than formal career preparation. The findings that many students indicated they are interested in automotive repair as a hobby and would consider further automotive education suggest the automotive program at Nicolet College should support avocational interests in automotive technology by offering weekend workshops for high schools students on car detailing and basic vehicle care, sponsoring an annual car show, and utilizing a vehicle that is attractive to hobbyists, such as a vintage muscle car, to conduct demonstrations and labs at high schools.

Conclusions

Based on the findings of this study, the following conclusions were made:

1. Automotive repair knowledge has an impact on students' future considerations for further automotive education. The development of knowledge supports a desire to develop more knowledge in the interest of pursuing avocational as well as vocational pathways.
2. Automotive repair skill does not make students more or less likely to enroll in the Nicolet College Automotive Technology program. No evidence was found to suggest the development of skills in automotive servicing leads to pursuing further education in automotive technology. Skill development could also lead to the fulfillment under the auspices of doing-it-yourself (DIY).
3. A majority of students do have accurate conceptions of the automotive repair industry and understand that being an automotive technician and working on vehicles is a

difficult occupation. Understanding the nature of the work does make students less likely to pursue a career in automotive repair, which also makes them less likely to enroll in the Nicolet College Automotive Technology program. To overcome the shortcomings of the profession and to gain a passion for automobiles, students need to be introduced to automotive repair under the auspices of an adolescent hobby rather than a career for adulthood.

4. Mentors have an impact on students' future considerations for automotive education and employment. Professional mentors are more likely to influence students than non-professional mentors to consider further automotive education. Initially, students with an avocational interest in automobiles should be connected with accomplished car enthusiasts who are willing to share their knowledge, interest, and passion. Students who want to learn more about automotive servicing can then be connected with professional mentors within the profession. Nicolet College needs to facilitate connections between accomplished hobbyists, automotive technicians, and aspiring automotive students.

Recommendations

Based on the findings and conclusion of this study, the following recommendations have been made:

1. Provide support in the form of professional development that leads to ASE certification for area high school automotive instructors. The knowledge gained through ASE certification will improve their automotive programs and allow them to become more effective as professional mentors.

2. Focus on the skills that support high school students' avocational interests in automotive repair such as detailing and cosmetic improvements, adding accessories, and performing basic maintenance procedures by holding workshops at high schools or holding weekend or evening workshops at Nicolet College.
3. Nicolet College should consider a new approach to the recruitment of high school students. Instead of relying on a direct approach that emphasizes a career in automotive servicing based on the demand for highly skilled technicians, a more indirect approach that supports and nurtures students' avocational interests might be more age and developmentally appropriate (e.g., cleaning and detailing, polishing paint, adding accessories, performing basic maintenance).
4. Nicolet College should become a facilitator for connecting accomplished hobbyists with high school students that are interested in automotive technology. This could be accomplished by holding an annual car show with local car enthusiast clubs. High school students would be able to connect with potential mentors and gain developmentally appropriate skills that will increase their passion for automobiles and possibly influence them to consider automotive repair as a career in the future.

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Appendix A: High School Student Survey

The following survey will ask you questions about your automotive knowledge, automotive repair skill, conceptions of automotive repair, and mentoring in automotive repair. Answers will remain anonymous – do not sign your name on this survey. Participation in this survey is voluntary – you do not have to take this survey. However, participating in this survey will be highly appreciated.

Directions: The following are ASE exam type questions about automotive knowledge. Please circle the answer that you feel is correct.

1. The main function of motor oil is to reduce _____ between moving parts of the engine.
 - A. Friction
 - B. Movement
 - C. Viscosity
 - D. Cooling

2. Two technicians are discussing 5W-30 motor oil. Tech A says the W stands for ‘weight.’ Technician B says the W stands “winter.” Which technician is correct?
 - A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician

3. The liquid used for the cooling systems for freeze and boiling protection is known as:
 - A. Coolant
 - B. Gear oil
 - C. Motor oil
 - D. Water

4. A compression test is performed on a 4 cylinder engine with the following results

| | | | |
|---------|---------|---------|---------|
| Cyl # 1 | Cyl # 2 | Cyl # 3 | Cyl # 4 |
| 140 psi | 135 psi | 130 psi | 95 psi |

Technician A says cylinder 4 has lower than normal compression. Technician B says that all readings are within 20% of each other and are OK. Which technician is correct?

- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
5. Two technicians are discussing brake fluid. Technician A says that air trapped within a brake line will compress, causing a spongy brake pedal, which will require the brakes to be bled. Technician B says that Dot 4 brake fluid readily absorbs moisture out of the atmosphere, requiring the fluid to be flushed/bled periodically to prevent corrosion. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
6. Technician A says that a vehicle's main fuel filter is usually located in the pressure line between the fuel pump and fuel rail. Technician B says that a vehicles main fuel filter is usually located in the return line between the fuel pump and fuel rail. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician

7. A trouble light is placed behind an air filter and light cannot be seen through the paper element. Technician A says that the air filter is clogged with dirt and needs replacement. Technician B says the air filter is fine and can be reinstalled. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
8. Two technicians are discussing uneven disc brake pad wear. Technician A says that one brake pad worn more than the other could be caused by a frozen caliper piston. Technician B says that one disc brake pad worn more than the other could be caused by frozen caliper slides. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
9. Two technicians are discussing tire pressure. Technician A says tire pressure must be set when tire is cold. Technician B says that tire pressure must be set when the tire is hot. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
10. Two technicians are discussing how to check automatic transmission fluid. Technician A says that the transmission must be cold and in park to check fluid level. Technician B says that the transmission must be hot and in park to check the fluid level. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician

11. Technician A says that the battery's cold cranking amperage (CCA) needs to be entered into the battery tester before performing a battery load test. Technician B says that each individual battery cell should produce 2.1 volts for a total battery voltage of 12.6 volts. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician
12. Two technicians are discussing a tire that is worn more in the center of the tread. Technician A says the tire has under-inflation wear. Technician B says that the tire has over-inflation wear. Which technician is correct?
- A. Technician A
 - B. Technician B
 - C. Both Technician A and B
 - D. Neither technician

Directions: Below are common maintenance procedures. In the first line, please indicate how confident you would be performing the task by circling the letter best representing your confidence level. In the second line please circle the letter indicating how many times you have performed the task. In the third line please circle the letter indicating how many different vehicle makes or models you have performed the task on.

13. Change oil and filter and check level

A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

14. Change automatic transmission fluid/filter and check level

A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

15. Flush cooling system

A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

16. Change fuel filter

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

17. Inspect tires and adjust tire pressure

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

18. Replace air filter and/or pollen filter

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

19. Inspect brake pads for uneven wear

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

20. Load-test batteries

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

21. Perform compression test

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

22. Bleed brakes/add brake fluid

- A. Very confident B. Confident C. Somewhat confident D. Not confident
 A. 0 times B. 1 time C. 2-3 times D. 4 or more times
 A. 0 make/model B. 1 make/model C. 2-3 makes/models D. 4 or more makes/models

Directions: Please indicate the extent to which you agree with the following conceptions of automotive repair by circling either strongly agree, agree, disagree, or strongly disagree.

23. Automotive technicians work in well ventilated and well lighted shops.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree

24. Automotive technicians fix problems with computers.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
25. Automotive technicians work with greasy parts and tools.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
26. Automotive technicians work in uncomfortable positions.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
27. Automotive technicians earn a median wage of \$38,470.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
28. Automotive technicians must purchase and maintain their own tools.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
29. Automotive technicians have one of the highest injury and illness rates of all occupations.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
30. Automotive technicians stand for most of the day.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
31. Automotive technicians typically work overtime and weekends.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
32. Automotive technicians have completed post-secondary training.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
33. Automotive technicians are required to become certified.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree
34. Automotive technicians often work on commission.
A. Strongly agree B. Agree C. Disagree D. Strongly disagree

Directions: Please circle more than one selection if needed.

35. Identify all role models or mentors who you have worked with or have inspired you to continue gaining knowledge and experience in automotive repair.

- | | |
|-------------------|---------------------------------------|
| A. Parent | G. Professional automotive technician |
| B. Grandparent | H. Shop owner |
| C. Brother/Sister | I. Teacher |
| D. Aunt/Uncle | J. T.V. personality/show |
| E. Neighbor | K. No mentor/role model |
| F. Friend | L. Other, please describe _____ |

Directions: Please indicate the extent to which you agree with the following statements on mentoring for automotive repair by circling any of the following: strongly agree, agree, disagree, strongly disagree, or NA for not applicable.

36. I feel working with a mentor introduced me to automotive repair.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

37. I feel working with a mentor increased my knowledge and skills in automotive repair.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

38. I feel working with a mentor made me feel like I can successfully service vehicles as a career.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

39. I feel working with a mentor gave me an accurate conception of automotive repair and what it is like to be an automotive technician.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

40. My mentor recommended me to continue my education in automotive repair.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

41. I did not work with or have any mentors to gain automotive knowledge and skills from.

- A. Strongly agree B. Agree C. Disagree D. Strongly disagree E. N/A

Appendix B: Automotive Knowledge Exam Results

The main function of motor oil is to reduce _____ between moving parts of the engine.

A. **Friction 62 (98%)** B. Movement 0 (0%) C. Viscosity 1 (2%) D. Cooling 0 (0%)

Two technicians are discussing 5W-30 motor oil. Tech A says the W stands for ‘weight.’

Technician B says the W stands “winter.” Which technician is correct?

A. Tech A 28 (44%) B. **Tech B 26 (41%)** C. Both Techs 3 (4%) D. Neither Tech 6 (10%)

The liquid used for the cooling systems for freeze and boiling protection is known as:

A. **Coolant 57 (90%)** B. Gear oil 1 (2%) C. Motor oil 3 (5%) D. Water 2 (3%)

A compression test is performed on a 4 cylinder engine with the following results: Technician A says cylinder 4 has lower than normal compression. Technician B says that all readings are within 20% of each other and are OK. Which technician is correct?

A. **Tech A 45 (71%)** B. Tech B 9 (14%) C. Both Techs 8 (13%) D. Neither Techs 1 (2%)

Two technicians are discussing brake fluid. Technician A says that air trapped within a brake line will compress, causing a spongy brake pedal, which will require the brakes to be bled.

Technician B says that Dot 4 brake fluid readily absorbs moisture out of the atmosphere, requiring the fluid to be flushed/bled periodically to prevent corrosion. Which technician is correct?

A. Tech A 33 (53%) B. Tech B 7 (11%) C. **Both Techs 21 (33%)** D. Neither Techs 2 (3%)

Technician A says that a vehicle’s main fuel filter is usually located in the pressure line between the fuel pump and fuel rail. Technician B says that a vehicles main fuel filter is usually located in the return line between the fuel pump and fuel rail. Which technician is correct?

A. **Tech A 34 (54%)** B. Tech B 20 (32%) C. Both Techs 6 (10%) D. Neither Techs 3 (5%)

A trouble light is placed behind an air filter and light cannot be seen through the paper element. Technician A says that the air filter is clogged with dirt and needs replacement. Technician B says the air filter is fine and can be reinstalled. Which technician is correct?

A. **Tech A 37 (59%)** B. Tech B 11 (17%) C. Both Techs 6 (10%) D. Neither Techs 9 (14%)

Two technicians are discussing uneven disc brake pad wear. Technician A says that one brake pad worn more than the other could be caused by a frozen caliper piston. Technician B says that one disc brake pad worn more than the other could be caused by frozen caliper slides. Which technician is correct?

A. Tech A 13 (20%) B. Tech B 19 (30%) C. **Both Techs 25 (40%)** D. Neither Techs 6 (10%)

Two technicians are discussing tire pressure. Technician A says tire pressure must be set when tire is cold. Technician B says that tire pressure must be set when the tire is hot. Which technician is correct?

A. **Tech A 25 (40%)** B. Tech B 16 (25%) C. Both Techs 10 (16%) D. Neither Techs 12 (19%)

Two technicians are discussing how to check automatic transmission fluid. Technician A says that the transmission must be cold and in park to check fluid level. Technician B says that the transmission must be hot and in park to check the fluid level. Which technician is correct?

A. Tech A 19 (30%) B. **Tech B 33 (52%)** C. Both Techs 5 (8%) D. Neither Techs 6 (10%)

Technician A says that the battery's cold cranking amperage (CCA) needs to be entered into the battery tester before performing a battery load test. Technician B says that each individual battery cell should produce 2.1 volts for a total battery voltage of 12.6 volts. Which technician is correct?

A. Tech A 11 (17%) B. Tech B 28 (45%) C. **Both Techs 20 (32%)** D. Neither Techs 4 (6%)

Two technicians are discussing a tire that is worn more in the center of the tread. Technician A says the tire has under-inflation wear. Technician B says that the tire has over-inflation wear. Which technician is correct?

A. Tech A 10 (15%) B. **Tech B 44 (70%)** C. Both Techs 3 (5%) D. Neither Techs 6 (10%)

Appendix C: Automotive Repair Skill Results

Change oil and filter and check level

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 31 (50%) | 19 (30%) | 9 (15%) | 3 (5%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 4 (7%) | 8 (14%) | 17 (28%) | 32 (53%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 4 (7%) | 15 (25%) | 26 (43%) | 15 (25%) |

Change automatic transmission fluid/filter and check level

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 6 (10%) | 12 (19%) | 23 (37%) | 21 (34%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 24 (41%) | 18 (31%) | 15 (26%) | 5 (9%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 23 (40%) | 18 (31%) | 14 (25%) | 4 (7%) |

Flush cooling system

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 8 (13%) | 7 (12%) | 14 (23%) | 31 (52%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 33 (55%) | 9 (15%) | 13 (22%) | 5 (8%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 33 (55%) | 13 (22%) | 9 (15%) | 5 (8%) |

Change fuel filter

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 12 (19%) | 9 (15%) | 19 (31%) | 22 (35%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 25 (42%) | 16 (27%) | 12 (20%) | 6 (10%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 25 (42%) | 18 (31%) | 9 (15%) | 7 (12%) |

Inspect tires and adjust tire pressure

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 44 (75%) | 8 (13%) | 7 (11%) | 3 (5%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 3 (5%) | 7 (12%) | 6 (10%) | 43 (73%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 4 (7%) | 7 (12%) | 13 (22%) | 35 (59%) |

Replace air filter and/or pollen filter

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 27 (44%) | 10 (16%) | 13 (21%) | 12 (19%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 16 (27%) | 7 (12%) | 19 (32%) | 17 (29%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 14 (24%) | 13 (22%) | 19 (32%) | 13 (22%) |

Inspect brake pads for uneven wear

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 18 (29%) | 22 (35%) | 13 (21%) | 9 (15%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 8 (14%) | 8 (14%) | 28 (48%) | 14 (24%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 8 (14%) | 17 (29%) | 25 (43%) | 8 (14%) |

Load-test batteries

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 10 (16%) | 16 (26%) | 19 (31%) | 17 (27%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 19 (32%) | 16 (27%) | 16 (27%) | 8 (14%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 19 (32%) | 22 (37%) | 13 (22%) | 5 (9%) |

Perform compression test

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 13 (23%) | 9 (16%) | 13 (22%) | 22 (39%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 22 (37%) | 14 (24%) | 15 (25%) | 8 (14%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 22 (37%) | 19 (31%) | 13 (21%) | 7 (11%) |

Bleed brakes/add brake fluid

| Very confident | Confident | Somewhat confident | Not confident |
|----------------|--------------|--------------------|------------------------|
| 22 (35%) | 10 (16%) | 11 (18%) | 19 (31%) |
| 0 times | 1 time | 2-3 times | 4 or more times |
| 14 (23%) | 11 (19%) | 14 (23%) | 21 (35%) |
| 0 make/model | 1 make/model | 2-3 makes/models | 4 or more makes/models |
| 15 (25%) | 15 (25%) | 18 (31%) | 11 (19%) |

Appendix D: Conceptions of Servicing Automobiles Results

| | | | |
|---|----------|----------|-------------------|
| Automotive technicians work in well ventilated and well lighted shops. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 26 (42%) | 33 (53%) | 3 (5%) | 0 (0%) |
| Automotive technicians fix problems with computers. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 11 (18%) | 38 (61%) | 10 (16%) | 3 (5%) |
| Automotive technicians work with greasy parts and tools. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 27 (44%) | 31 (50%) | 2 (3%) | 2 (3%) |
| Automotive technicians work in uncomfortable positions. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 21 (34%) | 35 (56%) | 5 (8%) | 1 (2%) |
| Automotive technicians earn a median wage of \$38,470. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 7 (11%) | 45 (72%) | 9 (15%) | 1 (2%) |
| Automotive technicians must purchase and maintain their own tools. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 14 (23%) | 32 (52%) | 14 (23%) | 2 (3%) |
| Automotive technicians have one of the highest injury and illness rates of all occupations. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 2 (3%) | 18 (29%) | 39 (63%) | 3 (5%) |
| Automotive technicians stand for most of the day. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 11 (18%) | 27 (45%) | 21 (34%) | 2 (3%) |
| Automotive technicians typically work overtime and weekends. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 6 (10%) | 34 (55%) | 21 (34%) | 1 (2%) |
| Automotive technicians have completed post-secondary training. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 7 (11%) | 46 (74%) | 8 (13%) | 1 (2%) |
| Automotive technicians are required to become certified. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 23 (37%) | 32 (52%) | 7 (11%) | 0 (0%) |
| Automotive technicians often work on commission. | | | |
| Strongly Agree | Agree | Disagree | Strongly Disagree |
| 5 (8%) | 38 (65%) | 14 (24%) | 2 (3%) |

Appendix E: Mentoring Automotive Students Results

I feel working with a mentor introduced me to automotive repair.

| | | | | |
|----------------|----------|----------|-------------------|--------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 17 (28%) | 38 (62%) | 1 (2%) | 1 (2%) | 4 (6%) |

I feel working with a mentor increased my knowledge and skills in automotive repair.

| | | | | |
|----------------|----------|----------|-------------------|--------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 29 (48%) | 27 (44%) | 2 (3%) | 1 (2%) | 2 (3%) |

I feel working with a mentor made me feel like I can successfully service vehicles as a career.

| | | | | |
|----------------|----------|----------|-------------------|--------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 19 (31%) | 27 (44%) | 9 (15%) | 1 (2%) | 5 (8%) |

I feel working with a mentor gave me an accurate conception of automotive repair and what it is like to be an automotive technician.

| | | | | |
|----------------|----------|----------|-------------------|--------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 17 (28%) | 32 (52%) | 9 (15%) | 0 (0%) | 0 (0%) |

My mentor recommended me to continue my education in automotive repair.

| | | | | |
|----------------|----------|----------|-------------------|----------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 16 (26%) | 22 (36%) | 10 (16%) | 3 (6%) | 10 (16%) |

I did not work with or have any mentors to gain automotive knowledge and skills from.

| | | | | |
|----------------|----------|----------|-------------------|----------|
| Strongly Agree | Agree | Disagree | Strongly Disagree | N/A |
| 2 (3%) | 13 (21%) | 15 (25%) | 15 (25%) | 14 (23%) |